Bugs, Bugs, and Bugs!
Infestations and Bites

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Scabies

• Most common human mite infestation
• Caused by 
  *Sarcoptes scabiei* which survives solely in human skin

*Courtesy of the Color Atlas of Family Medicine*
Scabies

- Tiny reddish papules and severe itching
- Spread person to person via direct contact, clothing, bedding, and shared objects
- Female mite tunnels under skin in stratum corneum and deposits eggs and fecal pellets

 Courtesy of the CDC/Susan Lindsley
Scabies

- Larvae hatch in a few days, mature in 2 weeks and live 30 days
- Humoral immune sensitivity
- Hyper-sensitivity to mite results in pruritis

Courtesy of the Color Atlas of Family Medicine
Scabies

• **Norwegian scabies** is a severe form in immunocompromised patients

• **Sx:** Intense *pruritis, worse at night* or after hot shower
Scabies

- **Pink linear burrows** up to 1-2 cm, with pinpoint erythematous vesicles and papules

  Courtesy of Richard Usatine, M.D.
Scabies Diagnosis

- Clinical presentation
  - Itching and typical rash
    - Symmetric, papulovesicular lesions accompanied by macules, pustules, scaly plaques
    - Interdigital webs, wrists, axilla, buttock and groin
  - Can do skin scraping for mite – Poor NPV
  - Liquid tetracycline followed by alcohol
    - Burrows fluorescence yellow gray with Wood’s Lamp
  - Ink test

Courtesy of the CDC
Scabies Treatment N.Z.

• Permethrin 5% (Elimite, Acticin crm)
  – Apply head down, leave 8-14 hrs, wash
    • Repeat in 2 weeks
    • Pregnancy Category B (Safer)
    • >2 months, Better for children

• 0.5% Aqueous malathion lotion
  – Apply from chin to toes and left on for 24 hours
Scabies Treatment

• Less effective: topical benzyl benzoate, synergized natural pyrethrins x 3 days
• Infants: Monosulfiram - at dx, 1 day & 1 wk
• Diphenhydramine, hydroxyzine, and mid-potency steroid creams for symptoms
• Wash clothes/linens in HOT water and remove from body contact for >72 hours
  – May be dry cleaned or stored in bags >20° C or <-20° C for 1 week
Scabies Treatment

• Ensure the scabicide is applied to the whole body from the chin down.
• Leave it on for the recommended time and reapply it after washing.
• Apply the scabicide under fingernails using a soft brush.
• Obtain antibiotics from your doctor if there is crusting and secondary infection.
• Ensure all close contacts are treated whether or not they are itchy.
Scabies Treatment

• **Oral Ivermectin** (Stromectol)
  – Not U.S. FDA approved for Scabies
  – One RCT comparing ivermectin to topical permethrin: topical permethrin was superior to a single dose of ivermectin
  – Maybe useful in *refractory patients* and compliance issues
  – Single dose at 200 mcg/kg
    • May repeat 1 week later
    • Not FDA labeled for children <15 kg
Recommendation

- Topical permethrin appears to be the most effective treatment for scabies. Ivermectin appears to be an effective oral treatment. More research is needed on the effectiveness of malathion, particularly when compared to permethrin, and on the management of scabies in an institutional setting and at a community level.

- Cochrane Database

Lice Infestation (Pediculosis)

• Lice can’t live more than 48 hours off human host, but nits can survive up to 1 month

• Lesions are induced by hypersensitivity to saliva and feces
Lice Infestation (Pediculosis)

- **Head Lice**
  - Live directly on person, esp. children (30%)
  - Spread by personal contact and shared personal items
  - Infestations sometimes extend to eyebrows, eyelashes and beard

*Courtesy of the CDC/Dr. Dennis D. Juranek*
Lice Infestation (Pediculosis)

- **Body Lice**
  - Longer than head lice
  - Live in garments that contact the skin
  - Not as contagious as head lice
  - Living in close quarters and **poor hygiene**
  - Carry typhus, trench fever and relapsing fever

Courtesy of the CDC/Frank Collins, PhD
Lice Infestation (Pediculosis)

• Pubic Lice
  – Wider and shorter bodies - resemble crabs
  – Live directly on person
  – Transmitted by bedding and clothing
  – Typically spread during sexual relations - 90% with 1 exposure

Courtesy of the CDC
Lice Infestation (Pediculosis)

- **Diagnosis** - Hx and PE - Head & pubic
  - Females lay nits (shiny grayish white eggs)
  - Adults & nits on hair, excrement in underwear

*Courtesy of the Centers for Disease Control and Prevention*
Head & Pubic Lice Topical Tx N.Z.

- Pyrethrum / pyrethrin / Phenothrin
  - Full Marks Mousse
  - Parasidose Extra Strength Lice Shampoo
- Synthetic pyrethroids (permethrin)
  - Lyderm Cream
  - Pyrifoam Shampoo
- Organophosphates (malathion, maldison)
  - A-Lices Scalp and Body Hygiene Shampoo
  - Derbac-M Liquid
  - Malathion Lotion
  - Prioderm Cream Shampoo
Head & Pubic Lice Topical Tx

• **Nits** are removed with a fine-toothed comb following the application of all tx ($8)
  – **Critical** in achieving resolution
  – 1:1 vinegar:water rinse or 8% formic acid rinse may enhance removal of tenacious nits

• **Treatment failure** common – resistance
  – Other tx options: permethrin 5% cream, lindane 1% shampoo, 10-days trimethoprim-sulfamethoxazole (kills symbiotic bacteria) or two doses of Ivermectin (200 mcg/kg) 7-10 d)
Head Lice

- Regularly examine your children's scalps.
- Treat all members of the family at the same time.
- Not all eggs are killed with one application of insecticide, a second application is recommended 7 days later.
- Lice may take a day or so to die.
- The presence of nits doesn't mean ACTIVE infection. Hatched nits (empty eggshells) will remain attached.
- Machine-wash all bed linens, clothes, towels in hot water.
- Items that can't be washed such as soft toys and helmets should be placed in an airtight plastic bags for two weeks.
- Vacuum pillows, etc.
- Spray hairbrushes, combs with fly spray
Body Lice Topical Treatment

- Improving **hygiene** and **laundering linens** at 65°C for 15-30 min **alone** will eliminate
  - Monthly application of 10% lindane powder to dust the lining of all clothing
  - Lindane lotion or permethrin cream may be applied to body for 8 to 12 hours

Courtesy of the Color Atlas of Family Medicine
Bedbugs

- Cimex species
- <1 cm in length
- Reddish brown in color
- Found in furniture, floorboards, peeling paint
- Come out at night in search of prey
  - Peak feeding times just before dawn
- Attracted to body heat, carbon dioxide, vibration, sweat, and odor

Courtesy of Piotr Naskrecki / CDC
Bedbugs

• Infestations increasing around the world
  – Possibly due to insecticide resistance
  – Resistance to pyrethroid insecticides widespread in the United States

• Mouthparts are modified for piercing and sucking

• inject anticoagulant- and anesthetic saliva


Courtesy of Janice Haney Carr / CDC
Bedbugs

• Visually search corners of beds and mattresses
• Produce a peculiar pungent odor
• Speck-like masses of dung may be evident behind wallpaper and headboards
Bedbug Bites

• Exposed skin
• Painless bite
• Often present on the face upon awakening
• Bites often in linear groups of 3
  – "breakfast, lunch, and dinner,"
• Erythematous papules, sometimes with a urticarial component
Bedbugs Medical care

• Usually require no treatment
• Local antiseptic lotion or antibiotic cream or ointment if secondary infection occurs
• Corticosteroids and oral antihistamines if allergic reaction
Bedbugs Medical care

• Eliminating bedbug hiding sites
• Permethrin insecticides
• Diethyltoluamide insect repellent
• Inserting bedposts into containers of paraffin oil
• Wear nightclothes
• Heat treatment
• Carbon dioxide baited traps
Spider Bites

• Most spiders are poisonous
• Most have fangs too short or too fragile to pierce human skin
• 60 species do bite
• Venom is complex - enzymes, proteins and other reactants
  – Many are not well studied
Spider Bites - Black Widow

- *Latrodectus mactans*
- Shiny black with red or white markings (hourglass) on abdomen
- Spider is ~1 cm in length
- 2 small red fang marks
- Injects a neurotoxin

Courtesy of the CDC/ Paula Smith
Spider Bites - Katipo

- *Latrodectus*
- Relative of the Black Widow
- Injects a neurotoxin

Courtesy of the CDC/Paula Smith

Courtesy of Wikipedia Commons
Spider Bites - Black Widow

• “Latrodectism” = Sx of bite:
  – Sharp pain initially, followed by numbing dull pain surrounding the bite site
    • Localized diaphoresis in affected limb
  – Cramping pain and muscular weakness in abdomen, shoulders, back, chest – 15-60min
    • May resemble acute surgical abdomen
  – Restlessness, anxiety, sweating, headaches, dizziness, N/V may develop
Spider Bites - Black Widow

- Drooping and swelling of the eyelids
- Skin rash and itching
- Severe breathing problems
- Nausea, vomiting and increased saliva production
- Skin around bite warm
- Pain for 2-3 hours, resolves in 2-3 days
- Shock/death 5% - mainly children and elderly
- Tx supportive, rarely antivenom (horse IgG)
Spiders - Brown Recluse/ Violin

Courtesy of the CDC
Spiders - Brown Recluse

- **Genus Loxosceles**
- Tan to brown and 2.5 cm in length
- **Timid spiders** – live in little-used protected areas
  - Most bite when trapped
- **Bite is not painful**
  - Within 2 to 8 hours, pain and redness develops, and a blister usually forms
  - An open sore or ulcer then develops
Spiders - Brown Recluse

• **Venom is necrotizing**
  – Initially have no symptoms
  – 8 hours - bite becomes painful
  – Area become red, bruised and may itch
  – **Blister forms,** surrounded by bruising, then fills with blood, ruptures & ulcerates
  – **Necrosis may occur**

Courtesy of E.J. Mayeaux, Jr., M.D.
Spider Bites Treatment

• Local **supportive** treatment
  – Debridement only if necessary
  – **NO wide excision!!!**
  – Prevention of infection

• Systemic symptoms treated symptomatically

*Courtesy of the CDC/ M. A. Parsons*
Lyme Disease

- Borrelia burgdorferi (spirochete)
- **Enters at bite and migrates to skin and lymphatics**
- **Hard ticks** – *Ixodes Spp.*
- Summer and early fall
- 17,730 cases in 2000

Courtesy of the CDC
Lyme Disease

- **Erythema chronicum migrans**
  - Occurs ~76% of cases
  - Begins at site of tick bite
  - Unique dermal sign

Courtesy of the CDC/James Gathany
Lyme Disease

- **Erythema chronicum migrans**
  - 3-30 days after the tick bite
  - Expands to 50 cm or greater with **central clearing**
  - **Blanches** under pressure
  - Palm and soles are spared
  - Malar rash and conjunctivitis can be seen

- **Chronic disease**
  - Ill feeling & fatigue remains for weeks
<table>
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<tr>
<th>System</th>
<th>Stage 1 (localized)</th>
<th>Stage 2 (early disseminated)</th>
<th>Stage 3 (late chronic)</th>
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<tbody>
<tr>
<td>Cardiac</td>
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<td>Prolonged arthritis attacks; chronic arthritis</td>
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<td>Headache</td>
<td>Meningitis, Bell's palsy; cranial neuritis; radiculoneuritis</td>
<td>Encephalopathy; polyneuropathy; leukoencephalitis</td>
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<tr>
<td>Skin</td>
<td>Erythema migrans</td>
<td>Secondary annular lesions</td>
<td>Lymphocytoma; acrodermatitis chronica atrophicans</td>
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</table>
Lyme Disease Sx

- Weeks to months
  - 15% develop neurologic symptoms
  - Bell’s palsy, meningitis

Courtesy of the CDC
Lyme Disease Diagnosis

- B. burdorferi very difficult to culture
- No single reliable test is available
- 1/2 of patients will have early + serology
- Most common test is to the antibodies
  - ELISA (sensitivity: 94%, specificity: 97%) — used as a screening test
  - Western blot (IgM and IgG) — confirmatory
- Tx based on Sx and exposure hx
Lyme Disease – Treatment Early Infectious Disease Society of America

- **Doxycycline** 100mg po bid for 14d
- **Amoxicilllin** 250-500mg po tid for 14d (50mg/kg/day for children in 3 divided doses)
- **Cefuroxime** 500mg bid for 14 d (30mg/kg in two divided doses)
- **Erythromycin** 250 mg qid (30 mg/kg/day in children) if PCN allergic
Tx: Early Disseminated Disease

• Treat if sx of meningitis, cardiac effects
  – **Ceftriaxone** 2g/day for 14d
  – **Penicillin G** 18-24 million Units/day divided doses q 4 hrs

• If have significant heart block, may need temporary pacer
Cutaneous Larva Migrans

- Creeping eruption
- In U.S., found mostly in Florida and Gulf Coast
- Children more frequently affected than adults

Courtesy of the Color Atlas of Family Medicine
Cutaneous Larva Migrans

• Hookworm infection
  – Hookworm (Ancylostoma brasiliense) normally infects dogs and cats
  – Eggs of parasite in feces
  – Human steps on feces ....infection can result
  – Africa, the Caribbean, southeast Asia, Central and South America
Cutaneous Larva Migrans

• Usually starts on feet, buttock, legs or back
• Hookworm burrows along a *haphazard track* leaving a winding *threadlike rash*
• Intensely pruritic
Cutaneous Larva Migrans

• **Oral thiabendazole** - only FDA approved
  – 25 mg/kg Q12 hours for 2-5 days (max 3g/d)

• **Topical cream (15%)** compounded from 500mg tablets in a water-soluble base
  – Good choice for children who cannot take tabs
  – Applied topically bid to tid for 5 days to the larval track and 2 to 3 cm above lesions

• **Cure rates of 75% to 89%** with the oral form and **96% to 98%** with topical treatment
Cutaneous Larva Migrans

• **Ivermectin** (Stromectol) lacks FDA indication, but has been well studied.
  – Single dose 0.2 mg/kg (12–24 mg)
  – Cure rates ~100%
  – No adverse events in series of 6 studies

• **Albendazole**, prescribed for >25 years
  – Lacks FDA indication
  – 400 to 800 mg/d for 3 to 5 days
  – Cure rates >92%

• Cryotherapy is harmful
Hymenoptera

- Have poison glands
- Stings produce immediate pain
- Prevalent worldwide

- European Wasp
- Courtesy of Wikipedia Commons and Fir0002/Flagstaffotos
Hymenoptera

• Reactions to hymenoptera stings:
  – Local erythematous wheal that subsides within a few hours (normal reaction)
  – Extensive swelling and induration that lasts for days due to venom-specific IgE and cell mediated reaction
  – Bullous reactions
  – Systemic anaphylaxis including urticaria, angioedema, bronchospasm and hypotension
Hymenoptera Treatment

• Quickly remove stinger (by scraping?)
• Cool compresses, calamine lotion, analgesics and antihistamines
• Steroids for severe swelling
Hymenoptera Treatment

• Scraped off vs pinched?
• Response to honey-bee stings was assayed measuring size of resulting weal
• Findings: Weal size increased as time from stinging increased, not removal method
• Quick removal, without concern for the method of removal best
Hymenoptera Treatment

• Anaphylaxis should be managed by:
  – Subcutaneous adrenaline 0.5 ml 1:1000
  – Oral, IV or IM antihistamines
  – Oxygen
  – Systemic steroids if symptoms persist for longer than 20 minutes
  – Venom immunotherapy
  – EpiPen