

# FBI

## Law Enforcement Bulletin

FILM WITH EACH ARTICLE

CAUTION

AIDS  
CASE I

July 1987

Autoclaving  
for Biohazardous  
Materials

Self Venting/Sealed

106429  
106434



Containing Infected Evidence **BASE COPY**

**FILM WITH EACH ARTICLE**  
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**FBI**

**Law Enforcement Bulletin**



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**The Cover:**

FBI Laboratory employee sterilizes evidence contaminated with the AIDS virus prior to examination. (See article p. 1.)

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# Collecting and Handling Evidence Infected with Human Disease-Causing Organisms

**Today ... investigators and crime scene technicians are more  
easily than ever before to encounter crimes of violence involving  
blood and other body fluids of persons with infectious diseases."**

By

PAUL D. BIGBEE, M.S.

*Special Agent*

*Serology Unit*

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*Washington, DC*

ve been assigned as the  
gator in a homicide that has  
d in your jurisdiction. The  
is an apartment which has  
ly secured by the first of-  
g. Upon entering the apart-  
bserve the nude body of a  
who has been stabbed nus-  
s, lying in a pool of liquid  
ted blood. His hands are  
wrists with rope, the body  
asculated, and no weapon  
u also discover a hypoder-  
a spoon "cooker," and a  
hite powder near the body,  
athroom, three drugs, Iso-  
upin and Ethambutol, pre-  
omeone at that address.  
rienced investigator could  
ertain that this was the  
omosexual murder and in-  
ast one intravenous drug  
escription drugs pose a di-  
you later learn that they are

prescribed for persons with active  
cases of tuberculosis.<sup>1</sup>

This victim is typical of one who fits  
into the group of high-risk people often  
infected with AIDS, hepatitis B, and tu-  
berculosis. Knowing this, you resist the  
urge to immediately leave the apart-  
ment and begin to process the crime  
scene. But, how should you proceed?  
What precautions should you take to  
protect yourself and others from possi-  
bly contracting a lethal or infectious dis-  
ease? And, what do you do with the evi-  
dence once it is collected?

Today, with AIDS and hepatitis B  
infections virtually epidemic, investiga-  
tors and crime scene technicians are  
more likely than ever before to encoun-  
ter crimes of violence involving blood  
and other body fluids of persons with in-  
fectious diseases. It is also likely that  
the patrol officer will encounter these in-  
fectious body fluids during his routine  
activities. For example, the

mouthpieces used on breath alcohol in-  
struments can be contaminated with  
the saliva of a person with a communi-  
cable disease. Officers conducting traf-  
fic accident investigations may come in  
contact with potentially infectious blood,  
and the search of a suspected drug  
user can and has resulted in serious  
puncture wounds from secreted hypo-  
dermic needles.

This article does not purport to  
solve all the potential problems posed  
to law enforcement officers when hand-  
ling blood and other body fluids. Its pur-  
pose is to acquaint the officer with  
some of the most commonly encoun-  
tered diseases from infectious body flu-  
ids and to recommend precautions that  
can be taken.

Human beings can be infected with  
pathogenic (disease-causing) micro-  
organisms and may or may not show  
symptoms of a disease state. Examples  
of these pathogens include bacteria,



Special Agent Bigbee

such as those responsible for tuberculosis, syphilis, and gonorrhea; viruses, such as those responsible for AIDS, hepatitis, and herpes; and fungi, such as that responsible for candidiasis. Other microscopic organisms, such as one-celled animals, can also be found in the blood of humans.

Since it is beyond the scope of this article to present a detailed listing of each potentially infectious micro-organism law enforcement officers may encounter, this article will concentrate on the disease-causing organisms responsible for AIDS, hepatitis B, and tuberculosis. However, the precautions taken when dealing with any pathogen that may be found in body fluids are essentially the same.

#### AIDS

Acquired Immune Deficiency Syndrome (AIDS) has a variety of manifestations that range from asymptomatic (no symptoms) infection to severe immunodeficiency and life-threatening secondary infections or cancer.<sup>2</sup> The virus responsible for AIDS, HTLV-III (Human T-lymphotropic Virus Type III) is a "retrovirus" which invades the victim's immune system, destroys it, and causes the patient to become highly susceptible to secondary infections, including a severe form of pneumonia caused by the one-cell animal *Pneumocystis carinii*. Kaposi's sarcoma, a form of cancer, may also develop. The Centers for Disease Control (CDC) in Atlanta, GA, advise that tuberculosis cases in the United States have recently increased because of the occurrence of tuberculosis among persons with AIDS.<sup>3</sup> The manifestations of this disease are usually confined to the lung area, but in AIDS patients, the bacteria often invades other areas of the body, including the lymph system.

The AIDS virus has been isolated from blood, bone marrow, saliva, lymph nodes, brain tissue, semen, cell-free plasma, vaginal secretions, cervical secretions, tears, and human milk.<sup>4</sup> There is currently no vaccine against this virus which, if fully developed as a disease, is fatal.

The highest frequency of AIDS cases occurs in male homosexuals, intravenous drug users, and hemophiliacs—the "high-risk" categories. The transmission of AIDS has been shown to occur from male to male, male to female, female to male, by intravenous drug users sharing infected needles, from blood and blood product transfusions, transplacentally (through the placenta), by artificial insemination, and during organ transplant.<sup>5</sup> In one unusual case, a male hemophiliac received the infection from a blood product, transmitted the virus to his wife, who then infected her infant after birth by Caesarian section, presumably from contaminated human milk.<sup>6</sup>

It appears unlikely that the virus is transmitted through casual contact or airborne particles. Cases of accidental inoculation by laboratory personnel with AIDS and hepatitis by needles and other sharp instruments have occurred.<sup>7</sup> Correctional facility officers should be aware that the virus has been isolated from inmates in the United States who claim both homosexual contact and intravenous drug use.<sup>8</sup> Because the incubation period may be years in duration, it seems logical that more prison inmates will exhibit symptoms of AIDS in the future.

In a study by the U.S. Department of Defense, conducted from October 1, 1985, through March 3, 1986, it was determined that positive tests for AIDS antibodies in military recruits was 1.5 per 1,000, a pattern that could be consistent throughout the United States in general.<sup>9</sup> Leading experts and epi-

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***"The first line of defense against infection at the crime scene is protecting the hands and keeping them clean and away from the eyes, mouth, and nose."***

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demologists anticipate that in the next 20 years, this number will increase exponentially.

Researchers have determined that the AIDS virus can survive at least 15 days in dried and liquid blood samples at room temperature,<sup>10</sup> although the survivability of the AIDS virus in other body fluids has not been determined. It is not known how long the hepatitis B virus and the tuberculosis spore can survive at room temperature.

#### **Hepatitis B**

Hepatitis B (serum hepatitis) is a viral infection that can result in jaundice, cirrhosis, and sometimes, cancer of the liver. The virus may be found in human blood, urine, semen, cerebrospinal fluid, vaginal secretions, and saliva.<sup>11</sup> Injection into the bloodstream, droplet exposure of mucous membranes, and contact with broken skin are the primary hazards. There is a vaccine currently available against hepatitis B.

#### **Tuberculosis**

This bacterial disease can be transmitted through saliva, urine, blood, and in some cases, other body fluids by persons infected with it. It can enter the body through droplets that are inhaled and primarily causes lung infections. The tuberculosis bacteria forms spores, similar to seeds in plants, that are highly resistant to drying and other physical means that would easily kill other bacteria.<sup>12</sup>

#### **Defenses Against Exposure**

What can be done to minimize the exposure of investigators and crime scene technicians to pathogenic microorganisms? The first line of defense

against infection at the crime scene is protecting the hands and keeping them clean and away from the eyes, mouth, and nose. The best protection is to wear disposable gloves. Any person with a cut, abrasion, or any other break in the skin on the hands should never handle blood or other body fluids without protection. Convenient boxes of latex medical examination gloves, in different sizes, may be purchased and kept in the crime scene kit or in the trunk of a patrol car. Always keep a plastic bag, clearly marked, which will be used for no other purpose than to collect contaminated items until they can be disposed of properly. Replace the gloves when they become heavily stained or if you leave the crime scene. When you are completely finished with the crime scene, or if you leave temporarily, wash your hands thoroughly with soap and water. If cotton gloves are worn when working with items having potential latent fingerprint value, wear cotton gloves over latex ones. Remember that under no circumstances, should anyone at the crime scene be allowed to smoke, eat, drink, or apply makeup.

Shoes can become contaminated with blood, which can then be transported from the crime scene to automobiles, the police station, or home. Protective coverings made of disposable plastic or paper should be considered.

Particles of dried blood fly in every direction when a dried blood stain is scraped. Because of this, surgical masks and protective eyewear should be considered when the possibility exists that dried blood particles or drops of liquid blood may strike the face or eyes. A mask and glasses will not protect you from viruses due to their minute size, but will certainly help prevent dried or liquid blood particles, which contain vi-

ruses, from entering the mouth, nose, or eyes.

While processing the crime scene, constantly be alert for sharp objects, since hypodermic needles and syringes are often secreted in unusual places. When handling knives, razors, broken glass, nails, or any other sharp object bearing blood, use the utmost care to prevent a cut or puncture of the skin. Even seemingly innocuous items, such as metal staples in paper, present a potential hazard. For this reason, use paper or plastic tape, whenever possible, when packaging evidence.

In the event you receive an accidental puncture or cut from a needle or instrument on which blood or another body fluid is present, immediately seek medical assistance. If an antiseptic, such as rubbing alcohol is available, cleanse the wound with the antiseptic, then wash with soap and water prior to seeking medical assistance. A physician will decide the best course of remedies, depending on the situation and the type of wound.

If practical, use only disposable items at a crime scene where infectious blood is present. However, even these items, such as pens, pencils, gloves, masks, and shoe covers, should be decontaminated before disposal. Preferably, the items should be incinerated; however, if this is not possible, arrange with your pathologist or a local hospital to sterilize the items by autoclaving and then dispose of them properly.

All nondisposable items, such as cameras, tools, notebooks, etc., also must be decontaminated. These items should be cleansed thoroughly with a solution consisting of 1 cup of sodium hypochlorite (common household liquid bleach) dissolved in a gallon of water (never mix bleach with ammonia or al-



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***“ ... protective practices ... along with exercising care and using common sense, will decrease the risk to the law enforcement officer and others.”***

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cohol). Either a bleach solution or ordinary rubbing alcohol will kill the AIDS virus within 1 minute.<sup>13</sup> Remember to wear gloves to protect the hands when decontaminating.

Spilt blood that has not been analyzed as evidence should also be cleaned with the same bleach solution. The solution should be poured on these stains and allowed to air dry. Before releasing the crime scene, advise the owner of the potential infection risk.

Even after the evidence has been properly dried and packaged, it is still potentially infectious. Therefore, appropriate warnings should be placed on all items. This can be accomplished by purchasing adhesive-backed labels bearing the international biohazard symbol and a space for labeling the appropriate disease, or simply writing on each package a warning, such as “Caution! Contains Potential Hepatitis (or AIDS) Case.” This will alert all persons subsequently handling the evidence, such as laboratory personnel, prosecutors, defense lawyers, and police officers, to the hazards therein. To avoid removing evidence contaminated with infectious body fluids in the courtroom, place the items in transparent packaging once they have been properly dried, with appropriate initials, marking, etc., visible for identification.

Evidence containing any body fluid contaminated with human pathogen that is shipped to a forensic laboratory by U.S. mail is subject to the Code of Federal Regulations, Part 72. This regulation specifies that appropriate warning labels must be placed on the package, and any liquid substance must be triple wrapped and sealed.<sup>14</sup> For further information on these procedures, contact the Centers for Disease Control, Office of Biosafety, 1600 Clifton Road, N.E., Atlanta, GA 30333 (404) 329-3883.

When conducting a crime scene investigation involving the shedding of blood from persons known to have infectious or contagious diseases, or even when it is suspected, the investigator should be very judicious with respect to the materials collected and forwarded to the laboratory for analysis. For example, in the scenario described earlier, it is obvious that the blood flowing from the victim's wounds originated from him. In another example, if John Smith is shot in the chest with a .44-caliber revolver by John Doe at a distance of 20 feet, there are several witnesses to the crime, and the assailant immediately flees the area with the weapon, it is obvious that the pool of blood underneath the body of John Smith originated from him. There is no probative value in analyzing the blood from the scene. Investigators and crime scene technicians should also consult with their local, State, or Federal forensic laboratory before submitting items for examination from persons with diseases, especially AIDS.

There are currently two opinions in forensic laboratories concerning the examination of cases with body fluids derived from persons with AIDS infections. The first is that the virus is not highly transmissible in dried stains and liquid blood samples, poses little hazard to laboratory personnel, and will be analyzed as usual. The other is that even though laboratory workers are at low risk of acquiring an AIDS infection from forensic specimens, that risk is not acceptable, especially when the laboratory worker could acquire an infection and unknowingly transmit it to his or her spouse.

The FBI Laboratory, in conjunction with the National Institutes of Health and the National Bureau of Standards, is currently conducting research into the feasibility of sterilizing forensic evidence with gamma radiation without

destroying the proteins required for serological examination. This procedure, if successful, would allow the evidence to be sterilized, thereby presenting no health hazard to laboratory workers or anyone subsequently handling the evidence and allowing for a complete serological examination. Until this procedure proves successful and is adopted, the FBI Laboratory will accept AIDS cases for analysis only if prior authorization has been obtained from the Section Chief, Scientific Analysis Section. The current prerequisites for acceptance of an AIDS case in the FBI Laboratory are as follows:

- 1) The contributor must understand that the submitted evidence will be autoclaved, which will render the evidence unsuitable for serological analyses. Other units of the FBI Laboratory will then conduct their examinations.
- 2) Acknowledgement letters from both the prosecuting and defense attorneys must accompany all evidence advising they are aware that serological evidence will be destroyed and that this procedure will not be subject to legal or judicial action in the future.
- 3) The evidence must be properly packaged and labeled.

It is the goal of the FBI Laboratory to continue to perform examinations as a full-service laboratory for its contributors. However, the safety and welfare of its employees and the rest of the law enforcement community are the laboratory's highest priorities and must be taken into consideration when accepting and analyzing evidence.

In the event your laboratory will not process cases involving blood or other body fluids from AIDS victims or suspects, it is recommended that the inves-

tigator contact that laboratory for the name and addresses of other public or private laboratories equipped to deal with infectious diseases and willing to examine the evidence.

### Conclusion

Law enforcement personnel investigating violent crimes must handle blood- and body fluid-stained evidence on a constant basis. Often, these body fluids will be contaminated with infectious and disease-causing microorganisms. There is no sure way to prevent accidental inoculation or contraction of a disease. However, protective practices, such as those discussed in this article, along with exercising care and using common sense, will decrease the risk to the law enforcement officer and others. These safety procedures should

always be used, and the officer should always assume that blood and other body fluids are potentially infectious, regardless of the source.

FBI

### Footnotes

<sup>1</sup>Centers for Disease Control, "Diagnosis and management of Mycobacterial infection and Disease in persons with Human T-lymphotropic virus type III/Lymphadenopathy associated virus infection," *MMWR*, vol. 35, 1986, pp. 448-452.

<sup>2</sup>Centers for Disease Control, "Classification system for Human T-lymphotropic virus type III/Lymphadenopathy-associated virus infection," *MMWR*, vol. 35, 1986, pp. 334-349.

<sup>3</sup>Supra note 1.

<sup>4</sup>J. Groopman et al., "HTLV-III in saliva of people with AIDS-related complex and healthy homosexual men at risk for AIDS," *Science*, vol. 226, 1984, pp. 447-449; S. Salahuddin et al., "Isolation of infectious human T-cell leukemia/lymphotropic virus type III (HTLV-III) from patients with acquired immunodeficiency syndrome (AIDS) or AIDS-related complex (ARC) and from healthy carriers; a study of risk groups and tissue sources," *Proc Natl Acad Sci, USA*, vol. 16, 1985, pp. 5530-5534; J. Vogt et al., "Isolation of HTLV-III/LAV from cervical secretions of women at risk for AIDS," *Lancet*, vol. 1, 1986, pp. 525-526; C. Wotsy et al., "Isolation of AIDS-associated retroviruses from genital secretions of women with antibodies to the viruses," *Lancet*,

vol. 1, 1986, pp. 527-529; L. Thiry et al., "Isolation of AIDS virus from cell free breast milk of three healthy virus carriers (letter)," *Lancet*, vol. 2, 1985, pp. 891-892.

<sup>5</sup>N. Lapointe et al., "Transplacental transmission of HTLV-III virus," *N. Eng. J. Med.*, vol. 312, 1985, pp. 1325-1326; C. Prompt et al., "Transmission of AIDS virus at renal transplantation," *Lancet*, vol. 2, 1985, p. 672.

<sup>6</sup>M. Ragni et al., "Acquired immune deficiency syndrome in the child of a homophile," *Lancet*, vol. 1, 1985, pp. 133-135.

<sup>7</sup>Abbott Laboratories, Diagnostics Division, "HTLV-III infection in health care workers," *HTLV-III Chronicle*, October 1985, pp. 1-6.

<sup>8</sup>Centers for Disease Control, "Acquired immune deficiency syndrome (AIDS) in Prison Inmates—New York, New Jersey," *MMWR*, vol. 31, 1983, pp. 700-701.

<sup>9</sup>Centers for Disease Control, "Human T-lymphotropic virus type III/Lymphadenopathy associated virus antibody prevalence in U.S. military recruit applicants," *MMWR*, vol. 35, 1986, pp. 4211-424.

<sup>10</sup>L. Resnick, et al., "Stability and inactivation of HTLV-III/LAV under clinical and laboratory environments," *JAMA*, vol. 225, 1986, pp. 1887-1890.

<sup>11</sup>G. Wistreich and M. Lechtman, *Microbiology* (New York: McMillan Publishing Company, 1984).

<sup>12</sup>Ibid.

<sup>13</sup>Supra note 10.

<sup>14</sup>D. Taylor (1986), Centers for Disease Control, Atlanta, GA, (personal correspondence) 1986; J. Richardson and W. Barkley (eds.), "Biosafety in microbiological and biomedical laboratories," U.S. Department of Health and Human Services, Centers for Disease Control and National Institutes of Health, 1984, pp. 10-23.

## Perilous Personal Pager

Both the Orange County, CA, Marshal's Department and the Massachusetts State Police submitted to the *Bulletin* information on this weapon which poses a new threat to law enforcement. The weapon holster, with authentic label, telephone number, and belt clip, resembles the individual pagers which have become so commonplace in today's society. Inside, a five-shot, .22LR short barrel revolver can be concealed. External controls and an opening in the bottom allow the weapon to be cocked and fired while remaining within the plastic casing. The same weapon also fits into a brass belt buckle.

