RFQ #7598713

Title: Laundry Services for Eleanor Slater Hospital (ESH) a division of Behavioral Healthcare, Developmental Disabilities and Hospitals (BHDDH)

Submission Deadline: Friday, April 26, 2019 @ 12:00 PM Eastern Time (ET)

NOTE TO VENDORS: Applicants must register online at the Rhode Island Division of Purchases website at www.purchasing.ri.gov. Proposals received without the completed RIVIP Bidder Certification Cover Form attached, may result in disqualification.

BID SCOPE OF WORK AND REQUIREMENTS:

1. **REQUIREMENTS**:

The Offeror must have the ability to provide facility laundry services (non-personal laundry) e.g. sheets and bath-size towels (all types listed below) according to the specific requirements and conditions described below and must comply with the Guidelines for Environmental Infection Control in Health-Care Facilities (2003) (see attached). Linens will be soiled with bio-hazard materials such as bodily fluids including but not limited to feces, blood, bile, urine, semen, saliva, etc.

- Vendor will pick-up soiled laundry sorted into laundry baskets, and deliver cleaned laundry at the loading dock at Eleanor Slater Hospital (ESH), Cranston, Rhode Island
- Vendor must provide a receipt to ESH documenting the number of bags collected and bundles by item delivered;
- To safeguard clean linens from cross-contamination, they shall be transported in containers used exclusively for clean linens and shall always be kept covered whilst in transit and delivered in an exclusively designated area identified by ESH for this purpose;
- Vendor will use their own cleaning formulas, bins and supplies;
- Washing formulas (subject to change based on Department of Health regulations) include:
    - Bactericidal / Antimicrobial action;
    - 180 degree washing capabilities;
    - Decontamination methods;
    - Basis of Sodium Orthosilicate in some products to break up acids and body waste;
    - Refresher such as Chromium (2+) Diiodide of water activated Malodor Control Concentrate;
    - Hypoallergenic Fabric Softener should be used for all linens listed below

- Damp textiles will not be left in machines overnight.

- Cleaning formulas and process is to be approved by ESH
- Clean linen will be supplied by and owned by ESH. Linens shall be pressed (as indicated) folded, counted, recorded and bundled as follows:
    - Bath towels – folded into bundles of (15) fifteen;
    - Face Cloths – in bundles of (50) fifty;
    - Fitted Sheets – folded into bundles of (4) four and no more than (6) six;
    - Flat Sheets – pressed into bundles of (10) ten;
    - Patient Gowns – folded and stacked in bundles of (16) sixteen;
    - Pillow Cases – folded into bundles of (25) twenty-five;
    - Thermal Blankets, Light Blankets & Bedspreads – folded into bundles of (2) two, not more than (4) four;

- A pick-up and delivery schedule will be submitted with the bid and must be approved by ESH before a contract is awarded; Thrice per week - Preferably Monday during the hours of 12:00pm and 3:00pm and Wednesday, and Friday during the hours of 8:30 AM and 11:30 AM. If for any reason there is a delay in routine delivery or only a partial delivery is made, the vendor will make additional deliveries of clean linens to ESH on either the same day or on the next calendar day, inclusive of weekends, to ensure that ESH receives an adequate supply of clean linens to sustain 24-hour, 7-day operations.
- The pick-up and delivery schedule shall accommodate all State holidays to maintain three pickup and deliveries per week.
- The contract award will be for a 1 year with the option to renew for three additional 1 year terms.

2. <u>WEIGHING AND COUNTING LAUNDRY</u>:

- Laundering cost shall be based on cost per pound of “clean” laundry;
- Pricing should be based on an average linen pick-up of approximately 125,000 lbs. per month – or 1,500,000 lbs. per year;
- Vendor shall develop and offer to ESH a standardized process for tracking linens so that once retrieved and laundered, only linens used by ESH are cycled through the process and returned to ESH during the thrice weekly schedule.

3. <u>INVENTORY</u>:

- Vendor shall allow ESH to make additions and/or deletions to the list of linens laundered. Cost for additions or deletions shall be pro-rated and based on a mutually agreed upon unit cost;
- The vendor will be responsible to replace all linens that are ruined at their facility or during transportation;
- ESH is responsible for linen replacement due to staining, and normal wear.

4. <u>BILLING REQUIREMENTS</u>:

Vendor must provide detailed billing statements listing the following:

- Pick-up dates and times;
- Documentation listing weight(s) of laundry picked up;

- Price per pound of “clean” laundry;
- Total charged

5. INSURANCE REQUIREMENTS:

The Vendor must have sufficient liability insurance coverage and/or must be bonded. A copy of the liability insurance certificate shall be submitted with this bid.

6. LICENSE REQUIREMENTS:

- Vendor is responsible to comply with all licensing or State Permits required for this service;
- A copy of license/permit shall be submitted with this bid;
- Bidder, by submission of this bid, certifies that any/all work related to this bid, any subsequent award which required a Rhode Island license(s), shall be performed by an individual(s) holding a valid Rhode Island license.

7. TRANSPORTATION REQUIREMENTS:

- Vendor must have adequate staff and vehicles available to provide required delivery and service as stated in this RFQ.
- Vendor shall maintain reliable transportation to support the needs required by ESH.
- Transportation to include insurance, for the beneficial and expeditious provision of ESH Institutional Laundering Services.

8. TRANSITION PERIOD:

The awarded Vendor will have a minimum of (30) thirty days with a maximum of (60) sixty days to transition all services and requirements as listed in this RFQ into complete and working order.

9. LOCATION:

- Eleanor Slater Hospital
  111 Howard Avenue
  Cranston, RI 02920

Request for Quote

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ONE CAPITOL HILL
PROVIDENCE RI 02908

CREATION DATE : 28-MAR-19
BID NUMBER: 7598713
TITLE: Laundry Services for Eleanor Slater Hospital (ESH) a division of BHDDH

BLANKET START : 01-JUN-19
BLANKET END : 31-MAY-23
BID CLOSING DATE AND TIME:26-APR-2019 12:00:00

BUYER: Vittorioso, Dawn R
PHONE #: 401-574-8134

BILL TO
DOA CONTROLLER
ONE CAPITOL HILL, 4TH FLOOR
SMITH ST
PROVIDENCE, RI 02908
US

SHIP TO
BHDDH-ESH MANAGEMENT SERVICES
PO BOX 8269
CRANSTON, RI 02920
US

Requistion Number: 1602290

Note to Bidders: QUESTIONS concerning this solicitation must be received by the Division of Purchases at DOA.PURQUESTIONS10@purchasing.ri.gov no later than Monday, April 8, 2019 @ 10:00 AM Eastern Time (ET). Questions should be submitted in a Microsoft Word attachment. Please reference the RFQ #7598713 on all correspondence. Questions received, if any, will be posted on the Division of Purchases' website as an addendum to this solicitation. It is the responsibility of all interested parties to download this information.

Line	Description	Quantity	Unit	Unit Price	Total
1	6/1/19 - 5/31/20 LAUNDRY SERVICES FOR BHDDH, ELEANOR SLATER HOSPITAL	1,500,000.00	Pound		
2	6/1/20 - 5/31/21 LAUNDRY SERVICES FOR BHDDH, ELEANOR SLATER HOSPITAL	1,500,000.00	Pound		
3	6/1/21 - 5/31/22 LAUNDRY SERVICES FOR BHDDH, ELEANOR SLATER HOSPITAL	1,500,000.00	Pound		
4	6/1/22 - 5/31/23 LAUNDRY SERVICES FOR BHDDH, ELEANOR SLATER HOSPITAL	1,500,000.00	Pound		
5	6/1/19 - 5/31/20 SOIL REPLACEMENT COST	1.00	Pound		
6	6/1/20 - 5/31/21 SOIL REPLACEMENT COST	1.00	Pound		
7	6/1/21 - 5/31/22 SOIL REPLACEMENT COST	1.00	Pound		
8	6/1/22 - 5/31/23 SOIL REPLACEMENT COST	1.00	Pound		

Delivery: _____

Terms of Payment: _____

It is the Vendor's responsibility to check and download any and all addenda from the RIVIP. This offer may not be considered unless a signed RIVIP generated Bidder Certification Cover Form is attached and the Unit Price column is completed. The signed Certification Cover Form must be attached to the front of the offer

Contract Terms and Conditions

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Terms and Conditions

BID STANDARD TERMS AND CONDITIONS

TERMS AND CONDITIONS FOR THIS BID

DELIVERY PER AGENCY

DELIVERY OF GOODS OR SERVICES AS REQUESTED BY AGENCY.

INSURANCE REQUIREMENTS (ADDITIONAL)

ANNUAL RENEWAL INSURANCE CERTIFICATES FOR WORKERS' COMPENSATION, PUBLIC LIABILITY, PROPERTY DAMAGE INSURANCE, AUTO INSURANCE, PROFESSIONAL LIABILITY INSURANCE (AKA ERRORS & OMISSIONS), BUILDER'S RISK INSURANCE, SCHOOL BUSING AUTO LIABILITY, ENVIRONMENTAL IMPAIRMENT (AKA POLLUTION CONTROL), VESSEL OPERATION (MARINE OR AIRCRAFT) PROTECTION & INDEMNITY, ETC., MUST BE SUBMITTED TO THE SPECIFIC AGENCY IDENTIFIED IN THE "SHIP TO" SECTION OF THE PURCHASE ORDER. CERTIFICATES ARE ANNUALLY DUE PRIOR TO THE BEGINNING OF ANY CONTRACT PERIOD BEYOND THE INITIAL TWELVE-MONTH PERIOD OF A CONTRACT. FAILURE TO PROVIDE ANNUAL INSURANCE CERTIFICATION MAY BE GROUNDS FOR CANCELLATION.

LICENSE REQUIREMENTS

VENDOR (OWNER OF COMPANY) IS RESPONSIBLE TO COMPLY WITH ALL LICENSING OR STATE PERMITS REQUIRED FOR THIS TYPE OF SERVICE. A COPY OF LICENSE/PERMIT SHOULD BE SUBMITTED WITH THIS BID. IN ADDITION TO THESE LICENSE REQUIREMENTS, BIDDER, BY SUBMISSION OF THIS BID, CERTIFIES THAT ANY/ALL WORK RELATED TO THIS BID, AND ANY SUBSEQUENT AWARD WHICH REQUIRES A RHODE ISLAND LICENSE(S), SHALL BE PERFORMED BY AN INDIVIDUAL(S) HOLDING A VALID RHODE ISLAND LICENSE.

MULTI YEAR AWARD

THIS IS A MULTI-YEAR BID/CONTRACT. PER RHODE ISLAND STATE LAW 37-2-33, CONTRACT OBLIGATIONS BEYOND THE CURRENT FISCAL YEAR ARE SUBJECT TO AVAILABILITY OF FUNDS. CONTINUATION OF THE CONTRACT BEYOND THE INITIAL FISCAL YEAR WILL BE AT THE DISCRETION OF THE STATE. TERMINATION MAY BE EFFECTED BY THE STATE BASED UPON DETERMINING FACTORS SUCH AS UNSATISFACTORY PERFORMANCE OR THE DETERMINATION BY THE STATE TO DISCONTINUE THE GOODS/SERVICES, OR TO REVISE THE SCOPE AND NEED FOR THE TYPE OF GOODS/SERVICES; ALSO MANAGEMENT OWNER DETERMINATIONS THAT MAY PRECLUDE THE NEED FOR GOODS/SERVICES.

PURCHASE AGREEMENT AWARD

THIS IS A NOTICE OF AWARD, NOT AN ORDER. Any quantity reference in the agreement or in the bid preceding it are estimates only and do not represent a commitment on the part of the state to any level of billing activity, other than for quantities or volumes specifically released during the term. No action is to be taken except as specifically authorized, as described herein under AUTHORIZATION AND RELEASE. ENTIRE AGREEMENT - This NOTICE OF AWARD, with all attachments, and any release(s) against it shall be subject to: (1) the specifications, terms and conditions set forth in the Request/Bid Number cited herein, (2) the General Terms and Conditions of Contracts for the State of Rhode Island and (3) all

provisions of, and the Rules and Regulations promulgated pursuant to, Title 37, Chapter 2 of the General Laws of the State of Rhode Island. This NOTICE shall constitute the entire agreement between the State of Rhode Island and the Vendor. No assignment of rights or responsibility will be permitted except with the express written permission of the State Purchasing Agent or his designee. CANCELLATION, TERMINATION and EXTENSION - This Price Agreement shall automatically terminate as of the date(s) described under CONTRACT PERIOD unless this Price Agreement is altered by formal amendment by the State Purchasing Agent or his designee upon mutual agreement between the State and the Vendor.

RIVIP INFO - BID SUBMISSION REQUIREMENTS

It is the vendor's responsibility to check and download anyand all addenda from the RIVIP. Thisoffer may not be considered unless a signed RIVIP generated BidderCertification Cover Form is attached and the Unit Price column is completed.The signed Certification Cover Form should be attached to the front of theoffer. Each bid proposal must be submitted in a separate sealed envelope withthe bidder's name and address and the specific "Solicitation Number,""Solicitation Title," and the "Bid Proposal Submission Deadline" marked in theupper left-hand corner of the envelope.

The bid proposal must be delivered (via mail, messengerservice, or personal delivery) to the Division of Purchases and date-stampedreceipted by the date and time specified for the bid proposal submissiondeadline. Bidders should mail bid proposals sufficiently in advance of the bidproposal submission deadline to ensure timely delivery to the Division ofPurchases or, when delivering a bid proposal in person or by messenger, shouldallow additional time for parking and clearance through security checkpoints.Bid proposals must be addressed to:

Rhode Island Department of Administration

Division of Purchases, 2nd Floor

One Capitol Hill, Providence, RI 02908-5855

Bid proposals that are not received by the Division ofPurchases by the bid proposal submission deadline for whatever reason will bedeemed late and will not be considered. The submission time will be determinedby the time clock in the Division of Purchases. Postmarks will not be considered proof of timely submission.

Bid proposals in electronic format are not accepted at thistime.

At the bid proposal submission deadline, bid proposals willbe opened and read aloud in public.

DIVESTITURE OF INVESTMENTS IN IRAN REQUIREMENT:
No vendor engaged in investment activities in Iran as described in R.I. Gen. Laws §37-2.5-2(b) may submit a bid proposal to, or renew a contract with, the Division of Purchases. Each vendor submitting a bid proposal or entering into a renewal of a contract is required to certify that the vendor does not appear on the list maintained by the General Treasurer pursuant to R.I. Gen. Laws §37-2.5-3.

Guidelines for Environmental Infection Control in Health-Care Facilities

Recommendations of CDC and the Healthcare Infection Control
Practices Advisory Committee (HICPAC)

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention (CDC)
Atlanta, GA 30329

2003

G. Laundry and Bedding

1. General Information

Laundry in a health-care facility may include bed sheets and blankets, towels, personal clothing, patient apparel, uniforms, scrub suits, gowns, and drapes for surgical procedures.[1245] Although contaminated textiles and fabrics in health-care facilities can be a source of substantial numbers of pathogenic microorganisms, reports of health-care associated diseases linked to contaminated fabrics are so few in number that the overall risk of disease transmission during the laundry process likely is negligible. When the incidence of such events is evaluated in the context of the volume of items laundered in health-care settings (estimated to be 5 billion pounds annually in the United States),[1246] existing control measures (e.g., standard precautions) are effective in reducing the risk of disease transmission to patients and staff. Therefore, use of current control measures should be continued to minimize the contribution of contaminated laundry to the incidence of health-care associated infections. The control measures described in this section of the guideline are based on principles of hygiene, common sense, and consensus guidance; they pertain to laundry services utilized by health-care facilities, either inhouse or contract, rather than to laundry done in the home.

2. Epidemiology and General Aspects of Infection Control

Contaminated textiles and fabrics often contain high numbers of microorganisms from body substances, including blood, skin, stool, urine, vomitus, and other body tissues and fluids. When textiles are heavily contaminated with potentially infective body substances, they can contain bacterial loads of 10^6–10^8 CFU/100 cm^2 of fabric.[1247] Disease transmission attributed to health-care laundry has involved contaminated fabrics that were handled inappropriately (i.e., the shaking of soiled linens). Bacteria (*Salmonella* spp., *Bacillus cereus*), viruses (hepatitis B virus [HBV]), fungi (*Microsporum canis*), and ectoparasites (scabies) presumably have been transmitted from contaminated textiles and fabrics to workers via

a. direct contact or
b. aerosols of contaminated lint generated from sorting and handling contaminated textiles.[1248–1252]

In these events, however, investigations could not rule out the possibility that some of these reported infections were acquired from community sources. Through a combination of soil removal, pathogen removal, and pathogen inactivation, contaminated laundry can be rendered hygienically clean. Hygienically clean laundry carries negligible risk to health-care workers and patients, provided that the clean textiles, fabric, and clothing are not inadvertently contaminated before use.

OSHA defines contaminated laundry as "laundry which has been soiled with blood or other potentially infectious materials or may contain sharps."[967] The purpose of the laundry portion of the standard is to protect the worker from exposure to potentially infectious materials during collection, handling, and sorting of contaminated textiles through the use of personal protective equipment, proper work practices, containment, labeling, hazard communication, and ergonomics.

Experts are divided regarding the practice of transporting clothes worn at the workplace to the healthcare worker's home for laundering. Although OSHA regulations prohibit home laundering of items that are considered personal protective apparel or equipment (e.g., laboratory coats),[967] experts disagree about whether this regulation extends to uniforms and scrub suits that are not contaminated with blood or other potentially infectious material. Health-care facility policies on this matter vary and may be inconsistent with recommendations of professional organizations.[1253, 1254] Uniforms without blood or body substance contamination presumably do not differ appreciably from street clothes in the degree and microbial nature of soilage. Home laundering would be expected to remove this level of soil adequately. However, if health-care facilities require the use of uniforms, they should either make provisions to launder them or provide information to the employee regarding infection control and cleaning guidelines for the item based on the tasks being performed at the facility. Health-care facilities

should address the need to provide this service and should determine the frequency for laundering these items. In a recent study examining the microbial contamination of medical students' white coats, the students perceived the coats as "clean" as long as the garments were not visibly contaminated with body substances, even after wearing the coats for several weeks.[1255] The heaviest bacterial load was found on the sleeves and the pockets of these garments; the organisms most frequently isolated were *Staphylococcus aureus*, diphtheroids, and *Acinetobacter* spp.[1255] Presumably, the sleeves of the coat may make contact with a patient and potentially serve to transfer environmentally stable microorganisms among patients. In this study, however, surveillance was not conducted among patients to detect new infections or colonizations. The students did, however, report that they would likely replace their coats more frequently and regularly if clean coats were provided.[1255] Apart from this study, which documents the presence of pathogenic bacteria on health-care facility clothing, reports of infections attributed to either the contact with such apparel or with home laundering have been rare. [1256, 1257]

Laundry services for health-care facilities are provided either in-house (i.e., on-premise laundry [OPL]), co-operatives (i.e., those entities owned and operated by a group of facilities), or by off-site commercial laundries. In the latter, the textiles may be owned by the health-care facility, in which case the processor is paid for laundering only. Alternatively, the textiles may be owned by the processor who is paid for every piece laundered on a "rental" fee. The laundry facility in a health-care setting should be designed for efficiency in providing hygienically clean textiles, fabrics, and apparel for patients and staff. Guidelines for laundry construction and operation for health-care facilities, including nursing facilities, have been published.[120, 1258] The design and engineering standards for existing facilities are those cited in the AIA edition in effect during the time of the facility's construction.[120] A laundry facility is usually partitioned into two separate areas - a "dirty" area for receiving and handling the soiled laundry and a "clean" area for processing the washed items.[1259] To minimize the potential for recontaminating cleaned laundry with aerosolized contaminated lint, areas receiving contaminated textiles should be at negative air pressure relative to the clean areas.[1260–1262] Laundry areas should have handwashing facilities readily available to workers. Laundry workers should wear appropriate personal protective equipment (e.g., gloves and protective garments) while sorting soiled fabrics and textiles.[967] Laundry equipment should be used and maintained according to the manufacturer's instructions to prevent microbial contamination of the system.[1250, 1263] Damp textiles should not be left in machines overnight.[1250]

3. Collecting, Transporting, and Sorting Contaminated Textiles and Fabrics

The laundry process starts with the removal of used or contaminated textiles, fabrics, and/or clothing from the areas where such contamination occurred, including but not limited to patients' rooms, surgical/operating areas, and laboratories. Handling contaminated laundry with a minimum of agitation can help prevent the generation of potentially contaminated lint aerosols in patient-care areas.[967, 1259] Sorting or rinsing contaminated laundry at the location where contamination occurred is prohibited by OSHA.[967] Contaminated textiles and fabrics are placed into bags or other appropriate containment in this location; these bags are then securely tied or otherwise closed to prevent leakage.[967] Single bags of sufficient tensile strength are adequate for containing laundry, but leak-resistant containment is needed if the laundry is wet and capable of soaking through a cloth bag.[1264] Bags containing contaminated laundry must be clearly identified with labels, color-coding, or other methods so that health-care workers handle these items safely, regardless of whether the laundry is transported within the facility or destined for transport to an off-site laundry service.[967]

Typically, contaminated laundry originating in isolation areas of the hospital is segregated and handled with special practices; however, few, if any, cases of health-care associated infection have been linked to this source.[1265] Single-blinded studies have demonstrated that laundry from isolation areas is no more heavily contaminated with microorganisms than laundry from elsewhere in the hospital.[1266] Therefore,

adherence to standard precautions when handling contaminated laundry in isolation areas and minimizing agitation of the contaminated items are considered sufficient to prevent the dispersal of potentially infectious aerosols.[6]

Contaminated textiles and fabrics in bags can be transported by cart or chute.[1258, 1262] Laundry chutes require proper design, maintenance, and use, because the piston-like action of a laundry bag traveling in the chute can propel airborne microbial contaminants throughout the facility.[1267–1269] Laundry chutes should be maintained under negative air pressure to prevent the spread of microorganisms from floor to floor. Loose, contaminated pieces of laundry should not be tossed into chutes, and laundry bags should be closed or otherwise secured to prevent the contents from falling out into the chute.[1270] Health-care facilities should determine the point in the laundry process at which textiles and fabrics should be sorted. Sorting after washing minimizes the exposure of laundry workers to infective material in soiled fabrics, reduces airborne microbial contamination in the laundry area, and helps to prevent potential percutaneous injuries to personnel.[1271] Sorting laundry before washing protects both the machinery and fabrics from hard objects (e.g., needles, syringes, and patients' property) and reduces the potential for recontamination of clean textiles.[1272] Sorting laundry before washing also allows for customization of laundry formulas based on the mix of products in the system and types of soils encountered. Additionally, if work flow allows, increasing the amount of segregation by specific product types will usually yield the greatest amount of work efficiency during inspection, folding, and pack-making operations.[1253] Protective apparel for the workers and appropriate ventilation can minimize these exposures. [967, 1258–1260] Gloves used for the task of sorting laundry should be of sufficient thickness to minimize sharps injuries.[967] Employee safety personnel and industrial hygienists can help to determine the appropriate glove choice.

4. Parameters of the Laundry Process

Fabrics, textiles, and clothing used in health-care settings are disinfected during laundering and generally rendered free of vegetative pathogens (i.e., hygienically clean), but they are not sterile.[1273] Laundering cycles consist of flush, main wash, bleaching, rinsing, and souring.[1274] Cleaned wet textiles, fabrics, and clothing are then dried, pressed as needed, and prepared (e.g., folded and packaged) for distribution back to the facility. Clean linens provided by an off-site laundry must be packaged prior to transport to prevent inadvertent contamination from dust and dirt during loading, delivery, and unloading. Functional packaging of laundry can be achieved in several ways, including

a. placing clean linen in a hamper lined with a previously unused liner, which is then closed or covered
b. placing clean linen in a properly cleaned cart and covering the cart with disposable material or a properly cleaned reusable textile material that can be secured to the cart; and
c. wrapping individual bundles of clean textiles in plastic or other suitable material and sealing or taping the bundles.

The antimicrobial action of the laundering process results from a combination of mechanical, thermal, and chemical factors.[1271, 1275, 1276] Dilution and agitation in water remove substantial quantities of microorganisms. Soaps and detergents function to suspend soils and also exhibit some microbiocidal properties. Hot water provides an effective means of destroying microorganisms.[1277] A temperature of at least 160°F (71°C) for a minimum of 25 minutes is commonly recommended for hot-water washing.[2] Water of this temperature can be provided by steam jet or separate booster heater.[120] The use of chlorine bleach assures an extra margin of safety.[1278, 1279] A total available chlorine residual of 50–150 ppm is usually achieved during the bleach cycle.[1277] Chlorine bleach becomes activated at water temperatures of 135°F–145°F (57.2°C–62.7°C). The last of the series of rinse cycles is the addition of a mild acid (i.e., sour) to neutralize any alkalinity in the water supply, soap, or detergent. The rapid shift in pH from approximately 12 to 5 is an effective means to inactivate some microorganisms.[1247] Effective

removal of residual alkali from fabrics is an important measure in reducing the risk for skin reactions among patients.

Chlorine bleach is an economical, broad-spectrum chemical germicide that enhances the effectiveness of the laundering process. Chlorine bleach is not, however, an appropriate laundry additive for all fabrics. Traditionally, bleach was not recommended for laundering flame-retardant fabrics, linens, and clothing because its use diminished the flame-retardant properties of the treated fabric.[1273] However, some modern-day flame retardant fabrics can now tolerate chlorine bleach. Flame-retardant fabrics, whether topically treated or inherently flame retardant, should be thoroughly rinsed during the rinse cycles, because detergent residues are capable of supporting combustion. Chlorine alternatives (e.g., activated oxygen based laundry detergents) provide added benefits for fabric and color safety in addition to antimicrobial activity. Studies comparing the antimicrobial potencies of chlorine bleach and oxygen-based bleach are needed. Oxygen-based bleach and detergents used in health-care settings should be registered by EPA to ensure adequate disinfection of laundry. Health-care workers should note the cleaning instructions of textiles, fabrics, drapes, and clothing to identify special laundering requirements and appropriate hygienic cleaning options.[1278]

Although hot-water washing is an effective laundry disinfection method, the cost can be substantial. Laundries are typically the largest users of hot water in hospitals. They consume 50%–75% of the total hot water,[1280] representing an average of 10%–15% of the energy used by a hospital. Several studies have demonstrated that lower water temperatures of 71°F–77°F (22°C–25°C) can reduce microbial contamination when the cycling of the washer, the wash detergent, and the amount of laundry additive are carefully monitored and controlled.[1247, 1281–1285] Low-temperature laundry cycles rely heavily on the presence of chlorine- or oxygen-activated bleach to reduce the levels of microbial contamination. The selection of hot- or cold-water laundry cycles may be dictated by state health-care facility licensing standards or by other regulation. Regardless of whether hot or cold water is used for washing, the temperatures reached in drying and especially during ironing provide additional significant microbiocidal action.[1247] Dryer temperatures and cycle times are dictated by the materials in the fabrics. Man-made fibers (i.e., polyester and polyester blends) require shorter times and lower temperatures.

After washing, cleaned and dried textiles, fabrics, and clothing are pressed, folded, and packaged for transport, distribution, and storage by methods that ensure their cleanliness until use.[2] State regulations and/or accrediting standards may dictate the procedures for this activity. Clean/sterile and contaminated textiles should be transported from the laundry to the health-care facility in vehicles (e.g., trucks, vans, and carts) that allow for separation of clean/sterile and contaminated items. Clean/sterile textiles and contaminated textiles may be transported in the same vehicle, provided that the use of physical barriers and/or space separation can be verified to be effective in protecting the clean/sterile items from contamination. Clean, uncovered/unwrapped textiles stored in a clean location for short periods of time (e.g., uncovered and used within a few hours) have not been demonstrated to contribute to increased levels of health-care acquired infection. Such textiles can be stored in convenient places for use during the provision of care, provided that the textiles can be maintained dry and free from soil and body-substance contamination.

In the absence of microbiologic standards for laundered textiles, no rationale exists for routine microbiologic sampling of cleaned health-care textiles and fabrics.[1286] Sampling may be used as part of an outbreak investigation if epidemiologic evidence suggests that textiles, fabrics, or clothing are a suspected vehicle for disease transmission. Sampling techniques include aseptically macerating the fabric into pieces and adding these to broth media or using contact plates (RODAC plates) for direct surface sampling.[1271, 1286] When evaluating the disinfecting properties of the laundering process specifically, placing pieces of fabric between two membrane filters may help to minimize the contribution of the physical removal of microorganisms.[1287]

Washing machines and dryers in residential-care settings are more likely to be consumer items rather than the commercial, heavy-duty, large volume units typically found in hospitals and other institutional healthcare settings. Although all washing machines and dryers in health-care settings must be properly maintained for performance according to the manufacturer's instructions, questions have been raised about the need to disinfect washers and dryers in residential-care settings. Disinfection of the tubs and tumblers of these machines is unnecessary when proper laundry procedures are followed; these procedures involve

a. the physical removal of bulk solids (e.g., feces) before the wash/dry cycle and
b. proper use of temperature, detergent, and laundry additives.

Infection has not been linked to laundry procedures in residential-care facilities, even when consumer versions of detergents and laundry additives are used.

5. Special Laundry Situations

Some textile items (e.g., surgical drapes and reusable gowns) must be sterilized before use and therefore require steam autoclaving after laundering.[7] Although the American Academy of Pediatrics in previous guidelines recommended autoclaving for linens in neonatal intensive care units (NICUs), studies on the microbial quality of routinely cleaned NICU linen have not identified any increased risk for infection among the neonates receiving care.[1288] Consequently, hygienically clean linens are suitable for use in this setting.[997] The use of sterile linens in burn therapy units remains unresolved.

Coated or laminated fabrics are often used in the manufacture of PPE. When these items become contaminated with blood or other body substances, the manufacturer's instructions for decontamination and cleaning take into account the compatibility of the rubber backing with the chemical germicides or detergents used in the process. The directions for decontaminating these items should be followed as indicated; the item should be discarded when the backing develops surface cracks.

Dry cleaning, a cleaning process that utilizes organic solvents (e.g., perchloroethylene) for soil removal, is an alternative means of cleaning fabrics that might be damaged in conventional laundering and detergent washing. Several studies, however, have shown that dry cleaning alone is relatively ineffective in reducing the numbers of bacteria and viruses on contaminated linens;[1289, 1290] microbial populations are significantly reduced only when dry-cleaned articles are heat pressed. Dry cleaning should therefore not be considered a routine option for health-care facility laundry and should be reserved for those circumstances in which fabrics cannot be safely cleaned with water and detergent.[1291]

6. Surgical Gowns, Drapes, and Disposable Fabrics

An issue of recent concern involves the use of disposable (i.e., single use) versus reusable (i.e., multiple use) surgical attire and fabrics in health-care settings.[1292] Regardless of the material used to manufacture gowns and drapes, these items must be resistant to liquid and microbial penetration.[7, 1293– 1297] Surgical gowns and drapes must be registered with FDA to demonstrate their safety and effectiveness. Repellency and pore size of the fabric contribute to gown performance, but performance capability can be influenced by the item's design and construction.[1298, 1299] Reinforced gowns (i.e., gowns with double-layered fabric) generally are more resistant to liquid strike-through.[1300, 1301] Reinforced gowns may, however, be less comfortable. Guidelines for selection and use of barrier materials for surgical gowns and drapes have been published.[1302] When selecting a barrier product, repellency level and type of barrier should be compatible for the exposure expected.[967] However, data are limited regarding the

association between gown or drape characteristics and risk for surgical site infections.[7, 1303] Health-care facilities must ensure optimal protection of patients and health-care workers. Not all fabric items in health care lend themselves to single-use. Facilities exploring options for gowns and drapes should consider the expense of disposable items and the impact on the facility's waste-management costs once these items are discarded. Costs associated with the use of durable goods involve the fabric or textile items; staff expenses to collect, sort, clean, and package the laundry; and energy costs to operate the laundry if on-site or the costs to contract with an outside service.[1304, 1305]

7. Antimicrobial-Impregnated Articles and Consumer Items Bearing Antimicrobial Labeling

Manufacturers are increasingly incorporating antibacterial or antimicrobial chemicals into consumer and health-care items. Some consumer products bearing labels that indicate treatment with antimicrobial chemicals have included pens, cutting boards, toys, household cleaners, hand lotions, cat litter, soaps, cotton swabs, toothbrushes, and cosmetics. The "antibacterial" label on household cleaning products, in particular, gives consumers the impression that the products perform "better" than comparable products without this labeling, when in fact all household cleaners have antibacterial properties.

In the health-care setting, treated items may include children's pajamas, mattresses, and bed linens with label claims of antimicrobial properties. These claims require careful evaluation to determine whether they pertain to the use of antimicrobial chemicals as preservatives for the fabric or other components or whether they imply a health claim.[1306, 1307] No evidence is available to suggest that use of these products will make consumers and patients healthier or prevent disease. No data support the use of these items as part of a sound infection-control strategy, and therefore, the additional expense of replacing a facility's bedding and sheets with these treated products is unwarranted.

EPA has reaffirmed its position that manufacturers who make public health claims for articles containing antimicrobial chemicals must provide evidence to support those claims as part of the registration process.[1308] Current EPA regulations outlined in the Treated Articles Exemption of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) require manufacturers to register both the antimicrobial chemical used in or on the product and the finished product itself if a public health claim is maintained for the item. The exemption applies to the use of antimicrobial chemicals for the purpose of preserving the integrity of the product's raw material(s). The U.S. Federal Trade Commission (FTC) is evaluating manufacturer advertising of products with antimicrobial claims.[1309]