**Exposure Control**

**Plan**

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**EXPOSURE CONTROL**

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# Introduction

The primary purpose of the DCPS Exposure Control Plan is to provide protection to all human health within the school system, pursuant to, the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to Bloodborne Pathogens (BBP) standards and DC government solid waste management rules.[[1]](#footnote-1) Additionally, the plan is designed to ensure that schools comply with the DC Department of Health (DOH) Universal Precautions Standards and public health practices.[[2]](#footnote-2)

The Exposure Control Plan includes a model that was established by the State of North Carolina’s Franklin County School System.[[3]](#footnote-3) The District decided to use the Franklin County exposure control model because it meets the requirements of OSHA BBP and hazard communication standards.[[4]](#footnote-4)

The OSHA BBP standard protects employees who work in occupations where they are at risk of exposure to blood or other potentially infectious materials. The OSHA hazard communication standard protects employees who may be exposed to hazardous chemicals.[[5]](#footnote-5) The primary purpose of the BBP standards is to eliminate or minimize on-the-job exposure to blood and other potentially infectious materials, which could result in the transmission of BBPs and lead to disease or death. The major pathogens are the Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and the Human Immunodeficiency Virus (HIV).[[6]](#footnote-6) The DC government waste management rules[[7]](#footnote-7) determine proper disposal methods of items that are contaminated with blood and other potentially infectious materials.[[8]](#footnote-8)

## Policy

The District is committed to providing a safe and healthy work environment for all staff and students. In pursuit of this goal, the following exposure control plan (ECP) is provided to eliminate or minimize occupational exposure to BBPs in accordance with OSHA standard 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens.

The policy applies to all school employees and students. For the purpose of this plan,*occupational exposure* means any reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's assigned work duties.[[9]](#footnote-9)

**Authorities**

* Department of Labor, OSHA Occupational Exposure to Bloodborne Pathogens Standard (29 CFR 1910.1030) provides provisions to employers to eliminate or minimize occupational exposure to BBPs in the work environment.
* DC Law 17-009, Public Education Reform Amendment Act of 2007. Sections 105, 106 grants the Chancellor authority to direct and supervise the administration of DC Public Schools.
* Preventive Health Services Administration Act of 1985 (D.C. Official Code 7-131 et seq.) authorizes the Mayor, in consultation with the DOH Director, to control the spread of a communicable disease, including the authority to order examination, treatment isolation, or quarantine of a person or persons.
* DC Law 3-20, Immunization Of School Students Act of 1979, describes immunization and medical exemption requirements.
* Title 22 DCMR Public Health and Medicine provides direction for human health best practices concerning management of infectious and communicable diseases. Title 22 also provides policy direction concerning management of infectious and hazardous waste.
* Title 5 DCMR Section 1023 sets forth provisions for the protection of employees’ health information.
* Provisions for the protection of student health information are included in Chapter 24, Title 5 DCMR and the Family Educational Rights and Privacy Act (FERPA) (20 U.S 123g; 34 CFR 99).
* DC Law 12-263, Human Right Genetic Information Amendment Act of 2004, includes provisions that allow an employer to obtain genetic information about an employee to potentially toxic substances in the workplace, provided that the employee provides, in writing, his or her informed consent, and the genetic information is provided to the employee in writing as soon as it is available, and the genetic information is not disclosed to any other person.
* DC Law 1-134, District of Columbia Solid Waste Regulations of 1997, provides for the safe management and disposal of infectious and hazardous waste.

# Program Administration

The Chancellor will appoint the Chief Business Officer as the lead school official to ensure that:

* All elements of the Exposure Control Plan (ECP) are met.
* Contents of the ECP are conveyed to employees.
* Policies and procedures are in place for employees not complying with the ECP.
* The BBP Standards Committee is appointed.
* BBP Program Coordinator is assigned to monitor implementation of the DCPS Exposure Control Plan.

The BBP Program Coordinator will ensure that:

* Appropriate housekeeping standards are developed and met for the cleaning and decontamination of work areas where there is potential for exposure to BBP.
* Appropriate personal protective equipment (PPE) is readily accessible at auxiliary sites.
* Contaminated waste disposal standards are met.
* Blood spill cleanup kits and antiseptic towelettes are available in school vehicles and buses.
* Incident and BBP Surveillance and Monitoring Forms are developed and placed in all schools.
* Mandatory BBP training is conducted and that all employees attend.
* Employees are identified as being at-risk for occupational exposure and at-risk employees attend the Required BBP training sessions.
* Appropriate PPE is available in accessible locations.
* Outdated BBP supplies are replaced (e.g., in cleanup/hygiene stations, in the main office).
* Employees comply with the ECP and address noncompliance issues.
* A copy of the Exposure Control Plan is readily accessible in the main office at each school and reception desk.
* Updates of the ECP occur when information is received from the BBP Program Coordinator and revisions are communicated to employees.
* The annual Bloodborne Pathogens Surveillance and Monitoring Form for the workplace is completed in accordance with program guidelines.
* The DCPS Incident Report and Bloodborne Pathogens Exposure Report forms are completed when indicated and assistance is provided to employees.
* BBP Program Coordinator is immediately notified when an occupational exposure incident occurs.
* Circumstances surrounding exposure incidents are evaluated and administrators initiate corrective actions to prevent future incidents.
* All work sites are maintained in a clean and sanitary condition.
* The ECP is developed, implemented, reviewed, and updated in conformity with applicable District and Federal OSHA regulations and waste management laws.
* An updated copy of the ECP is given to each principal. Plan recipients should place the document in accessible areas located in the main office and in the reception area of each auxiliary site.
* The work environment is evaluated, identifying actual and potential hazards for exposure to BBPs, jobs having collateral risk, and at-risk job categories.
* Employee Exposure Determination Questionnaires are reviewed to identify at-risk employees.
* Appropriate measures to protect employees from occupational exposure are developed and specified in the ECP and the information is conveyed to employees during BBP training sessions.
* These measures must include use of hand washing techniques, universal precautions, labels with the biohazard warning symbol, work practice controls, personal protective equipment, housekeeping standards, methods for handling contaminated laundry, and methods for disposing of contaminated waste and contaminated sharps.
* The BBP Program Coordinator will assess and at least annually document in the master copy of the ECP the availability of safer personal protective devices.
* The Hepatitis B vaccination series is offered to at-risk employees.
* The BBP Program Coordinator will coordinate with the DOH concerning the administration of the Hepatitis B vaccine for employees accepting the series.
* The BBP Program Coordinator will maintain Hepatitis B vaccination records of at-risk employees.
* Review the DCPS Incident Report, DCPS Bloodborne Pathogens Exposure Report, and DCPS Bloodborne Pathogens Source Incident Report forms in accordance with program guidelines.
* Develop Corrective Action Plans (CAP) and complete followup and documentation for occupational exposure incidents.
* Post-exposure medical evaluations and followup procedures are followed.
* Establish and confidentially maintain medical records systems. Ensure the completion of BBP training classes and maintain records at a central office for a three-year period. Current and archived records shall be maintained in a secured area at all times.
* Document data from nonmanagerial employees potentially exposed to injuries from contaminated sharps in the master copy of the Exposure Control Plan. Also, note recommendations and best management practices (BMP) for more effective engineering and work-practice controls.
* Complete the Sharps Injury Log and maintain confidentiality. Records shall be retained at a central office for five years. Current and archived records will be maintained in a secured area at all times.
* Complete the Annual Bloodborne Pathogens Surveillance and Monitoring Form for each school and auxiliary site.
* Review, file, and institute corrective actions, as required.
* Convene Bloodborne Pathogens Standards Committee meetings as required.

The BBP Program Coordinator will chair the BBP Standards Committee to ensure that:

* Mandatory annual BBP training takes place.
* BBP supplies are available at each school.
* Coordination occurs with school nurse, ensuring that letters are sent to parents/legal guardians who are providing needle devices for school personnel to use in the care of students.

# Plan Exposure Control

The ECP is the key document to assist DCPS in implementing and ensuring compliance with the BBP and hazard communications standards. A copy must be kept in the main office at each school and reception area at each auxiliary location. The plan shall be reviewed with all employees during mandatory BBP training.

The ECP will be reviewed and updated whenever necessary to reflect changes in at-risk job categories, tasks, and procedures. The review and update must reflect changes in technology that eliminate or reduce exposure to BBPs and annually document consideration and implementation of appropriate medical innovations commercially available to provide more effective protection to eliminate or minimize occupational exposure.

The DCPS BBP Program Coordinator will solicit input from non-managerial employees responsible for direct student care who are potentially exposed to injuries from contaminated sharps in the identification, evaluation, and selection of effective engineering and work practice controls.

The solicitation will be obtained during BBP training. Also, employees are encouraged to provide such information to their supervisor, principal, and/or BBP Program Coordinator at any time during the course of employment.

DCPS will request parents/legal guardians who purchase needle devices for school personnel to use in caring for students provide the safest and most effective syringes feasibly available for purchase.

The BBP Standards Committee will review changes annually in technology that eliminates or reduce s exposure to BBPs and make recommendations for changes such as purchasing new devices, if such devices are commercially available and improve safety. The review must be documented in the master copy of the Exposure Control Plan and shared with employees upon request. Also, the committee shall review all DCPS Exposure Report forms and make necessary recommendations to minimize or eliminate future exposures.

# Exposure Determination

The OSHA BBP standard covers any employee who is at risk for occupational exposure. *Occupational exposure* is defined as any reasonably anticipated skin, eye, mucous membrane, or potential contact with blood or other potentially infectious materials that may result from the performance of an employee's duties. However, *Good Samaritan* acts, or employees rendering assistance to accident victims, and other exposures that cannot be anticipated, do not constitute occupational exposure.[[10]](#footnote-10)

To help determine employees and students risk of exposure in the school environment, each Local Education Agency (LEA) must evaluate the work environment to determine the actual and potential hazards for exposure to BBPs. An exposure determination list identifying job classifications that have actual and collateral risk for occupational exposure will be made. Additionally, tasks will be identified and examined with recommendations made on how to reduce the potential of exposure to blood or other infectious materials through workplace controls, PPE, or other methods. Exposure determination will be made without regard to the use of PPE.

The Exposure Determination Questionnaire must also be used to identify at-risk employees. This questionnaire will be completed by every new employee during orientation in the Pre-exposure Introduction BBP training and by employees having employment changes placing them in at-risk job categories, during Refresher BBP training. Additionally, any employee who thinks his or her occupational exposure status has changed may request and complete this questionnaire at any time during the course of employment and submit the completed questionnaire to the BBP Program Coordinator. This tool is especially beneficial if exposure determination is questionable.

Employees listed in at-risk job categories are those who because of their usual duties might be exposed to blood or other potentially infectious fluids as an integral part of performing occupational tasks. Therefore, it is reasonable to anticipate that exposure may occur. The list may not be all-inclusive for at-risk exposure determination.

Employee positions that are not included on the list, who believe they are at risk for occupational exposure to blood and other potentially infectious materials, may request an Exposure Determination Questionnaire from their principal or the BBP Program Coordinator. The completed questionnaire must be submitted to the BBP Program Coordinator and reviewed by the BBP Standards Committee.

**Employees Having Occupational Exposure Must:**

* Identify job tasks placing them at risk for potential occupational exposure and perform all duties in compliance with the Exposure Control Plan.
* Attend mandatory BBP training annually and participate in subsequent seminars to updates to the OSHA BBP final standard and revisions to the ECP.
* Immediately (not later than 24 hours after incident) report occupational exposure to blood and other potentially infectious materials to their supervisor and complete a Bloodborne Pathogens Exposure Report form.
* All employees will utilize Universal Precautions.

**Students Potentially At-Risk for Exposure**

While students are not covered under Federal OSHA regulations, the DC public school system acknowledges that students are at risk for exposure, because of accidents that may occur during the school hours. Also, students who self–administer medications are potentially at risk of exposure if they use an EpiPen or other devices for diabetes.

Therefore, DCPS requires all students to comply with DC Law 3-20, Immunization of School Students Act of 1979. To ensure that students comply with the city’s immunization requirements, DOH makes available free Hepatitis B vaccine to children and young adults through 26 years of age.[[11]](#footnote-11)

All students attending DCPS are required to have Hepatitis B and Tetanus vaccinations. Students who do not comply with the city’s student immunization requirements cannot attend classes until their immunizations are up to date. Students can be excused from the city’s immunization requirements only if they have an approved medical or religious exemption.

If students have an exposure incident, the incident must be reported to the school principal, nurse, parent or legal guardian, and BBP Program Coordinator as quickly as possible. A DCPS Incident Report form will be initiated. The parent or legal guardian must be advised by the school nurse of pertinent health recommendations.

**Student-to-Student Exposure for Biting Incidents**

 ***For the person bitten—***

* + - Inspect area to see if skin is broken and if blood is visible.
		- Promptly advise school nurse and/or principal of the incident and promptly notify parents. The school nurse will advise the parent or legal guardian of the pertinent health recommendations
		- If the school nurse is not on duty, contact 911. Whenever skin is broken, promptly consult with the school nurse for direction regarding any necessary treatment measures, including tetanus immunization. There is minimal risk of contracting communicable diseases such as Hepatitis B or Hepatitis C from a human bite. HIV is not identified by the Centers for Disease Control and Prevention (CDC) as a risk factor.[[12]](#footnote-12)
		- Always use Universal Precautions when handling body fluids.

***For the biter—***

* + - When the skin is broken, resulting in visible blood during biting incident, promptly advise the school nurse, principal, and student’s parent/legal guardian. Assist student to rinse mouth with water to remove possible residual blood.
		- Promptly advise school nurse and principal of the incident and plan for prompt parental notification.
		- The school nurse will advise the parent or legal guardian of pertinent health recommendations. If the nurse is not on duty, immediately, contact 911. There is minimal risk of contracting communicable diseases such as Hepatitis B or Hepatitis C from a human bite. The Human Immunodeficiency Virus (HIV) is not identified by the CDC as a risk factor.
		- Always use Universal Precautions when handling body fluids.

The following table outlines job classifications considered to be at risk, tasks causing risk, and the protective barriers or engineering controls to be used during the implementation of the ECP.

| **At-Risk Job Classifications**  |
| --- |
| **Classifications** | **Tasks Inducing Risk** | **Protective Barrier/****Engineering Control** |
| Athletic Trainers | * Emergency first aid
* Handling contaminated laundry
 | Universal Precautions, gloves, goggles, masks protective clothing, first aid supplies, disinfectants, leak-proof bags, hand washing, and blood spill clean-up kit |
| Coaches | * Emergency first aid
* Handling contaminated laundry
 | Universal Precautions, gloves, goggles, masks protective clothing, first aid supplies, disinfectants, leak-proof bags, hand washing, and blood spill cleanup kit |
| First Responders | * Emergency first aid and CPR
 | Universal Precautions, gloves, goggles, masks protective clothing, first aid supplies, disinfectants, leak proof bags, hand washing, and blood spill cleanup kit |
| Custodians | * Cleaning up and decontaminating procedures
* Disposing of contaminated waste
 | Universal Precautions, gloves, goggles, masks, protective clothing, disinfectants, microshields, hand washing blood spill cleanup kit |
| Nurse | * Screenings, first aid
* Medically related procedures
* Direct patient care
 | Universal Precaution, gloves, goggles, masks, protective clothing, first aid, supplies, disinfectants, hand washing  |
| Physical Education Teachers contaminated | * Emergency first aid
* Handling contaminated laundry
 | Universal Precaution gloves, masks, protective clothing, first aid, supplies, disinfectants, hand washing, leak-proof bags, blood spill cleanup kit |
| Pre K Teachers Teacher Assistants | * Providing first aid to children of ages that are more prone to injury
 | Universal Precautions, gloves goggles, masks, protective clothing, first aid supplies, hand washing. |
| Secretaries  | * Emergency first aid
* Responsibilities for discipline
 | Universal Precautions, gloves goggles, masks, protective clothing, first aid supplies, hand washing. |
| Administrators | * Responsible for discipline
* Emergency first aid
* Potential for injury while intervening in fights/altercations
 | Universal Precautions, gloves goggles, masks, protective clothing, first aid supplies, hand washing. |
| Shop Teachers | * Emergency first aid
* Working with equipment having potential for causing injuries
 | Universal Precautions, gloves, goggles, protective clothing, first aid supplies, face shields, hand washing. |
| Administration (medication to student givers) | * Provide medication to students
 | Universal Precautions, gloves, goggles, protective clothing, first aid supplies, hand washing. |
| Speech Therapists | * Place hand in student’s for evaluation and therapy
 | Universal Precautions, gloves, hand washing |
| TeacherTeacher AssistantBus Drivers of Special Needs Children | * Medically related procedures
* Aggressive students, known biters
 | Universal Precautions, gloves, goggles, masks, protective clothing, first aid supplies, disinfectants, approved disposal containers, hand washing. |

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|  **Examples of Job Classifications at Possible Risk of Occupational Exposure** **(Category II collateral exposure**) |
| Chemistry/Biology Lab Teacher | Bus Drivers/Substitute Drivers |
| Classroom Teacher/ Substitutes Instructors | Teachers Substitutes |
| Maintenance Workers/Trades and Industry Teachers | Other health impaired teachers and assistants |
| Mini-Bus Drivers/Monitors | Teacher and Teacher Assistants of Health Impaired students |

**Collateral Exposure**

Employees having collateral exposure are encouraged to take the Hepatitis B vaccination series if he/she has rendered assistance in any situation involving the presence of blood or other potentially infectious materials on a post-exposure basis. It should be taken immediately and within 24 hours of the exposure incident. Employees can contact the DOH for vaccination assistance and information.

As indicated above, *Good Samaritan* acts, such as a teacher or secretary rendering assistance to an accident victim, and other exposures that cannot be anticipated do not constitute occupational exposure. Many employees may at some time in their career respond to an accident, but they are not considered at risk for occupational exposure. These employees should follow the same post-exposure followup as employees who are at risk for occupational exposure. All employees are to use good hand washing techniques and Universal Precautions as protective measures, regardless of whether designated as at risk for occupational exposure. Employees providing first aid and having to clean up blood or other potentially infectious materials (e.g., when a custodian is not available and/or a blood spill cleanup kit is used) must complete an Incident Report form. Additionally, a BBP Exposure Report form should be completed immediately in the event of a collateral exposure incident.

The following table outlines the job classifications and tasks for employees considered as having collateral risk for occupational exposure and the protective barriers or engineering controls to be used.

| **At-Risk Job Classifications (Collateral)** |
| --- |
| **Classifications** | **Tasks Inducing Risk** | **Protective Barrier/****Engineering Control** |
| Biology/Chemistry Lab Teachers | * Emergency first aid
* Working with equipment that could cause injury
 | Universal Precautions, gloves, goggles, masks protective clothing, first aid supplies, hand washing  |
| Maintenance Workers | * Working with equipment that could cause injury
 | Universal Precautions, gloves, goggles, masks protective clothing, first aid supplies, disinfectants, leak proof bags, hand washing and blood spill cleanup kit |
| Classroom Teachers | * Emergency first aid
* Potential for handling cleaning up body fluids
 | Universal Precautions, gloves, disinfectants, hand washing |

# Methods of Compliance and Safe Work Practices

Consistent with provisions set forth by the DC Department of Health Universal Precaution Guidelines, all employees should use Universal Precaution procedures to prevent contact with blood or other potentially infectious materials.[[13]](#footnote-13) Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids must be considered potentially infectious.[[14]](#footnote-14)

**Engineering and Work Practice Controls**

Engineering and work practice controls will be used to eliminate or minimize employee exposure. Where occupational exposure remains, personal PPE must also be used. Engineering controls will be examined and maintained or replaced on a regular schedule to ensure their effectiveness.

Hand washing facilities must be readily accessible to employees. Each school site will have a designated scrub area with running water and soap. Also, hand washing facilities are located in each staff and student restroom. When provision of hand washing facilities is not feasible, an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes must be provided. After using antiseptic cleansers or towelettes, employees wash their hands with soap and water as soon as possible. Also, antiseptic hand cleansers/towelettes should be available in school vehicles and buses.

Hands must be thoroughly washed between all direct student contacts, after handling soiled or contaminated items and equipment, prior to gloving, and immediately after gloves or other PPE are removed. Hands and other skin surfaces must be washed with soap and water and mucous membranes flushed with water immediately or as soon as feasible following contact with blood or other potentially infectious materials.

Contaminated sharps must be handled with caution. Contaminated needles and other sharps cannot be bent, recapped, or removed unless the employer demonstrates that no alternative is feasible or that such action is required by a specific medical procedure. Bending, recapping, or needle removal must be accomplished through the use of a mechanical device or a one-handed technique.

Shearing or breaking of contaminated needles is prohibited. Immediately, or as soon as possible after use, contaminated sharps must be placed in appropriate containers for disposal. These containers must be puncture resistant, leak proof on the sides and bottom, and labeled with the biohazard warning symbol.

Activities likely to produce self-contamination such as eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses should be avoided in settings or work areas where there is a reasonable likelihood of occupational exposure. Food and drink must not be kept in refrigerators, freezers, shelves, and cabinets or on countertops or bench tops where blood or other potentially infectious materials are present. All procedures involving blood or other potentially infectious materials will be performed in a manner to minimize splashing, spraying, spattering, and generation of droplets of these substances. Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

Specimens of blood or other potentially infectious materials must be placed in a container that prevents leakage during collection, handling, processing, storage, or transport. A readily observable biohazard warning label should be attached on the container. Outside agencies providing services such as wellness and volunteer blood donation involving the collection and transportation of specimens will be responsible for complying with the Federal and District OSHA BBP regulations.

Equipment that may become contaminated with blood or other potentially infectious materials must be examined prior to servicing or shipping and decontaminated as necessary. If decontamination of equipment or portions of such equipment is not feasible, a readily observable biohazard warning label must be attached stating which portions remain contaminated. This information will be conveyed to all affected employees, the servicing representative, and/or the manufacturer, as appropriate, prior to handling, servicing, or shipping so that necessary precautions can be taken.

**Personal Protective Equipment (PPE)**

***Provision—***Where there is exposure, DCPS will provide at no cost to the employee appropriate PPE such as, but not limited to, gloves, gowns, face shields or masks, eye protection, mouthpieces, resuscitation devices, pocket masks, or other ventilation devices. PPE will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time in which the protective equipment will be used.

***Use****—*DCPS will ensure that the employee uses appropriate PPE unless temporarily and briefly declined to use PPE when, under rare and extraordinary circumstances, it was the employee's professional judgment that its use would have prevented delivery of health care or public safety services or posed an increased hazard to the safety of the worker or coworker. When the employee makes this judgment, the circumstances will be investigated and documented to determine if changes can be instituted to future prevent occurrences.

***Accessibility*—**Appropriate PPE will be readily accessible to employees. Hypoallergenic gloves, glove liners, and powderless gloves or similar alternatives will be accessible to employees allergic to gloves normally provided. The school nurse or custodial staff can request PPE.

***Repair and replacement***—DCPS will, at no cost to the employee, repair or replace PPE as needed to maintain its effectiveness. Any garment penetrated by blood or other potentially infectious materials must be removed immediately or as soon as possible and placed in a leak-proof plastic bag.

***Removal and disposal***—All PPE must be removed prior to leaving the work area. Contaminated gloves should be removed immediately after use, using proper removal technique. PPE must be changed between each individual use and after use in other settings to avoid transmission of organisms to the environment or to other individuals. When PPE is removed, it must be placed in a leak-proof plastic bag and put in a trash can with a biohazard warning label on the container.

***Gloves—***Gloves must be worn when you reasonably expect hand contact may occur with blood, other potentially infectious materials, mucous membranes, or nonintact skin, performance of vascular access procedures, or handling of contaminated items or surfaces. Gloves must be worn when the employee has cuts, scratches, or other broken skin. Also, employees with cuts, scratches, or other broken skin must cover the exposed skin with a protective band-aid or gauze dressing. Disposable (single-use) gloves must be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured ,or when their ability to function as a barrier is compromised. Disposable (single-use) gloves may not be washed or decontaminated for reuse. Utility gloves may be decontaminated for reuse if the integrity of the glove is not compromised. However, they must be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration, or when their functions are compromised.

***Masks, eye protection, and face shields—***Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, must be worn whenever splashes, spray, splatter, or droplets of blood or other potentially infectious materials may be generated, and eye, nose, or mouth contamination can be reasonably anticipated.

***Gowns, aprons, and other protective body clothing—***Appropriate protective clothing, such as but not limited to, gowns, aprons, lab coats, clinic jackets, or similar outer garments shall be worn in situations involving occupational exposure. The type and characteristics shall depend upon the task and degree of exposure anticipated. Surgical caps, hoods, and/or shoe covers or boots must be worn in instances when gross contamination is reasonably anticipated.

***Resuscitation devices****—*Mouthpieces or pocket masks for mouth-to-mouth resuscitation, bag-valve-mask devices, or other resuscitation devices must be available to prevent oral fluids or blood from coming in contact with the provider of mouth-to-mouth resuscitation or other ventilator support.

***Blood spill cleanup kits****—*Blood spill cleanup kits are available in the custodial stations, in school vehicles, and buses. They can only be used in situations where a custodian is not available for cleaning up and decontamination.

**Housekeeping**

Each work site will be kept clean and sanitary. An appropriate written schedule can be determined and implemented for cleaning and method of decontamination based on the location within each facility, type of surface to be cleaned, type of soil present, and tasks or procedures performed in the area. Refer to DCPS Custodial Handbook.

All equipment, environmental, and work surfaces must be cleaned and decontaminated immediately after contact with blood or other potentially infectious materials. Contaminated work surfaces should be decontaminated with an appropriate disinfectant after completion of procedures, immediately, as soon as feasible when surfaces are overtly contaminated, or after any spill of blood or other potentially infectious materials—and at the end of the work shift if the surface may be contaminated during the shift.

For small spills, an appropriate absorbent product must first be used in the cleanup process to remove blood or other potentially infectious materials, if feasible. For large spills, the area must be flooded with a liquid germicide before cleaning, then cleaned with fresh germicidal chemical. Tuberculocidal disinfectants approved by and registered with EPA should be used and safety rules enforced for the proper selection and use of disinfectants.

Phenolic germicidal detergent solutions are recommended for use. Additionally, freshly mixed household bleach is effective. Prepared dilutions must be discarded within 24 hours.

Undiluted household bleach may be used on surfaces that can tolerate the concentration without damaging the surface. Bleach is not the disinfectant of choice because of its short shelf life and its lack of ability to cleanse. Bleach is easily inactivated by organic matter, is very corrosive to metals and damaging to many materials, and is relatively toxic.

Protective coverings such as plastic wrap, aluminum foil, or imperviously-backed absorbent paper used to cover equipment and environmental surfaces, should be removed and replaced as soon as feasible when they become overtly contaminated, or at the end of the work shift if they may have become contaminated during the shift.

All bins, pails, cans, and similar receptacles intended for reuse which have a reasonable likelihood of becoming contaminated with blood or other potentially infectious materials must be inspected and decontaminated on a regularly scheduled basis, as well as cleaned and decontaminated immediately upon visible contamination.

Broken glassware that may be contaminated must not be picked up directly with the hands. It should be cleaned up using mechanical means such as a brush and dust pan, tongs, or forceps and placed in a rigid, leak-proof, puncture resistant container with a biohazard warning label attached (e.g., sharps disposal container, cardboard box).

Reusable sharps that are contaminated with blood or other potentially infectious materials should not be stored or processed in a manner that requires employees to reach by hand into the containers where these sharps have been placed.

**Disposal of Waste Contaminated With Blood and Other Potentially Infectious Materials**

To prevent unnecessary exposure to blood and other potentially infectious materials, follow these procedures for disposal of items that include, but are not limited to, bloody bandages, gauze, dressings, sponges, paper towels, sanitary pads, swabs, and used gowns or gloves:

* + - Wear gloves during disposal process.
		- Place items in a leak-proof plastic bag.
		- Remove gloves using proper technique and place them in the plastic bag with the

contaminated items.

* + - Securely fasten the plastic bag and place it in a plastic-lined garbage container.
		- Label the bag and/or the garbage container with the biohazard warning symbol.
		- If the plastic bag becomes contaminated with blood or if there is a fear of leakage, place it inside a second bag, securely fastened, and place in the garbage container. The second bag and/or the garbage container must be labeled with the biohazard warning symbol.
		- Store filled, covered trash containers outside to be picked up by the city and county sanitation departments.
		- Diapers soiled with urine and/or feces are not regulated medical waste and may be disposed as general solid waste.

**Disposal of Regulated Medical Waste**

District of Columbia Government and OSHA waste management rules will be used to regulate medical waste, blood, and body fluids in individual containers in substantial volumes; microbiological waste such as laboratory cultures and stocks; and pathological waste such as human tissue, organs, or body parts. These three types of waste may be incinerated, steam sterilized, or disposed of by sanitary sewage for bulk blood prior to disposal with other general solid waste. Acceptable methods of treatment are incineration or sanitary sewage systems, provided the sewage treatment authority is notified.

Contaminated disposable items such as dressings, PPE, etc., that would release blood or body fluids in a liquid or semi-liquid state if compressed—or items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling—are regulated waste as defined by OSHA. Package such waste in a minimum of one plastic bag in a rigid fiberboard box or drum in a manner that prevents leakage of the contents. The plastic bag must be impervious to moisture and have sufficient strength to preclude ripping, tearing, or bursting when filled under normal conditions of usage and handling.

The red bag labeled with the biohazard warning symbol may be used. Store regulated medical waste in a manner that maintains the integrity of the packaging at all times. Each package of regulated medical waste must be labeled with a water-resistant universal biohazard warning symbol and marked on the outer surface with the following information:

* Generator's name, address, and telephone number;
* Transporter's name, address, and telephone number;
* Storage facility name, address, and telephone number, when applicable;
* Treatment facility name, address, and telephone number;
* Date of shipment; and
* Infectious Waste or Medical Waste.

Label containers leaving the facility with the biohazard warning symbol or properly color-coded. If outside contamination of the primary container occurs, the primary container must be placed in a second container which prevents leakage during handling, processing, storage, transport, or shipping and is labeled or color-coded according to the above requirements. The custodian or principal should call the BBP Coordinator for pick up and disposal.

**Contaminated Sharps**

Discard contaminated sharps immediately or as soon as feasible in containers that are closable, puncture resistant, leak proof on both sides and bottom. Containers should be appropriately labeled with the biohazard warning symbol.

During use, containers for contaminated sharps will be easily accessible to personnel and located as close as possible to the immediate area where sharps are used or can be reasonably anticipated to be found (e.g., in classrooms and buses). They must be maintained upright throughout use, replaced when necessary, and not allowed to overfill. Sharps disposal containers may be reordered by the principal.

When moving containers of contaminated sharps from the area of use, close the containers immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping. If leakage of the primary container is possible, place this container in a secondary container that is closable, constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping, and labeled or color-coded with the biohazard warning symbol.

Reusable sharps containers must not be opened, emptied, or cleaned manually or in any other manner that would expose employees to risk of percutaneous injury. Place filled sharps container in a closable, leak-proof container labeled with a biohazard warning symbol and transported by the BBP Program Coordinator for proper disposal.

**Contaminated Laundry**

At-risk employees wearing gloves must handle contaminated laundry using Universal Precautions and minimal agitation. Place contaminated laundry in plastic, heat-proof plastic bags or containers at the location where it was used. It should not be sorted or rinsed in the location where used. Place and transport contaminated laundry in bags or containers labeled with the biohazard warning symbol.

Placed and transported contaminated laundry that is wet and presents a reasonable likelihood of soak-through or leakage from the bag or container in properly labeled bags or containers that prevent soak-through and/or leakage to the exterior. A red bag with the biohazard warning symbol may be used. Although contaminated laundry must be handled more carefully and stored in properly labeled bags, it can be washed with regular laundry using hot water.

Athletic teams must comply with the city’s infectious disease policy. Clothing that becomes contaminated with blood and other potentially infectious material while at school must be removed as soon as possible and placed in a leak-proof plastic bag for transport to an appropriate place for cleaning.

# Hepatitis B Vaccination Post-Exposure

## Evaluation and Follow-up

DCPS will make available the Hepatitis B vaccination series to all employees who have occupational exposure and post-exposure evaluation and follow-up to all employees who had an exposure incident. According to OSHA BBP standards, a BBP incident involves contact with a specific eye, mouth , or other mucous membrane, non-intact skin or parenteral contact with blood or other potentially infectious materials. Potentially infectious materials are defined as semen, vaginal fluid, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, amniotic fluid, or any body fluid containing visible blood or where it is impossible to differentiate between body fluids.

Examples of exposure incidents include, but are not limited to:

* Parenteral exposure to blood;
* Sharps incidents, (e.g., contaminated needle sticks during or after needle disposal, recapping used needles, transferring uncapped used needles, handling sharp contaminated instruments);
* Non-intact skin, eyes, and mucous membranes (e.g., traumatic physical altercation with infected person; Handling or disposing of contaminated waste, linen, laboratory specimens, spills, and splashes of blood and other body fluids); and
* Human bites.

The BBP Coordinator and Human Resource office will organize Hepatitis B vaccination series with the DC Department of Health. Employees may also elect to receive the Hepatitis B vaccination, post-exposure evaluation and follow-up including prophylaxis, from their healthcare provider.

DCPS Incident Report form will be initiated when first aid is provided and the employee has to clean up the spill (e.g., when no custodian is available and/or a blood spill cleanup kit is used). A DCPS Bloodborne Pathogens Exposure Report form will be initiated immediately after an exposure incident.

# Hepatitis B Vaccine for Contract Workers

DCPS is not responsible for provision of the Hepatitis B vaccine to persons contracted to perform services for the school system.

**Post-Exposure Evaluation and Followup**

* Employees are required to remove PPE and follow the procedure for disposal of contaminated waste.
* Employees must then wash exposed areas (e.g., hands and other skin surfaces) with soap and water, then immediately flush exposed mucous membranes and eyes with water.
* Make arrangements immediately for cleanup of blood or other potentially infectious materials. An EPA-approved disinfectant should be used by a trained employee (e.g., custodian).
* Employees providing first aid and cleaning up blood or other potentially infectious materials (e.g., when no custodian is available and/or a blood spill cleanup kit is used) must complete DCPS Incident Report form. Blood spill cleanup supplies should be available in the custodial stations, in school vehicles, and buses. They should only be used in situations where a custodian is not available for cleanup and decontamination. Use the red bag in the kit only for regulated medical waste.
* A biohazard injury must be reported immediately, and in all circumstances within 24 hours, by the employee, in writing, using DCPS Bloodborne Pathogens Exposure Report form.
* Obtain the following information for DCPS BBP Exposure Report form:
	+ Time, date, and location of the incident;
	+ Description of the exposure: puncture, laceration, abrasion, mucosal inoculation, contamination of nonintact skin, or bite;
	+ Site of the exposure;
	+ Description of the severity of the exposure;
	+ Description of skin condition of the employee;
	+ Estimate of the volume and composition of fluid and duration of its contact: many fluids such as stool, saliva, emesis, and urine are not sources of HBV or HIV but may be sources of other pathogens;
	+ Description of how and why the exposure occurred and the job/duty performed at the time of exposure;
	+ Description of any PPE in use at the time of the exposure;
	+ Whether or not immediate medical attention was sought;
	+ Impact of student cooperation as a factor contributing to the exposure;
	+ Source's name, phone number, and address (if known);
	+ Exposed employee's physician's name, phone number, and address; and
	+ Observations of the supervisor related to the exposure incident and suggestions for corrective action to prevent future occurrences
* Supervisor immediately notifies the BBP Program Coordinator of the exposure incident, assists the employee in completing BBP Exposure Report form, and completes the supervisor's section on the form.

# Communicating Hazards to Employees

## Labels

Affix warning labels to containers used to dispose of and store regulated waste, items containing blood, or other potentially infectious materials. These labels should be fluorescent orange, orange-redor predominantly so, with lettering and symbols in a contrasting color. Red biohazard containers may be substituted for labels.

Labels must include the following legend:



**Information and Training**

DCPS offers training opportunities to all employees on the basic knowledge and prevention principles for bloodborne diseases caused by BBPs such as HBV, HCV and HIV. Required Preexposure Introduction BBP training will be offered to all new employees. Refresher BBP training will be presented annually to all employees.

All BBP training is conducted by individuals knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the workplace that the training will address. Contents of the training include the information required by OSHA's BBP final standard.

A general explanation of the epidemiology, symptoms of bloodborne diseases, and modes of transmission of BBPs uses the ABCs of Hepatitis information sheet.

# Record Keeping and Surveillance

Each LEA must keep records and store them in one central location.

***Training records—***

* Training records must include:
	+ Dates of training;
	+ Contents or a summary of the training sessions;
	+ Names and qualifications of persons conducting the training;
	+ Names, job titles, and work locations of training participants; and
	+ Any relevant concerns and/or unanswered issues that were raised during training.
	+ Training records must be maintained for three years from the date on which the training occurred.

***Medical records—***

* + Medical records of occupationally exposed employees must be established and accurately maintained for the duration of employment plus 30 years as required by OSHA regulations in 29 CFR 1910.1020. Access must be available to employee exposure and medical records.
	+ Medical records must include:
	+ Name and Social Security number of the employee;
	+ Copy of employee's Hepatitis B vaccination status including the dates of all Hepatitis B vaccinations kept in confidential file with approval of employee as in 29 CFR 1910.1030;
	+ Copy of the healthcare professional's written evaluation of the employee after a potential occupational exposure; and
	+ Copy of information provided to the healthcare professional regarding the occupational exposure.

***Confidentiality—***

* DCPS will maintain confidentiality of the exposed employee's medical records.
* Medical records will not be disclosed or reported without the exposed employee's expressed written consent to any person within or outside the workplace except as required by State and Federal law.
* The medical records shall be made available to the occupationally exposed employee if requested by the employee.

***Surveillance—***

* DCPS BBP Surveillance and Monitoring Form must be completed annually by each school principal and a representative from each auxiliary location to monitor compliance with safe workplace practices and use of PPE.
* BBP Program Coordinator shall coordinate, review, and file annual workplace surveys.
* Compliance with the required use of protective measures will be monitored and evaluated in the following ways by principal/supervisor or designee, BBP Program Coordinator:
* Follow-up on problems identified through informal reports from staff;
* Safety reports;
* Comments received during evaluations of education and training programs;
* Direct observation of individual employee performance;
* Walking rounds; and
* Indirect observation.

***Sharps injury log—***

* DCPS will establish and maintain a Sharps Injury Log to document percutaneous injuries from contaminated sharps. Information will be recorded and maintained in a manner to protect the confidentiality of the injured employee.
* Information will be provided describing the type and brand of device involved in the incident, the department or work area where the exposure incident occurred, and an explanation of how the incident occurred.
* The Sharps Injury Log shall be maintained for 5 years in accordance with OSHA Regulations. Reference 29 CFR 1904.6 for retention of records.

**Conclusion**

DCPS will exhaust every effort to mitigate occupational risks and safeguard human health. All DCPS officials must strictly adhere to the health management policies and protocols set forth in this Guide.

DCPS will assess options for future Federal financial support to more effectively implement the DCPS Exposure Plan and address the use of toxic and hazard substances in schools.

***Exposure Control Plan***

***Glossary of Terms***

***At-risk employees***—employees identified as being at risk for occupational exposure to blood and other potentially infectious materials.

***Blood and body fluids***—liquid blood, serum, plasma, and other blood products, emulsified human tissue, spinal fluids, and pleural and peritoneal fluids.

***Bloodborne pathogens (BBP)—***pathogenic microorganisms present in human blood that can cause disease in humans. These pathogens include but are not limited to: Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV).

***Collateral exposure***—occupational exposure to blood or other potentially infectious materials as a consequence of collateral job duty (coincidental to the primary job duties) to perform first aid and/or cardiopulmonary resuscitation.

***Contaminated***—the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

***Contaminated laundry***— laundry that has been soiled with blood or other potentially infectious materials or may contain sharps.

***Contaminated sharps***—any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

***Decontamination***—use of physical or chemical means to remove, inactivate, or destroy BBPs on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface of item is rendered safe for handling, use, or disposal.

***Engineering controls***—controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the BBP hazard from the workplace.

***Exposure Determination Questionnaire***—the tool used to identify employees at risk for occupational exposure to blood, BBPs, and other potentially infectious materials. This questionnaire is completed by every new employee during orientation in the Pre-Exposure Introduction BBP training and by employees having employment changes, placing them in at-risk job categories, during Refresher BBP training. Additionally, any employee who perceives his or her occupational exposure status has changed may request and complete this questionnaire at any time during the course of employment. This tool is especially beneficial if exposure determination is questionable.

***Exposure incident***—a specific eye, mouth, other mucous membrane, nonintact skin, or potential contact with blood or other potentially infectious materials, which results from the performance of an employee's duties.

***Good Samaritan acts***—rendering assistance to accident victims and other exposures that cannot be anticipated. These do not constitute occupational exposure.

***Hand washing facility***—a facility providing an adequate supply of running potable water, soap, and single-use towels or hot air drying machines.

***Licensed healthcare professional***—a person whose legally permitted scope of practice allows him or her to independently perform the activities required for Hepatitis B vaccination and post-exposure evaluation and followup.

***HBV***—Hepatitis B virus.

***HCV***—Hepatitis C virus.

***HIV***—Human Immunodeficiency Virus, the virus that can lead to Acquired Immunodeficiency Syndrome (AIDS).

***Medical waste—***any solid waste, which is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological, but not including any hazardous waste such as dressings, bandages, sponges, used gloves, and tubing.

***Microbiological waste***— cultures and stocks of infectious agents including but not limited to specimens from medical, pathological, pharmaceutical, research, commercial, and industrial laboratories.

***Needleless system***—a device that does not use needles for: 1) the collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established; 2) the administration of medication or fluids; or 3) any other procedure involving the potential for occupational exposure to BBPs due to percutaneous injuries from contaminated sharps.

***Occupational exposure***—reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

***Other potentially infectious materials***—1) the following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; 2) any unfixed tissue or organ (other than intact skin) from a human (living or dead); and 3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions, and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

***Parenteral***—piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

***Pathological waste***—human tissues, organs, and body parts; the carcasses and body parts of all animals that were known to have been exposed to pathogens that are potentially dangerous to humans during research, were used in the production of biological, or in vivo testing of pharmaceuticals, or that died with a known or suspected disease transmissible to humans.

***Personal Protective Equipment (PPE)***—specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard are not considered PPE.

***Pre-Exposure Introduction BBP training***—Bloodborne Pathogens training required for all employees employed by Franklin County Schools. This training is done during new employee and substitute teacher orientations.

***Reasonably anticipated***—an individual has reason to believe that exposure will occur while performing a task required by his or her job description.

***Red biohazard bag***—bag used for disposal of regulated medical waste (20 milliliters of blood or more in a container such as a suction container; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and capable of releasing these materials during handling).

***Refresher BBP training—***mandatory annual Bloodborne Pathogens training for all Franklin County Schools employees conducted at the beginning of each school year.

***Regulated medical waste***—from the Waste Management Rules of North Carolina used for disposal purposes. It means blood and body fluids in individual containers in volumes greater than 20 milliliters untreated microbiological and pathological waste. This refers to blood and body fluids that are in a liquid state and in a container such as a suction container. This does not refer to blood absorbed by materials such as bandages and dressings.

***Regulated waste***—OSHA-defined liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

***Sharps—***needles, syringes with attached needles, capillary tubes, slides and cover slips, and scalpel blades.

***Sharp with engineered sharps injury protections***—a non-needle sharp or a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

***Source individual***— any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, students and employees, trauma victims, clients of drug and alcohol treatment facilities, and individuals who donate or sell blood or blood components.

***Sterilize*—**use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores.

***Universal Precautions***—an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HBV, HCV, HIV, and other BBPs.

***Work practice controls***—controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

1. U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens (BBP) Standards; 29 CFR 1910.1030: Sec. 301 DC Law 1-134, May 1977. [↑](#footnote-ref-1)
2. DC Department of Health Guidelines for Handling Body Fluids in Schools, December 1984. [↑](#footnote-ref-2)
3. See Franklin County School Exposure Control Plan. [↑](#footnote-ref-3)
4. The full text of OSHA BBP and hazard communication standards can be found in 29 CFR 1910.1030 and 29 CFR 1910.1200. [↑](#footnote-ref-4)
5. Model Plans and Programs for the OSHA BBP and Hazard Communications: [www.osha.gov/publications/osha3186.html](http://www.osha.gov/publications/osha3186.html) [↑](#footnote-ref-5)
6. Excerpt, Franklin County School Exposure Plan: OSHA Bloodborne Pathogens. [↑](#footnote-ref-6)
7. [↑](#footnote-ref-7)
8. DC Law 1-134, Solid Waste Management Regulations, and all other related Infectious Disease and regulated waste management laws—as detailed DC Code and DCMR Title 22. [↑](#footnote-ref-8)
9. CFR 1910.1030 and 29 CFR 1910.1200: Franklin County School’s Exposure Control Plan. [↑](#footnote-ref-9)
10. CFR 1910.1030 and 29 CFR 1910.1200 [↑](#footnote-ref-10)
11. DC Law 3-20 [↑](#footnote-ref-11)
12. Franklin County School’s Exposure Control Plan [↑](#footnote-ref-12)
13. DC Department of Health, Universal Precaution Guidelines, 1987. [↑](#footnote-ref-13)
14. OSHA Bloodborne Pathogens, 1910.1030. [↑](#footnote-ref-14)