Germs and Jocks: Infectious Disease Challenges for the Athlete

DAFP Sports Medicine Symposium

Stephen C. Eppes, MD
Christiana Care
Sidney Kimmel Medical College at
Thomas Jefferson University
Disclosures

• Dr. Stephen Eppes has no financial conflicts of interest to disclose relevant to this activity.
Objectives

- Identify key cutaneous, respiratory, and other infections as they uniquely affect athletes.
- Describe clinical features and diagnostic tests that can establish the correct diagnosis.
- Use accepted criteria and expert opinion to identify when it is safe for athletes to return to participation.
Effects of Sports on Health

Benefits to general health and immune function

Potential for cutaneous, respiratory and other infections
Burden of Infectious Diseases in Sports

• 20% of wrestlers lose practice or competition time due to skin infections
• Up to 76% of wrestlers are colonized with MRSA
  – 0.9% develop clinical infection
• 0.6% of high school football players develop MRSA infections
Topics To Be Covered

• Skin and soft tissue infections
  – Special emphasis on MRSA
• Selected parasitic infestations
• Selected respiratory tract infections
• Blood borne viruses
• Infectious mononucleosis
• When to return to practice / competition
  – National Collegiate Athletic Association
  – National Federation of State High School Associations
  – National Athletic Trainers Association
Skin Infections & MRSA

Sports Hygiene

General guidelines for sports hygiene, skin infections, and communicable diseases from the NFHS


Skin Infections

NFHS Position Statement and Guidelines for Sports-Related Skin Infections


DIAA MRSA Protocol Management


MRSA


NWCA Memo on Reducing Skin Infections


Last Modified on April 10, 2017
Universal Hygiene Protocol for All Sports:

• Shower immediately after every competition and practice, using liquid soap and not a shared bar of soap.

• Wash all workout clothing after each practice, washing in hot water and drying on a high heat setting.

• Clean and/or wash all personal gear (knee pads, head gear, braces, etc.) and gym bags at least weekly.

• Do not share towels or personal hygiene products (razors) with others.

• Refrain from full body and/or cosmetic shaving of head, chest, arms, legs, abdomen and groin.
Infectious Skin Diseases
Strategies for reducing the potential exposure to these infectious agents include:

- Athletes must notify a parent/guardian and coach of any skin lesion prior to any competition or practice. An appropriate health-care professional shall evaluate all skin lesions before returning to practices or competition.

- If an outbreak occurs on a team, especially in a contact sport, all team members should be evaluated to help prevent the potential spread of the infection. All shared equipment shall be properly cleaned/disinfected prior to use.

- Coaches, officials, and appropriate health-care professionals must follow NFHS or state/local guidelines on “time until return to competition.” Participation with a covered lesion may be considered if in accordance with NFHS, state or local guidelines and the lesion is no longer contagious.
Blood-borne Infectious Diseases
Strategies for reducing the potential exposure to these agents include following Universal Precautions such as:

• An athlete who is bleeding, has an open wound, has any amount of blood on his/her uniform, or has blood on his/her person, shall be directed to leave the activity (game or practice) until the bleeding is stopped, the wound is covered, the uniform and/or body is appropriately cleaned, and/or the uniform is changed before returning to activity.

• Athletic trainers or other caregivers must wear gloves and use Universal Precautions to prevent blood or body fluid-splash from contaminating themselves or others.

• In the event of a blood or body fluid-splash, immediately wash contaminated skin or mucous membranes with soap and water.

• Clean all contaminated surfaces and equipment with disinfectant before returning to competition. Be sure to use gloves when cleaning.

• Any blood exposure or bites to the skin that break the surface must be reported and immediately evaluated by an appropriate health-care professional.
From DIAA: Delaware Interscholastic Athletics Association

• “All athletes/sports team members that participate in close skin-to-skin contact, shall receive a general visual screening before practice”
  – Wrestlers: daily
  – Other skin-to-skin contact sports: weekly

• “Any individual that exhibits a rash illness and/or skin lesion should be referred to the qualified healthcare provider”

• “Schools are encouraged to have a qualified healthcare provider present at wrestling weigh-ins to assure all teams are adhering to this skin lesion management protocol”
From DIAA:
Delaware Interscholastic Athletics Association

• “If any athlete is found to have a skin lesion, treatment should be started immediately. School nurses and athletic trainers should refer the athlete to the team physician, Wellness Center nurse practitioner, or personal physician/physician’s assistant.”

• “ANY lesion suspected of being a MRSA infection shall be treated as a suspected MRSA infection until proven otherwise. Culture should be collected, and treatment initiated immediately.”
Collection of culture:

a. Utilize standard precautions for collecting and handling all specimens.

b. Whenever possible, collect culture specimens prior to administration of antimicrobial agents.

c. Deliver all specimens to the laboratory as soon as possible after collection. Specimens for bacterial culture should be transported at room temperature.

d. Specimens should be contained in tightly sealed, leak-proof containers and transported in sealable, leak-proof plastic bags.

e. Superficial ulcers – Cleanse surface with sterile saline and collect material from below the surface. Cleanse rubber stopper of transport device with alcohol; push needle through the septum and inject all abscess material on top of agar. If a swab must be used, pass the swab deep into the base of the lesion to firmly sample the fresh border. Specimens should be received at the laboratory as soon as possible.

f. Abscess – Tissue or aspirates are always superior to swab specimens. Remove surface exudates by wiping with sterile saline or 70% alcohol. Aspirate with needle and syringe. If a swab is used, pass the swab deep into the base of the lesion to firmly sample the fresh border. Specimens should be received at the laboratory as soon as possible.

g. Other dermal lesion – Obtain either a small biopsy of skin or drainage from the infected site after debriding the surface and cleansing with sterile saline. Cleanse rubber stopper of transport device with alcohol; push needle through the septum and inject all abscess material on top of agar. If a swab must be used, pass the swab deep into the base of the lesion to firmly sample the fresh border. Specimens should be received at the laboratory as soon as possible.

h. Further questions regarding collection may be referred to the Division of Public Health Laboratory (Microbiology department): 302-223-1520.
From DIAA:
Delaware Interscholastic Athletics Association

• “DIAA skin lesion form must be completed by a physician/physician assistant or Wellness Center nurse practitioner on any and all skin lesions requiring intervention. Potential MRSA infections shall be reported to the DIAA and athletes must be removed from further participation until cleared.”

• “Proven MRSA infections shall be reported to the DIAA and opposing team’s athletic director if interscholastic wrestling occurred within the previous 1 week period.”
DIAA MEDICAL RELEASE FOR ATHLETES TO PARTICIPATE WITH SKIN LESION

Name:__________________________ Diagnosis:__________________________

Communicable_____ or Non-Contagious____ Sport:__________________________

Date first seen:___/___/___ Date treatment started:___/___/___

Date cultured:___/___/___ Culture Site(lab):__________________________

Location of lesion(s) (describe and mark on drawing):

Medication(s) used to treat lesion(s):__________________________

Earliest Date may return to participation:___/___/___

Provider Name (MD, DO, PA, NP-print):__________________________ Phone#:__________________________

Provider Signature__________________________ Date:__________________________

As a qualified healthcare provider at participants school, I hereby certify that DIAA protocol for skin lesions has been followed and athlete is cleared for return to participation:

School Healthcare Provider Name (School RN, ATC, or NP-print):__________________________

School Healthcare Provider Signature__________________________ Date:__________________________

Note to Providers: Non-contagious lesions do not require treatment prior to return to participation (e.g. eczema, psoriasis, etc.).

If athlete is a wrestler, please familiarize yourself with NFHS Wrestling Rule 4-2-3 which states: "If a participant is suspected by the referee or coach of having a communicable skin disease or any other condition that makes participation appear inadvisable, his coach shall provide current written documentation from a physician (MD, DO) physician assistant or nurse practitioner stating that the suspected disease or condition is not communicable and that the athlete’s participation would not be harmful to his opponent. Covering a communicable condition shall not be considered acceptable and does not make a wrestler eligible to participate. This document shall be furnished at the weigh-in or prior to competition in the dual meet or tournament.” For all athletes, please familiarize yourself with the DIAA skin lesion protocol.

Note: If an on-site physician is present, he/she may overrule the diagnosis of the physician signing this form. Below are some treatment guidelines that suggest minimum treatment before returning to sports that involve direct skin-to-skin contact.

Bacterial diseases (impetigo, boils): ALL SUSPECTED LESIONS MUST BE TREATED AS MRSA UNTIL PROVEN OTHERWISE. See DIAA Skin Lesion Protocol for more information. Otherwise, oral antibiotic for 2 days and no drainage, oozing or moist lesions.

Herpetic lesions (Simplex fever blisters, zoster, gladiatorium): Minimum of 120 hours or full five days of oral anti-viral treatment with no new lesions and all lesions dry and healed. If no oral treatment has been given, no visible lesions may be present.

Tinea lesions (ringworm scalp, skin): Oral or topical treatment for 7 days on skin and 14 days on scalp.

Scabies, Head Lice: 24 hours after appropriate topical management. And subsequent clearance by school/Wellness nurse.

Conjunctivitis: 24 hours of topical or oral medication and no discharge.

Molluscum Contagiosum: 24 hours after curettage.
From DIAA: Delaware Interscholastic Athletics Association

- “If the participant is evaluated by a healthcare provider who chooses to treat with topical medications and wound care, the participant must continue to be excluded until they are clear of any moist, exudative or draining lesions.”

- “If MRSA is culture-confirmed, at a minimum, the athlete/sports team member must be excluded for 48 hours after antimicrobial therapy was begun.”
From link on DOE Sports Medicine website
IDSA Guideline on Skin and Soft Tissue Infections, 2014

**MANAGEMENT OF SSTIs**

- **NONPURULENT**
  - Necrotizing Infection / Cellulitis / Erysipelas
  - **Severe**
    - **EMERGENT SURGICAL INSPECTION / DEBRIDEMENT**
      - Rule out necrotizing process
    - **EMPIRIC Rx**
      - Vancomycin **PLUS** Piperacillin/Tazobactam
  - **Moderate**
  - **Mild**

- **PURULENT**
  - Furuncle / Carbuncle / Abscess
  - **Severe**
    - **EMPIRIC Rx**
      - TMP/SMX **or** Doxycycline
  - **Moderate**
    - **DEFINED Rx**
      - MRSA
      - See Empiric
      - MSSA
        - Nafcillin **or** Cefazolin **or** Clindamycin
  - **Mild**
    - **I & D C & S**

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**DEFINED Rx (Necrotizing Infections)**

- **Monomicrobial** Streptococcus pyogenes
  - Penicillin **PLUS** Clindamycin
  - Clostridial sp.
    - Penicillin **PLUS** Clindamycin
  - Vibrio vulnificus
    - Doxycycline **PLUS** Ceftazidime
  - Aeromonas hydrophila
    - Doxycycline **PLUS** Ciprofloxacin

- **Polymicrobial**
  - Vancomycin **PLUS** Piperacillin/Tazobactam

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1 Since daptomycin and telavancin are not approved for use in children, vancomycin is recommended; clindamycin may be used if clindamycin resistance is <10-15% at the institution.
Treatment of Group A Strep SSTI

• Impetigo (may be due to *Staph aureus* as well)
  – Limited number of lesions
    • Topical mupirocin 2% ointment
  – More extensive
    • Dicloxacillin
    • Cephalexin
    • Clindamycin

• Mild non-purulent cellulitis (more severe cases may require hospitalization)
  • Dicloxacillin
  • Cephalexin
  • Clindamycin
Antibiotics for MRSA

**Oral**
- Clindamycin
- Trimethoprim-sulfamethoxazole
- Doxycycline
- Linezolid

**Parenteral**
- Vancomycin
- Daptomycin
- Ceftaroline
- Telavancin
- Dalbavancin
- Oritavancin

(All oral agents are also available in parenteral forms)
2018 Christiana Care Antibiogram

<table>
<thead>
<tr>
<th>Organism</th>
<th>Clinda (%S)</th>
<th>Erythro</th>
<th>Genta</th>
<th>Linezolid</th>
<th>Oxa</th>
<th>Rif</th>
<th>Tetra</th>
<th>SXT-TMP</th>
<th>Vanco</th>
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<tbody>
<tr>
<td><strong>Staphylococcus aureus</strong></td>
<td>2377 (71)</td>
<td>2377 (41)</td>
<td>2367 (98)</td>
<td>2363 (100)</td>
<td>2377 (81)</td>
<td>2367 (99)</td>
<td>2366 (88)</td>
<td>2377 (95)</td>
<td>2377 (100)</td>
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<tr>
<td>Total isolates (%)S</td>
<td>954 (61)</td>
<td>954 (9)</td>
<td>952 (98)</td>
<td>952 (100)</td>
<td>952 (99)</td>
<td>951 (81)</td>
<td>954 (91)</td>
<td>956 (100)</td>
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<tr>
<td>MRSA</td>
<td>1476 (78)</td>
<td>1476 (81)</td>
<td>1468 (99)</td>
<td>1465 (100)</td>
<td>1468 (99)</td>
<td>1468 (92)</td>
<td>1476 (97)</td>
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<td>MSSA</td>
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Antibiotics for MRSA

**Oral**
- Clindamycin
- Trimethoprim-sulfamethoxazole
- Doxycycline
- Linezolid

**Comments**
- Clindamycin active against 70% of *Staph aureus*
  - Great against group A strep
  - Diarrhea
- TMP-SMX active against 95% of *Staph aureus*
  - Not active vs. group A strep
  - Occasional allergic reactions
- Doxycycline active against 88% of *Staph aureus*
  - Photosensitivity
- Linezolid 100% against GPCs
  - Expensive
Treatment of Purulent SSTIs
(Usually Due to \textit{Staph aureus})

- Furuncle, carbuncle, abscess
  - Mild (< 5 cm surrounding erythema)
    - I & D only
  - Moderate
    - I & D, culture and sensitivity
    - Empiric antibiotics
      - TMP/SMX
      - Doxycycline

- Purulent cellulitis
  - Mild
    - Same antibiotic choices
  - More severe may require hospitalization
8 MRSA infections among 5 of the 58 Rams players
All associated with turf-related skin abrasions
Linemen and linebackers most affected
MRSSA recovered from whirlpools and taping gel
Sporadic MRSA cases were noted among opposing team members
# Bacterial Skin Infections
e.g., Staph and Group A Strep

<table>
<thead>
<tr>
<th>NCAA</th>
<th>NFHS</th>
<th>NATA</th>
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<tbody>
<tr>
<td>• No new lesions for 48 hr</td>
<td>• No new lesions for 48 hr</td>
<td>• No new lesions for 48 hr</td>
</tr>
<tr>
<td>• 72 + hr of antibiotic Tx</td>
<td>• 72 + hr of antibiotic Tx</td>
<td>• 72 + hr of antibiotic Tx</td>
</tr>
<tr>
<td>• No draining lesions</td>
<td>• No draining lesions</td>
<td>• No draining lesions</td>
</tr>
<tr>
<td>• May not cover active lesions to allow participation</td>
<td>• May not cover active lesions to allow participation</td>
<td>• May not cover active lesions to allow participation</td>
</tr>
<tr>
<td>• May Gram stain questionable lesions</td>
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MRSA in a Sports Setting

• High school in Midwestern town
• Boy’s varsity football team
• 11-game winning streak over last two seasons
The Problem

- 14 players missed at least one of the first 6 games of the new season due to painful skin sores and boils
Microbiology Studies

• All due to same erythromycin-resistant clindamycin-sensitive (negative D-test) strain of MRSA USA300
School/Community Management Demands

- Replace field turf
- Fumigate field turf
- Sterilize locker room and fumigate after every case of MRSA
- Call Hazmat company
- Culture all players and staff to define carriers and put them on antibiotics
- Treat all players and staff with antibiotics as prevention
More Appropriate Management

- Oral clindamycin x 10 days
- Topical mupirocin on open lesions
- I&D boils
- Disinfect football helmets and bleach chin strap and other equipment after each use
- Hygiene and wound care instructions
- Staff, student, parent education
Additional Hygienic Measures (Similar to DIAA Guidelines)

- Disinfectant wipe-down of personal equipment and surfaces, training equipment and shoes
- Daily laundering of uniforms, clothing, and towels
- No sharing - towels, personal hygiene items
- Bleach rinsing by all players during bathing - 3 times weekly for the season
  - 1 teaspoon bleach/gallon of water
The Team LUCKY TOWEL !!!!
Metaanalysis of Studies of Asymptomatic Colonization with MRSA in Athletes

Karanika, Clinical Infectious Diseases, 2016

• 15 studies of 1495 athletes and staff
• Total of 6% were colonized with MRSA
• 13% of college athletes colonized
  – Wrestling 22%
  – Football 8%
  – Basketball 8%
• Subsequent risk of MRSA infection was 7.4 X greater among previously identified carriers compared with non-colonized athletes
Metaanalysis of Studies of Asymptomatic Colonization with MRSA in Athletes
Karanika, Clinical Infectious Diseases, 2016

- 3 studies evaluated decolonization
  - Nasal mupirocin 5-10 days ± rifampin
- 100% effective base on re-screening following decolonization protocol
  - Negative culture or PCR
- Decolonization resulted in 33% reduction in MRSA *infections* compared with athletes who were not decolonized
Herpes Simplex Infections

• Among athletes HSV-1 >> HSV-2
• Primary infection more severe and accompanied by systemic symptoms compared with non-primary infections
• Primary infection can occur at any skin or mucosal site (recurrences occur at same site)
  – Wrestlers (herpes gladiatorum) and rugby players (herpes rugbiorum) are at highest risk
    • 2.6% of U.S. high school wrestlers
    • 7.6% of U.S. college wrestlers
Herpes Simplex Infections

- During outbreaks, as high as 34% have been infected
- Average of 7 days from exposure to infection
- Occur on trunk or in “lock up position” sites
  - Head, face and neck
- Concomitant HSV conjunctivitis reported in 5% of cases
Management of HSV Infections

• From NHFS: “Primary outbreaks [of herpes gladiatorum] are much more extensive and may take up to two weeks to clear. The infected individual must be immediately removed from contact and seek appropriate care and treatment.”

• Primary
  – Valacyclovir 1 g 2x daily for 10-14 days

• Recurrent
  – Valacyclovir 1 g 2x daily for 5-7 days

• Prophylaxis (can consider for remainder of season)
  – Valacyclovir 500 mg or 1 g daily
Return to Participation: Primary HSV Infections and Herpes Zoster

<table>
<thead>
<tr>
<th>NCAA*</th>
<th>NFHS*</th>
<th>NATA</th>
</tr>
</thead>
</table>
| • Firm, adherent crusts at time of participation  
• No evidence of 2° bacterial infection  
• No new vesicles for 72+ hr  
• 120+ hr of antiviral Tx  
• No systemic sx  
• May not cover active infections to allow participation | • All lesions scabbed over  
• No new lesions for 48+ hr  
• 10+ days of antiviral Tx (cutaneous lesions only)  
• 14 days of antiviral Tx (systemic sx)  
• No return to wrestling for 10+ days | • Firm, adherent crusts at time of participation  
• No new vesicles for 72+ hr  
• 120+ hr of antiviral Tx  
• No systemic sx  
• May not cover active infections to allow participation |

*NCAA and NFHS guidelines are unclear on primary vs. recurrent infections
From NFHS, SCE check out. Mention but no slide. This would seem to apply only in outbreak situation.

**Herpes Gladiatorum**

This skin infection, primarily seen among wrestlers, is caused by herpes simplex virus Type 1 (HSV-1). The spreading of this virus is strictly skin-to-skin. The majority of the outbreaks develop on the head, face and neck, reflecting the typical wrestling lock-up position. The initial outbreak is characterized by a raised rash with groupings of 6-10 vesicles (blisters). For head, face and neck involvement, symptoms include sore throat, fever, malaise and swollen cervical lymph nodes. Primary outbreaks are much more extensive and may take up to two weeks to clear. The infected individual must be immediately removed from contact and seek appropriate care and treatment. Return to contact is permissible only after all lesions are healed with well-adherent scabs, no new vesicles have formed, and no swollen lymph nodes remain near the affected area. Oral antiviral medications should be started and can expedite the clearing of an outbreak. Careful consideration should be given to prophylactic oral antivirals for the remainder of the season and each subsequent season.

Recurrent outbreaks usually involve a smaller area of skin, milder systemic illness and a shorter duration of symptoms. Treatment should include oral antivirals. If antiviral therapy is initiated, the participant must be held from contact sports for a minimum of five days. If antivirals are not used, the infected participant may return to contact only after all lesions are well-healed with well-adhered scabs, there has been no new vesicle formation in the preceding 48 hours, and there are no swollen lymph nodes near the affected area. Even greater consideration should be given to prophylactic antivirals for the remainder of the season. As the herpes virus may spread prior to vesicle formation, anyone in contact with the infected individual during the three days prior to the outbreak must be isolated from any contact activity for eight days and be examined daily for suspicious skin lesions.
Tinea Capitus and Kerion
Tinea Corporis
Tinea Cruris
Tinea Barbae and Tinea Unguium
Trichophyton and Microsporum Species
Tinea Infections: Diagnosis

- Physical exam + Wood’s light
- KOH prep
  - Rapid
  - Can usually identify species
  - Skin / hair follicle scrapings or swab
- Culture
  - Can take weeks
  - Can confirm species
  - Empiric therapy should not await culture results
Antifungal Therapy

• Tinea capitis
  – First line
    • Oral terbinafine for 6 weeks
      – Higher efficacy vs. Trichophyton spp.
    • Oral griseofulvin for 6-8 weeks
      – Higher efficacy vs. Microsporum spp.
  – Alternatives (fewer data, less effective)
    • Oral itraconazole
    • Oral fluconazole
  – Prednisone may be given for one week for kerion
Antifungal Therapy

• Tinea corporis, pedis, cruris
  – 1-3 weeks of topical therapy, usually
    • Terbinafine
    • Clotrimazole
    • Miconazole
    • Ketoconazole

• Tinea unguium (onychomycosis)
  – Oral terbinafine
    • Fingernails 6 weeks
    • Toenails 12 weeks
## Return to Participation: Tinea Capitus and Corporis

<table>
<thead>
<tr>
<th>NCAA</th>
<th>NFHS</th>
<th>NATA</th>
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</table>
| • Oral or topical Tx for 72+ hr on skin or 14 days on scalp  
• May cover active infections to allow participation  
• Return may be allowed on individual basis by physician or certified trainer | • Oral or topical Tx for 72+ hr on skin or 14 days on scalp  
• Lesions to be covered with bio-occlusive dressing once no longer considered contagious | • Oral or topical Tx for 72+ hr on skin or 14 days on scalp  
• Lesions must be covered with gas-permeable dressing followed by underwrap and stretch tape |
Return to Participation: Tinea Pedis and Cruris

• No recommendation from NCAA, NFHS or NATA
• American Academy of Pediatrics (AAP)
  – T. pedis
    • Exclude from swimming pools
    • Discourage walking barefoot in showers or locker room until treatment initiated
  – T. cruris
    • Exclude from swimming pools until treatment initiated
Molluscum Contagiosum: Treatment

• Most resolve within 1 year
• Curettage
  – Usual first line therapy
  – Recommended by NCAA and NFHS
• Cryotherapy
  – Liquid nitrogen
• Cantharidin
  – Blistering agent
## Return to Participation: Molluscum Contagiosum

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<tr>
<th>NCAA</th>
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<tbody>
<tr>
<td>• Curette or remove lesions before</td>
<td>• No treatment or restrictions</td>
<td>• Curette or remove lesions before competition</td>
</tr>
<tr>
<td>competition</td>
<td>• Cover lesions prone to bleeding with gas</td>
<td>• May cover solitary of localized clustered</td>
</tr>
<tr>
<td></td>
<td>permeable membrane and tape</td>
<td>lesions with gas permeable membrane, underwrap</td>
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</tbody>
</table>
Verruca Vulgaris: Treatment

• NFHS: No restrictions, treatment not required
  – Should be covered if prone to bleeding
• Options for treatment
  – Topical salicylic acid (first line)
  – Cryotherapy
## Return to Participation: Verrucae Vulgaris

<table>
<thead>
<tr>
<th>NCAA</th>
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<th>NATA</th>
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</thead>
</table>
| • Multiple lesions on face that cannot be covered result in disqualification  
  • Other lesions - curette and cover            | • No treatment or restrictions                 |                                                |
|                                                | • Cover lesions prone to bleeding with gas permeable membrane and tape |                                                |
Scabies: Diagnosis

• History
  – Widespread itching, worse at night
  – Multiple family members affected

• Physical exam
  – Papular eruption
  – Linear lesions
  – Interdigital involvement

• Skin scraping for microscopy
## Return to Participation: Scabies

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<thead>
<tr>
<th>NCAA</th>
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<tr>
<td>• Negative scabies prep prior to return</td>
<td>• 24 hours after treatment</td>
<td></td>
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</tbody>
</table>
Scabies: Treatment

• Permethrin cream
  – Second application 1-2 week later may be needed

• Oral ivermectin
  – One dose, followed by second dose 1-2 weeks later

• Household hygiene, laundry

• Management of contacts
Hidradenitis Suppurativa: Treatment

- Management of co-morbidities
  - e.g., weight loss
- Mild disease
  - Topical clindamycin
- More severe disease
  - Oral tetracyclines
    - Alternative: clindamycin and rifampin
- Immunomodulating agents
  - Intraleisional steroids
  - Oral dapsone
Return to Participation: Hidradenitis Suppurativa

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<tr>
<th>NCAA</th>
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<th>NATA</th>
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<tr>
<td>• Disqualified if extensive drainage</td>
<td>• May not cover active lesions to allow participation</td>
<td></td>
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Pediculosis humanus capitus

Pediculosis humanus
Return to Participation: Pediculosis

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<tbody>
<tr>
<td>• Appropriate treatment and reexamination for completeness of response before return</td>
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adenovirus
## Return to Participation: Adenovirus

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<th>NCAA</th>
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<tbody>
<tr>
<td></td>
<td>• 24+ hours after topical or oral treatment and no drainage</td>
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Respiratory Tract Infections

- Upper respiratory tract infection (URI)
- Influenza
- Pharyngitis
- Sinusitis
URI

• Most common infection in athletes
• Close contact with teammates and opponents is risk factor
• Management is same as for non-athletes, except
  – Oral decongestants may contain banned substances
  – Antitussives may cause fatigue and increase risk for injury
  – Antipyretics should not be used to mask fever in order to participate
URI: Return to Participation

• Mild disease – “above the neck”
  – Attempt 10-15 minutes of light exercise
  – If tolerate, return to play if athlete feels able

• Fever / systemic symptoms
  – Allow to play when afebrile for one day off antipyretics, well-hydrated, and feels well
  – Start with light activity / graded return to play
Acute Bacterial Rhinosinusitis

• Common, but probably over-diagnosed
• May be preceded by viral URI
• Emphasis on accurate diagnosis:
  – Persistent / not improving (10 days)
  – Severe (≥ 3 days)
  – Worsening or “double-sickening” (≥ 3 days)
• Imaging usually not required
Acute Bacterial Rhinosinusitis

• Amoxicillin (recommended by AAP)
• Amox/clav (recommended by IDSA and AAP)
  – 90 mg/kg/day divided 2X daily for children
    • 10-14 days
  – 2 g 2X daily for adults
    • 5-7 days
• Oral cephalosporin for non-type 1 reaction to penicillin
• Levofloxacin for type 1 hypersensitivity
Acute Bacterial Rhinosinusitis

• NOT recommended:
  – Trimethoprim-sulfamethoxazole
  – Doxycycline
  – Macrolides
    • Erythromycin
    • Clarithromycin
    • Azithromycin
Antibiotics to Use With Caution in Athletes

• Fluoroquinolones
  – Tendinopathy / rupture
  – Photosensitivity
  – QTc prolongation

• Macrolides
  – QTc prolongation

• Tetracyclines
  – Photosensitivity
Other Medications to Use With Caution in Athletes

- Antihistamines
  - Possible anticholinergic effects
- Antitussives
  - Fatigue, increased risk of injury
- Oral decongestants
  - May contain banned substances
- NSAIDs, acetaminophen
  - May mask fever
Influenza: The Virus That Has Changed the Course of Championships

• Joe Montana: 1990-91 NFC Championship Game
  – San Francisco lost to N.Y. Giants, 15-13
• Bruce Smith: 1995-96 NFL Division Playoffs
  – Buffalo lost to Pittsburgh, 40-21
• 1918-19 Stanley Cup
  – Seattle vs. Montreal
    • Multiple Canadians contracted flu
    • One died
    • Series was called off
Influenza in Athletes

• Can spread through roster in days / weeks
• If influenza-like illness develops during peak influenza season, clinical diagnosis is sufficient
• If illness or epidemiology atypical, consider testing
  – PCR is most sensitive and specific
  – Rapid antigen detection tests
    • 60-80% sensitive
    • 85-95% specific
Influenza in Athletes

• If sport is in season, consider empiric treatment
  – Antiviral of choice – oseltamivir 2x daily for 5 days
  – Do not need to wait for results of testing
  – Consider prophylaxis of close contacts
    • Especially during competitions
    • Oseltamivir once daily

• Return to play when symptoms resolving
  – Afebrile > one day w/o antipyretics
  – Well hydrated
  – Respiratory symptoms improving
Immunization: Your number one weapon against influenza
Sam Darnold, mononucleosis victim, 2019
## IM - Symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sore throat</td>
<td>70-88%</td>
</tr>
<tr>
<td>Malaise</td>
<td>43-76%</td>
</tr>
<tr>
<td>Headache</td>
<td>37-55%</td>
</tr>
<tr>
<td>Anorexia</td>
<td>10-27%</td>
</tr>
<tr>
<td>Myalgias</td>
<td>12-22%</td>
</tr>
<tr>
<td>Chills</td>
<td>9-18%</td>
</tr>
<tr>
<td>Abdominal discomfort</td>
<td>2-14%</td>
</tr>
<tr>
<td>Nausea, vomiting, cough and arthralgias</td>
<td>&lt; 10%</td>
</tr>
</tbody>
</table>
IM - Physical Signs

- Lymphadenopathy: 93-100%
- Pharyngitis: 69-91%
- Fever: 63-100%
- Splenomegaly: 50-63%
- Hepatomegaly: 6-14%
- Periorbital edema: 10%
- Palatal petechiae: 5-13%
- Jaundice: 4-10%
- Rash: 5-15%
IM – Splenic Enlargement

• When it is significant, it is usually palpable
• Imaging usually not necessary
• When is it safe to resume sports?
  – No clear evidence for any parameter
  – Current consensus is that athletes should be
    • afebrile
    • well hydrated
    • asymptomatic
    • have no palpable spleen (often about 1 mo)
    • 7 weeks is the latest that splenic rupture has occurred
• If uncertain, consider ultrasound
Age Related Sensitivity of Heterophile Tests

- < 2 years: infrequently positive
- 2-4 years: about 40%
- 4-12 years: 75-80%
- > 12 years: about 90%
Months following EBV infection:

- IgG to VCA
- IgM to VCA
- Anti-EA
- Anti-EBNA

Titer

Heterophile

Months following EBV infection
IM - How to Use the Lab Tests

MONOSPOT

CBC (atyp. lymphs)

EBV TITERS (esp young child)

IM

REPEAT MONOSPOT

Probably not IM

Not IM

IM

(+)

(-) (+)

(-) (-)

(+) (-)

(-)

(+)

Not IM

IM
IM - Supportive Measures

- Rest, fluids, antipyretics, observation
- Corticosteroids
  - theoretical risk of poor host response to EBV
  - NOT indicated for uncomplicated IM
  - steroids ARE considered useful for:
    - airway obstruction
    - severe thrombocytopenia
    - autoimmune hemolytic anemia
    - encephalitis*
Blood-Borne Pathogens

- HIV, HBV, HCV
- Risk of transmission in sports setting extremely low
  - No confirmed cases of HIV transmission
    - Theoretical risk in NFL < 1 in 85 million game contacts based on HIV prevalence, risk of bleeding injury and risk of transmission from percutaneous injury
  - Rare transmission of HBV
    - Hardier, remains viable on environmental surfaces > 1 week
  - No confirmed cases of HCV transmission
    - (Risk from injectable substances)
Blood-Borne Pathogens: Prevention

• Standard precautions
• Proper training to provided first aid for bleeding injuries
  – Gloves and other PPE as needed
  – Care should not be delayed for acute injuries if PPE not immediately available
• Appropriate cleaning of environmental surfaces, disposal of blood-contaminated articles
Blood-Borne Pathogens: Prevention

• Bleeding injuries in competition
  – Time out guidelines available for some sports
  – Often left to discretion of officials
  – Blood-stained uniforms must be changed

• Disinfecting surfaces
  – Bleach at 1:100 dilution
  – Bleach at 1:10 dilution for large blood spills