



## Infection Control Plan

### 1. The Science of Infection Control<sup>1</sup>

- a. What is a microbe?
  - i. A microbe is a collective name for microscopic organisms and includes bacteria, viruses, fungi, and some parasites. Microbes that are capable of causing disease and/or infection are pathogens. Pathogenic microbes may be bacteria, viruses, fungi, or parasites. A sufficient number of pathogenic microbes must be present to cause disease.
- b. What types of microbes are there and what is their effect on schools?
  - i. Bacteria
    1. Bacteria are microorganisms that are found on our skin, in our digestive tract, in the air, in soil, and on almost all the things we touch every day. Most are harmless (nonpathogenic). Many are helpful because they occupy ecological niches (both within our bodies and in the external environment) that could be occupied by harmful (pathogenic) bacteria. These helpful strains keep harmful microorganisms in check. They also help our digestion to function effectively and stimulate the development of a healthy immune system.

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<sup>1</sup> <http://www.cdph.ca.gov/programs/ohsep/Documents/CleanSchoolsHandbook.pdf>

2. Pathogenic bacteria can cause common infections, including food poisoning, acne, sinusitis, ear infections, or more serious diseases such as tuberculosis, whooping cough, staph infection, bacterial pneumonia, and bacterial meningitis.

ii. Viruses

1. Viruses are microorganisms that are smaller than bacteria and cannot grow or reproduce apart from a living host cell (animal, human, plant, or bacteria). They invade a living cell and use the host cell's chemical machinery to stay alive and replicate itself. Viruses may be spread through the air, by contact with contaminated surfaces, and by the exchange of body fluids.
2. Viruses are responsible for the common cold (rhinoviruses), intestinal and respiratory flu (noroviruses), human immunodeficiency virus (HIV), hepatitis B, hepatitis C, and influenza A subtype H1N1 (swine flu). Viruses do not respond to antibiotics, which makes them more difficult to control.

iii. Fungi

1. Fungi are parasites that feed on living organisms or dead organic material and reproduce by means of spores. Examples of fungi are yeasts, molds, and mushrooms.
2. Common fungal infections include ringworm, athlete's foot, and yeast infections such as Candida or thrush.

c. Where do these microbes live in schools?

- i. Microbes live everywhere in dust, in biofilm, and on surfaces throughout the school. Common "high-touch" surfaces in schools. High-touch point surfaces are those that are frequently touched by a variety of hands. Surfaces that might be touched frequently by many different hands and that might be considered high-touch surfaces of concern include but are not limited to:

- ✓ A shared computer mouse and keyboard
- ✓ Desks/chairs
- ✓ Shared musical keyboards and instruments

- ✓ Doorknobs, elevator buttons, light switches, door push bars, handrails
- ✓ Faucet handles, toilet handles, towel dispensers, hand driers
- ✓ School bus doors and railings
- ✓ Handles on coffee pots, microwave doors, refrigerator doors
- ✓ Vending machines
- ✓ Buses seats/windows

d. The pathway of exposure is the path the organism takes to move through the environment. Possible pathways include

1. Air – Microbes can move through the air in a room, or through the air ducts of a building.
2. Water – Microbes can move through water systems.
3. Surfaces – Microbes can survive and remain on surfaces when the conditions are optimal.

e. A route of exposure is the primary way that the infectious agent enters the host and causes disease. The route may be oral (through ingestion), dermal, or respiratory (through inhalation).

## 2. Levels of Disinfection<sup>2</sup>

a. High Level Disinfection (Deep Disinfection)

- i. A high level encompasses all non-porous surfaces within a site with a qualified disinfecting agent. All hard surfaces will be disinfected and wiped down. Special attention will be paid to spots where vomit or fecal matter was present as a result of the potential outbreak. If these spots were on soft surfaces (carpet, upholstery, etc.), appropriate cleaning must take place.
- ii. A high level is accomplished by the Special Projects Crew, designated staff or a contracted vendor.

b. Intermediate Level Disinfection (touch-points)

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<sup>2</sup> <https://www.oakland.edu/upload/docs/LabSafety/disinfectantsFinaLAug2009.pdf>,  
[http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection\\_Nov\\_2008.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf)

- i. An intermediate level disinfection is aimed at all touch. An intermediate level disinfection could be utilized as a secondary clean, following an earlier high level disinfection.
  - ii. An intermediate disinfection is accomplished by the Special Projects Crew, designated staff or a contracted vendor.
- c. Low Level Disinfection
  - i. Low level disinfection is used when additional steps above everyday cleaning are needed but not an in-depth High or Intermediate level clean. Low level disinfection is done to minimize potential germ spread when a potential outbreak has not been designated. Low level disinfection is often localized to a particular area or spot, such as when a student vomits or has a fecal accident or when an area needs extra attention.
  - ii. A low level disinfection is accomplished by the site building engineer/custodian, Special Projects Crew, designated staff or a contracted vendor.
- d. Cleaning may be required before any disinfection process because dirt, waste, and other materials can lessen the efficacy of many chemical disinfectants. Remember to dispose of cleaning/dust cloths as contaminated waste following initial cleaning. This is not normally an issue if the surface is part of the schools regular cleaning cycle.
- e. Depending on the microbe present and what product is used will determine specific disinfection strategies.
- f. In order for product effectiveness the disinfectant must be applied, allowed to dwell, and only after a required contact time, wiped up if not left on the surface such as with a spray and walk away approach. Contact times vary based on disinfectant, disease, and surface. Always follow guidance on container, this plan, or leadership when determining contact times.

### **3. Disinfection Products<sup>3</sup>**

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<sup>3</sup> See “Disinfection Product Selection” White Paper

- a. The district may employ several specialty disinfecting agents depending on the virus/bacteria needing disinfection. Specialty agents will be used according to the directions listed directly on the bottle for mix solutions, contact times, and personal protective measures.
- b. The main goal of product selection is to choose the most effective disinfection product with the least risk factor.
- c. Specialty agents must specifically target the virus, bacteria, microorganism, or germ in question.
- d. In the event that specialty agents are unavailable, the fail-safe standard to effectively disinfect surfaces and materials contaminated with infectious microbes is bleach.
  - i. Specialty disinfectants (Virus/Bacteria Specific):
    1. Follow all directions listed on the bottle itself regarding mix ratio and personal protection.
  - ii. Standard Bleach (non-concentrated household bleach):
    1. Mix all solutions with a 1:10 ratio, meaning for every 1 measure of bleach add 10 measures of water. Example: 1 cup bleach to 10 cups water.
      - a. Product must remain on the affected surface (sprayed or poured) for 5 minutes before wiping off.
  - iii. Germicidal Bleach (Clorox):
    1. Mix solutions of germicidal bleach in Gallon batches. Mix ½ cup with a gallon of water.
      - a. Product must remain on the affected surface (sprayed or poured) for 3-5 minutes before wiping off.
- e. Use disinfecting wipes on electronics such as keyboards, telephones, and other equipment that will not respond well to sprayed disinfectant. It may be necessary to use multiple wipes in order to keep the item moist for the needed amount of time to ensure disinfection. Wipes are available for both specialty and bleach products.

- f. In the event of a Highly Infectious Disease, selection of disinfection products will be made using guidance from CDC, CDPHE, and TCHD.

#### 4. Contact Times

- a. The below list contains microbe related infectious diseases for which schools are at high risk. This list is not all inclusive. Below you will find the common name of the disease, specific cleaning guidance, and contact times required to effectively kill the microbe in question.

Name	Disinfect Guidance 	Contact Time: Oxivir Tb (minutes) <sup>4</sup>	Contact Time: Clorox HP (minutes) <sup>5</sup>	Contact Time: Bleach (minutes) <sup>6</sup>	Contact Time: Quaternary Disinfectant Cleaner (minutes) <sup>7</sup>
		Hydrogen Peroxide Based	Hydrogen Peroxide Based	Chlorine Based	Quaternary Compound Based
Norovirus /Norwalk	standard	1 min.	1 min.	5 min.	30 sec.
Hanta Virus	standard	no data	no data	5 min.	no data
Hep A	standard	no data	no data	5 min.	no data
RSV	standard	no data	30 sec	5 min.	2 min.
VRE	standard	1 min.	30 sec	5 min.	2 min.
HEV 68	standard	no data	30 sec	5 min.	no data

<sup>4</sup> Diversey – Oxivir Tb, [http://diversey.com/en/catalog/north-america//Product?family=375,http://www.epa.gov/pesticides/chem\\_search/ppls/070627-00056-20120920.pdf](http://diversey.com/en/catalog/north-america//Product?family=375,http://www.epa.gov/pesticides/chem_search/ppls/070627-00056-20120920.pdf)

<sup>5</sup> Clorox – HP Cleaner, <http://www.cloroxprofessional.com/products/clorox-hydrogen-peroxide-disinfecting-cleaners/efficacy/>

<sup>6</sup> Clorox – Bleach, <http://www.cloroxprofessional.com/products/clorox-germicidal-bleach/efficacy-claims/>

<sup>7</sup> Clorox – QA Disinfectant, <http://www.cloroxprofessional.com/products/clorox-broad-spectrum-quaternary-disinfectant-cleaner/efficacy-claims/>

<b>Rotavirus</b>	standard	1 min.	1 min.	5 min.	3 min.
<b>MRSA</b>	standard	1 min.	1 min.	5 min.	2 min.
<b>Strep</b>	standard	no data	30 sec	5 min.	2 min.
<b>Pink eye</b>	standard	1 min.	no data	5 min.	3 min.
<b>Influenza</b>	standard	1 min.	30 sec	5 min.	2 min.
<b>Pertussis</b>	standard	no data	no data	5 min.	no data
<b>Measles</b>	standard	no data	no data	5 min.	no data

## 5. Personal Protection

- a. Specialty products and bleach solutions pose some hazards and risks that users must be aware of and plan for. Bleach and bleach solutions are corrosive in nature and precautions should be taken by users to protect themselves during use. Steps should be taken to protect eyes, hands, skin, and respiratory system when using any cleaning solution.
  - i. Eyes
    1. Goggles or safety glasses should be used and precautions should be taken not to splash or spray bleach/solution into eyes/face.
  - ii. Hands/Skin
    1. Gloves should be worn and all exposed skin should be covered and/or protected.
  - iii. Respiratory System
    1. If possible steps should be taken to ventilate the area where disinfection will take place. If not possible, be aware that bleach/solution can bring powerful fumes. If the odor is too strong, vacate the area and go outside to fresh air.
- b. Dispose of gloves or any other disposable equipment following disinfection procedures. If possible discard into a trash bag and tie close. If the item is not disposable, ensure the item is disinfected itself before storage. Example:

disinfect protective eyewear (carefully) before putting away.

- c. Do not mix cleaners and disinfectants unless the labels indicate it is safe to do so. Combining certain products (such as chlorine bleach and ammonia cleaners) can result in serious injury or death.

**6. Maintenance Response**

If necessary, Facilities Maintenance can respond to a potential outbreak by cleaning/disinfecting the air handling units (AHU's) that feed the school. If the infectious disease in question has a hardened airborne element, the maintenance department can change air handling unit filters and clean the coil elements in order to minimize the spread of the virus/germs via the HVAC system. Due to the high amount of labor and cost of filter change out/coil cleaning, use of this option must be warranted based on the severity of the infection.

- a. Coil cleaning/disinfection
  - i. Coil cleaning should use the 1:10 ratio chlorine bleach solution to effectively disinfect the coils within the AHU's.

**7. Contract Labor**

- a. In the event that the District Custodial Special Projects Crew is unavailable or spread thin, contract labor must be used to disinfect the affected site.
  - i. In most cases, if available, the contract cleaning vendor for each school can be called and requested to provide the needed labor/cleaning action. If specific disinfection products are needed, these will be provided.
  - ii. The EHM has vendors ready and capable to conduct infection control operations within a short period of time, if needed.

**8. Reference**

- a. CDC Disease Fact Sheets

<a href="#">CDC A-Z</a>	<a href="#">Hep A</a>	<a href="#">Hantavirus</a>
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<a href="#"><u>RSV</u></a>	<a href="#"><u>VRE</u></a>	<a href="#"><u>Enterovirus</u></a>
<a href="#"><u>Norovirus</u></a>	<a href="#"><u>Rotavirus</u></a>	<a href="#"><u>MRSA</u></a>
<a href="#"><u>Strep</u></a>	<a href="#"><u>Pink eye</u></a>	<a href="#"><u>Influenza</u></a>
<a href="#"><u>Pertussis</u></a>	<a href="#"><u>Lice</u></a>	<a href="#"><u>Measles</u></a>