

# Infectious disease

- Herpes gladiatorum
  - important, frequent, prophylaxis possible
- Impetigo contagiosum
  - Frequent
  - contagion (tango, tangere l. to touch)
- HIV infection and Aids
  - numerically unimportant, but emphasized by NCAA
- Hepatitides
  - more frequent than HIV, blood borne, sexually transmitted

Missouri Department of Health Fact Sheet For Athletes and Families

## Skin Infections in Athletes

**Skin infections can be passed between athletes by:**

- Direct skin-to-skin contact
- Sharing sports equipment, clothes, and towels

**The three most important skin infections are:**

<b><i>Staphylococcus aureus</i> "Staph"</b>	<b>Herpes</b>	<b>Tinea "Ringworm"</b>
<ul style="list-style-type: none"> <li>• Caused by: bacteria</li> <li>• Typically: one or more painful sores, with pus surrounded by redness, sometimes associated with fever</li> </ul>	<ul style="list-style-type: none"> <li>• Caused by: virus, the same virus that causes cold sores in the mouth</li> <li>• Typically: one or more painful blisters with clear fluid surrounded by redness</li> </ul>	<ul style="list-style-type: none"> <li>• Caused by: fungus</li> <li>• Typically: itchy, dry, red, circular patches</li> </ul>
		

**Skin infections can lead to:**

- Lost playing time
- Scarring, sometimes on face
- Wounds or rashes that keep coming back
- Rarely, serious life-threatening infections if not treated quickly

**Prevent skin infections:**

<p><b>Wash hands:</b></p>  <p style="font-size: x-small;">Clean hands often with soap and water. Use alcohol hand rub if soap is not available and hands do not look dirty.</p>	<p><b>Shower:</b></p>  <p style="font-size: x-small;">Shower soon immediately after every practice and game. Use soap and warm water. Do not share towels.</p>	<p><b>Cover wounds:</b></p>  <p style="font-size: x-small;">Cover all breaks in skin with a water proof bandage. Change the bandage if it gets wet.</p>	<p><b>Wash clothes:</b></p>  <p style="font-size: x-small;">Wash clothes and towels after every practice and game. Use detergent and dry thoroughly.</p>
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**Get it checked out. Don't wait.**

- Report any skin problems to your athletic trainer, school nurse, coach, or health care provider
- Tell your health care provider you participate in competitive sports
- Check with league rules if you have questions about participation

For more information see: [www.health.state.mn.us/divs/idepc/topics/athletes/](http://www.health.state.mn.us/divs/idepc/topics/athletes/)

**MIDH** Acute Disease Investigation and Control, Infectious Disease Epidemiology, Prevention and Control  
 651-281-3444 • TDD/TTY 651-281-3791 • [www.health.state.mn.us](http://www.health.state.mn.us)

08/2007

# Herpes gladiatorum

Manifestation of herpes simplex viral infection, HSV-1 or HSV-2, transmitted by direct contact between skin and virus

Major item in wrestling

- virtually closed Minnesota 2006 – 2007 high school wrestling season
- True contagion, spread by direct contact with infected athlete or mat etc.
- Non-epidemic circumstances:
  - $\approx 3\%$  of high school wrestlers
  - $\approx 8\%$  of collegiate wrestlers



# Incubation

- Primary infection, incubation period from two to fourteen days
- Reactivation possible any time host resistance lowered
- Stress of weight loss, competition, academic responsibilities, perhaps real but unquantifiable factor



# Manifestations

## Signs and symptoms

- burning, stinging, itching at inoculation site for variable period before appearance of cluster of vesicles on erythematous base
- major areas of contact, with opponent or mat, are head and neck, including face, and upper body.
- Inoculum close to eye carries risk of corneal involvement - herpes keratitis
- Possible fever, malaise, localized lymphadenopathy
- Recurrences usually milder and shorter



# Differential diagnosis

- Impetigo
- Contact dermatitis
- Folliculitis
- Cellulitis
- Herpes zoster



# Treatment

## Primary outbreak

- while vesicles are forming, anti-viral agents will arrest viral replication and shorten course of illness
- Suitable agents:
  - Acyclovir 400mg tid x 10 days
  - Valacyclovir, 1g twice daily x 10 days
- If crusting, benzoyl peroxide and warm convection from hair dryer will dry and minimize secondary bacterial infection



# Treatment

## Recurrence

- athlete should be educated to recognize 'prodrome'
- started during prodrome, anti-viral agents, in smaller doses, will again shorten duration
  - Acyclovir 200mg 5 times daily x 5 days
  - Valacyclovir 500mg bid x 5 days
  - Famcyclovir 125mg bid x 5days



# Prophylaxis

- Contact' precautions. (Not respiratory transmission problem)
- Normal skin hygiene and protection of abrasions and skin breaches
- Anti-viral agents as prophylaxis during wrestling season and prior to important competitions:
  - Acyclovir 200mg bid
  - Valacyclovir 500mg daily
  - Famciclovir 250mg bid



# NCAA Guidelines

## General

- disqualification if lesions or ulcers are present.  
Participation only permitted if area scabbed and dry

## Specific

- no new lesions for 3 days
- no active lesions
- lesions are crusted
- appropriate medications at time of competition
- lesions covered with gas-permeable membrane



# Impetigo contagiosum

Superficial intra-dermal infection, spread by contact

- red, tender 'spot', quickly develops blisters/vesicles, rupture to develop golden crust
- over 20 years, pathogen changed from
  - hemolytic streptococcus to staphylococcus aureus (80%)
  - 10% due to hemolytic streptococcus
  - remainder mixture of two
- Most frequently on face, around mouth or nose, but often multiple sites and bullae may develop over buttocks, trunk, face



## Risk factors

- Warm humid environment (reduction of natural skin defense)
- Summer and fall (seasonal predilection)
- Minor skin injury (ingress of bacteria)
- Contact sports (skin injury)
- Day care (lots of touching)
- Complication of scabies, chickenpox, eczema (pre-existing skin injury)



# Differential diagnosis

- Chickenpox
- Herpes simplex
- Folliculitis
- Erysipelas
- Insect bites
- Infected eczema (which it may complicate)



# Complications

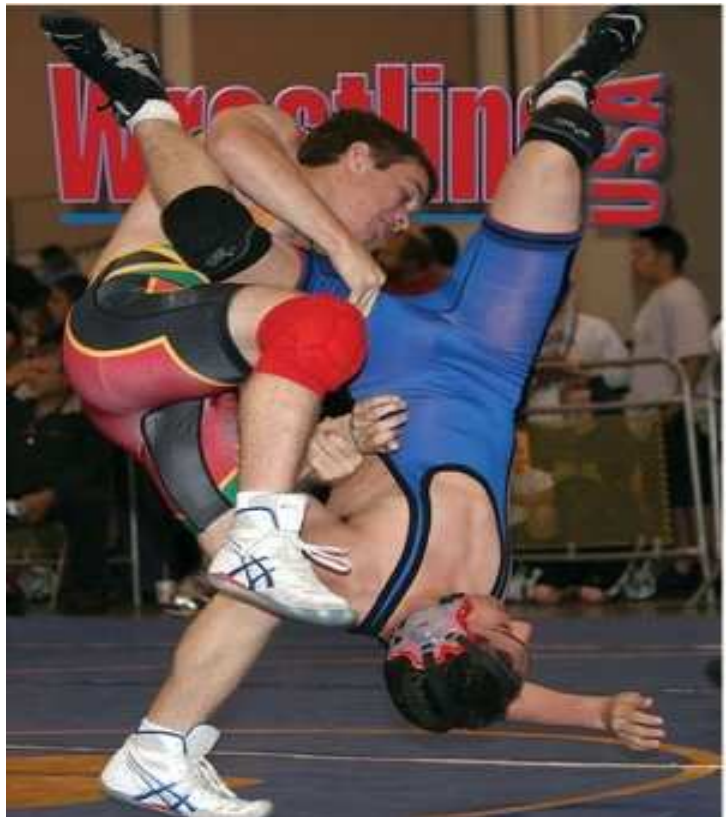
Unusually, rarely, complications such as:

- ecthyma (infection of deeper layers of dermis)
- erysipelas (spreading superficial cellulitis)
- acute glomerulonephritis (where organism has been streptococcal)
- cellulitis
- pneumonia
- glomerulonephritis as complication not prevented by Penicillin



## Prognosis & Treatment

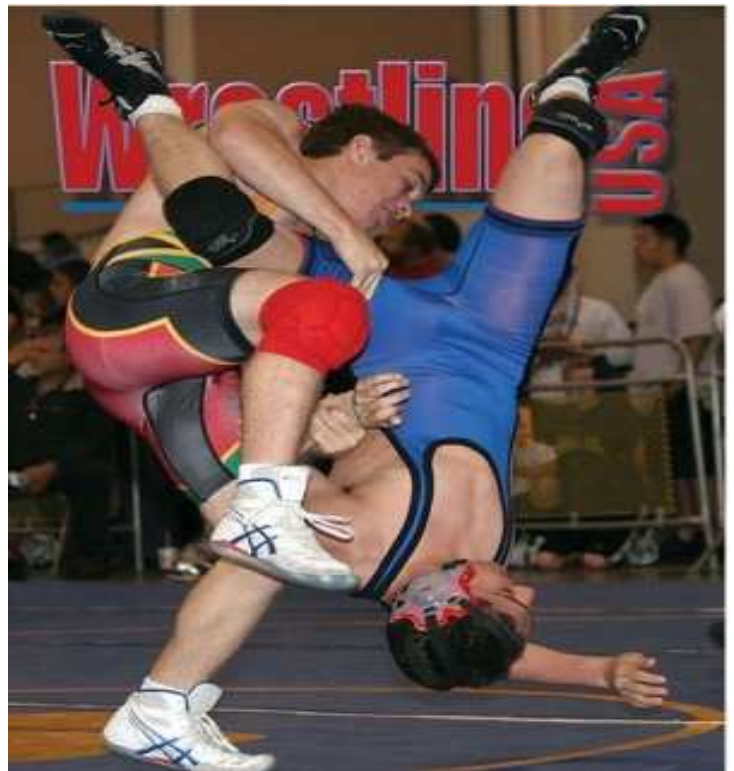
- Resolution in 7 - 10 days
- Investigation, culture usually not necessary
- Credible evidence that Mupirocin topical ointment (Bactroban) more effective than oral antibiotics, except in widespread infection, involvement of scalp. Should not be used in bullous form
- Increasing staphylococcal resistance to erythromycin





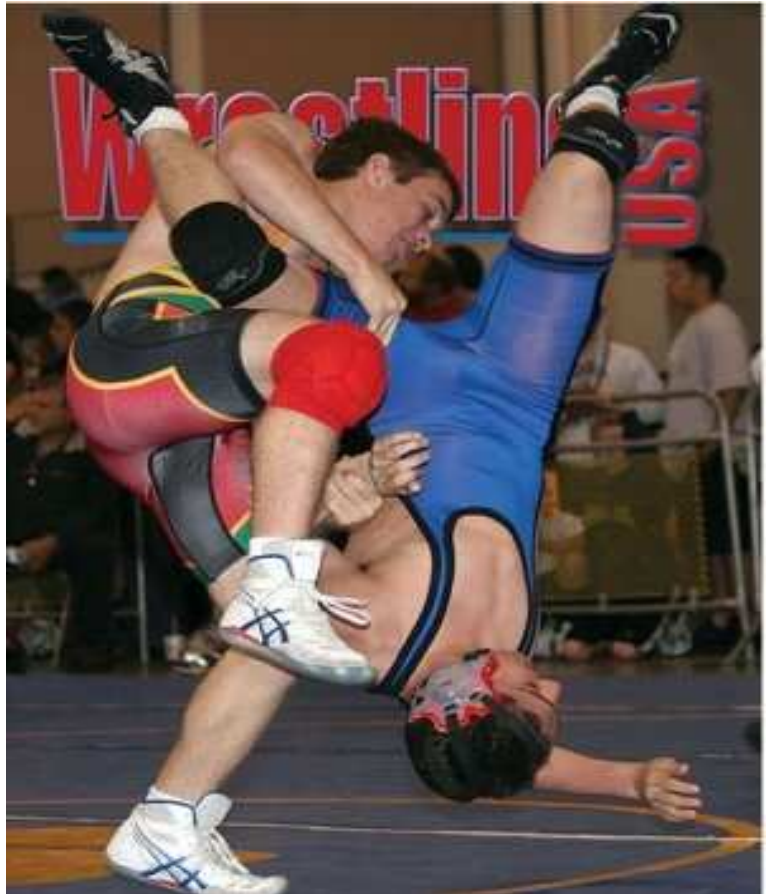
# Treatment

- Antibiotics
  - dicloxacillin - effective against staph, less effective in strep forms
  - amoxicillin - still reasonable choice
  - keflex - good choice, QID dosing
  - vantin - good choice, BID dosing
  - clarithromycin - good choice in penicillin allergic patients



# NCAA Regulations

- No new lesions for 48 hours before meet/tournament
- 72 hours of antibiotic therapy completed
- No moist, exudative lesions at meet or tournament time
- Active bacterial infections not to be covered to allow participation





## Tinea (ringworm)

- Characterized by reddish/brownish raised or bumpy patch
- May be lighter in center, giving appearance of “ring”
- Parasitic fungi (Dermatophytosis)
  - trichophyton
  - dermatophyton
  - microsporum
- Named after body site
  - does not indicate fungal type



# Tinea

- Very common, especially in children
- Spread by skin-to-skin contact and contact with contaminated hairbrushes etc.
- Spreads readily
- Increased risk in contact sports
- Common infection in domestic animals, dogs and cats, hamsters or guinea pigs
- Contracted by direct contact and prolonged contact with flakes of shed skin (from sharing clothes or from house dust)



# Tinea corporis gladiatorum

## I. See Also

- A. Tinea Corporis

## II. Definition

- A. Tinea Corporis variant seen in wrestlers

## III. Epidemiology

- A. Seen in wrestlers from skin-to-skin contact

## IV. Signs

- A. Characteristics
  1. Classic Annular Lesions as described above or
  2. Erythematous Scaling Papules or Plaques
- B. Distribution
  1. Head, neck and arms

## V. Management

- A. See Tinea Corporis

## VI. Prevention

- A. Lesions must be completely and securely covered for wrestlers to participate
- B. Wrestlers with extensive involvement may return to sport after one week of treatment



# Tinea corporis gladiatorum

*Journal of Athletic Training* 1999;34(4):350-352  
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www.nata.org/jat

## Prevention of Tinea Corporis in Collegiate Wrestlers

James W. Hand, MS, ATC\*; Randall R. Wroble, MD\*†

\* Ohio University, Athens, OH; † Sportsmedicine Grant, Columbus, OH

**Objective:** To examine the role of a comprehensive skin disease prevention protocol in conjunction with the use of a barrier cream to prevent tinea corporis (ringworm) in collegiate wrestlers.

**Design and Setting:** We studied a college wrestling team for 16 weeks during 1 season. During the first 8 weeks, no preventive measures were taken. For the remaining 8 weeks, wrestlers were randomized into 2 groups and used either a barrier or a placebo.

**Subjects:** Twenty-two male college wrestlers with a mean age of 20.4 years (range, 18.1 to 23.2), a mean weight of 68.4 kg (range, 55.8 to 130.2), and a mean height of 177.8 cm (range, 168.7 to 186.9).

**Measurements:** We performed skin checks daily. All new or exacerbated lesions were clinically diagnosed by the same team physician and recorded.

**Results:** Cases of tinea corporis declined from 10 diagnosed before initiation of the protocol to 1 after the protocol was initiated. One athlete in the placebo group was found to have tinea corporis versus none in the barrier cream group.

**Conclusions:** Strict adherence to the prevention protocol for skin infections significantly decreased the number of cases of tinea corporis. The use of the barrier cream in conjunction with the prevention protocol did not result in any further statistical reduction in the number of wrestlers who contracted tinea corporis.

**Key Words:** ringworm, barrier cream, skin infections, wrestling, prevention

# Treatment

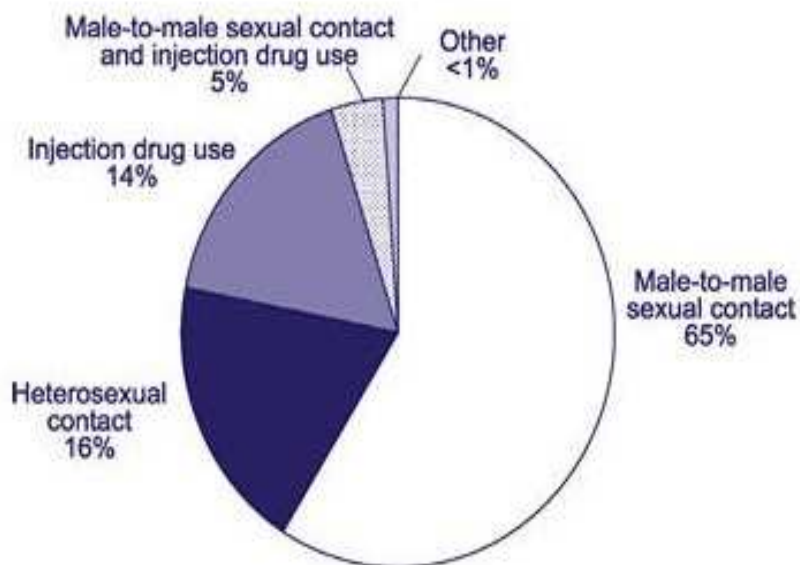
<i>Agent</i>	<i>Rx or OTC</i>	<i>Solution or spray*</i>	<i>Lotion†</i>	<i>Cream‡</i>	<i>Gel or ointment§</i>	<i>Powder*</i>
Tolnaftate (Tinactin)	OTC	Yes	Yes	Yes	Yes	No
Haloprogin (Halotex)	Rx	Yes	No	Yes	No	No
Ciclopirox (Loprox; Penlac  )	Rx	Lacquer	Yes	Yes	No	No
Clotrimazole (Lotrimin)	OTC	Yes	Yes	Yes	No	No
Miconazole (Micatin)	OTC	Yes	Yes	Yes	No	Yes
Ketoconazole (Nizoral)	Rx	Shampoo	No	Yes	No	No
Sulconazole (Exelderm)	Rx	No	No	Yes	No	No
Oxiconazole (Oxistat)	Rx	No	Yes	Yes	No	No
Econazole (Spectazole)	Rx	No	No	Yes	No	No
Butenafine (Mentax)	Rx	No	No	Yes	No	No
Naftifine (Naftin)	Rx	No	No	Yes	Yes	No
Terbinafine (Lamisil)	Rx	Yes	No	Yes	No	No
Clotrimazole/BMD (Lotrisone)	Rx	No	No	Yes	No	No

# HIV-AIDS

Origin in sub-Saharan Africa during 20th century, now pandemic

- US and dependent areas (2005)
  - estimated number 433,760
  - estimated deaths 17,011
  - cumulative deaths 550,394
- Median incubation from acquisition to development of immune deficiency syndrome about 10 years

Transmission categories of male adults and adolescents living with AIDS, 2004



# Virology 101

- Transcription - DNA sequence enzymatically copied by an RNA polymerase to produce a complementary RNA. i.e. transfer of genetic information from DNA into RNA. (DNA polymerase catalyzes polymerization of deoxyribonucleotides alongside DNA strand, which is "read" and used as template)
- Central dogma of molecular biology - DNA transcribes to RNA
- However, HIV possesses 'reverse transcriptase' which transcribes RNA into DNA
- Term "retro" in retrovirus refers to this reversal making HIV virus member of Retroviridae

# Virology 101

- HIV affects lymphocytes (and other cells such as macrophages and dendrites) that bear CD4 surface protein
- Consequent depletion of CD4 T-lymphocytes, impaired cell-mediated immunity and B-cell activation
- Acquired immunodeficiency syndrome (AIDS) is expression of this disordered immunity and is collection of symptoms and infections, mainly opportunistic



# Sport epidemiology

- American football only sport in which HIV transmission risk investigated, based on frequency of bleeding injuries and player contact
- Risk of infection estimated at less than 1 per 85 million game contacts
- Only one case of transmission during sports contact ever reported:
  - Italian soccer player seroconverting after bloody head-to-head collision with HIV-positive player
  - not possible to verify actual mode of transmission



# Sport epidemiology

- No definitive studies confirming transmission through sweat, tears, urine, sputum, vomitus, saliva, or droplets from sneezing or coughing
- Proven modes of transmission:
  - sexual contact
  - parenteral exposure to blood or its components
  - contamination of open wounds, mucus membranes with infected blood
  - blood inoculation
  - needle sharing
  - perinatal sharing
  - from infected mother to fetus



# Sport epidemiology

- Millions live with HIV-Aids worldwide
- Many of them children born to infected mothers
- Low probability of virus transmission during sport
- 'right to play' has become major affirmative action issue



# Manifestations

- Absence of symptoms to opportunistic infection
- During development of antibodies, (6-8 weeks) may be self-limited mono-like illness with fever, rash, myalgia, malaise
- Other syndromes include:
  - persistent lymph node enlargement (greater than 3 months)
  - unexplained weight loss, persistent diarrhea and chronic fatigue
  - peripheral neuropathy or myelopathy, not explained by other disease processes

# Opportunistic infections

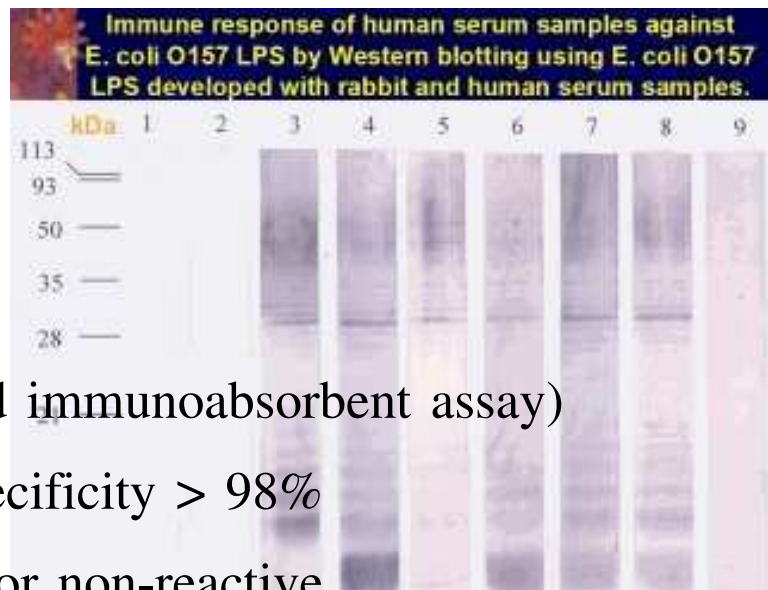
- Oral thrush
- Pneumocystis carinii pneumonia
- Diffuse lymphadenopathy due to mycobacteria or fungi

## Characteristic neoplasms

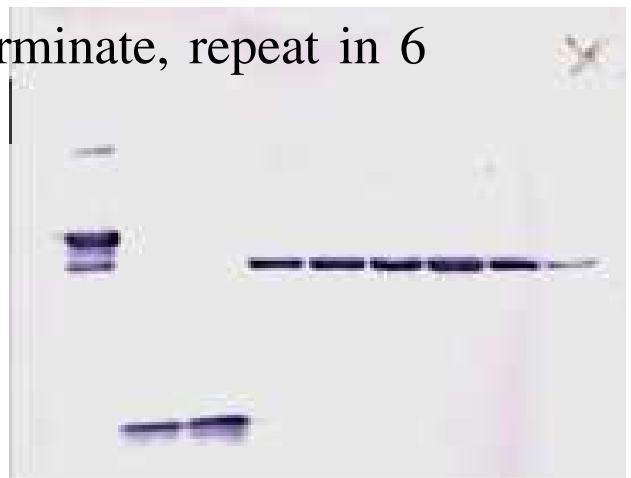
- Lymphoma
- Kaposi's sarcoma



# Laboratory diagnosis



- ELISA (enzyme linked immunoabsorbent assay)
  - Sensitivity and specificity > 98%
  - Reported reactive or non-reactive
  - Reactive tests should be repeated
  - Persistently reactive tests should be confirmed with Western Blot
- Western Blot (gel electrophoresis to detect specific protein)
  - Reported as positive, negative, or indeterminate
  - CDC recommends reaction with two of three specific bands for positivity
    - If results are indeterminate, repeat in 6 months



# Prevention

## For everyone:

- avoid unscreened blood products
- avoid unprotected intercourse
- avoid injection drug abuse
- avoid needle sharing

## For athletic trainers:

- skin lesions should be cleansed with antiseptic, covered with occlusive dressing
- participant with bleeding wound should be removed from participation until lesion cleansed and covered
- blood saturated uniform must be changed before return to competition

# Prevention

Coaches and trainers should receive training and be provided with:

- latex or vinyl gloves, disinfectant, bleach, designated receptacles for soiled equipment
- containers for disposal of needles, syringes or scalpels
- visibly contaminated athletic equipment should be wiped clean and disinfected with bleach
- gloves should be worn if risk of contact with blood or bodily fluids
- gloves should be changed after treating participants together with hand washing



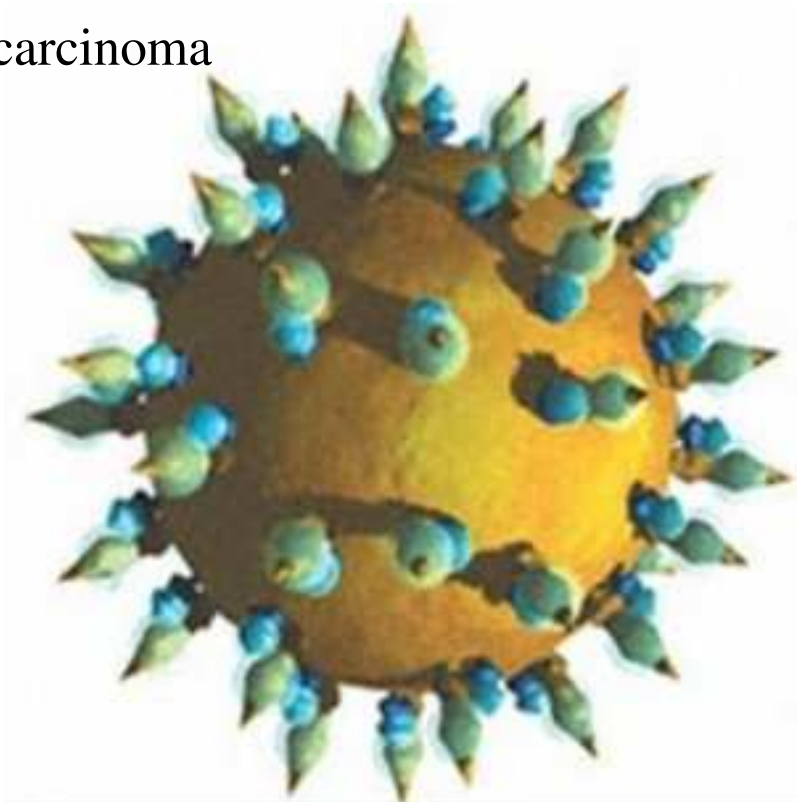
## Additional

- Privacy and confidentiality should be respected
- Athletes should be appropriately educated
- No restriction because of HIV status alone
- Consider immunization for other, more frequent, infectious diseases such as hepatitis B
- Occasionally, post-exposure treatment (needle stick, etc) with an antiretroviral regimen is indicated. Time is of essence.

**Do not hesitate to consult**

# Hepatitides

- Hepatotropic viruses:A, B, C, D and E
- 2 additional hepatotropic viruses, G and TT
  - no known human role
- A and E (HAV, HEV), fecal-oral transmission
  - no chronic form of either
- B, C and D (HBV, HCV, HDV) transmitted parenterally
  - may progress to chronic hepatitis, cirrhosis, hepatocellular carcinoma



## Acute and chronic

- Acute hepatitis
  - can be silent, especially in young
  - perhaps malaise, fatigue, headache, abdominal pain, myalgias, nausea, vomiting
  - associated jaundice, dark urine, clay-colored stools, tenderness to palpation over liver
- Chronic hepatitis
  - slow, indolent course
  - fatigue as only symptom until end-stage liver disease manifestations appear

# Hepatitis A

- Fecal-oral transmission (contaminated food, drinking water), although sexual and parenteral transmission can occur
- Large outbreaks create public health problems
- Greatest infectivity about 2 weeks before clinical symptoms, persists for further 2 - 3 weeks after symptoms develop



Flies may carry diseases such as hepatitis A, typhoid, amebic dysentery and polio by contaminating food or water

# Diagnosis

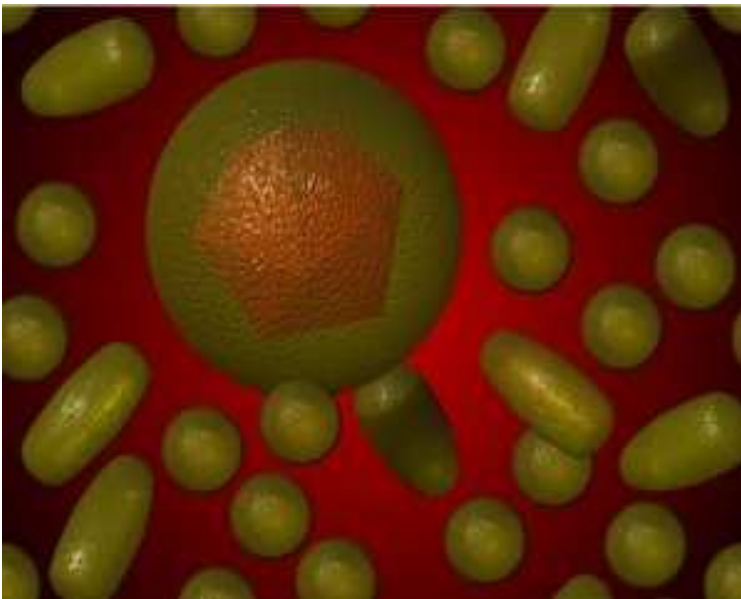
- Non-specific evidence of injury to hepatic cells
- Detection of IgM antibody to HAV
- Later development of IgG anti-HAV antibody occurs after recovery providing lifelong immunity

# Immunization

- HAV vaccine should be offered to:
  - travelers to endemic areas
  - men who have sex with men
  - illegal drug users
  - those with a high occupational risk
    - working with HAV-infected primates
  - those with clotting factor disorders
  - children residing in areas where incidence is twice national average

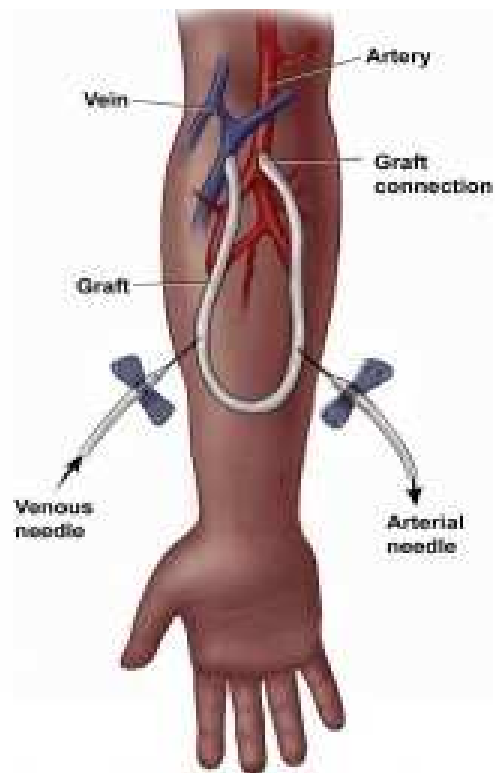
# Hepatitis B

- Compared to HIV, Hepatitis B (HBV) much more serious threat
- 150,000 - 300,000 infections per year in US
- 1.25 million chronically infected
- Clinical presentation as described for other hepatitides



# Risk factors

- Health care workers
- Hemodialysis
- Recipients of blood and blood products prior to 1992
- IV drug users. (60-70% of all new cases)
- Sexually active homosexual males
- Intimate exposure
- Snorting cocaine
- Recent body piercing
- Perinatal transmission





## Differential diagnosis

- Anything else which can involve the liver such as:
  - infectious mono
  - drug-induced hepatitis
  - alcoholic hepatitis
  - etc. etc.

## Laboratory diagnosis

Needs to differentiate between:

- acute and chronic infection
- successful vaccination etc.
- Structural viral features are used in process

### Antigens

- Hepatitis B surface antigen (HBsAg) first detectable antigen
- early in infection, may not have appeared (so-called window)
- may be undetectable later while being cleared by host
- Infectious virion contains inner "core particle" enclosing viral genome, known as hepatitis B core antigen, or HbcAg
- during 'window', IgM antibodies to hepatitis B core antigen (anti-HBc IGM) may be only serologic evidence of disease

## Antigens and Antibodies

- Shortly after HBsAg appears, hepatitis B e antigen (HBeAg) will appear
- Often, not invariably, associated with much higher rates of viral replication

# Antigens and Antibodies

- In natural course of infection, HBeAg may be cleared, and antibodies to 'e' antigen (anti-HBe) will arise immediately afterward, usually associated with dramatic decline in viral replication
- Finally, if host able to clear infection, HBsAg will become undetectable and antibodies to the hepatitis B surface antigen (anti-HBs) will follow

# Summary

**Interpretation of the Hepatitis B Panel**

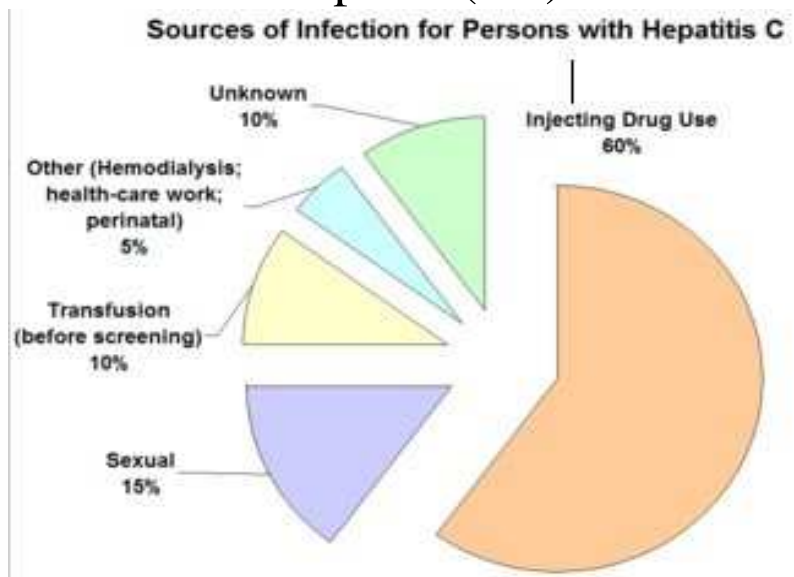
Tests	Results	Interpretation
HBsAg anti-HBc anti-HBs	negative negative negative	Susceptible
HBsAg anti-HBc anti-HBs	negative positive positive	Immune due to natural infection
HBsAg anti-HBc anti-HBs	negative negative positive	Immune due to hepatitis B vaccination**
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	Acutely infected
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	Chronically infected
HBsAg anti-HBc anti-HBs	negative positive negative	Four interpretations possible *

## Summary

- Might be recovering from acute HBV infection
- Might be distantly immune and test not sensitive enough to detect very low level of anti-HBs in serum
- Might be susceptible with a false positive anti-HBc
- Might be undetectable level of HbsAg present in the serum and the person is actually chronically infected

# Hepatitis C

- Less common than B
- $\approx 40,000$  new cases/year (US)
- 85% develop chronic hepatitis,
- $\approx 3$  million
- Transmission similar to B, blood and blood products, particularly pre- 1992
- 40%, mode unknown
- Snorting, male to male sex, intimate exposure, remain important but  $\approx 65%$  of new cases attributable to IV drug use
- Leading reason for liver transplant (US)



# Hepatitis C

- HCV antibody can be detected:
  - 80% within 15 weeks of exposure
  - >97% by 6 months
- Tests have strong positive predictive value for exposure to virus, but may miss those who have not yet developed antibodies or have insufficient levels
- Minority never develop antibodies and never test positive
- Anti-HCV antibodies indicate virus exposure but cannot determine ongoing infection



# Hepatitis C

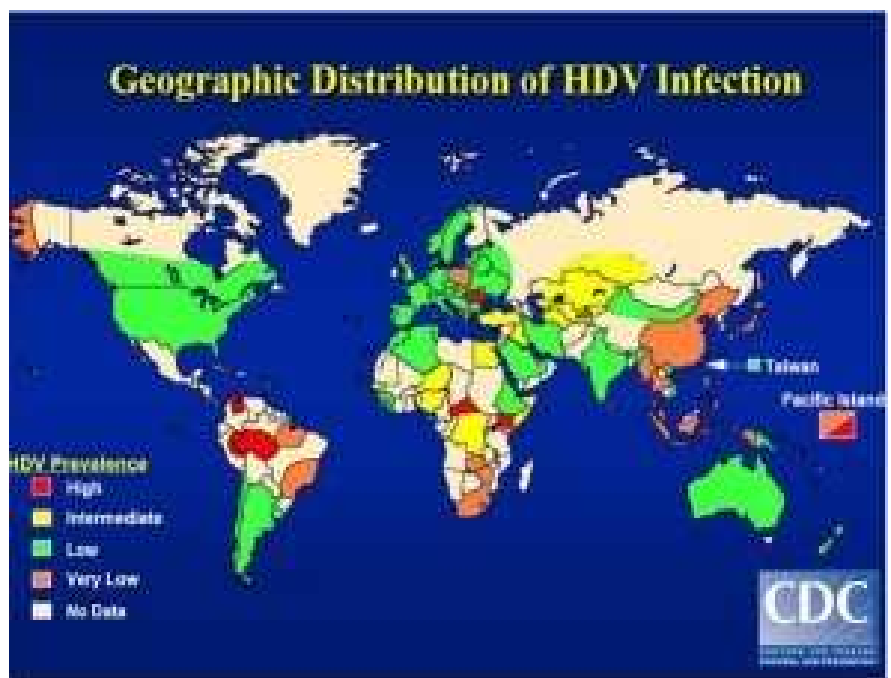
- All with anti-HCV antibody should be tested for presence of C virus to determine if current infection is present
- Tested by molecular nucleic acid methods:
  - polymerase chain reaction (PCR)
  - transcription mediated amplification (TMA)
  - branched DNA (b-DNA)
- Such tests detect:
  - presence of virus
  - viral load
  - probability of response to therapy but indicating neither severity nor progression likelihood

# Hepatitis C

In those with confirmed infection, genotype testing is recommended to determine required length and potential response to interferon-based therapy

# Hepatitis D

- Small circular RNA virus (delta virus or hepatitis D virus, HDV)
- Considered subviral satellite because propagates only in presence of another virus, hepatitis B virus (HBV)
- Transmission via simultaneous infection with HBV (coinfection) or via infection of an individual previously infected with HBV (superinfection)



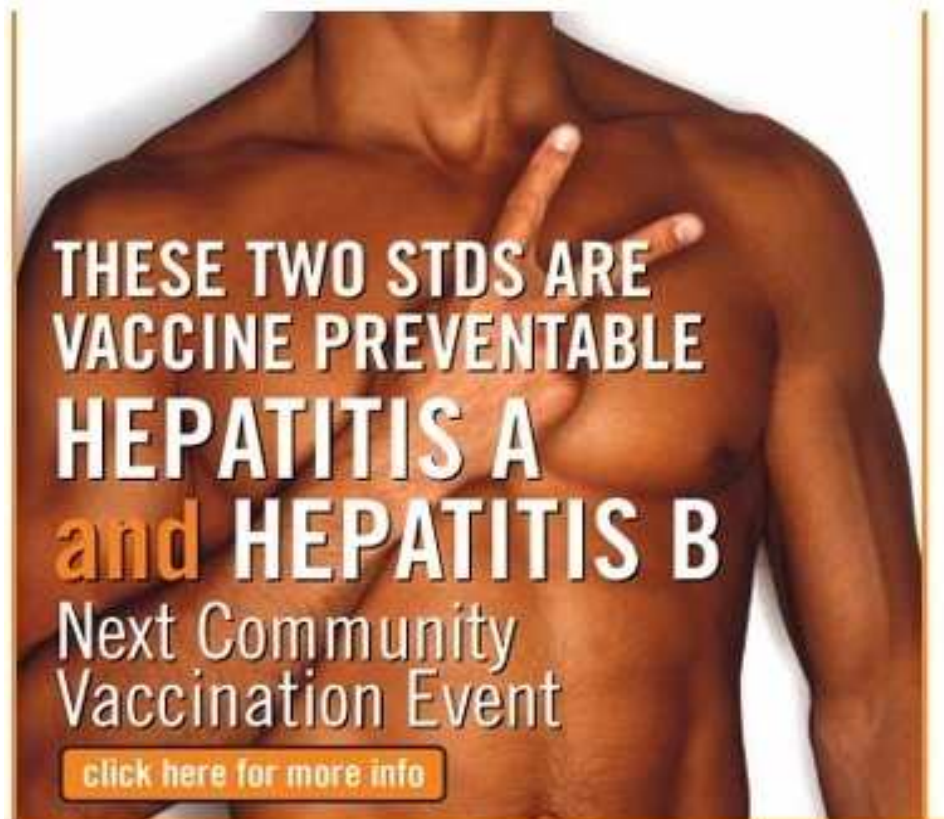
# Hepatitis D

Both superinfection and coinfection with HDV results in more severe complications than HBV alone

- Complications include:
  - greater likelihood of liver failure in acute infections
  - greater likelihood of liver cancer in chronic infections
  - In combination with B virus, D has highest mortality rate of all hepatitides - 20%

# Prophylaxis

- Pre-exposure
  - Active immunization for HAV and HBV and effective combined vaccine available
- Post-exposure
  - Immunoglobulin available
  - may be used in HAV (Ig)
  - should be used in HBV (HbIg)



# Treatment of chronic infection

## Hepatitis B

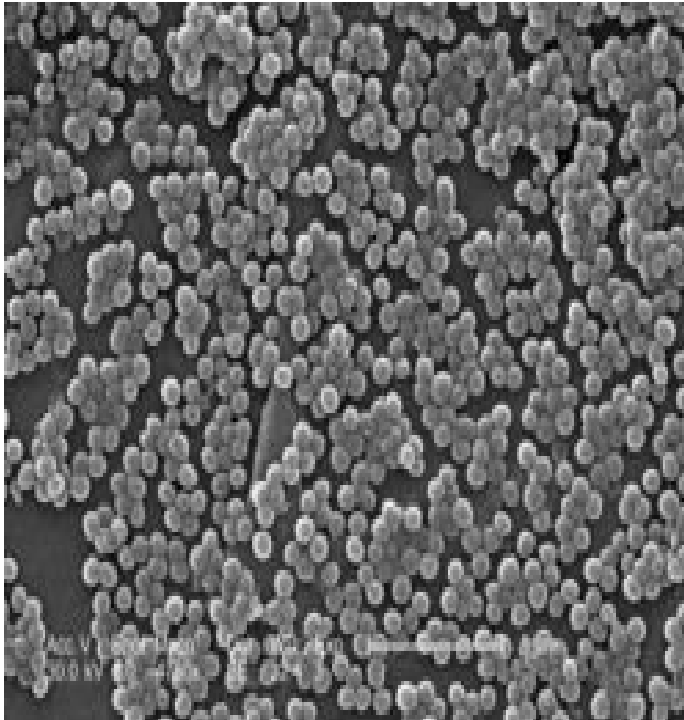
- six FDA-approved treatment options available for chronic infection
- about 45% achieve sustained response

## Hepatitis C

- viral levels can be reduced to undetectable levels by combination of interferon and ribavirin
- genotype of virus determines rate of response to treatment regime
- genotype 1 is more resistant to interferon therapy than other genotypes

# MRSA

- Resistant variation of common bacterium
- Evolved to survive beta-lactam antibiotics, including penicillin and methicillin
- Discovered in 1961 in UK, now worldwide. Often referred to as a “superbug” more appropriately multiple-resistant *Staphylococcus aureus*



## S. aureus

- Most commonly colonizes anterior nares
- Healthy may carry MRSA asymptomatically from weeks to years
- 3 postulates:
  - widespread, inappropriate, antibiotic use, particularly in viral infections
  - inclusion of antibiotics in animal feed
  - genetic selection



## Genetic selection

- Constant evolution because of mutations during genetic replication
- Those with innate resistance pre-selected and assume dominance
- Patient non-compliance and incomplete courses of antibiotics, encourage survival of resistant or partially-resistant strains with their further multiplication

# Presentations

Commonest presentations include:

- pustule
- furuncle
- carbuncle
- abscess
- misdiagnosis as 'spider bite' not uncommon
- may also present as:
  - cellulitis
  - impetigo
  - red, swollen and painful wounds



# Risk factors

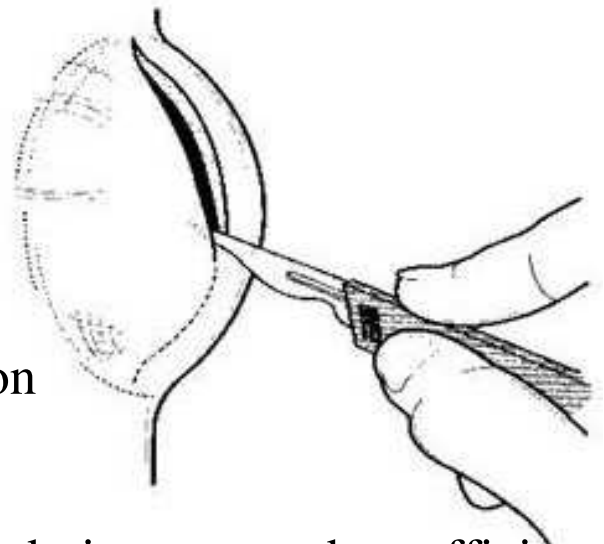
## 5 "C"s (Courtesy of CDC)

- CROWDING
- Frequent skin CONTACT
- COMPROMISED skin
- Sharing CONTAMINATED personal care items
- Lack of CLEANLINESS



## Outpatient management

- Skin and soft tissue infection
  - local care, incision and drainage may be sufficient
  - consider topical antimicrobials
  - if oral antibiotics used, include therapy active against MRSA



# Systemic antimicrobials

Use systemic antimicrobials based on:

- clinical judgment
- Severity
- Size
- Location
- rapidity of spread
- presence of systemic illness
- monitored response to antibiotics
- adjusted Rx based on results of culture and susceptibility
- Cephalexin and Dicloxacillin preferred for MSSA

# Education

- Adequate hygiene
- Clean, dry dressings that cover lesions completely
- No sharing of towels, bar soap, personal care items
- Disinfect surfaces that contact bare skin
- Maintain equipment hygienically



## Recommended antimicrobials

- Trimethoprim-Sulfamethoxazole
- Doxycycline or minocycline
- Clindamycin
  - if Clindamycin considered, isolates resistant to erythromycin should be tested for inducible clindamycin resistance. ('D' test)
- If Group A Strep suspected



- rapid onset
- lymphangitic streaking
- regional lymphadenopathy
- Beta-lactam, Macrolide or Clindamycin should be included
- TMP-SX and Tetracyclines not be relied upon again GAS

## NOT recommended

- Fluoroquinolones
  - Macrolides
  - Linezolid
- 
- Eradication of CA-MRSA Colonization not routinely recommended