Medical Concerns in the Athlete

Justin M. Wright, M.D.
Assistant Professor
Sports Medicine
Department of Family and Community Medicine
Paul L. Foster School of Medicine

October 9, 2012

TEXAS TECH UNIVERSITY
Health Sciences Center
Paul L. Foster School *of* Medicine™

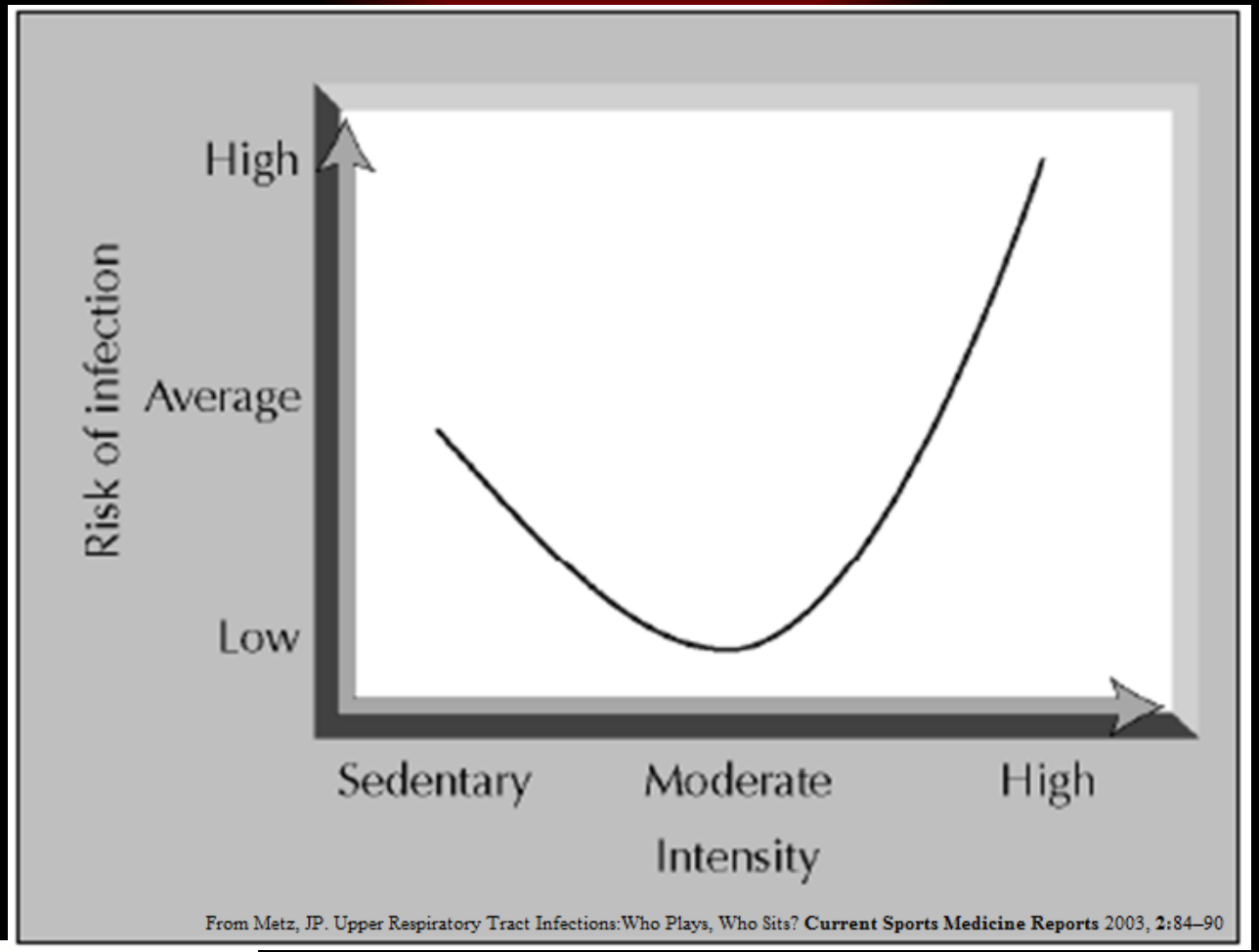
Objectives

- Describe the components of the immune system and how they are affected by exercise
- Identify common infections and their etiologies
- Identify various skin conditions common in athletes
- Understand return-to-play decisions for various conditions

The Immune System

- Innate – barrier to infection
  - Skin
  - Mucous membranes
  - Natural killer cells
- Acquired – infection-specific
  - T-cells
  - B-cells – make antibodies

How does exercise affect immunity?



Exercise Effects

- Mouth breathing – bypass nasal defenses
- Dry mucous membranes – decrease ability to clear infections
- “Open Window”
  - Immune suppression after intense exercise

Acute Conditions

Case 1

- 16-year-old female, junior soccer player
  - Nasal congestion, runny nose for 4 days
  - Mild sore throat
  - Mild cough
  - No fever
  - Taking OTC meds with some relief

- What does she have, and can she play?

Upper Respiratory Infection

- Viral – rhinovirus, adenovirus
- Symptoms
  - Nasal congestion
  - Runny nose
  - Fatigue
  - Sore throat
  - Cough
- Self-limited – 7-10 days, day 4-5 the worst
- Treament – Symptomatic
  - Hydration
  - Handwashing

Upper Respiratory Infection

- Return to Play
  - "Neck check"
    - Symptoms above neck – may return
      - Nasal congestion
      - Sore throat
      - Runny nose
      - Mild cough
    - Symptoms below neck – sit them out
      - Fever
      - Malaise
      - Severe cough
      - Vomiting, diarrhea

Case 2

- 14-year-old male, freshman running back
  - 2 days of sore throat
  - Fever to 102
  - Fatigue, body aches
  - No cough
  - No relief with OTC meds

Case 2

- Physical exam
  - Tender anterior cervical lymph nodes
  - Posterior pharynx:

  - Diagnosis?
  - Can he play?

Streptococcal Pharyngitis

- Bacterial – Group A strep
- Signs/Symptoms
  - Exudative pharyngitis
  - Sore throat
  - Fever
  - Body aches
  - Anterior cervical lymphadenopathy
  - No cough
- Treatment – PCN, amoxicillin, clindamycin, azithromycin
- Return to play – 24 hours after antibiotics
  - Neck check

Case 3

- 17-year old-female, senior basketball player
  - 4 days of sore throat
  - Fever to 102
  - Fatigue, body aches
  - No cough
  - No relief with OTC meds

Case 3

- Physical exam
  - Tender anterior and posterior cervical lymph nodes
  - Posterior pharynx:

  - Suspect strep
  - Amoxicillin given

After amoxicillin

Infectious Mononucleosis

- Virus – Epstein-Barr
- Signs/Symptoms
  - Sore throat, fever, malaise, lymphadenopathy
  - Rash after amoxicillin treatment
  - Splenomegaly
- Spread by saliva droplets – kissing, sharing drink
- Treatment – rest, fluids
- Return to play - controversial

Return to Play

- Splenomegaly
  - Risk of spleen rupture
  - Size difficult to assess
  - Most within 1st 3 weeks
- Return guidelines
  - May start light exercise 3 weeks after symptom onset
  - Must be asymptomatic, afebrile, and normal energy level
  - Return to contact - recommendations are less clear

Case 4

- 18-year-old male, senior cross-country runner
- 3 day history of nausea, vomiting, diarrhea
- No blood in stool
- Has fatigue
- Denies new foods, undercooked foods
- No recent camping, travel
- Brother and sister with similar symptoms

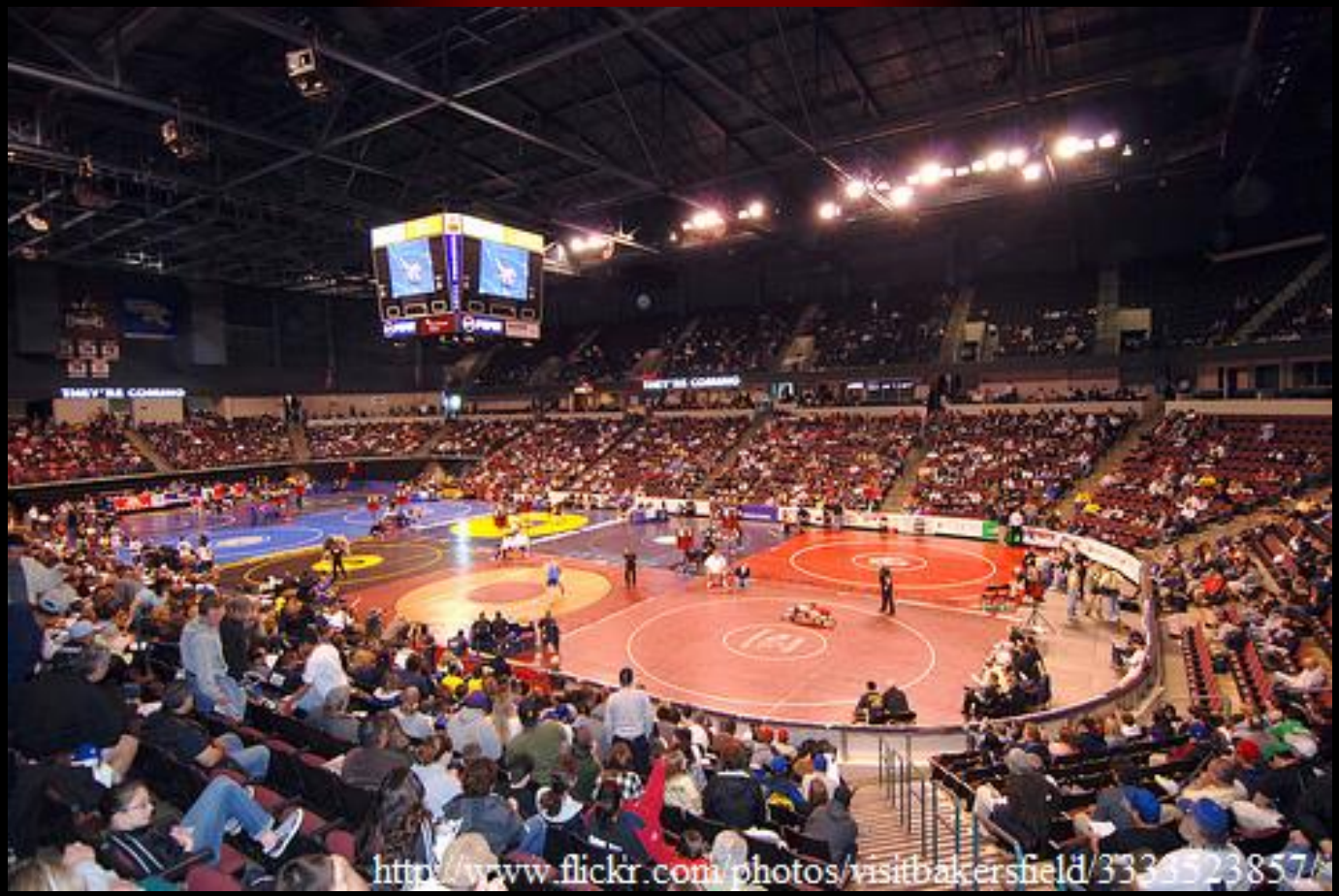
Acute Gastroenteritis

- Most commonly viral
- Symptoms
  - Nausea, vomiting, diarrhea, fever
- Treatment
  - Usually self-limited
  - Fluids, fluids, fluids
  - Antibiotics if suspect bacterial etiology
  - Bismuth subsalicylate (Pepto Bismol, Kaopectate)
  - Avoid anti-motility agents
- Return to play
  - Symptom resolution
  - Well-hydrated

Gastrointestinal Symptoms

- Anxiety
- Runner's trots
  - Stimulated by intense endurance exercise
  - May have associated GI bleeding
  - Causes
    - Ischemia
    - Nervous-system mediated
    - Mechanical
    - Fluid/electrolyte
  - Treatment
    - Training modification – diet, intensity
    - Further evaluation if bloody

Skin



Junior 189-pound

Herpes Simplex (Gladiatorum)

- Virus
- Symptoms
  - Flu-like
  - Prodromal pain, tingling
  - Rash – grouped vesicles on erythematous base
- Skin-to-skin contact
- Primary vs. recurrent infection
  - Dormant phase
- Treatment
  - Antiviral
  - Cover lesions
- Prevention
  - Early recognition
  - Good hygiene

Return to play

- NFHS Guidelines
  - Primary outbreak
    - No competition for a minimum of **10 days** with treatment
    - If systemic signs and symptoms → extended to **14 days**.
  - Recurrent outbreaks
    - Minimum of **120 hours or five full days** of oral antiviral treatment
    - No new lesions have developed and all lesions are scabbed over.
  - To be considered non-contagious, lesions must be scabbed over with no oozing or discharge, **no new lesions should have occurred in the preceding 48 hours**.

Freshman 103-pound

MRSA

- Methicillin-resistant *Staphylococcus aureus*
- “Spider bite”
- Range from cellulitis to abscess
- Signs/Symptoms
  - Pain, swelling, redness
  - Fever, flu-like symptoms
- Treatment
  - Antibiotics
  - Incision and drainage (I&D)

MRSA

- PREVENTION!!!!!
  - Handwashing, alcohol-based gel/liquid
  - Routine showering
  - Cleaning equipment
  - Prompt abrasion care
- Return to play (NFHS)
  - Oral antibiotics for **10 days** before returning the athlete to competition or until all lesions are scabbed over, whichever occurs last.

Sophomore 171-pound

Impetigo

- Bacterial – strep or staph
- Signs/symptoms
  - Rash – “honey-crusted” lesions
  - Usually painless, may be itchy
  - No fever, flu-like symptoms
- Treatment
  - Antibiotics – topical vs. oral

Impetigo

- Prevention
  - Same as for MRSA
- Return to play (NFHS)
  - All lesions must be scabbed over with no oozing or discharge
  - No new lesions in the preceding 48 hours
  - **Oral antibiotic** for three days is considered a minimum to achieve above status

Senior Heavyweight

Tinea (Ringworm)

- Fungal infection
- Moist environments, skin to skin contact
- Signs/symptoms
  - Itching
  - Rash – erythematous patch with central clearing, scaly
- Treatment
  - Topical for lesions on the body
  - Oral medication for scalp lesions

Tinea

- Prevention
  - Hygiene
  - Dry clothing
  - Flip flops in shower
- Return to play (NFHS)
  - Oral or topical treatment for **72 hours on skin**
  - Oral medication for **14 days for scalp lesions**

Acute Conditions Summary

- Strenuous exercise can open a window for infections
- “Neck check” is a good rule of thumb for return-to-play decisions
- Hygiene is key to prevent the spread of infection
  - Handwashing
  - Showers

Chronic Conditions

Diabetes

Diabetes

- Type 1
  - Autoimmune
  - No insulin
- Type 2
  - Insulin resistance

Exercise and Diabetes

- Glucose metabolism in exercise
- Benefits
  - Type 1
  - Type 2
- Risks

Diabetes and Athletes
Exercise Guidelines

- Glucose should be checked before, during, and after exercise!
- If glucose levels exceed 250 to 300 mg/dl prior to exercise
  - Blood glucose levels will tend to rise rather than fall during exercise.
- If glucose is 250 mg/dl check urine ketones (dip stick test)
  - If positive, the athlete cannot/ should not participate.

Diabetes and Athletes Exercise Guidelines

Rapid acting insulin before exercises rules of thumb

- Exercising lasting less than 1 hr – 30% reduction
- Exercise lasting 1-2 hrs – 40% reduction
- Exercise lasting 2 or more hours – 50% reduction

Hypertension

Hypertension

- Found in up to 5% of athletes during preparticipation screening
- Adults

	Systolic (mm Hg)	Diastolic (mm Hg)
Normal	<120	<80
Prehypertension	120-139	80-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	≥160	≥100

Hypertension

- Pediatric

Normal	Systolic and diastolic BP <90th percentile
Prehypertension	Systolic and/or diastolic BP ≥90th percentile but <95th percentile, or if BP exceeds 120/80 mm Hg even if <90th percentile.*
Stage I hypertension	Systolic and/or diastolic BP between the 95th percentile and 5 mm Hg above the 99th percentile
Stage 2 hypertension	Systolic and/or diastolic BP ≥99th percentile plus 5 mm Hg.

Hypertension

- Pharmacologic Treatment
  - ACE inhibitors/ARBs
    - 1st line – no major impact on cardiac function
  - Calcium channel blockers
    - Dihydropyridines (amlodipine) preferred – no heart rate limitation
  - Beta blockers
    - Reduce endurance
    - Banned in precision sports
  - Thiazide diuretics
    - Can cause electrolyte imbalances
    - Banned by athletic associations because of urinary dilution

Hypertension

- Exercise Restrictions
  - Prehypertension – no restriction
  - Stage 1
    - No end-organ damage - no restriction
    - End-organ damage – limit participation until BP is controlled
  - Stage 2
    - Limit participation until BP is controlled

Reactive Airway

Reactive Airway

- Exercise-induced bronchoconstriction
  - Airway narrowing during or after exercise
  - Occurs 5-8 minutes into exercise – 80% maximal effort
  - Peak 5-10 minutes after exercise cessation
  - Mechanism – 2 hypotheses
    - Loss of water → change in airway osmolarity → mast cell activation → bronchoconstriction
    - Loss of heat → vascular engorgement → bronchoconstriction

Reactive Airway

- Exercise-induced Bronchoconstriction
  - Testing
    - Spirometry – decline of 10% of FEV1 after exercise
    - Field exercise challenge
    - Eucapnic voluntary hyperpnea
    - Methacholine challenge
    - Elite athletes – Exercise challenge and spirometry required for diagnosis

Reactive Airway

- Exercise-induced Bronchoconstriction
  - Treatment
    - Prophylaxis
      - Premedication
        - » Short acting β-agonist
        - » Long acting β-agonist
      - Warm-up period
    - Inhaled corticosteroids
    - Leukotriene modifierss

Asthma Governing Regulations

Governing body	Policy on EIB/EIA	Medications
NCAA	Need a written prescription from doctor for the medication.	Albuterol is allowed in aerosolized form only.
International Olympic Committee	Need a positive exercise challenge or BPV test (Bronchial Provocation Test)	All beta-2 agonists and their D- and L-isomers are prohibited.
	Need a therapeutic use exemption (TUE) form for medications.	Exceptions (with a valid TUE) are formoterol, albuterol/salbutamol, salmeterol, and terbutaline.

Seizure Disorder

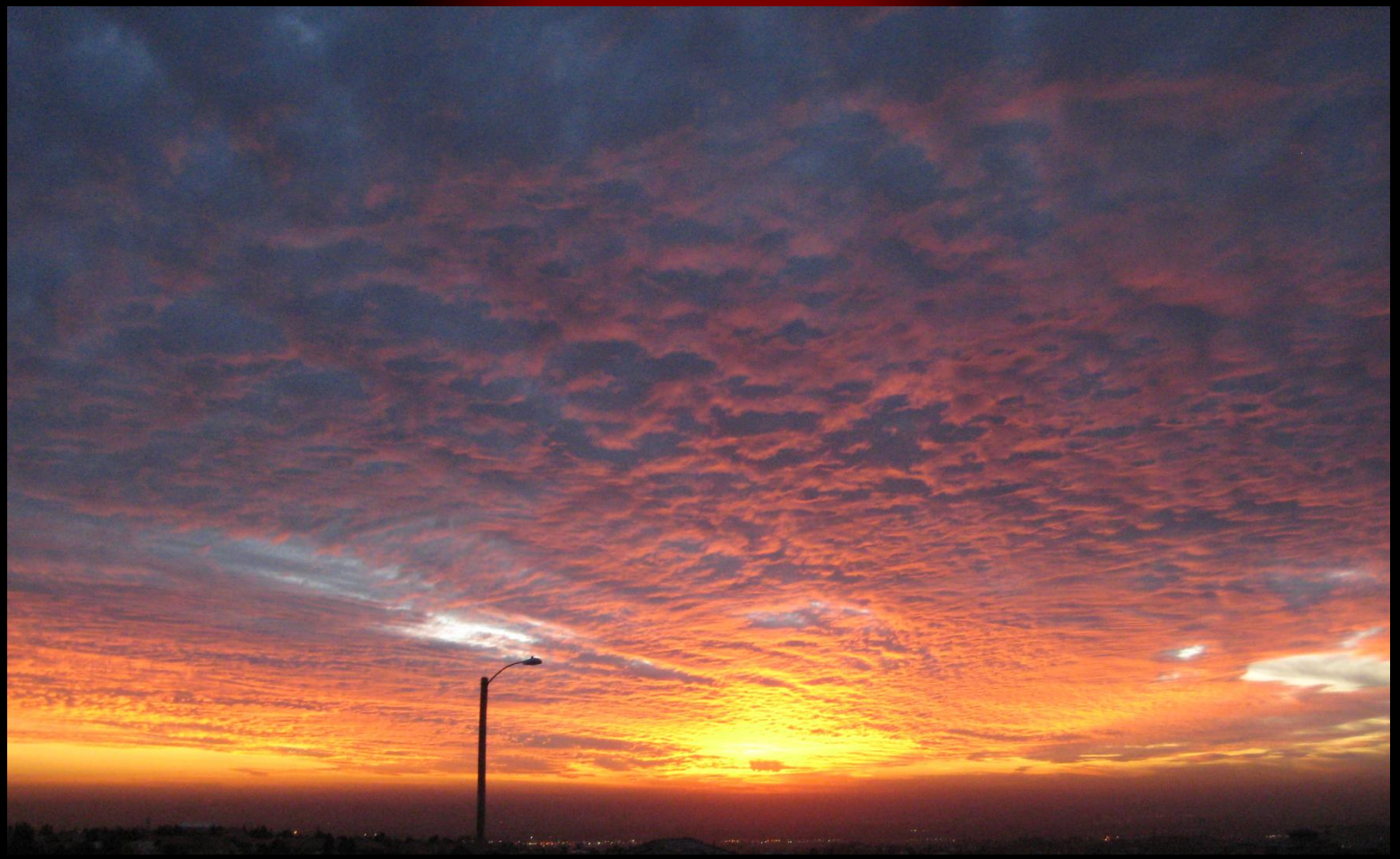
Seizure Disorder on Field Treatment

- ABC's
- Assist to ground – DO NOT RESTRAIN!!
- Don't roll onto side during seizure – will end up hurting the athlete
- Don't stick anything in their mouth

Seizure Disorder- Guidelines

- Contact Sports – no restrictions unless newly dx.
- Water Sports – generally permitted unless not supervised sections or poor water clarity or avoid open water
- Motor Sports – Discouraged
- Aerobic Sports - No restrictions
- Sports at Heights – should be avoided
- Shooting Sports – Avoided

Questions?



Sources

- Barnes, K, & Hudnall, S. (2011). Cellulitis. In M. Bracker (Ed.), *The 5-Minute Sports Medicine Consult* (pp. 66-67). Philadelphia, PA: Lippincott Williams & Wilkins.
- Callahan, LR, & Giugliano, DN. (2010). Infections in athletes. In C. Madden (Ed.), *Netter's Sports Medicine* (pp. 197-203). Philadelphia, PA: Elsevier.
- Harmon, K. (2011). Exercise-induced Diarrhea. In M. Bracker (Ed.), *The 5-Minute Sports Medicine Consult* (pp. 144-145). Philadelphia, PA: Lippincott Williams & Wilkins.
- Metz, JP. (2003). Upper respiratory tract infections: who plays, who sits?. *Current Sports Medicine Reports*, 2: 84-90.
- Natarajan, B. (2010). Gastrointestinal problems. In C. Madden (Ed.), *Netter's Sports Medicine* (pp. 204-208). Philadelphia, PA: Elsevier
- NFHS MEDICAL RELEASE FORM FOR WRESTLER TO PARTICIPATE WITH SKIN LESION. Retrieved May 22, 2011, from www.nfhs.org/WorkArea/DownloadAsset.aspx?id=5168
- Putakian, M, et al. (2008). Mononucleosis and athletic participation: an evidence-based subject review. *Clinical Journal in Sports Medicine*, *18*(4), 309-315.
- Ratz, J. (20009). Impetigo. *eMedicine*. Retrieved May 22, 2011, from http://emedicine.medscape.com/article/219473-overview
- Underwood, P. (2011). Tinea Gladiatorum (Capitis, Corporis, Cruris, Pedis). In M. Bracker (Ed.), *The 5-Minute Sports Medicine Consult* (pp. 600-601). Philadelphia, PA: Lippincott Williams & Wilkins.