# HUMAN IMMUNODEFICIENCY VIRUS (HIV) AND OTHER BLOOD-BORNE PATHOGENS IN SPORTS

JOINT POSITION STATEMENT BY THE AMERICAN MEDICAL SOCIETY FOR SPORTS MEDICINE (AMSSM) AND THE AMERICAN ORTHOPAEDIC SOCIETY FOR SPORTS MEDICINE (AOSSM) The AMSSM and the AOSSM recognize that human immunodeficiency virus (HIV) infection, as well as other blood-borne pathogens including hepatitis B and C, poses a series of important and complex issues for practitioners involved in the care of athletes. This document is directed toward physicians and other health care providers involved in the field of sports medicine and is intended to serve as a guideline to:

1. understand HIV and other blood-borne pathogens as they relate to sports;
2. implement practical preventive measures that further minimize the low risk of transmission of these pathogens.
3. develop effective educational initiatives regarding these infections, their transmission, and prevention among athletes and others involved in sports; and
4. provide guidance for the care of HIV-infected athletes.

The AMSSM and AOSSM recognize that the medical information concerning blood-borne pathogens, particularly with regard to HIV, is evolving rapidly. This document is intended only as a guideline and is based on the present available knowledge. The following recommendations may change in the future.

## HIV and Hepatitis B, C, and D: Epidemiology and Transmission

In the United States alone it is estimated that there are approximately one million HIV-infected persons. This translates into one infection in every 250 Americans. The natural history of HIV infection, while continuously being refined, is one of a progressive disease leading to immune suppression and the development of acquired immunodeficiency syndrome (AIDS). The AIDS is characterized by the development of opportunistic infections and malignancies that ultimately lead to the death of the infected person. However the course of the infection is frequently protracted, affording the HIV-infected person many years of good health, during which issues concerning an infected person's involvement in exercise and sports may arise. The HIV is transmitted through sexual contact, parenteral exposure to blood and blood components, contamination of infected blood into open wounds or mucous membranes, and perinatally from an infected mother to fetus or infant. There is no evidence of transmission via other routes, such as through casual contact in a household or the aerosol route. One case was reported of transmission from an HIV-infected hemophiliac to his twin hemophiliac brother, which may have resulted from a shared razor." A second case was documented of transmission of the HIV from an HIV-infected child to an HIV-seronegative child. Although the mode of transmission is unknown, it is believed to be through unrecognized exposure to blood.[7]

While the virus may be present in a variety of body fluids, only blood poses any degree of risk of transmission in athletic settings. Tears, sweat, urine, sputum, vomitus, saliva, and respiratory droplets have not been implicated in infection transmission. There are currently estimated to be over one million carriers of hepatitis B virus (HBV) in the United States. Hepatitis B is spread through the same routes as HIV (sexual contact, parenteral blood exposure, and perinatally) but is more readily transmitted than HIV. Explanations for this difference may include the fact that HBV is far more concentrated in blood, with a milliliter of blood containing upward of 100 million infectious doses of the virus,[2] whereas HIV is generally found in concentrations of only a few hundred to a few thousand particles per milliliter of blood.[12]

In 1989, hepatitis C virus (HCV) was isolated and identified as an important cause of posttransfusion hepatitis. The current state of medical knowledge of HCV in comparison with HIV and HBV is incomplete, but it does appear to be efficiently transmitted by blood transfusion and by needle sharing among intravenous drug users, but only rarely as a result of occupational exposure in health-care settings.[8]

Hepatitis delta virus (HDV) is an unusual RNA virus that requires the presence of HBV for expression of the disease. The HDV results in a more virulent course of the disease than HBV alone and may be present during initial infection with HBV or may infect persons with preexisting HBV infection. Risk factors for the two diseases are similar.[16]

## Transmission of HIV and Other Blood-Borne Pathogens Through Sports

### HIV

At present there are no epidemiologic studies assessing the transmission of HIV or other blood-borne pathogens during athletic activity. One alleged case of HIV transmission was reported in 1990 between soccer players in Italy.[2]

However, this case lacked sufficient documentation to be considered a transmission during athletic activity.[3]

This absence of documented cases of transmission during athletic activity is significant in view of the known prevalence of HIV infection. The risk of HIV transmission on the field in the National Football League has been conservatively estimated at below one per million games.[8]

The experience gathered from occupational exposure in the health care setting has shown that the risk of transmission for parenteral exposure is likely influenced by a variety of factors, including the size of the inoculum and the route of entry. The HIV transmission is documented to occur in approximately 1 of 300 needle-stick injuries involving infected blood. However, most cases have been associated with deep (intramuscular) penetrations with hollowbore needles.[9] Mucocutaneous transmission has been only rarely reported, and each case has involved large quantities

of blood, prolonged exposure, and a portal of entry. Prospective analysis of cases of HIV-infected blood contact with mucous membranes or nonintact skin or both has revealed one case of such transmission.[14]

These occupational data provide strong resumptive evidence that sports-related transmission of HIV is unlikely. However, despite the negative data, the theoretical chance is not zero for HIV transmission in situations in sports in which significant blood exposures to open wounds could occur. However, the risk is sufficiently small that we are not able to quantify it. HBV There has been one valid report (based on epidemiologic evidence) of HBV transmission in sports participation. This involved a group of high school-aged Sumo wrestlers in Japan and was reported in 1982.[15]

Given the prevalence of chronic carriers of HBV in the general population, it is remarkable that only one well-validated case has been reported in the literature. In the health care setting the risk of transmission for parenteral exposure is much greater than that of HIV (approximately 3 of 10).[4]

In addition, cases of transmission among household/institutional contacts who have not been involved in shared needle use or sexual intercourse with other infected partners have been reported only rarely.[13]

Although not certain, the routes of entry may have resulted from unnoticed wound or mucous membrane exposure through shared razors or toothbrushes. The chronic HBV carrier who is e-antigen positive presents the greatest concern for transmission. Again, as in the case of HIV, we are not able to quantify the risk of transmission in sports. However, given the limited data about transmission, it may be presumed that the sports-related transmission risk for HBV (especially in the presence of

e-antigen positive persons) is greater than the risk for HIV. It should be recognized that contact and collision sports have a higher risk of significant blood exposure than do other sports. Athletes competing in such sports need to be aware of the small theoretical risk of blood-borne pathogen transmission in these sports. The infected athlete has special responsibilities in continuing to participate in this form of competition. Even given these small probabilities of transmission, where preventive actions (which are consistent with basic good hygiene) are practical and simple to implement, such actions should be taken. The greatest risk to the athlete for contracting any blood-borne pathogen infection is through sexual activity and parenteral drug use, not in the sporting arena.

## Education

The AMSSM and AOSSM recognize that preventive education remains the most important weapon in the effort to prevent blood-borne pathogen transmission. Sports medicine practitioners should play an important role in educational activities directed at athletes, their families, athletic trainers, other healthcare providers, coaches, officials, and others involved in sports. First and foremost, athletes should be educated in clear and effective language about the risk of HIV and other blood-borne pathogen transmission through sexual contact. Abstinence or monogamous sex between uninfected partners is the only certain strategy for protection against sexual transmission. In other sexual relationships, the use of condoms with water-based lubricants is recommended. Although the effectiveness of spermicides containing nonoxynol-9 is still being reviewed, these may serve as adjuncts to condoms. Also, the athlete is susceptible to transmission via shared contaminated needles and syringes associated with drug use. This includes the use of ergogenic aids such as anabolic steroids as well as drugs of abuse, such as heroin. These risks should be clearly presented to the athlete as well. Athletes should also avoid sharing personal items such as razors, toothbrushes, and nail clippers. Education regarding the risk of transmission during athletic competition is also important. The risk of such transmission, while highly improbable, can be minimized further by such common-sense hygienic measures as the prompt application of first aid to bleeding injuries. Athletes should be made aware that it is in their best interest to report significant injuries in a timely manner to the appropriate official, coach, or caregiver. Caregivers should be trained in and adhere to universal precautions.[5,13] Physicians involved in sports medicine can also play important roles in general.

Education should be designed to reduce fear and misconceptions among athletes, their families, and all persons associated with sports concerning blood-borne pathogen transmission. The athletic setting affords unique opportunities for educational initiatives regarding the transmission and prevention of HIV and other blood-borne pathogens. Physician-athlete interactions such as preparticipation or injury evaluations may be the only interactions that the athlete has with a knowledgeable health professional. Opportunities to incorporate education on disease transmission during these encounters should be sought. Athletic organizations, as well as individual athletes, may also be able to make meaningful contributions to the community's overall education effort.

### The HIV-Infected Athlete

Physicians involved in sports medicine must be knowledgeable in the issues surrounding management of HIV-infected athletes. Given the continuing epidemic of HIV infection worldwide, this disease will be diagnosed in increasing numbers of infected athletes. Although HIV is an extremely serious health problem, it must be recognized that it is a chronic disease, frequently affording the infected person many years of excellent health

and productive life during its natural history. During the period of preserved health, the sports medicine practitioner may be involved in the series of complex issues surrounding the advisability of continued exercise and athletic competition. The first priority of the HIV-infected athlete is ensuring that he or she comes under the care of a physician knowledgeable in the management of HIV infection. In addition, the infected athlete should be directed to appropriate counselling services dealing with the psychosocial aspects of this disease. Confidentiality of the patient must be maintained as dictated by medical ethics and legal statutes. The decision to advise continued athletic competition should be individualized involving the athlete, the athlete's personal physician, and the sports medicine practitioner. Variables to be considered in reaching this decision include:

1. the athlete's current state of health and the status of HIV infection,
2. the nature and intensity of training,
3. potential contribution of stress from athletic competition, and
4. potential risk of HIV transmission.

There is no evidence that exercise and training of moderate intensity are deleterious to the health of HIV-infected persons. To the contrary, there is growing evidence that such forms of physical activity may be beneficial both psychologically and immunologically, and thus should be encouraged with appropriate monitoring.[2]

When counselling the HIV-infected athlete, sports medicine physicians should remember that severe psychological and physical stress, as can be found in athletic competition, can have a deleterious effect on the functions of the immune system as well as the overall state of mental and physical health and thus should be taken into consideration. Based on current medical and epidemiologic information, HIV infection alone is insufficient grounds to prohibit athletic competition.

### The HBV-Infected Athlete

In general, acute HBV infection should be viewed just as other viral infections. Decisions regarding ability to play are made according to clinical signs and symptoms such as fever, fatigue, or hepatomegaly. There is no evidence that intense, highly competitive training is a problem for the asymptomatic HBV carrier (acute or chronic).

## HIV Testing

### Mandatory Testing

The AMSSM and AOSSM believe that mandatory testing or widespread blood-borne pathogen screening is not justified for medical reasons as a condition for athletic participation or competition. Such testing would not effectively prevent infection, promote health, or be easily implemented. Any consideration of a blood-borne pathogen testing program in the athletic setting must address the practical, medical, scientific, legal, and ethical problems that such a program poses. First, the issue of who should be tested may be unclear. Testing at one level (the professional level) cannot be done without consideration of testing at other levels (e.g., collegiate, high school, community sports programs). In addition, the frequency of testing would have to be determined. An athlete with a negative test at the beginning of the season would not be guaranteed of having a negative test three months later. Massive screening in low-prevalence populations leads to a higher rate of false-positive tests, resulting in undue duress, counselling, and complex follow-up evaluation. Most importantly, any testing program, no matter how widespread, is not justifiable precisely because it fails to further diminish the "too low to qualify risk of blood-borne pathogen transmission in sports. Other factors, including overwhelming costs, as well as legal and ethical considerations of mandatory testing for populations that may include minors, further suggest that there is no rational basis for supporting blood-borne pathogen tests in sports.

### Voluntary Testing

Voluntary testing should be suggested to athletes as well as nonathletes who may have been exposed to blood-borne pathogen transmission. Included would be those who have had:

1. multiple sexual partners;
2. injections of nonprescription drugs, such as drugs of abuse or ergogenic aids;
3. sexual contacts with at-risk persons;
4. sexually transmitted diseases, including HBV; and
5. blood transfusions before 1985.

Pre- and posttest counselling is extremely important for anyone undergoing HIV testing and should be arranged by the ordering physician. When obtaining informed consent and reviewing the positive and negative results, state guidelines must be followed. (Guidelines may vary from state to state.) Personal knowledge of blood-borne serum status combined with pre- and posttest counselling can be a helpful adjunct to preventive education. Knowledge of one's infection is helpful for a variety of reasons. These reasons include availability of therapy for asymptomatic patients in the case of HIV, modification of behavior that can prevent transmission of blood-borne pathogens to others, and appropriate counselling regarding exercise and sports participation. The AMSSM and AOSSM urge that applicable public health measures for handling an epidemic be followed with the HIV-infected persons.

## Specific Management and Preventive Measures for Sports Events

Any risk of blood-borne pathogen transmission in sports is exceedingly small. However, all involved with sports will help further reduce the risk of transmission by following guidelines that are both practical and simple to implement. A major component to these guidelines is common sense and adherence to basic principles of hygiene. Universal precautions, developed by the Centers for Disease Control and Prevention, should be learned and followed by all health care providers. Because the risk of blood-borne pathogen transmission in sports is confined to contact with blood, body fluids, and other fluids containing blood, preventive measures should be focused on the recognition and immediate treatment of bleeding.

The following recommendations are designed to minimize the risk of blood-borne pathogen transmission in the context of athletic events and provide treatment guidelines for caregivers.

1. Pre-event preparation includes proper care for existing wounds. Abrasions, cuts, or oozing wounds that may serve as a source of bleeding or as a portal of entry for blood-borne pathogens should be covered with an occlusive dressing that will withstand the demands of competition. Likewise, care providers with healing wounds or dermatitis should have these areas adequately covered to prevent transmission to or from a patient.
2. Necessary equipment or supplies or both important for compliance with universal precautions should be available to caregivers. These supplies include latex or vinyl gloves, disinfectant, bleach (freshly prepared in a 1:10 dilution with tap water), antiseptic, designated receptacles for soiled equipment or uniforms (with separate waterproof bags or receptacles appropriately marked for uniforms and equipment contaminated with blood), bandages or dressings, and a container for appropriate disposal of needles, syringes, or scalpels.
3. During the sports event, early recognition of uncontrolled bleeding is the responsibility of officials, athletes, and medical personnel. Participants with active bleeding should be removed from the event as soon as this is practical. Bleeding must be controlled and the wound cleansed with soap and water or an antiseptic. The wound must be covered with an occlusive dressing that will withstand the demands of the activity. When bleeding is controlled and any wound properly covered, the player may return to competition. Any participant whose uniform is saturated with blood, regardless of the source, must have that uniform changed before returning to competition.
4. The athletes should be advised that it is their responsibility to report all wounds and injuries in a timely manner, including those recognized be fore the sporting activity. It is also the athlete's responsibility to wear appropriate protective equipment at all times, including mouth protectors, in contact sports.
5. The care provider managing an acute blood exposure must follow the guidelines of universal precaution.[1,15] Appropriate gloves should be worn when direct contact with blood, body fluids, and other fluids containing blood can be anticipated. Gloves should be changed after treating each individual participant and, as soon as practical after glove removal, hands should be washed with soap and water or antiseptic.
6. Minor cuts or abrasions or both commonly occur during sports. These types of wounds do not require interruption of play or removal of the participant from competition. Minor cuts and abrasions that are not bleeding should be cleansed and covered during scheduled breaks in play. Likewise, small amounts of blood stain on a uniform do not require removal of the participant or a uniform change.
7. Lack of protective equipment should not delay emergency care for life-threatening injuries. Although HIV is not transmitted by saliva, medical personnel may prefer using airway devices. These devices should be made available whenever possible.
8. Any equipment or area (e.g., wrestling mat) soiled with blood should be wiped immediately with paper towels or disposable cloths. The contaminated areas should be disinfected with a solution prepared with one part household bleach to ten parts water and should be prepared fresh daily. The cleaned area should be dry before reuse. Persons cleaning equipment or collecting soiled linen should wear gloves.
9. Postevent considerations should include reevaluation of any wounds sustained during the sporting event. Further cleaning and dressing of the wound may be necessary. Also, blood-soiled uniforms or towels should be collected for eventual washing in hot water and detergent.
10. Procedures performed in the training room are also governed by adherence to universal precautions. Gloves should be worn by

care providers. Any blood, body fluids, or other fluids containing blood should be cleaned in a manner as described previously. Equipment handlers, laundry personnel, and janitorial staff should be advised to wear gloves whenever contact with bloody equipment, clothing, or other items is anticipated. Appropriate containers for the disposal of needles, syringes, or scalpels should be available.

11. Some of the members of the athletic health-care team may be considered to be covered under OSHA guidelines. Assessment of the application of these guidelines must be made on an individual basis. This application may include consideration for HBV immunization for some personnel who are involved with the athletic healthcare team. No recommendation has been specifically made for the immunizations against HBV for athletes in particular. However, several groups now recommend universal immunization against HBV of the newborn and college-aged groups.[6,10,17]

Many athletic contests and practices, especially at the community or scholastic level, occur without medical personnel in attendance. The above guidelines apply not only to physicians, athletic trainers, and physical therapists involved in the coverage of sports, but also to coaches and officials who may be involved as the primary caregivers in many circumstances. All personnel involved with sports should be trained in basic first aid and infection control, including the preventive measures outlined here.

## Legal Considerations

The AMSSM and AOSSM support the following statements regarding confidentiality and other legal considerations.

1. Confidentiality dictates that medical information is the property of the patient. The patient (or parent or guardian, in the case of a minor) is the sole decider as to whom the medical information is transmitted. Exceptions include medical conditions that are reportable by state regulation and statute. Acquired immunodeficiency syndrome and hepatitis A and B are reportable in all states, but HIV infections are reportable to public health agencies in many, but not all, states. Any physician who wants to know how to report a case or has related questions may contact city, county, or state health officials.
2. The team physician may feel dual, and at times conflicting, responsibilities in managing the HIV infected athlete and other teammates or opponents. However, confidentiality makes the physician's responsibilities very clear. The physician may not apprise other physicians, coaches, trainers, teammates, or opponents of the HIV-positive athlete as to that athlete's infection. Thus, the physician is not liable for failure to warn the uninfected opponent. That legal responsibility lies with the HIV-infected athlete. However, the uninfected athlete must be aware that he or she assumes some of the risk (albeit small) of contacting HIV or other blood-borne pathogen disease in sports activities because it cannot be assumed that his or her competitors are HIV (or other blood-borne pathogen) free. This is the same as with other injuries that are inherent in sports.
3. The courts have universally found that the responsibility for the sexual transmission of HIV lies with the HIV-infected person. As yet, there has been no legal activity regarding the transmission of HIV in athletic competition. There is then no legal precedent with regard to HIV transmission in sports.
4. The physician is advised to be aware of state and federal statutes and regulations concerning confidentiality. It is also important for the physician to know state and federal rules and regulations concerning blood contamination in the work place, including federal and state OSHA regulations on the prevention of blood-borne pathogen transmission in the work place.

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## *Suggested Readings*


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