HIV: Infection Control/Exposure Control Issues for Oral Healthcare Personnel

Course Author(s): Michaell A. Huber, DDS; Géza T. Terézhalmy, DDS, MA
CE Credits: 2 hours
Intended Audience: Dentists, Dental Hygienists, Dental Students, Dental Hygiene Students
Date Course Online: 09/08/2009
Last Revision Date: 09/13/2023
Course Expiration Date: 09/12/2026
Cost: Free
Method: Self-instructional
AGD Subject Code(s): 148

Online Course: *www.dentalcare.com/en-us/ce-courses/ce97*

Disclaimers:

- P&G is providing these resource materials to dental professionals. We do not own this content nor are we responsible for any material herein.
- Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

Conflict of Interest Disclosure Statement

- Dr. Huber is a member of the dentalcare.com Advisory Board. He has no relevant financial relationships to disclose.
- Dr. Terézhalmy has done consulting work for Procter & Gamble and has served on the dentalcare.com Advisory Board. He has no relevant financial relationships to disclose.

Short Description

HIV: Infection Control/Exposure Control Issues for Oral Healthcare Personnel is a free dental continuing education course that covers a wide range of topics relevant to the oral healthcare professional community.

Course Contents

Overview

This course presents the background essential to understand the transmission of the human immunodeficiency virus (HIV) in healthcare settings and provides evidence-based information related to potential risks of exposure and procedures that promote a seamless response following occupational exposure including post prophylaxis and follow up. In addition, it provides evidence-based recommendations for granting graduated clinical privileges to clinicians infected with HIV predicated on their viral load and the likelihood of procedure-related provider-to-patient transmission of HIV.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Discuss the etiology, epidemiology, clinical manifestations, and diagnosis of HIV infection.
- Develop an office infection control/ exposure control protocol with exposure prevention and post-exposure strategies specific for HIV.
- Establish policy for work restriction of HIV-positive oral healthcare providers.

Introduction

Healthcare-associated infections (HAIs) are a potential hazard to healthcare personnel (HCP) and their patients. The most important strategy for reducing the risk of HAIs is exposure prevention. For this reason federal, state, and local agencies and professional organizations repeatedly emphasize the importance of Standard and Transmission-based Precautions as the foundation for preventing the transmission of pathogenic organisms during patient care in all healthcare settings.

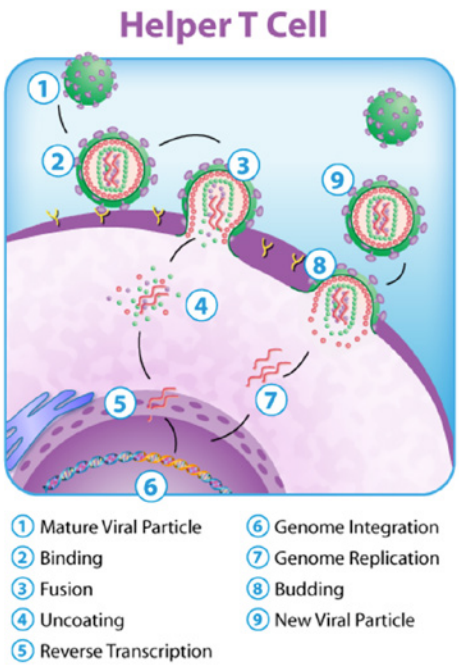
Much of the vigilance concerning HAIs was initiated in response to concerns related to the transmission the hepatitis B virus and the human immunodeficiency virus (HIV). From 2017 through 2021 the annual infection rate for HIV in the United States dropped 12%, from 36,500 to 32,100. In 2021, an estimated 1.2 million people were living with HIV and 13% were unaware of their infection.[1]

Etiology and Epidemiology

The first cases of acquired immunodeficiency syndrome (AIDS) in the United States were reported in 1981.[2] Soon thereafter, HIV, which is an RNA virus of the Retroviridae family, was identified as the underlying pathogen. HIV probably entered the human population by cross-species transmission of the ancestral virus found in wild chimpanzees in Central Africa. The spread of HIV in Africa corresponds to urbanization and occurred before the recognition of AIDS.[3]

HIV is a bloodborne pathogen acquired in non-occupational settings most readily either across mucous membranes or parenterally by 4 prime modes of transmission:[4]

1. unprotected anal sex,
2. unprotected vaginal sex,
3. mother to child spread during pregnancy, delivery, or breast feeding,
4. sharing needles, syringes, or other drug injection equipment.



The estimated per exposure risk of HIV transmission following (1) receptive anal intercourse is 1 to 30%; (2) insertive anal or receptive vaginal intercourse it is 0.1 to 10%; (3) insertive vaginal intercourse it is 0.1 to 1%; and (4) injection drug use with needle sharing it is 0.67 per needle-sharing contact.[5] The risk increases with advanced HIV disease, cervical or anal dysplasia, circumcision status, and the presence of genital ulcer disease. Data are lacking on transmission of HIV via oral sex.

HIV has the same general life cycle as other viruses. Infection begins when a virion attaches to a host cell. CCR5 and CXCR4 are the two major co-receptors used by HIV-1. The viral strains can be classified on the basis of which co-receptor they use as CCR5-tropic, CXCR4-tropic, or mixed-tropic. CCR5-tropic strains predominate during early stages of infection and remain dominant in 50-60% of late stage disease.[6] Capsid- or envelop-related viral proteins mediate attachment.

Viral entry into the host cell is mediated by other viral proteins which promote the fusion of the viral capsid or envelop with host cell membrane. Once the virus has gained entry into the host cell, it loses its capsid proteins by the process known as uncoating. The viral nucleic acid now becomes available for replication, which requires the generation of protein kinase-dependent nucleoside triphosphates (ribo- or deoxyribo-) to be incorporated into the new viral genome by viral or host cell polymerases.

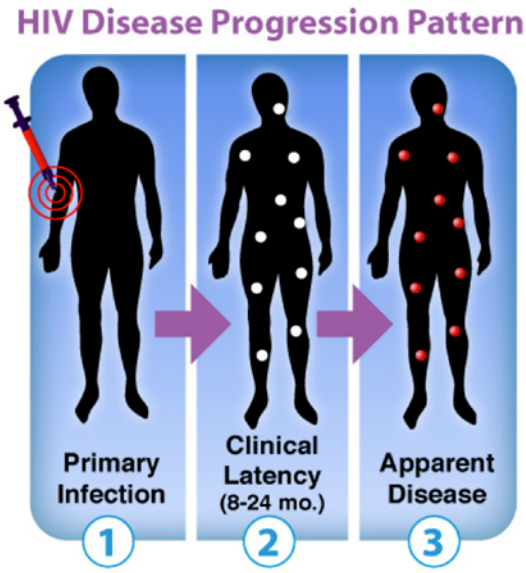
In most instances the viral DNA or RNA is replicated and then transcribed into a mRNA. Since HIV is an RNA retrovirus, uncoating is followed by reverse transcription, i.e., the viral RNA is first copied into DNA and then it is transcribed into a mRNA. Next, the newly synthesized mRNA is translocated to host cell ribosomes. Viral proteins synthesized by host cell ribosomes are then assembled with the duplicate viral genome. Assembly is followed by the process of maturation.

Maturation, characterized by cleavage of viral proteins by proteases, is essential for the newly formed virion to become infectious. Following maturation viruses egress from the host cell either by cell lysis or budding through the cell membrane. Replication of HIV may include the additional step of integration, i.e., the viral genome may be incorporated into the host genome. The process of integration is responsible for the capacity of certain viruses, i.e., oncogenic viruses, to induce tumor growth.

Clinical Manifestations

Available scientific evidence suggests a dynamic process in which initial and ongoing immunological responses to HIV infection are not only unsuccessful in clearing HIV but, paradoxically, they are paralleled by a progressive reduction in immunocompetence.[7] Individual variations exist, but a pattern of disease progression has been established as consisting of three phases: (1) primary infection, (2) a period of clinical latency, and, finally, (3) clinically apparent disease.[7]

After an incubation period of 1 to 3 weeks, 50% to 80% of patients experience an ill-defined Acute Retroviral Syndrome characterized by fever, lethargy, malaise, sore throat, arthralgia, myalgia, headaches, photophobia, maculopapular rash, and lymphadenopathy.[7,8] Antibodies can be detected 3 to 6 months



after exposure. During clinical latency (8 to 24 months), the patient is free of overt signs and symptoms. Without appropriate antiretroviral therapy, an HIV-infected patient is at risk of developing a multitude of opportunistic infections, the most common of which are summarized in Table 1.[9]

HIV-induced immunosuppression places the patient at risk for numerous oral conditions (Table 2). The most notable are candidiasis (erythematous, pseudomembranous), hairy leukoplakia, Kaposi's sarcoma, non-Hodgkin's lymphoma, and periodontal disease (linear gingival erythema, necrotizing ulcerative periodontitis).[10-11] Hairy leukoplakia and oral candidiasis are positive predictors of HIV disease progression. Contemporary antiretroviral therapy significantly decreases this risk.[12] Indeed, for a patient on an antiretroviral regimen, the development of an HIV-associated oral manifestation may signal therapeutic failure.[11] If this occurs, the patient should be promptly referred to their managing physician for evaluation.

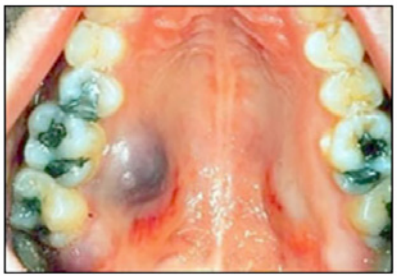
Diagnosis

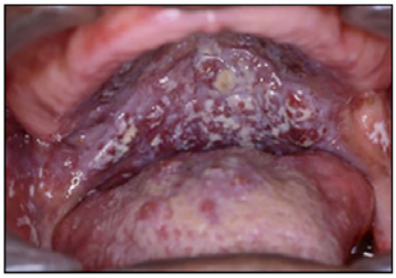
Laboratory criteria for defining a confirmed case now accommodate new multi-test algorithms, including criteria for differentiating between HIV-1 and HIV-2 infection and for recognizing early HIV infection (Figure 1). In 2023, the CDC updated its recommendations for HIV testing to provide guidance on the use of HIV NATs (nucleic acid tests) with a diagnostic claim in the third step of the current recommended algorithm for laboratory testing.[13]

A confirmed case of HIV infection is now classified in one of five stages (0, 1, 2, 3, or unknown).[9] Early infection, i.e., a negative HIV test within 6 months of HIV diagnosis, is classified as stage 0. If the criteria for stage 0 are not met, the stage is classified as 1, 2, 3, or unknown depending on CD4+ T-lymphocyte test results or whether an opportunistic illness was diagnosed >180 days after the diagnosis of HIV infection (Table 3). Acquired immunodeficiency syndrome (AIDS) is classified as stage 3.

Antiretroviral Therapy

To reduce the risk of disease progression and to prevent the transmission of the virus to others, antiretroviral therapy (ART) is recommended for all patients with HIV infection. The Food and Drug Administration has approved 10 mechanistic classes of drugs to manage HIV infection and numerous combination formulations (Tables 4 and 5).[14,26] Recommended regimens are those


Kaposi's Sarcoma


Hairy Leukoplakia


Oral Candidiasis

Table 1. Opportunistic illnesses (AIDS-defining conditions).[9]

1. Bacterial infections, multiple or recurrent*
2. Candidiasis of bronchi, trachea, or lungs
3. Candidiasis, esophageal
4. Cervical cancer, invasive†
5. Coccidioidomycosis, disseminated or extrapulmonary
6. Cryptococcosis, extrapulmonary
7. Cryptosporidiosis, chronic intestinal (> one month's duration)
8. Cytomegalovirus disease (other than liver, spleen, or nodes), onset at age > 1 month
9. Cytomegalovirus retinitis (with loss of vision)
10. Encephalopathy attributed to HIV§
11. Herpes simplex: chronic ulcer(s) (> month's duration); or bronchitis,pneumonitis, or esophagitis (onset at age >1 month)
12. Histoplasmosis, disseminated or extrapulmonary
13. Isosporiasis, chronic intestinal (greater than one month's duration)
14. Kaposi sarcoma
15. Lymphoma, Burkitt's (or equivalent term)
16. Lymphoma, immunoblastic (or equivalent term)
17. Lymphoma, primary, of brain
18. Mycobacterium avium complex or Mycobacterium kansasii, disseminated or extrapulmonary
19. Mycobacterium tuberculosis of any site, pulmonary† or extrapulmonary
20. Mycobacterium, other species or unidentified species, disseminated or extrapulmonary
21. Pneumocystis jirovecii (previously known as Pneumocystis carinii) pneumonia
22. Pneumonia, recurrent†
23. Progressive multifocal leukoencephalopathy
24. Salmonella septicemia, recurrent
25. Toxoplasmosis of brain, onset at age > 1 month
26. Wasting syndrome attributed to HIV§

* Only among children aged <6 years

† Only among adults, adolescents, and children aged ≥6 years

§ Suggested diagnostic criteria for these illnesses, which might be particularly important for HIV encephalopathy and HIV wasting syndrome, are described in the following references:

CDC. 1994 Revised classification system for human immunodeficiency virus infection in children less than 13 years of age. MMWR 1994;43(No. RR-12).

CDC. 1993 Revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. MMWR 1992;41(No. RR-17).

Table 2. Oral Lesions Associated with HIV Infection.[10,23]

Group 1 Lesions strongly associated with HIV infection	**Candidiasis** Erythematous Pseudomembraneous **Hairy leukoplakia** **Kaposi's sarcoma** **Non-Hodgkin's lymphoma** **Periodontal disease** Linear gingival erythema Necrotizing (ulcerative) gingivitis Necrotizing (ulcerative) periodontitis
Group 2 Lesions less commonly associated with HIV infection	**Bacterial infections** ***Mycobacterium avium-intracellularae*** ***Mycobacterium tuberculosis*** **Melanotic hyperpigmentation** **Necrotizing (ulcerative) stomatitis** **Salivary gland disease** Dry mouth due to decreased salivary flow rate Swelling of major salivary glands **Thrombocytopenia purpura** **Ulceration NOS** (not otherwise specified) **Viral infections** Herpes simplex virus Human papillomavirus (warty-like) lesions ***Condyloma acuminatum*** Focal epithelial hyperplasia Verruca vulgaris Varicella-zoster virus Herpes zoster Varicella
Group 3 Lesions seen in HIV infection	**Bacterial** Actinomyces israelii Escherichia coli Klebsiella pneumonia **Cat-scratch disease** **Drug reactions** (ulcerative, erythema multiforme, lichenoid, toxic epidermolysis) **Epithelioid** (bacillary) **angiomatosis** **Fungal infection other than candidiasis** Cryptococcus neoformans Geotrichum candidum Histoplasma capsulatum Mucoraceae (mucormycosis zygomycosis) Aspergillus flavus **Neurological disturbances** Facial palsy Trigeminal neuralgia **Recurrent aphthous stomatitis** **Viral infections** Cytomegalovirus ***Molluscum contagiosum***

Figure 1. Recommended Laboratory HIV Testing Algorithm for Serum or Plasma Specimens.[13]

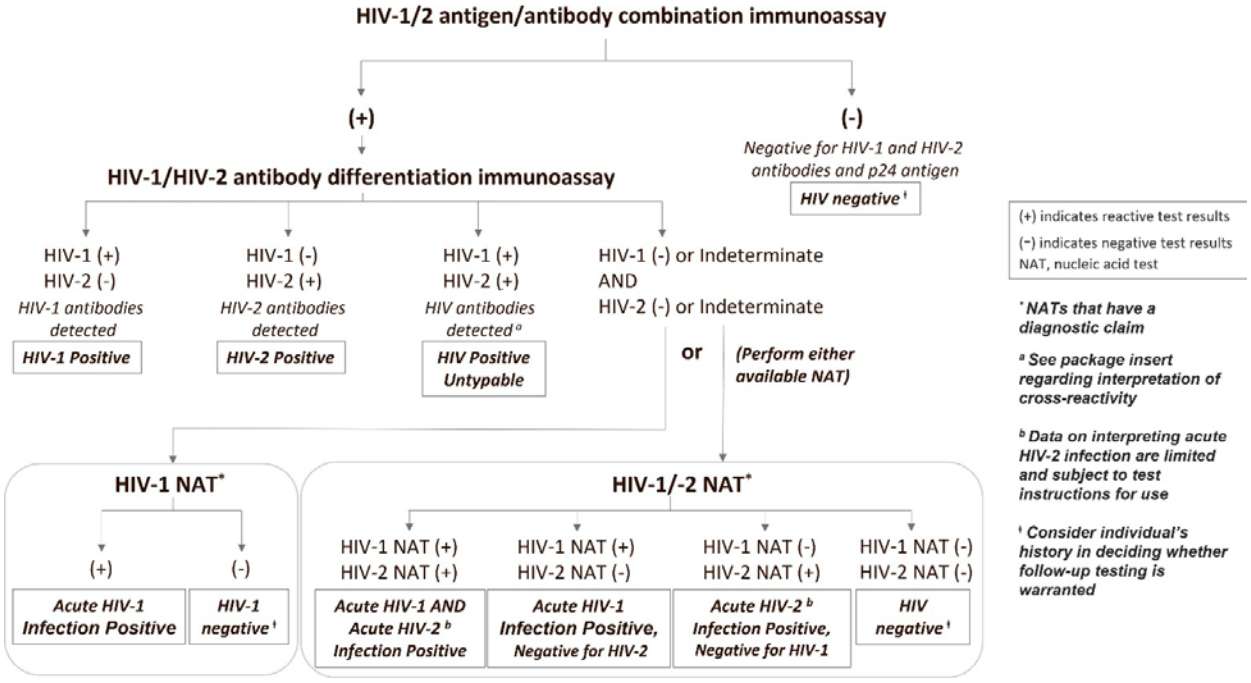


Table 3. Case classification of HIV infections (persons ≥6 years of age).[9]

Stage 0	No opportunistic illnesses	If >180 days have elapsed after stage 0 at diagnosis, the stage at the later date is classified as 1, 2, 3, or unknown
Stage 1	No opportunistic illnesses	Either CD4+ T-lymphocyte count of ≥500 cells/μL or CD4+ T-lymphocyte percentage of total lymphocytes ≥26
Stage 2	No opportunistic illnesses	Either CD4+ T-lymphocyte count of 200-499 cells/μL or CD4+ T-lymphocyte percentage of total lymphocytes of 14-25
Stage 3 (AIDS)	At least one opportunistic illness	Either CD4+ T-lymphocyte count of <200 cells/μL or CD4+ T-lymphocyte percentage of total lymphocytes of <14.*
Stage unknown	No information on opportunistic illnesses	No information on CD4+ T-lymphocyte count or percentage.

*Documentation of opportunistic illnesses (Table 1) supersedes a CD4+ T-lymphocyte count of >200 cells/μL or CD4+ T-lymphocyte percentage of total lymphocytes of >14.

Table 4. Drugs for Antiretroviral Therapy (ART).[25,26]

Class	Generic Name	Brand Name	Mechanisms of Action
Nucleoside reverse transcriptase inhibitors (NRTIs)	abacavir (ABC) emtricitabine (FTC) lamivudine (3TC) tenofovir (TDF) zidovudine (AZT, ZDV)	Ziagen Emtriva Epivir Viread Retrovir	Mimic deoxyribonucleoside triphosphate, the natural substrate for reverse transcriptase – they become incorporated into the growing DNA chain, terminate elongation and decrease or prevent HIV replication
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)	doravirine (DOR) efavirenz (EFV) etravirine (ETR) nevirapine (NVP) rilpivirine (RPV)	Pifeltro Sustiva Intelence Viramune Edurant	Bind near the catalytic site of reverse transcriptase and inhibit a crucial step in the transcription of the RNA genome into double-stranded retroviral DNA
Protease inhibitors (PIs)	atazanavir (ATV) darunavir (DRV) fosamprenavir (FPV) ritonavir (RTV) saquinavir (SQV) tipranavir (TPV)	Reyataz Prezista Lexiva Norvir Invirase Aptivus	Prevent cleavage of viral proteins during assembly and maturation – a process essential for the newly formed virus to become infectious
Fusion inhibitors	Enfuvirtide (T-20)	Fuzeon	An anti-HIV peptide structurally similar to a segment of the HIV protein (gp 41) – blocks membrane fusion
CCR5 antagonists	maravoric (MVC)	Selzentry	Blocks CCR5, one of the two major co-receptors used by HIV-1 to attach to host cells
Integrase strand transfer inhibitors (INSTI)	cabotegravir (CAB) dolutegravir (DTG) raltegravir (RAL)	Vocabria Tivicay Tivicay PD Isentress Isentress HD	Blocks HIV-1 integrase – prevents viral DNA from integrating with host cell DNA
Attachment inhibitors	Fostemsavir (FTR)	Rukobia	Bind to the gp120 protein on the outer surface of HIV, preventing HIV from entering CD4 cells
Post-attachment inhibitors	ibalizumab-uiyk (TMB-355)	Trogarzo	Blocks CD4 receptors on the surface of certain immune cells – preventing entry of HIV into cell
Capsid inhibitors	Lencapavir	Sunlenca	Interferes with the HIV capsid, a protein shell that protects HIV's genetic material and enzymes needed for replication
Pharmacokinetic enhancers	cobicistat (COBI)	Tybost	Inhibit the breakdown of ATV and DRV – enhancing efficacy

Table 5. Available Antiretroviral Combinations.[26]

Generic Names	Brand Name
ABC / 3TC	Epzicom
ABC / DTG / 3TC	Triumeq, Triumeg PD
ABC / 3TC / ZDV	Trizivir
ATV / COBI	Evotaz
BIC / FTC / TAF	Biktarvy
CAB / RPV	Cabenuva
DRV / COBI	Prezcobix
DRV / COBI / FTC / TAF	Symtuza
DTG / 3TC	Dovato
DTG / RPV	Juluca
DOR / 3TC / TDF	Delstrigo
EFV / FTC / TDF	Atripla
EFV / 3TC / TDF	Symfi Lo
EVG / COBI / FTC / TAF	Genvoya
EVG / COBI / FTC / TDF	Stribild
FTC / RPV / TAF	Odefsey
FTC / RPV / TDF	Complera
FTC / TAF	Descovy
FTC / TDF	Truvada
3TC / TDF	Cimduo
3TC / ZDV	Combivir
LPV / RTV	Kaletra

with durable virologic efficacy, favorable tolerability and toxicity profiles, and ease of use (combination formulations).

Healthcare-associated Transmission of HIV

Occupational transmission of HIV to health care workers is extremely rare.[15] The risk of infection among HCP following percutaneous exposure to HIV-infected blood is more likely (1) in the presence of visible blood on the instrument before injury, (2) if the injury involved a needle that was placed directly into the patient's vein or artery, (3) if the injury caused by the contaminated instrument or needle was deep, or (4) if the source patient has high viral load.[16-19] The risk of transmission with OPIM is probably lower than with blood.[20,21]

Prospective studies estimate that the average risk for HIV infection after percutaneous and mucous membrane (eyes, nose, and mouth) exposure to HIV-infected blood is approximately 0.3% (1 infection associated with 2,885 exposures) and 0.09%, respectively.[20,21,33] The transmission of HIV infection after nonintact skin exposure is estimated to be less than the risk following mucous membrane exposure.[23,24] The risk of infection associated with intact skin is below detection.

Since HIV was first isolated, only 4 instances of HIV transmission from infected provider-to-patient have been documented worldwide and no cases have been reported since 2003.[25] The U.S. cluster involved a dentist with AIDS. All HIV isolates were linked to the dentist, but the precise mechanisms of transmission were never determined. Since then, more than 4 dozen look-back studies have been conducted and none of these studies identified evidence of provider-to-patient transmission.[26]

HIV-related Precautions

Oral HCP have both a moral (ethical) and legal obligation to provide care for HIV-infected patients within the scope of their practice.[26,27] Standard and Transmission-based Precautions are effective to prevent exposure to blood or OPIM and constitute the primary strategy for the prevention of healthcare-associated transmission of HIV in all healthcare settings.[16,28] Specific issues related to the dental

management of patients with HIV infection are discussed elsewhere.[26,38]

Management of HCP Potentially Exposed to HIV

Oral healthcare facilities should have the organizational infrastructure that promotes a seamless response following occupational exposure, i.e., clear written procedures for prompt reporting, evaluation, and follow-up.[19,28] Access to clinicians familiar with post-exposure evaluation and treatment protocols should be made available during all working hours (including nights and weekends) and oral HCP should be familiar with the principles of post-exposure management.[30]

Provide Immediate Care to the Exposure Site

Following an exposure, the injured area contaminated with blood or OPIM should immediately be washed with soap and water.[30] Exposed mucous membranes should be flushed with water. While the use of an antiseptic agent is not contraindicated, using antiseptic agents for wound care or squeezing the wound to express fluid has not been shown to reduce the risk of infection. The application of caustic agents or the injection of antiseptics into the wound is not recommended.

Determine the Risk Associated with the Exposure

Recording and reporting occupational injuries should be in accordance with state and federal requirements. When an occupational exposure occurs, the circumstances of the incident should be recorded on a form appropriate for the oral healthcare setting (Box 1). To determine the risk associated with the exposure record the type of fluid (blood, OPIM, concentrated virus) and the type of exposure (percutaneous, mucous membrane, nonintact skin, bites).[19]

Evaluate the Exposure Source to Assess Risk

If the infectious status of the source person is unknown, he/she should be informed of the incident and tested for serologic evidence for HBsAg, anti-HCV, and HIV antibody (consider using rapid testing).[19] Concerns have been expressed that an HIV-negative source might be in the so-called "window period", i.e., the period of time between initial HIV infection and the development of detectable HIV antibodies; however, no such instances of occupational transmission have reported to date.[19]

Evaluate the Exposed Person

The exposed person should be evaluated within two hours after exposure to determine his/her HBV vaccination and response status; and, to establish the HIV status at the time of exposure (baseline), the exposed person should be tested for HIV.[30] Antiretroviral postexposure prophylaxis (PEP) should not be delayed while waiting for test results. Once the source patient is determined to be HIV-negative, PEP should be discontinued, and no follow-up HIV testing for the exposed provider is indicated.[19]

Initiate PEP for Exposures Posing Risk of HIV Transmission

PEP should be initiated as soon as possible, preferably within 72 hours after a possible exposure to HIV.[19] This recommendation is based on evidence that following primary exposure systemic infection does not occur immediately, leaving a brief window of opportunity during which PEP might limit the proliferation of HIV in initial target cells or lymph nodes. In a retrospective case-control study of HCP, PEP with zidovudine reduced the risk of HIV infection by approximately 81%.[18] *The Centers For Disease Control and Prevention website offers PeP locator service*.

The U.S. Public Health Service no longer recommends that the severity of exposure be used to determine the number of drugs to be offered in an HIV PEP regimen.[19] A basic 4 week PEP regimen containing 3 (or more) antiretroviral drugs is now routinely prescribed following all occupational exposures. The preferred regimen is: Raltegravir (Isentress®; RAL) 400mg PO Twice Daily ***plus*** Truvada™, 1 PO Once Daily [Tenofovir DF (Viread®; TDF) 300mg + emtricitabine (Emtriva™; FTC) 200mg]. Alternative regimen combinations are available to include a the single fixed-dose combination regimen: Stribild™ (elvitegravir, cobicistat, tenofovir DF, emtricitabine). Prescribers should be familiar with the agents and their toxicities.[19]

Box 1. Uniform Needlestick and Sharp Object Injury Report Form.

UNIFORM NEEDLESTICK AND SHARP OBJECT INJURY REPORT

Name: _____
Incident Report #: _____
Job Category:

- ○ DDS/DMD (attending/staff)
- ○ DDS/DMD (intern/resident)
- ○ DS I
- ○ DS II
- ○ DS III
- ○ DS IV
- ○ RDH (attending/staff)
- ○ DH I
- ○ DH II
- ○ DA
- ○ Dental technician
- ○ Sterilization personnel
- ○ Housekeeping/ laundry worker
- ○ Other_____

Where did injury occur?

- ○ Treatment room
- ○ Outside treatment room (hallway, etc)
- ○ Emergency clinic
- ○ Operating room
- ○ Procedure room (x-ray, sterilization, etc)
- ○ Dental laboratory
- ○ Pathology
- ○ Other_____

Was the source patient identified?

- ○ Yes
- ○ No

Was the injured person the original user of the sharp item?

- ○ Yes
- ○ No

Was the sharp item:

- ○ Contaminated (known exposure to patient or contaminated equipment)
- ○ Uncontaminated (no known exposure to patient or contaminated equipment)
- ○ Unknown

For what purpose was the sharp item originally used?

- ○ Unknown
- ○ Injection (syringe)
- ○ To connect IV line (intermittent IV/piggyback/IV infusion)
- ○ To start IV (IV catheter or butterfly-type needle)
- ○ To draw a venous blood sample
- ○ To obtain a body fluid or tissue sample
- ○ Fingerstick
- ○ Suturing
- ○ Cutting (surgery)
- ○ Electrocautery
- ○ To contain a specimen or pharmaceutical (glass items, local anesthetic cartridge)
- ○ Other_____

What device or item caused the injury?

_____

When and how did the injury occur?

- ○ Before use of item (item broke or slipped, assembling device, etc)
- ○ During use of item (item slipped, patient jarred item, etc)
- ○ Between steps of a multistep procedure (between incremental injections, passing instrument, etc)
- ○ Disassembling device or equipment
- ○ In preparation for reuse or reusable instrument (sorting, disinfection, sterilization, etc)
- ○ While recapping a used needle
- ○ Withdrawing a needle from rubber or other resistant material (rubber stopper, IV port, etc)
- ○ Other after use, before disposal (in transit to disposal, cleaning up, left on table, floor, other inappropriate place)
- ○ From item left on or near disposal container
- ○ While putting the item into the disposal container
- ○ After disposal, stuck be item protruding from opening of disposal container
- ○ Item pierced side of disposal container
- ○ After disposal, item protruded from trash bag or inappropriate waste container
- ○ Other_____

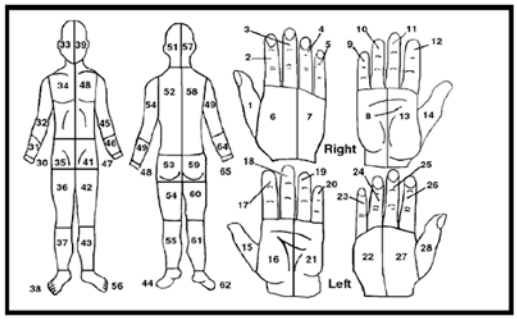
If the item caused the injury was a needle, was it a "safety design" with a shield, recessed, or retractable needle?

- ○ Yes
- ○ No

Was the injury:

- ○ Superficial (little or no bleeding)
- ○ Moderate (skin punctured, some bleeding)
- ○ Severe (deep stick/cut, or profuse bleeding)

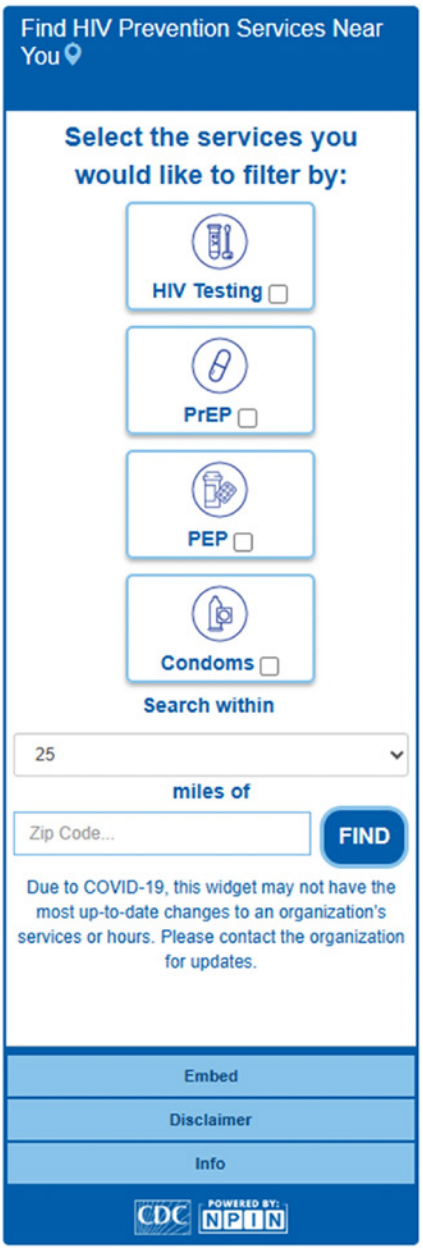
Mark the location of the injury:



Describe the circumstances leading to this injury:

_____
_____
_____
_____

[Download PDF]



Provide Counseling and Follow-up Testing

Exposed persons should be counseled about precautions related to donating blood or tissue, becoming pregnant, breastfeeding, and to practice sexual abstinence or safe sex, especially during the first six to 12 weeks after exposure.[19] Those taking PEP should be advised about of the importance of completing the PEP regimen and educated about possible drug toxicities, drug-drug interactions, measures to be taken to minimize side effects, and methods for clinical monitoring of toxicity.[19]

Those taking PEP who experience nausea, diarrhea, rash, fever, back and abdominal pain, increased thirst, or frequent urination should seek immediate medical attention. In addition, they should be advised about the importance of follow-up testing at six weeks, 12 weeks, and six months; in some cases, extended follow-up may be recommended.[19] Exposed persons should also be advised to seek medical evaluation for any acute illness during the follow-up period.

Implement Administrative Controls

The Society of Healthcare Epidemiology of America (SHEA) emphasizes the importance of Standard and Transmission-based Precautions to minimize HIV transmission and states that infected providers should not be totally prohibited from providing patient care solely on the basis of HIV infection.[25] SHEA recommends that clinical privileges be granted according to the provider's viral load and the likelihood of procedure-related provider-to-patient transmission of HIV (Table 6).[25,31]

HCP have the ethical and moral duty to ensure patient safety. Routine, voluntary, confidential testing of oral HCP is encouraged, emphasizing that those who perform Category III procedures should know their immune or infectious status not only with respect to HIV, but HB and HCV.[25] HIV-infected clinicians are legally and ethically bound to so inform the local or state public health authorities. Table 7 lists recommended clinical privileges for healthcare providers with HIV infection.[25]

Summary

The occupational risk of becoming infected with HIV in oral healthcare settings is extremely low; yet, the emotional impact of a potential HIV exposure in the oral healthcare setting (e.g. needlestick injury, splash) can be substantial. Oral HCP must be knowledgeable about the potential risks of occupational exposure and the importance of post-exposure management strategies. Clear, written procedures related to prompt reporting, evaluation, treatment, follow-up, and administrative controls should provide for safe care in oral healthcare facilities.

Table 6. The level of risk for the transmission of bloodborne pathogens associated oral healthcare. procedures.

- Category I: Procedures with minimal risk of bloodborne pathogen transmission
  - History-taking
  - Extraoral physical examination
  - Intraoral examination
    - Including the use of a tongue depressor, mirror, explorer, or a periodontal probe
  - Routine preventive dental procedures - not requiring the administration of local anesthesia
    - Application of sealants or topical fluoride
    - Prophylaxis – not to include subgingival scaling with a hand instrument
    - Orthodontic procedures
    - Prosthetic procedures
      - Fabrication of complete dentures
    - Hands-off supervision of surgical procedures
- Category II: Procedures for which bloodborne pathogen transmission is theoretically possible but unlikely
  - Dental procedures requiring the administration of local anesthesia
    - Operative, endodontic, and prosthetic procedures and periodontal scaling and root planning
      - Use of ultrasonic instruments greatly reduce or eliminate the risk of percutaneous injury to the provider
      - If significant physical force with hand instruments is anticipated to be necessary, scaling and root planning and other Category II procedures could reasonably classified as Category III
    - Minor surgical procedures
      - Simple tooth extraction not requiring excessive force
      - Soft tissue flap procedures
      - Minor soft tissue biopsy
      - Incision and drainage of an abscess
  - Insertion of, maintenance of, and drug administration into arterial and central venous lines

(Continued on Next Page)

Table 6. The level of risk for the transmission of bloodborne pathogens associated oral healthcare procedures. (Cont.)

- ✓ Category III: Procedures for which there is a definite risk of bloodborne pathogen transmission or that have been classified as "exposure prone"
  - General oral surgery
    - Surgical extractions
      - Removal of an erupted or unerupted tooth requiring elevation of a mucoperiosteal flap, removal of bone, or sectioning of tooth and suturing
    - Apicoectomy and root amputation
    - Periodontal curettage, gingivectomy, and mucogingival and osseous surgery
    - Alveoplasty and alveolectomy
    - Endosseous implant surgery
  - Open extensive head and neck surgery involving bone
  - Trauma surgery, including open head injuries, facial fracture reductions, and extensive soft issue trauma
  - Any open surgical procedure with a duration of more than 3 hours, probably necessitating glove change

Table 7. Recommended clinical privileges for healthcare providers with HBV or HCV infection.[36]

- ✓ Circulating viral burden <5 x 10^2GE/mL
  - Category I, II, and III procedures – no restrictions as long as the infected healthcare provider:
    - no evidence of having transmitted infection to patients
    - obtained advice from an Expert Review Panel about continued practice
    - follow-up twice a year to demonstrate the maintenance of a viral burden <5 x 10^2GE/mL
    - follow-up by a personal physician who has expertise in the management of HIV infection and who is allowed to communicate with the Expert Review Panel about the infected provider's clinical status
    - consulted with an expert about optimal infection control procedures and strictly adheres to the recommended procedures
      - routine use of double gloving and frequent glove changes during procedures (particularly when performing tasks known to compromise glove integrity) for all instances in patient care for which gloving is recommended
    - agreed to and signs a contract or letter from the Expert Review Panel that characterizes the infected providers responsibilities
- ✓ Circulating viral burden ≥5 x 10^2GE/mL
  - Category I and II procedures – no restrictions as long as the infected provider meets the criteria noted above for infected providers with a viral burden of <5 x 10^2GE/mL
  - Category III procedures – these procedures are permissible only when the viral burden is <5 x 10^2GE/mL

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: *www.dentalcare.com/en-us/ce-courses/ce97/test*

1. Which of the following statements is incorrect with respect to the CDC's estimates of HIV infection in the United States?

A. Approximately 32,100 people became infected with HIV in 2021.
B. An estimated 5 million people are living with HIV.
C. About 13 percent of those infected with HIV in 2021 were not aware of their infectious status.
D. An estimated 1.2 million people were living with HIV in 2021.

2. HIV is acquired in non-occupational settings either across mucous membranes or parenterally by _____.

A. unprotected anal sex
B. sharing utensils such as a spoon or fork
C. unprotected vaginal sex
D. A and C

3. Which of the following statements is incorrect with respect to the estimated per exposure risk of HIV transmission? Following _____.

A. oral sex it is 0.67
B. receptive anal intercourse it is 1 to 30%
C. insertive anal or receptive vaginal intercourse it is 0.1 to 10%
D. insertive vaginal intercourse it is 0.1 to 1%

4. Which of the following statements with respect to the pattern of disease progression is incorrect?

A. After an incubation period of 1 to 3 weeks, 50 to 80 percent of patients experience an ill-defined Acute Retroviral Syndrome.
B. Non-specific signs and symptoms associated with primary infection include malaise, lethargy, and a sore throat, arthralgia, myalgia, headache, photophobia, maculopapular rash and lymphadenopathy.
C. During the period of clinical latency, which typically lasts 8 to 24 years, the patient is usually free of overt illness.
D. The final phase is characterized by the appearance of opportunistic illnesses.

5. Which of the following oral conditions have been demonstrated to be positive predictors of HIV-associated disease progression?

A. Oral candidiasis
B. Hairy leukoplakia
C. Salivary gland disease
D. A and B

6. Which of the following statements with respect to the diagnosis and staging of HIV infections is incorrect?

A. Laboratory criteria for defining a confirmed case now accommodate new multi-test algorithms, including criteria for differentiating between HIV-1 and HIV-2 infection and for recognizing early HIV infection.
B. A confirmed case of HIV infection is now classified in one of five stages (0, 1, 2, 3, or unknown).
C. Early infection, i.e., a positive HIV test within 6 months of HIV diagnosis, is classified as stage 0.
D. If the criteria for stage 0 are not met, the stage is classified as 1, 2, 3, or unknown depending on CD4+ T-lymphocyte test results or whether an opportunistic illness was diagnosed >180 days after the diagnosis of HIV infection.

7. Which of the following statements related to antiretroviral drug therapy is incorrect?

A. To reduce the risk of disease progression and to prevent the transmission of the virus to others, antiretroviral therapy (ART) is recommended for all patients with HIV infection.
B. The Food and Drug Administration has approved more than 25 antiretroviral drugs in 4 mechanistic classes.
C. Recommended regimens are those with durable virologic efficacy, favorable tolerability and toxicity profiles, and ease of use (including some newer combinations).
D. Multiple combination formulations are available to improve ease of use and compliance.

8. A fusion inhibitor acts to:

A. blocks CCR5, one of the two major co-receptors used by HIV-1 to attach to host cells
B. prevent cleavage of viral proteins during assembly and maturation
C. binds to the gp120 protein on the outer surface of HIV, preventing HIV from entering CD4 cells
D. blocks membrane fusion

9. Which of the following scenarios does not appear to increase the risk of infection among HCP following percutaneous exposure to HIV-infected blood?

A. Patient blood was visibly noted on the instrument before exposure.
B. The injury involved a needle that was placed directly into the patient's vein or artery prior to the exposure.
C. The exposure resulted in profuse bleeding.
D. The exposure was superficial and resulted in no bleeding.

10. Which of the following statements related to the average risk of HIV transmission following various routes of exposure is incorrect?

A. Prospective studies estimate that the average risk for HIV infection after percutaneous exposure to HIV-infected blood is approximately 0.3% (1 infection associated with 2,885 exposures).
B. Prospective studies estimate that the average risk for HIV infection after mucous membrane (eyes, nose, and mouth) is approximately 0.09%.
C. The transmission of HIV infection after nonintact skin exposure is estimated to be higher than the risk following mucous membrane exposure.
D. The risk of infection associated with intact skin is below detection.

11. Which of the following statements related to provider-to-patient transmission of HIV is incorrect?

A. Since HIV was isolated, only 4 instances of HIV transmission from infected provider to patient have been documented worldwide and no cases have been reported since 2003.
B. The U.S. cluster involved a dentist, although the precise mechanisms of transmission were never determined.
C. More than 4 dozen look-back studies have been conducted and none of these studies identified evidence of provider-to-patient transmission.
D. The U.S. cluster of a provider to patient transmission was determined to have been the result of intentional malfeasance.

12. The first step in managing a percutaneous wound to the finger is _____.

A. to inject the wound with an antiseptic
B. to squeeze the wound to express fluid
C. to flush the wound with water
D. to wash the wound with soap and water

13. Which of the following statements is incorrect with respect to the process and requirements for determining the risk associated with a percutaneous exposure?

A. Recording and reporting occupational injuries should be in accordance with state and federal requirements.
B. When an occupational exposure occurs, the circumstances of the incident should be recorded on a form appropriate for the oral healthcare setting.
C. When an occupational exposure occurs one should record the type of fluid (blood, OPIM, concentrated virus) and the type of exposure (percutaneous, mucous membrane, nonintact skin, bites).
D. Ensuring the exposed provider is evaluated within 4 days of the exposure.

14. Which of the following statements is incorrect with respect to the evaluation and management of the exposed person?

A. The exposed person should be evaluated within two hours after exposure.
B. The exposed person should have his/her HBV vaccination and response status determined.
C. To establish the HIV status at the time of exposure (baseline), the exposed person should be tested for HIV.
D. PEP prophylaxis should be initiated and completed regardless the HIV status of the patient.

15. Which of the following statements concerning post-exposure prophylaxis (PEP) for the healthcare worker potentially exposed to HIV is incorrect?

A. PEP should be initiated as soon as possible, preferably within 72 hours after a possible exposure to HIV.
B. Antiretroviral PEP has been shown to be 100% effective in preventing infection.
C. The U.S. Public Health Service no longer recommends that the severity of exposure be used to determine the number of drugs to be offered in an HIV PEP regimen.
D. The recommended 4-week PEP regimen include two NRTIs plus an INSTI, or a NNRTI, or a PI) with a pharmacokinetic booster such as cobicistat or ritonavir.

16. Elements of post-exposure counseling should include information _____.

A. about precautions related to donating blood or tissue, becoming pregnant, breastfeeding, and to practice sexual abstinence or safe sex
B. mandatory registration with the appropriate state health agency
C. about possible drug toxicities, drug-drug interactions, measures to be taken to minimize side effects, and methods for clinical monitoring of toxicity
D. A and C

17. In managing a possible occupational HIV exposure, follow-up testing to monitor HIV seroconversion is indicated at _____.

A. 1 month, 6 months, and 1 year
B. 12 weeks, 6 months, and 1 year
C. 6 weeks, 12 weeks, and 6 months
D. 6 weeks, 6 months, and 1 year

18. Which of the following statements is incorrect with respect of SHEA guidelines to minimize provider-to-patient transmission of HIV in healthcare settings?

A. Infected healthcare providers should be totally prohibited from patient care solely on the basis of an infection with HIV.
B. Clinical privileges should be granted according to the viral load of the infected provider.
C. SHEA guidelines emphasize the importance of Standard and Transmission-based Precautions to minimize HIV transmission.
D. The likelihood of procedure-related provider-to-patient transmission of HIV should be considered when determining the provider's occupational limitations.

19. Which of the following statements is incorrect relative to the responsibilities of an HIV infected healthcare provider?

A. Routine, voluntary, confidential testing of providers is encouraged.
B. HIV-infected clinicians are ethically bound to inform local or state public health authorities of their status.
C. In particular, those clinicians who perform Category III procedures should know their immune or infectious status not only with respect to HIV, but HBV and HCV.
D. HIV infected providers should withdraw from all forms of clinical care.

20. For an HIV infected clinician, which of the following criteria would preclude recommending them to perform Category I, II, and III procedures?

A. There is no evidence of the provider having transmitted infection to patients and obtained advice from an Expert Review Panel about continued practice.
B. The provider demonstrates an HIV viral burden ≥5 x 102 GE/mL.
C. Consulted with an expert about optimal infection control procedures and strictly adheres to the recommended procedures.
D. The provider agrees to twice yearly follow-up to verify viral burden levels.

References

1. Centers for Disease Control and Prevention. HIV Surveillance Report. Estimated HIV Incidence and Prevalence in the United States, 2017–2021. Accessed August 1, 2023.
2. Centers for Disease Control (CDC). Pneumocystis pneumonia--Los Angeles. MMWR Morb Mortal Wkly Rep. 1981 Jun 5;30(21):250-2.
3. Worobey M, Gemmel M, Teuwen DE, et al. Direct evidence of extensive diversity of HIV-1 in Kinshasa by 1960. Nature. 2008 Oct 2;455(7213):661-4. doi: 10.1038/nature07390.
4. Centers for Disease Control and Prevention. Ways HIV can be transmitted. Accessed August 1, 2023.
5. Landovitz RJ, Currier JS. Clinical practice. Postexposure prophylaxis for HIV infection. N Engl J Med. 2009 Oct 29;361(18):1768-75. doi: 10.1056/NEJMcp0904189.
6. Westby M, Lewis M, Whitcomb J, et al. Emergence of CXCR4-using human immunodeficiency virus type 1 (HIV-1) variants in a minority of HIV-1-infected patients following treatment with the CCR5 antagonist maraviroc is from a pretreatment CXCR4-using virus reservoir. J Virol. 2006 May;80(10):4909-20. doi: 10.1128/JVI.80.10.4909-4920.2006.
7. Pantaleo G, Fauci AS. New concepts in the immunopathogenesis of HIV infection. Annu Rev Immunol. 1995;13:487-512. doi: 10.1146/annurev.iy.13.040195.002415.
8. Kinloch-De Loës S, Hirschel BJ, Hoen B, et al. A controlled trial of zidovudine in primary human immunodeficiency virus infection. N Engl J Med. 1995 Aug 17;333(7):408-13. doi: 10.1056/NEJM199508173330702.
9. Centers for Disease Control and Prevention. Revised surveillance case definition for HIV infection--United States, 2014. MMWR Recomm Rep. 2014 Apr 11;63(RR-03):1-10.
10. Patton LL, Phelan JA, Ramos-Gomez FJ, et al. Prevalence and classification of HIV-associated oral lesions. Oral Dis. 2002;8 Suppl 2:98-109.
11. Reznik DA. Oral manifestations of HIV disease. Top HIV Med. 2005 Dec-2006 Jan;13(5):143-8.
12. Patton LL, McKaig R, Strauss R, et al. Changing prevalence of oral manifestations of human immuno-deficiency virus in the era of protease inhibitor therapy. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2000;89:299-304.
13. Centers for Disease Control and Prevention. Technical Update for HIV Nucleic Acid Tests Approved for Diagnostic Purposes. Published May 16, 2023. Accessed August 1, 2023.
14. HIVinfo.NIH.gov. FDA-Approved HIV Medications. Updated March 23, 2023. Accessed August 1, 2023.
15. Centers for Disease Control and Prevention. Occupational HIV Transmission and Prevention among Health Care Workers. Published June 2015. Accessed August 1, 2023.
16. Siegel JD, Rhinehart E, Jackson M, et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings. Am J Infect Control. 2007 Dec;35(10 Suppl 2):S65-164. doi: 10.1016/j.ajic.2007.10.007.
17. Do AN, Ciesielski CA, Metler RP, et al. Occupationally acquired human immunodeficiency virus (HIV) infection: national case surveillance data during 20 years of the HIV epidemic in the United States. Infect Control Hosp Epidemiol. 2003 Feb;24(2):86-96. doi: 10.1086/502178.
18. Cardo DM, Culver DH, Ciesielski CA, et al. A case-control study of HIV seroconversion in health care workers after percutaneous exposure. Centers for Disease Control and Prevention Needlestick Surveillance Group. N Engl J Med. 1997 Nov 20;337(21):1485-90. doi: 10.1056/NEJM199711203372101.
19. Kuhar DT, Henderson DK, Struble KA, et al. Updated US Public Health Service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for postexposure prophylaxis. Infect Control Hosp Epidemiol. Update May 23, 2018. Accessed August 1, 2023.
20. Bell DM. Occupational risk of human immunodeficiency virus infection in healthcare workers: an overview. Am J Med. 1997 May 19;102(5B):9-15.
21. Henderson DK, Fahey BJ, Willy M, et al. Risk for occupational transmission of human immunodeficiency virus type 1 (HIV-1) associated with clinical exposures. A prospective evaluation. Ann Intern Med. 1990 Nov 15;113(10):740-6.

22. Ippolito G, Puro V, De Carli G. The risk of occupational human immunodeficiency virus infection in health care workers. Italian Multicenter Study. The Italian Study Group on Occupational Risk of HIV infection. Arch Intern Med. 1993 Jun 28;153(12):1451-8.
23. Centers for Disease Control (CDC). Update: human immunodeficiency virus infections in health-care workers exposed to blood of infected patients. MMWR Morb Mortal Wkly Rep. 1987 May 22;36(19):285-9.
24. Fahey BJ, Koziol DE, Banks SM, et al. Frequency of nonparenteral occupational exposures to blood and body fluids before and after universal precautions training. Am J Med. 1991 Feb;90(2):145-53.
25. Henderson DK, Dembry L, Fishman NO, et al. SHEA guideline for management of healthcare workers who are infected with hepatitis B virus, hepatitis C virus, and/or human immunodeficiency virus. Infect Control Hosp Epidemiol. 2010 Mar;31(3):203-32. doi: 10.1086/650298.
26. Crossley ML. An investigation of dentists' knowledge, attitudes and practices towards HIV+ and patients with other blood-borne viruses in South Cheshire, UK. Br Dent J. 2004 Jun 26;196(12):749-54, quiz 780. doi: 10.1038/sj.bdj.4811382.
27. Shirlaw PJ, Chikte U, MacPhail L, et al. Oral and dental care and treatment protocols for the management of HIV-infected patients. Oral Dis. 2002;8 Suppl 2:136-43.
28. Kohn WG, Collins AS, Cleveland JL, et al. Guidelines for infection control in dental health-care settings--2003. MMWR Recomm Rep. 2003 Dec 19;52(RR-17):1-61.
29. DePaola LG. Managing the care of patients infected with bloodborne diseases. J Am Dent Assoc. 2003 Mar;134(3):350-8.
30. Campo-Trapero J, Cano-Sánchez J, del Romero-Guerrero J, et al. Dental management of patients with human immunodeficiency virus. Quintessence Int. 2003 Jul-Aug;34(7):515-25.
31. Reitsma AM, Closen ML, Cunningham M, et al. Infected physicians and invasive procedures: safe practice management. Clin Infect Dis. 2005 Jun 1;40(11):1665-72. Epub 2005 May 2. doi: 10.1086/429821.

Additional Resources

- No Additional Resources Available.

About the Authors

Michaell A. Huber, DDS

Professor Department of Comprehensive Dentistry The University of Texas Health Science Center at San Antonio, School of Dentistry, San Antonio, Texas

Dr. Michaell A. Huber is an Adjunct Professor of Oral Medicine, Department of Comprehensive Dentistry, the UT Health School of Dentistry. He received his DDS from the UTHSCSA in 1980 and a Certificate in Oral Medicine from the National Naval Dental Center, Bethesda, Maryland in 1988. He is certified by the American Board of Oral Medicine. Dr. Huber served as Graduate Program Director in Oral Medicine at the National Naval Dental Center, Bethesda, Maryland. In addition he served as Specialty Leader for Oral Medicine to the Surgeon General of the United States Navy, Washington, DC; and Force Dental Officer, Naval Air Force Atlantic, Norfolk, Virginia.

Since joining the faculty in 2002, Dr. Huber has been teaching both pre-doctoral and graduate dental students at the UT Health School of Dentistry. In 2019 he was awarded the UT System Regents Outstanding Teaching Award. He is a Past President of the American Academy of Oral Medicine and is a member of the dentalcare.com Advisory Board. Dr. Huber has spoken before many local, state, and national professional organizations. He has published over 90 journal articles, book chapters, and online postings.

Phone: (210) 567-3360
Fax: (210) 567-3334

Email: huberm@uthscsa.edu

Géza T. Terézhalmy, DDS, MA

Dr. Terézhalmy is Professor and Dean Emeritus, School of Dental Medicine, Case Western Reserve University. Dr. Terézhalmy earned a BS degree from John Carroll University; a DDS degree from Case Western Reserve University; an MA in Higher Education and Human Development from The George Washington University; and a Certificate in Oral Medicine from the National Naval Dental Center. Over the past 50+ years, Dr. Terézhalmy held more than 30 positions in professional societies, served as editor or contributing editor for several publications, co-authored or contributed chapters for several books, conducted oral healthcare related research, and had over 250 papers and abstracts published.

Email: gterezhalm@gmail.com