Managing Common Infections in Outpatients
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Disclosures
The planners and presenter of this presentation have disclosed no conflict of interest, including no relevant financial relationships with any commercial interests pertaining to this topic.

Goals for Today
Plan for today

Learning Objectives
1. Explain how healthcare members best collaborate within pharmacist prescribing in the outpatient setting
2. Evaluate a patient presenting with symptoms of Group A Streptococcus, influenza, pinworms, and onychomycosis for outpatient treatment or referral
3. Select appropriate therapy for Group A Streptococcus, influenza, pinworms, and onychomycosis

Protocol-based prescribing
- Educated pharmacist
- Patient-prescriber relationship and obtain patient information
- Conditions that:
  - Do not require new diagnosis
  - Minor and generally self-limiting
  - Have CLIA waived test for diagnosis
  - Threaten health/safety of patient should Rx not be immediately dispensed
- Protocol with inclusion, exclusion, referral criteria
- PCP notified within 5 business days
- Documentation maintained

Group A Strep
### Group A Streptococcus

**Centor Criteria**

- **Absence of cough:** 1 point
- **Swollen, tender anterior cervical nodes:** 1 point
- **Temperature >100.4°F (38°C):** 1 point
- **Tonsillar exudates or swelling:** 1 point

**Shulman ST, Bisno AL, Clegg HW, et al. Clinical Practice Guideline for the Diagnosis and Management of Group A Streptococcal Pharyngitis: 2012 Update by the Infectious Diseases Society of America.**


**Rapid Strep Test**

- **Sensitivity:** 86%
- **Specificity:** 95%

**Cohen JF, Bertille N, Cohen R, Chalumeau M. Rapid antigen detection test for group A streptococcus in children with pharyngitis.**

**Cochrane Database of Systematic Reviews 2016, Issue 7. Art. No.: CD010502. DOI: 10.1002/14651858.CD010502.pub2

### Treatment

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin VK</td>
<td>250mg PO QID</td>
<td>10 days</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>50mg/kg PO daily (max 1000mg)</td>
<td>10 days</td>
</tr>
<tr>
<td>Penicillin G</td>
<td>&lt;60 lbs: 600,000 units IM</td>
<td>Single dose</td>
</tr>
<tr>
<td></td>
<td>&gt;60 lbs: 1,200,000 units IM</td>
<td></td>
</tr>
<tr>
<td>Penicillin Allergy Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cephalaxin</td>
<td>20mg/kg PO BID (max 500mg per dose)</td>
<td>10 days</td>
</tr>
<tr>
<td>Cefadroxil</td>
<td>30mg/kg PO daily (max 1000mg)</td>
<td>10 days</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>7mg/kg/dose PO TID (max 300mg per dose)</td>
<td>10 days</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>12mg/kg PO daily (max 500mg)</td>
<td>5 days</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>7.5mg/kg/dose PO BID (max 250mg/dose)</td>
<td>10 days</td>
</tr>
</tbody>
</table>

**IDBOP Protocol**

**Inclusion:** Symptomatic, Age 6-45, Centor 2+, positive CLIA-waived test

**Exclusion:**

- Axth therapy within previous 30 days
- Pregnant or breastfeeding (patient report)
- Immunocompromised (patient report)
- Patients with one or more of the following:
  - Systolic hypotension <100 mgHg
  - Tachypnea >25 breaths/min (>20 breaths per minute for patients <18 years)
  - Tachycardia >100 beats/min (>119 beats/min for patients <18 years)
  - Oxygenation <90% via pulse oximetry
  - Body temperature >103°F (>102°F for patients <18 years)
  - History of renal dysfunction
Case 1

Ginny Weasley, a 27-year-old female, presents to the pharmacy with complaints of a sore throat that has lasted 3 days and chills. She reports that she can’t swallow anything because her throat is swollen. She denies any congestion, cough, or fever. On examination, she has bilateral tonsillar erythema and exudate. Her anterior cervical lymph nodes are tender. She is not pregnant, breastfeeding, or immunocompromised and is generally healthy. Her last antibiotic therapy was for a UTI 7 months ago.

Ginny’s vitals

- BP: 106/78
- Pulse: 87
- RR: 14
- Temp: 101.1
- PulseOx: 96%

Does Ginny need to be referred today?

What would you recommend for Ginny?
**Influenza**

**Signs and Symptoms**

<table>
<thead>
<tr>
<th></th>
<th>Cold</th>
<th>Influenza</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Gradual</td>
<td>Abrupt</td>
</tr>
<tr>
<td>Fever</td>
<td>Rare</td>
<td>Usual</td>
</tr>
<tr>
<td>Aches</td>
<td>Slight</td>
<td>Usual</td>
</tr>
<tr>
<td>Chills</td>
<td>Uncommon</td>
<td>Common</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Sometimes</td>
<td>Usual</td>
</tr>
<tr>
<td>Sneezing</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Cough/Chest Discomfort</td>
<td>Mild to moderate</td>
<td>Common</td>
</tr>
<tr>
<td>Congestion</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Sore throat</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Headache</td>
<td>Rare</td>
<td>Common</td>
</tr>
</tbody>
</table>

**Rapid Influenza Diagnostic Test**

- Sensitivity: 40-70%
- Specificity: 90-95%

**Who gets tested?**

**Treatment**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oseltamivir</td>
<td>75mg PO BID</td>
<td>5 days</td>
</tr>
<tr>
<td>Pediatric: Weight-based</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zanamivir</td>
<td>2 puffs (10mg) PO BID</td>
<td>5 days</td>
</tr>
<tr>
<td>(7 and older)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baloxavir</td>
<td>40mg (40-80kg) or 80kg (at least 80kg)</td>
<td>Single dose</td>
</tr>
<tr>
<td>(12 and older)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peramivir</td>
<td>13+: 600mg 2-12: 12mg/kg Renally dosed</td>
<td>Single dose</td>
</tr>
<tr>
<td>(IV only)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Protocol Review**

Why is each factor present?
Case 2

Newt Scamander, a 42-year-old male, presents to the pharmacy for a flu test. He reports being around a friend with the flu last week. He states he woke up today and “felt like he had been hit by a truck” but felt fine yesterday. He complains of chills, fever, and emesis. Newt reports that he is generally healthy (no immunocompromise), and has never taken an antiviral.

Newt’s vitals

- BP: 102/66
- Pulse: 88
- RR: 13
- PulseOx: 96%
- Temp: 102

Case 2

- With a partner, please review the protocol and determine if Newt qualifies for screening or if he needs to be referred.

What would you recommend for Newt?

Flu questions?

Pinworms
**Pinworms**

- Transmission: fecal-oral route
- Risk Factors:
  - 4–11 years of age
  - Anus-finger-mouth contact
  - Nail-biting
  - Unsupervised body hygiene
  - Poor compliance with basic hand hygiene

**Symptoms**

- Cardinal symptom: (Intermittent) peri-anal pruritis
- Can also visualize moving worm-like parasites on underwear, bed sheets, or directly on anal verge
- A worm identified macroscopically constitutes evidence of infection
- [https://www.youtube.com/watch?v=3nCLdLXkZNU](https://www.youtube.com/watch?v=3nCLdLXkZNU)

**Diagnosis**

- View adult worms:
  - Look near anus 2-3 hours after infected person is asleep
- View adult worms or eggs:
  - Tape test
  - Touch anus with clear tape first thing in the morning to possibly collect eggs (visible under a microscope); collect on 3 consecutive mornings then bring 3 samples to clinician
- Fingernail samples

**No protocol**
Differential

- Other signs and symptoms presenting with peri-anal itching
  - Hemorrhoids
  - Sexually transmitted infections
  - Yeast infections
  - Skin conditions (psoriasis, contact dermatitis)
  - Allergic reaction (e.g. irritant)
  - Anal tumors
  - Thyroid disease

Treatment

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mebendazole</td>
<td>100mg PO</td>
<td>Single dose; repeat in 2 weeks</td>
</tr>
<tr>
<td>Albendazole</td>
<td>≤2 years: 200mg PO as a single dose; may repeat in 3 weeks &gt;2 years: 400mg PO</td>
<td></td>
</tr>
<tr>
<td>Pyrantel Pamoate</td>
<td>11 mg/kg PO (max 1 g/dose) <em>alternative fixed-weight dosing available</em></td>
<td></td>
</tr>
</tbody>
</table>

Case 3

Ginny Potter comes into your pharmacy with her son Albus Severus Potter, a 40-lb, 4-year-old male. She states that he has been itching his behind for 3 days and she is concerned he may have pinworms. Albus recently noted ‘curling white threads’ on toilet paper after pooping but Ginny did not see them herself.

She read online to do a tape test at night. She explains exactly what she did (sounds appropriate) and that there were “little white worm-looking things” (1/2 long) on the tape when she examined it. She asks for your recommendation on what to give her son.

Pinworms Questions?

Onychomycosis
Onychomycosis

- May begin as athlete’s foot
- Extension to nail bed makes increased difficulty to eradicate
- Most common cause: dermatophytes
- 10%: yeast and nondermatophytes
- 30% Candida

Risk Factors

- Age
- Male sex
- Nail trauma
- Immunosuppression
- Diabetes mellitus
- Peripheral vascular insufficiency
- Wearing tight shoes
- Communal locker rooms

Presentation

Differential

Infections

<table>
<thead>
<tr>
<th>Condition</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic paronychia</td>
<td>Chronic inflammation of the proximal paronychium; cross-striations of the nail; Streptococcus, Staphylococcus, or Candida found on smear and culture; common in children</td>
</tr>
<tr>
<td>Viral warts</td>
<td>Localized in nail folds and subungual tissue; longitudinal depressed grooves in the nail plate</td>
</tr>
</tbody>
</table>

Skin Disorders

<table>
<thead>
<tr>
<th>Condition</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic dermatitis</td>
<td>Subungual dermatitis, hyperkeratosis, Beau lines, and pitting; thickened nail with corrugated surface</td>
</tr>
<tr>
<td>Psoriasis</td>
<td>Nail pitting, splinter hemorrhages, “oil staining,” yellow-gray or silvery white nails</td>
</tr>
<tr>
<td>Lichen planus</td>
<td>Longitudinal grooves and fissures; usually affects fingernails</td>
</tr>
<tr>
<td>Twenty-nail dystrophy</td>
<td>Dystrophy of all 20 nails; usually resolves in childhood; associated with the lesions of lichen planus</td>
</tr>
</tbody>
</table>
Trauma

<table>
<thead>
<tr>
<th>Condition</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footwear</td>
<td>Onycholysis, ingrown toenails, subungual keratosis, nail plate discoloration and irregularities; caused by friction against the shoe</td>
</tr>
<tr>
<td>Manipulation (e.g., manicures, pedicures, rubbing)</td>
<td>Horizontal parallel nail plate grooves, inflammation from <em>Staphylococcus aureus</em> or <em>Pseudomonas</em> infection</td>
</tr>
</tbody>
</table>

Tumors

<table>
<thead>
<tr>
<th>Condition</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowen disease</td>
<td>Squamous cell carcinoma; bleeding, pain, nail deformity, and nail discoloration</td>
</tr>
<tr>
<td>Fibroma</td>
<td>Oval or spherical, white or yellow nodule; causes tunnel-like melanonychia; fibrous dermatofibroma or periangual fibroma</td>
</tr>
<tr>
<td>Melanoma</td>
<td>Brown-yellow nail with dark pigment extending into the periungual skin folds; poor prognosis</td>
</tr>
</tbody>
</table>

Diagnosis

- Physical exam: discoloration, deformed, hypertrophic, hyperkeratotic, subungual debris
- Medical history/risk factors: diabetes, hypothyroidism, psoriasis, current medications
- Lab test and culture

Clean area with 70% isopropyl alcohol and obtain several samples of nail clippings and subungual debris

Office microscopy using KOH or KOH/dimethyl sulfoxide, or laboratory microscopy using KOH or KOH/calcofluor white stain

Obtain culture and/or histologic evaluations with periodic acid–Schiff staining

Consider other nail disorders

Begin treatment

Obtain culture and/or histologic evaluations with periodic acid–Schiff staining
<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciclopirox 8% solution</td>
<td>Apply to adjacent skin</td>
<td>Local 1 year</td>
</tr>
<tr>
<td>Efnaconazole 10% solution</td>
<td>Apply to affected toenail(s) daily</td>
<td>48 weeks</td>
</tr>
<tr>
<td>Terbinafine 5% solution</td>
<td>250mg PO daily</td>
<td>Systemic</td>
</tr>
<tr>
<td>Itraconazole (capsule)</td>
<td>Fingernail: 200mg BID</td>
<td>For 1 week; repeat 1-week course after 3-week off-time</td>
</tr>
<tr>
<td></td>
<td>Toenails due to Trichophyton rubrum or T. mentagrophytes: 200mg PO daily</td>
<td>For 12 consecutive weeks</td>
</tr>
<tr>
<td></td>
<td>Toenails with or without fingernail involvement: 200mg PO daily</td>
<td></td>
</tr>
</tbody>
</table>

Case 4

Vernon Dursley, a 60-year-old male with a history of type 2 diabetes, comes to your pharmacy and asks what he should do for his toes. It doesn’t hurt, but he is worried about how it looks.

You notice the nail discoloration and splitting. You hypothesize that Vernon has onychomycosis.

Case 4

What do you recommend for Vernon?

Onychomycosis Questions?

Case 5

- Draco Malfoy is a 32-year-old who presents to the pharmacy with complaints of peri-anal itching. He has had pinworms in the past and is concerned he has them again. He is generally healthy, works as a lawyer, has one 7-year-old daughter, and has NKDA.
  - What is your initial thought process?
  - What questions do you want to ask Draco to assess his likelihood of pinworm infection?
  - Would the situation be different if his daughter had similar complaints?
Case 5, modified

- Draco and his 7-year-old daughter Helga have similar symptoms (perianal itching that is worst at night).
- What questions do you want to ask Draco and Helga?
- If no worms have been visualized, what action should the pharmacist take?

Case 6

- Horace Slughorn is a 67-year-old male presenting with complaints of sudden onset of fever, myalgia, arthralgia, and sore throat. He is generally healthy, takes no medications, and doesn’t know how he could have gotten sick as he’s meticulous about handwashing.
- What immediate concerns would you like to address with Horace?
- What if Horace was 37 years old?
- What additional information would you like to know?

Case 7

- Florean Fortescue is a 37 year-old male presenting with concerns about his toenails. He’s noticed three of them have been getting “scaly and thick” lately.
- You ask probing questions and these symptoms have been present and gradually worsening for a period of 5 months. Upon examination, the toenails Florean’s right and left big toes and left middle toe are all significantly thickened throughout, have a yellowish tinge, and appear dull. Florean is generally healthy aside from this issue—he works out diligently and, aside from a mild case of athlete’s foot here and there, is literally never unwell.
- What are your concerns with this patient?
- What additional information would you like to know about Florean?
- How should this referral be made?
- What presentation would you feel comfortable treating in the outpatient community pharmacy?

Case 8

- Colin Creevey is a 6.5 year old boy who has been feeling under the weather. He’d like to get back to school because he’s getting really good at kickball. His chief complain is a sore throat that looks swollen on examination. He has not had a fever but has had a mild cough.
- Upon examination, he reports no discomfort in cervical nodes, has a temperature of 99.2, RR of 13, pulse of 102, pulseox of 98%, and BP of 105/70.
- What is your thought process for this kiddo?
- What do you do next?