Postexposure Evaluation and Follow-up

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Please Note:

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- **Iowa Dental Professionals:** This course complies with the Iowa Dental Board for recertification in the area of infection control standards, as established by the Centers for Disease Control and Prevention (CDC).

Conflict of Interest Disclosure Statement

- Dr. Huber has done consulting work for Procter & Gamble and serves on the dentalcare.com Advisory Board.
- Dr. Terézhalmy has done consulting work for Procter & Gamble and has served on the dentalcare.com Advisory Board.

Short Description

Postexposure Evaluation and Follow-up is a free dental continuing education course that covers a wide range of topics relevant to the oral healthcare professional community.

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Overview

This course presents concept of postexposure management of healthcare personnel and provides evidence-based guidance on the importance of prompt wound care, reporting, and evaluation of occupational exposures to pathogenic organisms, the timely initiation of postexposure prophylaxis, and the implementation of postexposure follow-up strategies in order to prevent infection and the development of disease.

Learning Objectives

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

- Discuss the concept of postexposure prophylaxis.
- Discuss elements of a successful postexposure response to an occupational exposure.
- Demonstrate familiarity with strategies for postexposure prophylaxis (PEP) following exposure to blood and potentially infectious material (OPIM).
- Initiate in a timely manner the cascading steps in response to an occupational exposure.

Introduction

Adherence to the principles of Standard and Transmission-based Precautions is the best means to minimize occupational exposure to blood and other potentially infectious material (OPIM).[1-3] However, occupational exposures still occur. Healthcare facilities should have an organizational infrastructure that promotes a seamless response following such events to facilitate timely access (during all working hours) of exposed healthcare personnel (HCP) to physicians familiar with strategies to prevent postexposure healthcare-associated infections (HAIs).

The term HCP refers to all paid and unpaid persons working in healthcare settings who have the potential for exposure to blood and other potentially infectious material (OPIM).[4] HCP include, but are not limited to, emergency medical service personnel, dental personnel, laboratory personnel, nurses, nursing assistants, physicians, technicians, therapists, pharmacists, students and trainees, and persons not directly involved in patient care but potentially exposed to blood and OPIM (e.g., clerical, dietary, housekeeping, security, maintenance, and volunteer personnel).

An exposure that might place HCP at risk for HAIs is defined as an event that results in the transfer of pathogenic organisms from a source to a host by contact transmission, i.e., direct or indirect contact transmission; or respiratory transmission, i.e., inhalation of droplets or droplet nuclei (airborne transmission).[2,3]

Droplets and droplet nuclei are generated when people talk, breath, cough, or sneeze; or when water is converted to a fine mist by medical/dental devices, such as high-speed handpieces, ultrasonic instruments, or by lasers and electrosurgical units.[2,3]

Pathogenic organisms associated with HAIs may be the result of person-to-person transmission, but contaminated patient-care items and environmental sources may also be implicated.[1-3] Source persons may be patients, other HCP, visitors to the healthcare facility, and household members. A source person may have acute infection or may be transiently or chronically colonized by pathogenic organisms. It is also important to recognize the source person with an acute or chronic infection may be asymptomatic.

All HCP should be familiar with postexposure management strategies such as procedures for proper wound care and prompt reporting of an exposure. Postexposure evaluation, initiation of postexposure prophylaxis (PEP), and postexposure follow-up is to be performed by a physician familiar with strategies to prevent postexposure HAIs.[4] PEP is any preventive medical treatment (e.g., administration of vaccines, immune globulins, antiviral, or antibacterial agents) started in a timely manner after exposure to a pathogenic virus or bacteria in order to prevent infection and/or the development of disease.

Healthcare-associated Exposure to Bloodborne Pathogens

An exposure that might place HCP at risk for HAIs with bloodborne pathogens (i.e., infection with hepatitis B, hepatitis C, or human immunodeficiency viruses) is defined as a (1) percutaneous injury (e.g., needlesticks or cuts with sharp objects), (2) direct contact of ocular, nasal, or oral mucous membranes, or (3) direct contact of nonintact skin (e.g., dermatitis, or chapped or abraded skin) with blood and OPIM.[4]

Percutaneous wounds and nonintact skin that have been in contact with blood or OPIM should be washed with soap and water; mucous membranes should be flushed with water[5] Using antiseptics (e.g., chlorhexidine) for wound care or expressing fluid by squeezing the wound have not been shown to reduce the risk for infection. Injecting antiseptics or disinfectants into the wound and the application of caustic agents (e.g., bleach) is not recommended.

PEP intended to prevent HAIs is most effective when administered as soon after an exposure as possible (ideally within hours). Consequently, immediately after wound care, the exposure must be reported to the Office Infection Control Officer and the circumstances of the incident documented in accordance with all federal and state mandates.[1,2,4] The report must include the date and time of exposure and details of the event (Box A).

Following an exposure to blood and OPIM, the potential to transmit HBV, HCV, and HIV will depend on the type of body fluid involved and the route and severity of the exposure.[4] Exposures to blood and OPIM through percutaneous injuries (i.e., needlesticks or other penetrating sharps-related events) or through direct contact with mucous membrane are situations that pose the greatest risk of bloodborne pathogen transmission in oral healthcare settings.

Exposure to a blood-filled hollow needle or visibly bloody instruments and other medical/dental devices suggests a higher risk than exposure to a needle that was used for administering an injection, e.g., a local anesthetic. Skin exposure to blood and OPIM, when the integrity of the skin is compromised (e.g., dermatitis, abrasion, or open wound), may potentially result in a healthcare-associated infection.

If the exposure incident was related to a human bite, possible exposure of both the person bitten and the person who inflicted the bite must be considered, especially if the bite resulted in bleeding. In addition, any direct contact (i.e., personal protective equipment was not used or was ineffective in protecting skin or mucous membranes) with concentrated HBV, HCV, or HIV in a research laboratory is considered a significant exposure incident.

Box A. Recommendations for the Content of an Occupational Exposure Report.[4]

- ✓ Date and time of exposure
- ✓ Details of the procedure being performed
  - Where and how the exposure occurred
  - If related to a sharp device, the type and brand of device
  - How and when in the course of handling the device the exposure occurred
- ✓ Details of the exposure
  - Type and amount of source material
    - Blood
    - OPIM
    - Direct contact with concentrated virus (research laboratory)
- ✓ Type of exposure
  - Percutaneous injury
    - Depth of injury
    - Whether blood or OPIM was injected
- ✓ Mucous membrane exposure
  - Estimated volume of blood or OPIM
- ✓ Nonintact skin exposure
  - Condition of the skin (e.g., chapped, abraded, open wound)
- ✓ Bites resulting in blood exposure to either person involved

The next step in data collection relates to the exposure source. The person whose blood or OPIM is the source of an occupational exposure should be evaluated for HBV, HCV, and HIV infection (Box B). Information already available in the chart of the source person at the time of exposure (e.g., medical history and/or laboratory test results) or other information obtained from the source person might provide clues to potential infection with a bloodborne pathogen.

If the infectious status of the source person is unknown, he/she should be informed of the incident and after obtaining informed consent (in accordance with applicable state and local laws) should be tested for serologic evidence of HBV, HCV, and HIV infection. A source person determined to be infected with HBV, HCV, or HIV should be referred for medical treatment and counseling. Confidentiality of the source person must be maintained at all times.

If the source of blood or OPIM is unknown, information about where and under what circumstances the exposure occurred should be assessed. An important consideration is the prevalence of HBV, HCV, or HIV in the population from which the contaminated source material is derived. An exposure related to a community where injection-drug use is prevalent would present a higher risk for transmission than one related to a nursing home for the elderly.

Box B. Information to be Obtained From or About the Exposure Source.[4]

- ✓ Infectious status of the source person
  - History of HBV, HCV, or HIV infection
  - Laboratory test results
    - Hepatitis B surface antigen (HBsAg)
    - Anti-hepatitis C antibody
    - Anti-HIV antibody
      - If the source person is HIV-infected
        - Stage of disease
        - History of antiretroviral therapy
        - Viral load
        - Antiretroviral resistance information

The need for PEP should be determined within 2 hours after HCP experience any percutaneous, ocular, mucous-membrane or nonintact skin exposure to blood and OPIM. Exposed HCP should undergo postexposure evaluation by an expert consultant (a physician knowledgeable about occupational transmission and one who can deal with the many concerns of an exposed person). Exposed HCP should present for the evaluation with (1) the incident report, (2) all available information about the source person, and (3) his/her OSHA-mandated medical record maintained by the employer (Box C).[1-3]

Hepatitis B Virus (HBV)

Unvaccinated or incompletely vaccinated HCP exposed to a HBsAg-positive source person should receive HBV PEP as soon as possible (preferably within 24 hours) after exposure.[4,5] HB immune globulin (HBIG) and the first dose of the HepB vaccine (if indicated) can be administered simultaneously at separate sites (HepB vaccine should always be administered in the deltoid muscle). Fully vaccinated HCP, defined as a person with anti-HBs ≥10 mIU/mL after ≥3 doses of HepB vaccine, require no HBV PEP.

Box C. Content of an OSHA-mandated Medical Record.[1-3]

- ✓ Vaccination status
  - Dates of vaccinations (where appropriate or available)
  - Evidence of immunity (where applicable or available)
  - Documentation related to the individual's inability to receive the vaccinations mandated or highly recommended
  - A signed copy of the mandatory hepatitis B vaccination declaration (if applicable)
- ✓ A copy of all previous exposure reports (if applicable)

Expert counseling is recommended for susceptible HCP exposed to the HBV, especially in cases of known or suspected pregnancy, breastfeeding, or serious medical illnesses. Additional information should be provided on any special precautions to prevent secondary transmission of the HBV during the follow-up period, current information on how to modify sexual practices and strategies to prevent pregnancy, and on donating blood, plasma, organs, tissue, or semen.[4]

No modifications of patient-care responsibilities are necessary based solely on an exposure to HBV-positive blood or OPIM.[4] If an exposed person becomes acutely infected with the HBV, the person should be evaluated according to published recommendations for infected healthcare providers. Those who are chronically infected with the HBV should ensure adherence to the principles of Standard and Transmission-based Precautions and all other recommendations.[6,7]

Hepatitis C Virus (HCV)

Recommendations for postexposure evaluation and follow-up are intended to achieve early diagnosis of HCV infection. Postexposure prophylaxis (PEP) is not recommended for HCP after exposure to HCV-positive blood or OPIM.[4,8]

Baseline testing of the source patient and exposed HCP is recommended as soon as possible (preferably within 48 hours) after the exposure.[8] The source patient should ideally undergo a nucleic acid test (NAT) for HCV RNA. The exposed HCP should undergo baseline testing for anti-HCV with reflex to a NAT for HCV RNA if positive, to identify a preexisting infection. If further follow-up testing is recommended based on the source patient's status (e.g., HCV RNA positive or anti-HCV positive with unavailable HCV RNA or if the HCV infection status is unknown), HCP should be tested with a NAT for HCV RNA at 3–6 weeks postexposure. If HCV RNA is negative at 3–6 weeks postexposure, a final test for anti-HCV at 4–6 months postexposure is recommended. HCP with detectable HCV RNA or anti-HCV seroconversion should be referred for further care and evaluation for treatment as indicated.[8]

Expert counseling is recommended for HCP exposed to the HCV, especially in cases of known or suspected pregnancy, breastfeeding, or serious medical illnesses. Additional information should be provided on any special precautions to prevent secondary transmission of the HCV during the follow-up period, current information on how to modify sexual practices and strategies to prevent pregnancy, and on donating blood, plasma, organs, tissue, or semen.[4]

No modifications of patient-care responsibilities are necessary based solely on an exposure to HCV-positive blood or OPIM.[4] If an exposed person becomes acutely infected with the HCV, the person should be evaluated according to published recommendations for infected healthcare providers. Those who are chronically infected with the HCV should ensure adherence to the principles of Standard and Transmission-based Precautions and all other recommendations.[6,7]

Human Immunodeficiency Virus (HIV)

U.S. Public Health Service (PHS) guidelines emphasize the importance of strict adherence to (1) the principles of Standard Precautions, (2) prompt reporting of an exposure (3) expert management of occupational exposures, (4) adherence to the recommended HIV PEP regimen, and (5) follow-up of exposed HCP including careful monitoring for adverse events related to PEP and for virologic, immunologic, and serologic signs of infection.[9]

If the infectious status of the exposure source is unknown, he/she should be tested for serologic evidence of HIV infection. If the source person is seronegative, baseline testing and further follow-up of exposed HCP normally is not necessary. If the exposure source is unknown, the likelihood of exposure to a source at high risk is based on a determination of the risk or prevalence of HIV infection among patients in the exposure setting.

When deemed necessary, the PEP medication regimen should contain 3 (or more) antiretroviral drugs and be initiated within 72 hours (ideally within hours) of exposure.[9] Initiation of PEP should not be delayed while awaiting test results. If PEP is initiated and the source person is later determined to be HIV negative, PEP should be discontinued, and no further follow-up testing is indicated

for exposed HCP. If a newer 4th generation combination HIV p24 antigen-HIV antibody test is utilized for follow-up HIV testing of exposed HCP, HIV testing may be concluded at 4 months after exposure. Otherwise, follow-up HIV testing is typically concluded at 6 months after an HIV exposure.[9]

Expert counseling is recommended for those exposed to HIV, especially in cases of known or suspected pregnancy, breastfeeding, or serious medical illnesses. Those offered PEP should be provided information about possible drug toxicities and drug-drug interactions. Additional guidance should be given on how to prevent sexual transmission of HIV and about donating blood, plasma, organs, tissue, or semen during the follow-up period.

The patient-care responsibilities do not need to be modified based solely on an HIV exposure; however, they should be advised to seek medical evaluation for any acute illness that occurs during the follow-up period, especially within the first 6 to 12 weeks after exposure when most HIV-exposed persons are expected to seroconvert. If HIV seroconversion is detected, the person should be evaluated according to published recommendations for infected HCP.[6,7]

Healthcare-associated Exposure to Measles, Mumps, or Rubella Viruses

If measles, mumps, or rubella exposure occurs in a healthcare setting, all case-patient contacts should be evaluated immediately for presumptive evidence of measles, mumps, or rubella immunity.[10] Persons are considered immune only if they have documentation of:

1. Laboratory confirmation of measles, mumps, or rubella infection
   or
2. laboratory evidence of measles, mumps, or rubella immunity
   or
3. appropriate vaccination against measles, mumps, and rubella
   or
4. birth before 1957.

Measles

The measles virus is transmitted from person-to-person primarily by direct contact with respiratory secretions or by inhalation of airborne droplets generated by coughing or sneezing. Exposed HCP without evidence of immunity to the measles virus should be offered PEP, preferably MMR vaccine within 72 hours of initial exposure, or immunoglobulin (IG) within six days of exposure. The simultaneous administration of the MMR vaccine and IG invalidates the vaccine.[11] Available data suggests that the live measles vaccine, if administered promptly after exposure, will prevent or modify the disease.[10] Exposed HCP should be closely monitored for sign(s) of illness.

Mumps

The mumps virus is transmitted from person-to-person primarily by direct contact with saliva or by inhalation of airborne droplets generated by coughing or sneezing. Exposed HCP without evidence of immunity to the mumps virus should be offered the MMR vaccine.[10] However, antibodies develop too slowly the mumps component of the vaccine to provide effective prophylaxis after exposure. The efficacy of IG has not been established and it is not recommended for postexposure prophylaxis for mumps. Exposed HCP should be closely monitored for sign(s) of illness.

Rubella (German measles)

The rubella virus is transmitted from person-to-person primarily by direct contact with respiratory secretions or by inhalation of airborne droplets generated by coughing or sneezing. There is no evidence that postexposure vaccination is effective in preventing rubella infection. IG administered within 72 hours of exposure might reduce the risk, but does not eliminate it (infants with congenital rubella have been born to women who received IG shortly after exposure).[10] Exposed HCP should be closely monitored for sign(s) of illness.

Healthcare-associated Exposure to the Herpes Simplex Virus (HSV)

The HSV is transmitted from person-to-person primarily by direct contact with vesicular fluid and contaminated saliva; less frequently, by touching freshly contaminated articles and environmental surfaces. There is no PEP available. When a person with probable or confirmed herpetic infection visits an oral healthcare facility, elective and routine care

should be deferred until lesion resolution. When rendering necessary emergency care, strict adherence to the principles of Standard and Transmission-based Precautions is the best means to minimize occupational exposure.[2,3]Exposed HCP should be closely monitored for sign(s) of infection.

Healthcare-associated Exposure to the Varicella-Zoster Virus (VZV)

The VZV is transmitted from person-to-person primarily by direct contact with vesicular fluid; inhalation of droplet nuclei from infected respiratory secretions; and less frequently, by contact with freshly contaminated articles and environmental surfaces. If VZV exposure occurs in a healthcare setting, all case-patient contacts should be evaluated immediately for presumptive evidence of immunity.[10] Persons are considered immune only if they have documentation of:

1. physician-diagnosed varicella (chickenpox)
   or
2. physician-diagnosed herpes zoster
   or
3. laboratory evidence of VZV immunity
   or
4. age-appropriate vaccination against the VZV.
   or
5. non immunocompromised or pregnant born in the United States before 1980

All susceptible HCP exposed to the VZV should receive PEP with two doses (4-8 weeks apart) of the varicella-zoster vaccine (*Varivax*) as soon as possible. Vaccination within 3-5 days of exposure to rash might modify the disease if infection occurred. Vaccination >5 days postexposure is still indicated because it induces protection against subsequent exposures (if the current exposure did not cause infection).[10] HCP who have received the vaccine more than 5 days after the exposure should be excluded from duty for 8-21 days after exposure.[12] Susceptible HCP exposed to the VZV for whom the vaccine is contraindicated (e.g., pregnant, immunocompromised HCP) should be administered varicella-zoster immunoglobulin (VZIG) no later than 96 hours of an exposure.[10] This recommendation also applies to women exposed to the VZV at any stage of pregnancy. The VZIG product currently used in the United States is *VariZIG*™.

Healthcare-associated Exposure to the Human Papilloma Virus (HPV)

The HPV is transmitted from person-to-person primarily by direct contact through cuts, small tears, or abrasions in skin or mucous membranes. While vaccines are available for active immunization of HPV-susceptible individuals, there is no recommendation for PEP.[12] When a person with probable or confirmed HPV infection of the oral cavity visits an oral healthcare facility, strict adherence to the principles of Standard and Transmission-based Precautions is the best means to minimize occupational exposure.[2,3] Exposed HCP should be monitored for sign(s) of infection.

Healthcare-associated Exposure to Influenza Viruses

Influenza viruses are transmitted from person-to-person primarily by inhalation of airborne droplets generated by coughing or sneezing; less frequently by contact with freshly contaminated articles and environmental surfaces. It is strongly recommended that HCP be vaccinated annually.[10,13] Antiviral drugs for PEP can be administered to unvaccinated HCP (1) during outbreaks of influenza, (2) following exposure to a person with influenza, or (3) after exposure to a strain against which vaccination is not protective.[10]

Oseltamivir is the preferred PEP agent. If oseltamivir is unavailable, oral baloxavir, inhaled zanamivir, or intravenous peramivir can be used for PEP.[13] To better preserve medication availability, some authorities recommend against PEP and endorse watchful waiting and prompt treatment (within 2 days) only when signs and symptoms of infection appear.[10]

Healthcare-associated Exposure to SARS-CoV-2 Virus

The COVID 19 pandemic is caused by the novel SARS-CoV-2 virus. SARS CoV 2 is transmitted from person-to-person primarily by inhalation of airborne droplets or nuclei generated by coughing or sneezing.[14] HCP should monitor and follow the Centers for Disease Control and Prevention (CDC) recommendations for infection control, the appropriate use of personal protective equipment, and vaccination.

Currently, there are three vaccines authorized or approved for use in the United States to protect against COVID-19: the mRNA vaccines Cominarty (Pfizer-BioNTech) and Spikevax (Moderna) and the recombinant spike protein with matrix-M1 adjuvant vaccine (Novavax).[14] There are currently no COVID-19 PEP agents proven to be effective in reducing SARS-CoV-2 infection.[14]

Healthcare-associated Exposure to *Mycobacterium tuberculosis* (MBT)

MBT is transmitted from person-to-person primarily by inhalation of droplets and droplet nuclei generated by talking, coughing, or sneezing. Health care personnel with a documented history of a prior positive TB test should receive an individual TB risk assessment and TB symptom screen upon hire (i.e., pre-placement). Otherwise, HCP should undergo baseline TB screening, including a symptom evaluation and testing (tuberculin skin test [TST] or , interferon-gamma release assay [IGRA]) at the beginning of employment.[15,16] A positive TST or IGRA indicates prior exposure to MBT and the provider should be evaluated for the presence of tuberculosis (TB) disease or latent TB infection (LTBI).

HCP with a negative baseline TST or IGRA who experience an unprotected occupational exposure, are susceptible to infection. As soon as possible after exposure to a patient with TB disease, the provider should undergo a TST or IGRA test. If the result is negative, the test should be repeated at 8-10 weeks after the last exposure.

Immunocompetent providers with LTBI are asymptomatic and not infectious but have a 10% life-time risk of developing active TB. Treatment for LTBI is strongly encouraged for all HCP with LTBI. Shorter treatment regimens, including once-weekly isoniazid and rifapentine for 3 months and daily rifampin for 4 months, should be used as they are more likely to be completed when compared to the traditional regimens of 6 or 9 months of isoniazid.[16]

Healthcare-associated Exposure to *Clostridium tetani*, *Corynebacterium diphtheriae*, and *Bordetella pertussis*

Four vaccines are available to prevent diphtheria, tetanus, and pertussis: DTaP, DT, Tdap, and Td.[17] The upper-case letters "D," "T," and "P" denote full-strength doses of diphtheria, tetanus toxoid and pertussis, respectively. The lower-case letters "d" and "p" denote reduced doses of diphtheria and the "a" in DTaP and Tdap stands for "acellular," i.e., the pertussis component of the vaccine contains only a part of the organism. DTaP and DT are prescribed to immunize children younger than 7 years old.[17]

Clostridium tetani (C. tetani)

C. tetani usually enter the body through cuts or puncture wounds caused by contaminated objects. Following exposure, HCP who have not or are unsure if they have previously been vaccinated should receive PEP, i.e., a dose of Tdap as soon as feasible.[18] Exposed HCP should be monitored closely and human tetanus immune globulin (TIG), agents to control muscle spasm, and antibacterial agents should be administered at the first sign(s) of illness.[18]

Corynebacterium diphtheriae (C. diphtheriae)

C. diphtheriae is transmitted from person-to-person by direct contact with respiratory secretions or by inhalation of airborne droplets generated by coughing or sneezing.[19] HCP in close contact with patients with diphtheria should be administered PEP, (i.e., a dose of Td or Tdap) and antibacterial agents (benzathine penicillin G or oral erythromycin).[12,19] Exposed HCP should be monitored closely and diphtheria antitoxin administered at the first sign(s) of illness.[19]

Bordetella pertussis (B. pertussis)

B. pertussis is transmitted from person-to-person by direct contact with respiratory secretions or by inhalation of airborne droplets generated by coughing or sneezing.[10] Regardless of age, HCP should receive a single dose of Tdap as soon as feasible if they have not previously received Tdap and regardless of the time since their most recent Td vaccination.[10] Booster doses of either Td or Tdap should be administered every 10 years throughout life.

Some vaccinated HCP exposed to B. pertussis may experience a breakthrough infection and need postexposure prophylaxis. Postexposure antimicrobial prophylaxis is recommended for all HCP who have unprotected exposure to pertussis and are likely to expose a patient at risk for severe pertussis (e.g., hospitalized

neonates and pregnant women). Other HCP should either receive postexposure antimicrobial prophylaxis or be monitored daily for 21 days after pertussis exposure and treated at the onset of signs and symptoms of pertussis.[10]

Healthcare-associated Exposure to *Neisseria meningitidis (N. meningitidis)*

N. meningitidis is transmitted from person-to-person by direct contact with respiratory secretions and saliva and by inhalation of airborne droplets generated by coughing or sneezing. At risk HCP (e.g., asplenia or persistent complement component deficiencies) should receive a 2-dose series of the Men ACWY vaccine, because these conditions increase the risk for meningococcal disease.[20] All HCP with close or lengthy contact with a patient with meningococcal disease are considered at increased risk of infection and should receive antimicrobial PEP within 24 hours of exposure.[21]

Healthcare-associated Exposure to *Streptococcus pneumoniae (S. pneumoniae)*

S. pneumoniae is transmitted from person-to-person by direct contact with respiratory secretions and saliva and by inhalation of airborne droplets generated by coughing and sneezing.[22] Previously unvaccinated HCP ≥65 years old or 19-64 years old with certain underlying medical conditions or other risk factors should receive a one-time dose of PCV20 or a dose of PCV15 followed by PPSV23 at least one year later. It is uncommon for contacts to develop pneumococcal infection; hence no PEP is required. Exposed HCP should be closely monitored for sign(s) of illness.[22] Early diagnosis and treatment with an antibacterial agent is the cornerstone of treating pneumococcal infections.

Healthcare-associated Exposure to Methicillin-resistant *Staphylococcus aureus* (MRSA)

MRSA is primarily transmitted by direct contact with an infected skin lesion; less frequently by contact with contaminated articles and environmental surfaces.[23] PEP is not recommended. Exposed HCP should be monitored for skin lesions, i.e., redness, warmth, swelling, fluctuance, draining pus, fever, and pain at sites that initially may have looked like "spider bites." Incision and drainage and empirical adjunctive antibacterial coverage are the first step in treating purulent skin infections.[23]

Healthcare-associated Exposure to the Hepatitis A Virus (HAV)

HAV is transmitted primarily by the fecal-oral route, either person-to-person, i.e., close personal contact with an infected household member or sex partner; or consumption of contaminated food or water.[24] HCP have not been demonstrated to be at increased risk for HAV infection because of occupational exposure.[24]

However, HCP traveling to or working in countries that have high or intermediate hepatitis A endemicity should complete a 2 dose HepA vaccination regimen (Havrix or Vaqta) prior to travel. Unprotected HCP exposed to HAV should be administered PEP consisting of the HepA vaccine within 2 weeks of exposure and, under certain circumstances, coadministration of immune globulin (GamaSTAN IG) for HCP >40 years of age.[24]

Basic Expectations for Safe Care

A Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care published by the CDC in 2016 includes an Infection Prevention Checklist for Dental Settings (Appendix A).[25] The Infection Prevention Checklist, Section I: Policies and Practices, Subsection I.3, provides an instrument to monitor institutional compliance with administrative requirements intended to fulfill basic expectations for Dental Health Care Personnel Safety.[23]

Summary

Primary prevention, i.e., strict adherence to the principles of Standard and Transmission-based precautions is the best means of preventing occupational exposure to blood and OPIM. When an occupational exposure does occur, immediate wound care (when applicable), prompt reporting of the incident, timely postexposure evaluation and initiation of PEP followed by expert follow-up and counseling are the cornerstones to prevent infection and the development of disease.

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/ce472/test*

1. All of the following statements are correct with reference to occupational exposure of healthcare personnel (HCP), EXCEPT for one. Which one is the exception?

A. Healthcare facilities should have the organizational infrastructure that promotes a seamless response following an occupational exposure of HCP.
B. The term HCP refers to all paid and unpaid persons working in healthcare settings who have the potential for exposure to blood and OPIM.
C. The term HCP include emergency medical service personnel, dental personnel, laboratory personnel, nurses, nursing assistants, physicians, technicians, therapists, pharmacists, and students and trainees.
D. The term HCP excludes persons not directly involved in patient care (e.g., clerical, dietary, housekeeping, security, maintenance, and volunteer personnel).

2. All of the following statements related to an exposure that might place HCP at risk for HAIs are correct, EXCEPT for one. Which one is the exception? The transfer of pathogenic organisms from a source to a host may be the result of _____.

A. direct contact transmission
B. indirect contact transmission
C. respiratory transmission, i.e., inhalation of droplets or droplet nuclei (airborne transmission)
D. droplets and droplet nuclei only generated by medical/dental devices, such as high-speed handpieces, ultrasonic instruments, or by lasers and electrosurgical units. Not as a result of talking, breathing, coughing or sneezing.

3. All of the following statements related to a source person are correct, EXCEPT for one. Which one is the exception?

A. The source person may be a patient, another HCP, a visitor to the healthcare facility, or a house-hold member.
B. A person with asymptomatic acute or chronic infections, in general, is non-infectious and does not qualify as a source person.
C. The source person may have acute infection or may be transiently or chronically colonized by pathogenic organisms.
D. The source person with an acute or chronic infection may be asymptomatic.

4. All of the following statements are correct with reference to postexposure management strategies, EXCEPT for one. Which one is the exception?

A. All HCP should be familiar with postexposure management strategies such as procedures for proper wound care.
B. In a dental office, postexposure evaluation, initiation of postexposure prophylaxis (PEP), and postexposure follow-up is the responsibility of the dentist.
C. PEP is any preventive medical treatment, e.g., administration of vaccines, immune globulins, or antibacterial agents.
D. PEP started in a timely manner after exposure to a pathogenic virus or bacteria is intended to prevent infection and the development of disease.

5. Healthcare-associated Exposure to Bloodborne Pathogens

An exposure that might place HCP at risk for HAIs with bloodborne pathogens (i.e., infection with hepatitis B, hepatitis C, or human immunodeficiency viruses) may include a percutaneous injury, e.g., needlestick or cut with a sharp object contaminated with blood or OPIM; direct contact of ocular, nasal, or oral mucous membranes with blood or OPIM; direct contact of nonintact skin, e.g., dermatitis, or chapped or abraded skin with blood and OPIM.

A. True
B. False

6. All of the following segments related to wound care are correct, EXCEPT for one. Which one is the exception?

A. Percutaneous wounds and nonintact skin that have been in contact with blood or OPIM should be washed with soap and water.
B. Mucous membranes that have been in contact with blood or OPIM should be flushed with water.
C. Using antiseptics (e.g., chlorhexidine) for wound care or expressing fluid by squeezing the wound have been shown to reduce the risk for infection.
D. Injecting antiseptics or disinfectants into a wound and the application of caustic agents (e.g., bleach) is not recommended.

7. Which of the following is NOT recommended content to include in an occupational exposure report?

A. details of the procedures being performed
B. details of the exposure
C. type of exposure
D. history of high-risk behavior of the healthcare worker (other than occupation)
E. date and time of exposure

8. After exposure to a blood borne pathogen, all of the following elements regarding presentation for a post-exposure evaluation are true, EXCEPT for one. Which one is the exception?

A. Present within 2 days of the exposure incident
B. Present with the incident report
C. Present with all available information about the source person
D. Present with HCP's OSHA-mandated medical record maintained by the employer

9. All of the following statements related to HBV PEP are correct, EXCEPT for one. Which one is the exception?

A. HBV PEP should be initiated as soon as possible (preferably within 24 hours) after exposure.
B. HBIG and the first dose of the HepB vaccine (if indicated) can be administered simultaneously.
C. The HepB vaccine should never be administered in the deltoid muscle.
D. Expert counseling is recommended for susceptible HCP exposed to the HBV.

10. All of the following statements related to exposure to the HCV are correct, EXCEPT for one. Which one is the exception?

A. Recommendations for postexposure evaluation and follow-up are intended to achieve early diagnosis of HCV infection.
B. Postexposure prophylaxis (PEP) is recommended for HCP after exposure to HCV-positive blood or OPIM.
C. The exposed HCP should undergo baseline testing for anti-HCV with reflex to a NAT for HCV RNA if positive, to identify a preexisting infection.
D. The source patient should ideally undergo a nucleic acid test (NAT) for HCV RNA.

11. All of the following statements related to exposure to the HIV are correct, EXCEPT for one. Which one is the exception? The latest U.S. Public Health Service (PHS) guidelines emphasize the importance of _____.

A. prompt reporting of expert management of occupational exposures
B. adherence to the recommended HIV PEP regimen
C. follow-up of exposed HCP to including careful monitoring for adverse events related to PEP and for virologic, immunologic, and serologic signs of infection
D. modified patient-care responsibilities of exposed HCP based solely on evidence of HIV exposure

12. All of the following statements related to exposure to measles, mumps, or rubella are correct, EXCEPT for one. Which one is the exception?

A. If measles, mumps, or rubella exposure occurs in a healthcare setting, all case-patient contacts should be evaluated immediately for presumptive evidence of measles, mumps, or rubella immunity.
B. Exposed HCP without evidence of immunity to the measles virus should be offered the MMR vaccine or a of immune globulin (IG).
C. Exposed HCP without evidence of immunity to mumps should be offered the MMR vaccine; however, antibodies develop too slowly to provide effective prophylaxis after exposure.
D. There is strong evidence that postexposure vaccination is effective in preventing rubella infection.

13. All of the following statements related to exposure to the varicella-zoster virus (VZV) are correct, EXCEPT for one. Which one is the exception?

A. If VZV exposure occurs in a healthcare setting, all case-patient contacts should be evaluated immediately for presumptive evidence of immunity.
B. All susceptible HCP exposed to the VZV should receive PEP with two doses (4-8 weeks apart) of the varicella-zoster vaccine (Varivax).
C. Women exposed to the VZV at any stage of pregnancy should receive the varicella-zoster vaccine (Varivax) no later than 96 hours of an exposure.
D. Susceptible HCP exposed to the VZV for whom the vaccine is contraindicated should be administered varicella-zoster immunoglobulin (VZIG).

14. All of following statements related to exposure to the influenza viruses and SARS-CoV-2 are correct, EXCEPT for one. Which one is the exception?

A. It is strongly recommended that HCP be vaccinated against influenza and SAR-CoV-2.
B. There are two antiviral drugs for PEP recommended for use following healthcare-associated exposure to the influenza viruses.
C. Some authorities recommend against PEP for influenza and endorse watchful waiting and prompt early treatment (within 2 days) only when signs and symptoms of infection appear.
D. There are currently no COVID-19 PEP agents proven to be effective in reducing SARS-CoV-2 infection.

15. All of the following statements related to exposure to Mycobacterium tuberculosis (MBT) are correct, EXCEPT for one. Which one is the exception?

A. HCP should obtain a baseline tuberculin skin test (TST), preferably a two-step TST, at the beginning of employment.
B. HCP with a negative TST, in case of unprotected occupational exposure, are susceptible to infection.
C. HCP with a previously negative TST or BAMT who subsequently have a positive TST result (a reaction ≥5 mm) or a positive BAMT result should be evaluated for treatment of LTBI.
D. An exposed person may develop latent TB infection (LTBI), which is asymptomatic but highly infectious.

16. All of the following statements are related to Clostridium tetani, Corynebacterium diphtheriae, or Bordetella pertussis are correct, EXCEPT for one. Which one is the exception?

A. Following exposure to C. tetani, no PEP is indicated; exposed HCP should be monitored closely and human tetanus immune globulin (TIG) should be administered at the first sign(s) of illness.
B. HCP in close contact with patients with diphtheria should be administered PEP, i.e., a dose of diphtheria toxoid booster Td) and antibacterial agents.
C. HCP exposed to B. pertussis should receive PEP, i.e., antibacterial prophylaxis within 21 days of exposure when (1) at high risk of developing severe pertussis or (2) when close contact with patients at high risk is anticipated.
D. If there is an increased risk of pertussis in a healthcare setting, evidenced by documented or suspected healthcare-associated transmission of pertussis, revaccination of HCP with Tdap should be considered.

17. HCP with close or lengthy contact with a patient with meningococcal disease are considered at increased risk of infection and should receive PEP, i.e., antimicrobial prophylaxis.

A. True
B. False

18. It is common for contacts of patients with S. pneumoniae infection to develop pneumococcal infection; PEP with an effective antibacterial agent is recommended.

A. True
B. False

19. Which of the following statements in reference exposure to methicillin-resistant Staphylococcus aureus (MRSA) is incorrect?

A. MRSA is primarily transmitted by direct contact with an infected skin lesion; less frequently by contact with contaminated articles and environmental surfaces.
B. PEP is highly recommended for HCP.
C. Exposed HCP should be monitored for skin lesions.
D. Incision and drainage and adjunctive antibacterial coverage are the first step in treating purulent skin infections.

20. All of the following statements in reference to exposure to the hepatitis A virus (HAV) are correct, EXCEPT for one. Which one is the exception?

A. The HAV is transmitted primarily by the fecal-oral route, either person-to-person, i.e., close personal contact with an infected household member or sex partner, or consumption of contaminated food or water.

B. HCP have not been demonstrated to be at increased risk for HAV infection because of occupational exposure.

C. HCP traveling to or working in countries that have high or intermediate hepatitis A endemicity should complete a 2 dose HepA vaccination regimen (Havrix or Vaqta) prior to travel.

D. There is no PEP recommended for unprotected HCP exposed to HAV.

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Additional Resources

- No Additional Resources Available.

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