



## Sanitation Guidelines for Management of Military and Contracted Shower and Laundry Operations Associated with Operation United Assistance

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### Technical Information Paper No. 31-036-0215

**1. Purpose.** This information paper identifies sanitation measures that effectively remove and destroy harmful microorganisms from surfaces and fabrics to prevent cross-contamination and the potential spread of infection. This paper is not intended to address sanitary controls at hospitals or medical facilities and the services (e.g., laundry) that directly support those facilities.

**2. Applicability.** The practices and controls presented in this paper apply to military and contracted shower and laundry services occurring on military installations in support of Operation United Assistance and include observation sites used for Ebola Virus Disease (EVD) redeployment observation. Laundering processes discussed in this paper are for water-based laundry systems and do not apply to dry-cleaning. This paper does not apply to hospital laundry management and hospital facility sanitation involving suspected or confirmed cases of EVD.

### **3. Background.**

a. The Ebola virus cannot be spread by a person simply because he or she travelled to an Ebola-affected country. The Ebola virus is spread when there is direct contact between an individual's broken skin or mucous membranes (e.g., eyes, nose, and mouth) and the blood or other body fluids of a person ill with Ebola. The virus is not transmissible to people from the environment such as soil or water. The virus can be spread indirectly from surfaces to people if the surface is contaminated with untreated blood or other body fluids (e.g., vomit, feces, urine, or breast milk) from a person ill with Ebola. Individuals who have been exposed to EVD are not infectious to others until they become symptomatic.<sup>1,2</sup>

b. Soldiers and personnel engaged in Operation United Assistance and who are not assigned a direct healthcare function associated with management of EVD patients or handling the bodies of persons who are known or suspected to have died from the Ebola virus are not likely to come into contact with body fluids from persons infected with the Ebola virus.

As a result, facilities that are used by personnel involved with Operation United Assistance and the laundry generated by this population are considered low risk and do not require application of specialized sanitation controls that extend beyond normally expected practices.

c. For the purpose of this paper, the terms “sanitize” and “disinfect” are used interchangeably. The applied meaning is a process by which cleaned surfaces are further treated to reduce the number of disease-carrying microorganisms to a safe level.

#### **4. Source water and wastewater.**

a. At fixed installations in a nondeployment setting, source water supplying shower and laundry operations must meet the National Drinking Water Standards for potability, as applicable, for the United States or host nation. Water produced by military or contracted services or procured from local municipalities in a deployment setting and intended to supply shower and laundry operations must at a minimum meet the criteria for Class II water quality specified in Technical Bulletin, Medical 577 (Sanitary Control and Surveillance of Field Water Supplies). Before nonpotable water may be used for showering, a health risk assessment must be conducted by preventive medicine and approved by the local medical authority.

b. Source water used to conduct cleaning and sanitation of shower and laundry facilities must meet the criteria specified in paragraph 4a.

c. Wastewater treatment processes are designed to inactivate or remove infectious agents, making it unlikely that the Ebola virus could spread through sewers or properly constructed septic systems.<sup>3, 4</sup> Wastewater generated from shower and laundry operations supporting Operation United Assistance does not require specialized treatment prior to discharge. Discard wastewater in an approved sanitary sewer or appropriate field wastewater system.

#### **5. Cleaning and sanitizing surfaces.**

a. To prevent the spread of the Ebola virus from surfaces contaminated with body fluids the Centers for Disease Control and Prevention (CDC) recommends using disinfectants that are registered by the U.S. Environmental Protection Agency (EPA) as effective against non-enveloped viruses such as norovirus, rotavirus, adenovirus, and poliovirus. A list of these products is available at the EPA website, <http://epa.gov/oppad001/chemregindex.htm>; products identified on *List G: EPA’s Registered Antimicrobial Products Effective Against Norovirus* and *List L: EPA’s Registered Antimicrobial Products that Meet the CDC Criteria for Use Against the Ebola Virus* are appropriate for use.

b. For daily cleaning and sanitizing of surfaces outside of a healthcare setting, such as barracks and associated shower and laundry facilities, it is appropriate to use any EPA-registered disinfectant for environmental surface cleaning.

c. There are many ready-to-use chlorine bleach solutions among the EPA-registered products. Registered products are formulated with a minimum free available chlorine (FAC) concentration that typically exceeds 500 parts per million (ppm); products identified on the EPA *List G* and *L* are formulated at significantly higher concentrations. The CDC recommends application between 500 and 5,000 ppm FAC, depending on the amount of organic material (e.g., blood, urine, or mucous) present on the surface.<sup>4</sup>

(1) For nonhealthcare settings, application of a 500-ppm chlorine solution is appropriate for conducting general sanitization of barracks, shower and toilet facilities, and laundry facilities.

(2) A 500-ppm chlorine solution is often referenced by the CDC as a 0.05 percent bleach solution or a 1 part bleach to 100 parts water (1:100) dilution. Additional guidance and discussion for preparing chlorine bleach solutions from concentrated products is provided in USAPHC TIP 13-034-1114, *Preparing and Measuring High Chlorine Concentrations for Disinfection*, [http://phc.amedd.army.mil/PHC%20Resource%20Library/TIP\\_No\\_13-034-1114\\_Prep\\_Measure\\_High\\_Chlorine\\_Solutions.pdf](http://phc.amedd.army.mil/PHC%20Resource%20Library/TIP_No_13-034-1114_Prep_Measure_High_Chlorine_Solutions.pdf).

d. Hygiene facilities such as showers, toilets, and sinks should be cleaned and disinfected daily. The CDC notes that the physical removal of microorganisms and soil by wiping or scrubbing is considered as important, if not more, than any antimicrobial effect of the cleaning agent used.<sup>4, 5</sup> Surfaces should be cleaned prior to disinfection using an appropriate detergent to remove soil residues. Apply an EPA-registered disinfectant in accordance with the manufacturer's label, or use a 500-ppm diluted chlorine bleach solution and allow a 1-minute contact time for disinfection before rinsing with potable water.<sup>5</sup>

e. Facility managers should develop an emergency cleanup Standard Operating Procedure (SOP) to address incidents when surfaces are contaminated with blood, feces, or vomit. Additionally, each facility should provide a cleanup kit with appropriate supplies and personal protective equipment for conducting a gross contamination cleanup. All facility occupants (e.g., barracks personnel and staff) should be given an orientation on the SOP and the location(s) of associated supplies. Consult with supporting preventive medicine assets for assistance in developing the SOP.

## 6. Laundry

a. *Laundry classification.* For the purpose of this paper laundry is divided into three distinct categories: ordinary laundry, infected laundry, and heat-labile items. *Ordinary laundry* represents fabrics soiled through routine use and may include items fouled by bodily excretions or secretions (e.g., feces, urine, blood, and vomit) from non-infectious persons. *Infected laundry* includes any textiles contaminated with potentially infective body substances generated from persons having gastrointestinal infections such as norovirus, tuberculosis, methicillin-resistant Staphylococcus aureus (MRSA), Hepatitis A, viral hemorrhagic fevers, or other notifiable diseases. *Heat-labile* items are fabrics, such as wool, silk, and delicate synthetics which are easily damaged by the normal wash, rinse, and drying temperatures. This paper is not intended to specifically address laundering procedures for *infected laundry* or *heat-labile* fabrics.

(1) Linens, clothing, and textiles used by persons who have not been diagnosed with EVD, but are operating in the Ebola Virus Area of Operation (AO) or undergoing observation following redeployment from the Ebola Virus AO are managed as *ordinary laundry* and do not require special handling or treatment.

(2) Except as specified in subparagraph (a), below, linens, clothing, and textiles used by individuals who become symptomatic while deployed to the Ebola Virus AO or during the redeployment observation period are managed as *ordinary laundry*.

(a) When laundry items from a symptomatic person are contaminated with blood, feces, or vomit, the items should be placed in a double plastic bag. The outer bag should be conspicuously marked to indicate possible contamination and the source's name or other unique identifier such as the first initial of the last name and last four digits of the person's social security number. Retain the laundry in a controlled location until a definitive diagnosis by the medical treatment facility is rendered. Laundry and textiles that are contaminated with blood, feces, or vomit from a person with a confirmed EVD diagnosis are disposed of as EVD waste. If the patient's diagnosis is negative for EVD, the laundry may be processed as *ordinary laundry*.

(b) A local procedure (SOP) should be developed for managing laundry that is soiled with blood or bodily excretions from symptomatic persons pending a diagnosis of their EVD status. Collaboration is recommended between preventive medicine, the medical commander, and commanders responsible for billeting and providing shower and laundry support for SOP development.

b. *Laundering process.* Standard laundry processes significantly reduce the level of microbial contamination on fabrics. Contaminated laundry can be rendered hygienically clean through a combination of soil removal, pathogen removal, and pathogen

inactivation. This is achieved by applying a combination of mechanical, thermal, and chemical factors. Hygienically clean laundry carries a negligible risk of causing infection among healthcare workers, patients, or other persons such as laundry operators.<sup>4, 6</sup>

(1) The term “soil” as used in this paper is a general term which includes dirt, insects, insect eggs, microbial contamination from the user or external sources (e.g., bacteria, viruses, or bodily excretions), allergens (e.g., dander from humans or animals), plant toxins (e.g., poison ivy), and chemical residues (e.g., fuel, or oil). Most bacteria on linen, clothing, and textiles (hereafter referred to as “fabrics” or “laundry”) are contained in or shielded by soil.

(2) Steps in the laundering process may include some or all of the following actions: collection or receiving, sorting, pre-wash, wash, rinse, extraction, drying, finishing, and reissue or return to customer. Guidance for sanitary control of laundry facilities is provided in Appendix A. The effectiveness of the laundering process to adequately remove and destroy harmful microorganisms from fabrics is dependent on the following actions: proper load management, proper execution of prescribed procedures when using military or commercial laundry systems, application of detergents formulated for laundering textiles at prescribed temperatures, use of hot water during wash and rinse cycles (when possible), application of a heated drying system, and ensuring laundry is sufficiently dry before reissue.

(a) Water process. Dilution and agitation of textiles in water alone removes substantial quantities of microorganisms. Soaps and detergents help to suspend soil away from the fabric and contain some microbiocidal properties that destroy the cells of microorganisms. Hot water and bleach are independently effective means of destroying microorganisms. The recommended hot water wash temperature with detergent is 160°F (71°C) for a minimum wash cycle of 25 minutes. The total available chlorine recommended for disinfection is 50-150 ppm.<sup>4</sup>

(b) Detergents. A typical laundry requires water, detergent (or alkali), and agitation to dislodge ordinary soil and other matter from fabrics. The soapy solution releases soil from fabric, holds it in suspension in the wash water, and enables it to be removed when the wash water is drained and the fabric undergoes a rinse and extraction cycle. Although using hot water during the wash and rinse cycles is recommended, lower temperature water may also be effective in destroying microorganisms when the procedure is properly controlled. The effectiveness of a low-temperature wash to destroy microorganisms is dependent upon use of detergents that are specifically formulated for colder water and application of chlorine or oxygen bleaches.<sup>4, 6, 7</sup>

(c) Rinsing. The rinse stage helps to remove suspended soil from fabrics. Microbial contamination and insect infestations are also reduced by dilution, depending on the number of rinse cycles used and the type of rinse water treatment, if the rinse water is recycled.

(d) Drying. Removing moisture from washed fabrics inhibits the growth of microorganisms that were not removed during washing. Application of heat also destroys the cells of live microorganisms and insects (e.g., bed bugs and lice), to include insect eggs, that may remain on the fabric after washing. Properly washed laundry should be tumbled dry using the highest heat setting possible to maximize the antimicrobial effects of the laundering process.<sup>8</sup> A minimum drying temperature of 140°F (60°C) [as recommended for hot water washing] should be applied until the laundry is completely dry.

c. *Laundry chemicals.*

(1) Detergent/soap. Laundry detergent formulations are a mixture of builders, surfactants, and bleaches. Detergents may also contain organic enzymes which aid in breaking up soil.

(a) Alkali builders are chemicals that change the quality and properties of wash water, specifically hardness and pH, to allow detergents and bleaches to work more efficiently. Builders neutralize acids in the wash water by raising the overall pH to a value greater than neutral (7.0). Increasing the wash water pH helps to cut through dirt, grease, proteins, and other organic material by rupturing the chemical bonds of oil and fat molecules. The increased pH also results in the death of some pathogenic microorganisms.

(b) Surfactants are compounds that can loosen, emulsify, and suspend soil in solution. Surfactants lower the surface tension between two liquids or between a liquid and a solid. As a result, organic compounds such as oils and grease become soluble in water and are removed from the fabric. The separated soil is suspended in the wash water and eliminated during the drain and rinse cycles.

(2) Bleach. Bleaches enhance laundry performance by breaking down the molecular bonds in soil. There are two types of bleach products: chlorine-based and oxygen bleaches. Bleach components found in a laundry detergent are generally “color-safe” and do not contain chlorine. Nonchlorine or chlorine-free bleaches are made of peroxides (i.e., hydrogen peroxide, sodium percarbonate, and sodium perborate) or other oxygen-releasing compounds such as oxalic acid and bromates. Application of a bleach product following the wash cycle will further reduce the microbial load on fabrics.

(a) Chlorine-based bleach is considered the most effective laundry disinfectant. Hypochlorite in chlorine bleach causes proteins to lose their structure; microbes are killed through the inactivation of proteins.

(b) Oxygen-based bleaches must be EPA-registered for proven effectiveness as a laundry disinfectant. At the time of this publication only one product was found to be EPA-registered as a laundry disinfectant: AdvaCare™ [Ecolab; Registration No. 1677-193]. Refer to *List H: EPA's Registered Products Effective Against Methicillin Resistant Staphylococcus aureus (MRSA) and Vancomycin Resistant Enterococcus faecalis or faecium (VRE)* at [http://epa.gov/oppad001/list\\_h\\_mrsa\\_vre.pdf](http://epa.gov/oppad001/list_h_mrsa_vre.pdf). This product is recommended for use in military field laundry systems and contracted operations when use of chlorine bleach is not possible.

(c) The disinfection properties of peroxide bleaches are ineffective for laundry applications; therefore, using peroxide bleaches as a laundry disinfectant is prohibited in hospitals, medical institutions, and other locations where public health is monitored.

(3) **Sours.** Soaps are alkaline, having a pH greater than 8.0. Sours are acidic chemical compounds with a pH less than 7.0 (generally 3.0 – 4.0), which may be added during a wash or rinse cycle to return the water to a more neutral pH. Neutralizing the pH increases the effectiveness of chlorine bleach, decreases degradation of fabric fibers, minimizes development of mineral stains on fabric, and reduces the potential for skin irritation. **Note:** Mineral acid-based sours, those containing hydrochloric, sulfuric, or phosphoric acid, are prohibited due to the potential to form hazardous gases and byproducts that can be extremely harmful to both laundry workers and the environment.

d. *Laundry equipment.*

(1) Generally, laundry operations occurring at fixed installations only employ commercial-grade (industrial) equipment designed for large load management and durability. Army field laundry systems, such as the Laundry Advanced System (LADS) and Containerized Batch Laundry (CBL) also use commercial-grade equipment and are appropriate for supporting Operation United Assistance. Tables 1 and 2 identify: recommended laundry products; wash, rinse and drying temperatures; and cycle times when using the CBL and LADS, respectively. Both tables are based on *ordinary laundry* with medium soil levels. Application of a sanitizing rinse is recommended for military and contracted laundry operations as an added level of protection from accidental or incidental contamination by microorganisms.

(2) Contracted laundry services may be used to augment or replace military laundry systems. The use of residential-grade (household) washers and dryers is not uncommon in contracted operations because they enable management of single loads

for individual Soldiers. Although laundering processes using household equipment and consumer versions of detergents and laundry additives have not been linked to spreading infection in cases involving in-home care of patients with potentially transmittable diseases<sup>4, 6, 9</sup>, the use of residential-grade equipment is not recommended for contracted laundry operations. Residential machines are less durable than commercial equipment and may also be less efficient at achieving the desired standards for washing and drying when the machines are heavily used on a consistent basis. Residential machines are acceptable for use in barracks.

**Table 1. Laundry Cycle for Containerized Batch Laundry**

Cycle	Cycle Time	Chemical*	Temperature	Concentration
Pre-Wash	6 minutes	Alkali, detergent	100°F	½ concentration of wash cycle
Wash	4 minutes	Alkali, detergent	140°F	
1 <sup>st</sup> Rinse				
Sours				
Sanitizing Rinse	5 minutes	AdvaCare™ 120 Sanitizer/Sour	140°F	4 oz per 100 lb of laundry; or 4 oz per 65 gal of rinse water
Final Rinse	5 minutes		140°F	
Drying	45 minutes		[140°F] Use the highest heat recommended by the fabric/uniform manufacturer.	
Note: * Brand-named items may be substituted with products that are found to be equivalent in their soil removal or sanitizing properties.				

e. *Special fabrics.*

(1) Military uniforms. The Army Combat Uniform (ACU) is impregnated with pyrethrum as an insect repellent. The repellent properties of the ACU (and other similarly treated fabrics) are significantly reduced by repeated washings and other factors associated with the laundering process. Specific instructions for washing and drying the ACU are provided with the garment. The temperatures and products identified in Tables 1 and 2 are based on requirements for laundering the ACU.



**Table 2. Laundry Cycle for Laundry Advanced System**

Cycle	Cycle Time	Chemical	Temperature	Concentration
Pre-Wash				
Wash		Kindet detergent liquid		1 pump (1 oz. to 180 lbs of laundry)
1 <sup>st</sup> Rinse				
Sanitizing Rinse		AdvaCare™ 120 liquid		
Final Rinse				
Drying	45 minutes		[140°F] Use the highest heat recommended by the fabric/uniform manufacturer.	
Note: * Brand-named items may be substituted with products that are found to be equivalent in their soil removal or sanitizing properties.				

(2) Bed mattresses. Placing a water-resistant cover over bed mattresses and pillows is recommended as an added protective measure in the event an individual vomits or defecates in bed. This action will preclude having to discard the mattress and pillow as EVD waste should the individual be confirmed through laboratory analysis as having EVD. Unprotected mattresses and pillows that are subsequently exposed to vomit, feces, or blood from an individual presenting with EVD symptoms must be placed in a controlled area until a conclusive diagnosis is determined [refer to paragraph 6a(2)]. If the patient receives a positive diagnosis for EVD, the contaminated mattress must be disposed as EVD waste. When the diagnosis is negative for EVD, soiled bedding may be processed as *ordinary laundry*.

f. *Handling precautions.*

(1) Soiled laundry items should be handled with a minimum of agitation and shaking as this may cause microbial contaminants to become aerosolized and inhaled by workers.

(a) Signage or other suitable form of information for patrons should require individuals to remove excessive soil, such as solid matter, feces, and vomit from the fabric before submitting laundry for processing. Instructions should also require patrons to roll or fold soiled laundry to contain heaviest soil in the center of the laundry bundle before placing in collection bins/bags or submitting for laundry turn-in.

(b) Individual mesh laundry bags should be provided to patrons for processing personal laundry. Laundry that is turned in using a mesh bag should be washed in the bag.

(c) When mesh bags are not available, patrons should submit their laundry using a plastic bag or fabric laundry bag. Laundry operators should open/untie the bag, place it into the washer, and gently empty the contents into the machine with minimum shaking or agitation.

(2) Laundry workers should be informed of potential hazards from sharp objects (e.g., needles, broken glass, and razor blades) when handling soiled laundry, carrying bags that were filled by patrons, and loading bags into the washing machine.

*g. Personal protection and hygienic practices.*

(1) Hand washing is essential for minimizing worker exposure to infectious and other harmful agents and to reduce potentially cross-contaminating clean items. Workers must wash their hands thoroughly with soap and water after handling soiled laundry and before handling clean laundry. If wearing disposable gloves, gloves should be changed after handling soiled laundry and before handling clean laundry. Hands should be washed each time disposable gloves are removed. Use of a hand sanitizer containing a minimum of 60% ethyl alcohol is acceptable between glove changes, but is not appropriate when changing tasks between handling soiled and clean laundry.

(2) Laundry workers must protect open cuts and any unhealed abrasions or burns on their hands and exposed portions of their arms by using an impermeable bandage.

(3) The minimum recommended personal protective equipment (PPE) for all laundry workers includes disposable gloves and smock or outer garment to prevent contamination of personal clothing. Additional PPE such as N-95 face mask, head covering, and eye protection is recommended for laundry operators responsible for emptying soiled laundry bags into washers and when sorting soiled laundry.

(4) All PPE must be changed between handling soiled laundry and clean laundry.

(5) Laundry workers must remove all PPE (disposable and nondisposable) prior to taking a break and at the end of a work shift before departing the laundry facility.

(6) Single-use PPE must be immediately disposed of when removed. Nondisposable PPE such as gowns, head coverings, and eye protection should be

TIP No. 31-036-0215

placed in collection containers appropriately marked for soiled items. All used PPE is considered contaminated and must be laundered or cleaned and disinfected, as appropriate, at the end of a worker's shift or prior to use by another worker.

**7. Point of contact.** The point of contact for this document is the Army Institute of Public Health, Drinking Water and Sanitation Program, at 410-436-3919, DSN 584-3919, or email [usarmy.apg.medcom-phc.mbx.environmentalhealthsanitation@mail.mil](mailto:usarmy.apg.medcom-phc.mbx.environmentalhealthsanitation@mail.mil).

**Endnotes:**

- <sup>1</sup> USAPHC, Ebola Virus Disease, Information for Soldiers, [http://phc.amedd.army.mil/PHC%20Resource%20Library/EbolaInfoSheetSoldier\\_09262014.pdf](http://phc.amedd.army.mil/PHC%20Resource%20Library/EbolaInfoSheetSoldier_09262014.pdf)
- <sup>2</sup> CDC, What you need to know about Ebola, <http://www.cdc.gov/vhf/ebola/pdf/what-need-to-know-ebola.pdf>
- <sup>3</sup> CDC, Frequently Asked Questions (FAQs) on Interim Guidance for Managers and Workers Handling Untreated Sewage from Suspected or Confirmed Individuals with Ebola in the U.S., <http://www.cdc.gov/vhf/ebola/prevention/faq-untreated-sewage.html>
- <sup>4</sup> CDC, Guidelines for Environmental Infection Control in Health-Care Facilities, 2003, [http://www.cdc.gov/hicpac/pdf/guidelines/eic\\_in\\_HCF\\_03.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf)
- <sup>5</sup> CDC, Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008, [http://www.cdc.gov/hicpac/pdf/guidelines/disinfection\\_nov\\_2008.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/disinfection_nov_2008.pdf)
- <sup>6</sup> NIH, Enteric Virus Survival during Household Laundering and Impact of Disinfection with Sodium Hypochlorite, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1932823/>
- <sup>7</sup> NIH, Effect of Water Temperature on Bacterial Killing in Laundry, <http://www.ncbi.nlm.nih.gov/pubmed/3647942>
- <sup>8</sup> NIH, Level of Decontamination after Washing Textiles at 60°C or 70°C Followed by Tumble Drying, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4229498/>
- <sup>9</sup> CDC, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, <http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf>

## **Appendix A Sanitation Controls for Laundry Facilities**

### **A-1. Facility controls.**

a. Maintain laundry facilities in a clean and sanitary condition:

(1) Walls, floors, ceiling, equipment, and fixtures are free of mold and mildew and buildup of dust and lint.

(2) Floors are cleaned daily using a dustless method.

(3) Trash receptacles are emptied daily.

(4) Premises are free of standing water.

b. Keep premises free of insects and rodents.

c. Provide hand-wash sinks that are readily accessible and supplied with soap, paper towels, and a trash can.

d. Protect all fixtures and appliances from back flow and cross-connections with wastewater discharge and the sanitary sewer.

(1) Use air gaps to protect wastewater discharge lines that are not plumbed to the sanitary sewer.

(2) Disconnect hoses that are connected to a potable water system and used for general area cleaning when not in active use.

e. Prohibit personnel from eating in laundry processing areas; a closed beverage container (e.g., water bottle or covered cup with straw) is authorized.

f. Laundry processes may generate excessive heat, release noxious vapors, and result in excess moisture throughout the facility. Additionally, dirt, mold, yeast, bacteria and other microbes, animal and human dander, and some insect eggs that are attached to soiled laundry can easily be released into the air, exposing laundry workers to allergens and potentially infectious materials and resulting in contamination of other areas of the laundry operation.

(1) Use local exhaust and area (dilution) ventilation to control occupational exposures to heat and chemicals and to control indoor mold growth due to high moisture conditions.

(2) Ensure air flow within the laundry facility moves from the clean side of the operation to the soiled side. The soiled side includes receiving, sorting, if performed, and loading laundry into washers. The clean side begins where laundry is either put into an extractor or into the dryer and includes pressing, folding, and laundry reissue, delivery or pickup.

## **A-2. Processing controls.**

a. *Protection principles.* Laundry operations should be designed and organized to achieve sanitary control throughout the laundry process. In addition to properly removing contamination from fabrics, sanitation controls are designed to protect workers from aerosolized hazards and illness from contact with contaminated surfaces and to prevent cross contamination of clean items. The CDC has identified the following key principles to protect workers when handling soiled laundry—

- Do not shake laundry items or handle them in any way that may aerosolize infectious agents,
- Avoid direct contact with your body and personal clothing from soiled items being handled, and
- Contain soiled items in a laundry bag or designated bin.

b. *Receiving.* A receiving point is any designated room or area within the laundry facility where soiled laundry from individuals or bags and bins of soiled institutional laundry are delivered for processing. A receiving point may be a turn-in counter, a designated collection bin for individuals to drop off bagged laundry, or a large staging area for bins and carts. Cross contamination is likely to occur from soiled bins, carts, and the outsides of bags containing soiled laundry. Receiving personnel's hands, uniforms, face, and hair may become contaminated when processing loose laundry and linens.

(1) Separate the receiving point from the return/reissue point in a manner that minimizes the potential for cross contamination.

(2) Use different personnel to operate the receiving and reissue points. Provide administrative controls and a written procedure when the same individual is required to manage the receiving and reissue points. Controls include—

- Scheduling receiving and reissue operations on different days or at different times during the day.
- Wearing a smock with sleeves to prevent contamination of personal clothing and then changing into a clean smock between receipt and reissue tasks.

c. *Loading/unloading machines.* Minimize cross contamination when removing cleaned items from washers. Establish procedural controls when commercial or military washers are not designed with two doors, one for loading soiled laundry and the other for extraction of cleaned laundry.

d. *Pressing and folding.* Maintain a physical separation between soiled and clean laundry.

(1) Use separate carts to manage soiled and cleaned items. For common-use carts, clean and sanitize them prior to use with clean laundry.

(2) Cover carts that are used to move cleaned items or temporarily hold laundry prior to immediate pressing or folding.

(3) Use separate tables from soiled laundry items to fold clean laundry.

e. *Reissue/return.*

(1) Keep storage locations dry and free from soil and other substances that can contaminate clean laundry.

(2) Do not store clean laundry on the same shelves or in the bins that are used to receive soiled laundry. Clean and sanitize bins that are used for soiled laundry before using them for clean laundry.

(3) Segregate the reissue point from receiving activities. Establish written procedures to prevent cross contamination when the issue and receiving points are the same.