

## Hospital Laundry Arrangements for Used And Infected Linen

### Executive summary

The provision of adequate laundry services is a fundamental requirement of direct patient care and a major feature among a hospital's many activities which contribute to its commitment to meet Patient's Charter standards of quality services. "Hospital Laundry Arrangements for Used And Infected Linen" sets out the recommended procedures to help meet this commitment. In particular it covers the handling and laundering of linen; the importance of securing the disinfection of used and infected linen; and the basic principles of infection control.

### Background

The NHS has an obligation under the Health and Safety at Work Act to take steps to prevent the risk of infection to staff handling and laundering linen. There is also a need to deal with the potential for harm to staff and damage to linen by a failure to separate "sharps" from dirty linen before it is placed in laundry bags.

### Action

NHS managers are asked to draw the accompanying guidance to the attention of all staff, including contract staff, who may need to apply it.

Managers should ensure that relevant legislation, including the requirements of the Registered Homes Act in respect of laundry from small units, is complied with.

Management should adopt procedures to ensure that patients and staff are not put at risk of infection from used and infected linen.

Management should ensure that all staff, and laundry contractors, responsible for handling or laundering linen are appropriately trained.

The advice contained in the HSG should be incorporated into contracts where laundry services are not provided in-house.

The help of the Society of Hospital Linen Services and Laundry Managers, in conjunction with the industry technical association, FCRA in drawing up this guidance is acknowledged.

HSG(95)18

Hospital Laundry  
Arrangements for Used  
And Infected Linen

This replaces HC(87)30  
which expired on 1  
December 1992

21 April 1995

### Addressees

For action:  
NHS Trusts  
Directly Managed Units

For information:  
Regional Health Authorities  
District Health Authorities  
Special Health Authorities

### From

CA-OPU  
NHS Executive  
Eileen House  
80-94 Newington Causeway  
London SE1 6EF

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# LAUNDERING PROCEDURES TO SECURE DISINFECTION OF USED AND INFECTED LINEN

## 1. INTRODUCTION

- 1.1 This guidance, which should be applied to all laundry facilities including launderettes and on-premise laundries associated with small units, is issued to promote practices which will reduce the possible risk of infection to laundry staff during the laundry process and to secure the disinfection of used and infected linen. These practices will also help to eliminate possible damage to linen and laundry equipment from the failure of staff to separate potentially dangerous items ("sharps" in particular) from dirty linen before it is placed in laundry bags.
- 1.2 It is essential for a laundry and its associated operations to ensure that it provides health care units with adequate and timely supplies of the necessary requirement of clean items. This is a major feature in the many aspects of a hospital's activities which also helps them to meet their "Patients Charter" commitment of providing quality services. Even minor variations in the levels of service provided can have serious consequences.
- 1.3 The main problems demonstrating the need for revised advice involve the sorting and categorising of linen. Although handling of foul linen is undesirable there is a need to separate articles requiring different treatment and to detect sharp objects that may damage the whole load. This is a particular problem when dealing with linen from some units eg geriatric and psychiatric where up to 80% of its linen is in the foul or infected category. The separation of soiled and foul linen is often not carried out in the wards and items likely to damage linen, or machines, are commonly found in pockets of garments or accidentally placed in the laundry bag. Positive efforts should be made to encourage ward and theatre staff to use the bagging procedures as in Appendix A and to avoid putting extraneous items into laundry bags. Linen from patients with diseases likely to be transmissible to staff should be transferred to a washing machine without handling by the laundry operative.
- 1.4 The local control infection committee should use this advice when determining local policy procedures. It should also take into account HC(91)33 - Decontamination of contaminated equipment, linen or other surfaces contaminated with hepatitis B and/or Human Immunodeficiency Virus (HIV). The committee could also usefully urge staff not to send sharp items with linen to the laundry.
- 1.5 All staff handling linen should receive appropriate training to carry out their duties efficiently and safely.

## 2. CATEGORIES OF LINEN

- 2.1 It is recommended that linen (in this document "linen" refers to all articles for laundering) should be divided by staff in
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wards and departments into three categories.

- 2.1.1 Used (Soiled and Foul) - all used linen, irrespective of state, but on occasion contaminated by body fluids or blood, apart from linen from infectious patients, those suspected as being infectious and linen covered by 2.1.2 and 2.1.3. Handling policy for used (soiled and foul) linen will be determined at local level with advice from the local infection control committee whether the foul linen is to be categorised with the used or infected linen.
- 2.1.2 Infected - linen from patients with or suspected of suffering from enteric fever, and other salmonella infections, dysentery (*Shigella* spp), hepatitis A, hepatitis B, hepatitis C and carriers, open pulmonary tuberculosis, HIV infection, notifiable diseases and other infections in hazard group 3 COSHH 1994 Approved List of Biological Agents (see Advisory Committee on Dangerous Pathogens) and other infections specified by the infection control officer as hazardous to staff. Linen from patients infected with hazard group 4 organisms (haemorrhagic fever viruses such as Lassa Fever) must be steam-sterilised by autoclaving within the group 4 containment unit before laundering - see Memorandum On The Control of Viral Haemorrhagic Fevers, HMSO 1986. It is most important that linen likely to infect staff should be put immediately into a water soluble bag or bag with a water-soluble stitched seam or membrane which will release its load in the wash process and which is sealed with an appropriate soluble tie and labelled as to its origin. The containers should be correctly coloured in accordance with the amended SIB(10)20. (See Appendix A.)
- 2.1.3 Heat-Labile - fabrics damaged by the normal heat disinfection process and likely to be damaged at thermal disinfection temperatures.

### 3. DISINFECTION OF USED (SOILED AND FOUL) LINEN

- 3.1 This category accounts for the vast majority of used linen from hospitals. For transportation, such linen should be placed into polythene or nylon/polyester laundry bags, colour coded in accordance with Appendix A. Bags must be securely fastened before being sent to the laundry. Care should be taken to prevent linen or foul seepage (body fluids or blood) escaping from laundry bags and contaminating other items or staff. Use of a water soluble bag as a liner is recommended.
- 3.2 The washing process should have a disinfection cycle in which the temperature in the load is maintained at 65°C (150°F) for not less than 10 minutes or preferably at 71°C (160°F) for not less than 3 minutes. With both options, "mixing time" must be added to ensure heat penetration and assured disinfection. For machines of conventional design and a low degree of loading (for example, below 0.056kg/litre) 4 minutes should be added to these times to allow for mixing time. For machines with a heavy degree of loading (for example above 0.056kg/litre) it is necessary to add up to 8 minutes. A sluice cycle should be included as necessary when

dealing with foul linen.

- 3.3 All washing machines should be checked prior to purchase to ensure that they have the specified programming ability to meet the above disinfection standards, and on commissioning to ensure compliance with disinfection standards. The special requirements for continuous batch washing machines are set out in paragraph 8.
- 3.4 All washing machines should be fitted with accurate heat sensors. The sensing elements must be correctly placed to register the true wash temperature, i.e. the temperature of the wash water in contact with the load. Wash temperatures should be subject to a monitoring system and heat sensing systems should be tested at six weekly intervals and calibrated accordingly. Records should be kept of the six weekly testing and the necessary calibration.
- 3.5 Categorisation of linen should be done at local level with the appropriate coloured coded containers. However, water soluble bags or bags with a water-soluble stitched seam or membrane are recommended for heavily fouled linen.

#### 4. DISINFECTION OF INFECTED LINEN

- 4.1 Linen in this category should not be sorted, but should be sealed in a water-soluble bag or bag with a water-soluble stitched seam or membrane immediately on removal from the bed or before leaving a clinical department. This primary container should then be placed in a nylon or polyester bag with the appropriate colour code in accordance with Appendix A and labelled if considered necessary locally. The inner bag should be transferred to the designated washer extractor without opening, followed by the outer bag which should be washed in a similar fashion. Due to the potential for blockages and a need for staff to enter the machine in this event, under no circumstances should infected linen be processed in a batch continuous washing machine.
  - 4.2 The provision of a designated storage area should not be necessary but infected linen should be stored under secure conditions prior to treatment.
  - 4.3 The recommendations on the washing process for used linen regarding the thermal disinfection stage, set out in paragraph 3.2, also apply to the process for infected linen.
  - 4.4 The temperatures recommended in paragraph 3.2 should inactivate HIV but there is some uncertainty as to minimal temperatures required to inactivate hepatitis B virus. However, the heat inactivation at these temperatures, combined with the considerable dilution factor stage, should render the linen safe to handle on completion of the wash cycle.
  - 4.5 Where central disinfection areas exist it is not expected that the arrangements will automatically be dispensed with but, if necessary, they will continue because of the financial and practical implications of making the alteration. However, where laundries are also producing linen and laundry for other than hospital purposes, ie
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commercial contracts which may include food industry or related work, it may be a contractual requirement that a barrier operation is provided to effectively separate unprocessed work from clean work. In this situation, a central disinfection area or barrier room for infected work may be desirable.

- 4.6 Where a known infection occurs in a small unit all used linen and patients' personal clothing must be disinfected in accordance with the preceding guidance and advice from the control of infection officer.

#### 5. DISINFECTION OF "HEAT-LABILE" LINEN

- 5.1 The purchase of fabrics which will not withstand the temperatures set out in paragraph 3.2 should be avoided where possible.
- 5.2 Heat-labile materials, for example, patients' clothing articles manufactured from knitted polyester, need to be washed at low temperatures (40°C - 104°F) to avoid damage. The temperature in tumble driers, if used, must be limited to 60°C and calenders should be avoided wherever possible.
- 5.3 Disinfection with chemicals at low temperatures is possible with hypochlorite but the performance of hypochlorite is often restricted by the presence of soiling, detergents and alkalis in the wash. However, in clean conditions hypochlorite is active at a temperature below 60°C (140°F) in low concentrations and will not damage fabrics outside acceptable limits.
- 5.4 Disinfection of heat-labile materials, only if suitable, may be achieved by the addition of sodium hypochlorite to the penultimate rinse. This should be a medium or high dip rinse of at least five minutes duration and sufficient sodium hypochlorite must be added to achieve a concentration of 150 ppm available chlorine. Overriding of washing programmes must be avoided. Hypochlorite must not be used on fabrics treated for fire retardance. Other chemical processes may be used if approved by the Control of Infection Committee.

#### 6. DESIGN FEATURES TO REDUCE CROSS-CONTAMINATION

- 6.1 The provision of a barrier between the section which receives the used or infected linen and the rest of the laundry is not considered necessary. It is recommended that infected linen should be washed in designated washer extractors as set out in paragraph 4.1. Any vent pipe associated with such machines should be routed outside.
- 6.2 Effluent from the drains of such machines must be sealed (closed piped) from the machine to the manhole (preferably situated outside the laundry) to prevent cross-infection. If machines drain into an open sump or pit immediately below the machine drain valve, the sump or pit should be covered to reduce the risk of bacteria being spread by the aerosol effect when the water is pumped from the machine.
- 6.3 When laundering infected linen at launderettes or in on-

premise laundries associated with small units the machine requirements set out in the preceding paragraphs are necessary.

- 6.4 There must be a physical barrier between clean and used or infected linen when carried on a vehicle at the same time. No bag of linen that is not securely fastened should be placed in a vehicle.
- 6.5 Trolleys for clean linen in transit should be covered with a washable or disposable cover. Fully enclosed and sealed containers with a lockable door may be used in preference, in which case these covers are not required.

## 7. PROTECTION OF LAUNDRY WORKERS

- 7.1 Staff in the sorting areas handling used unwashed linen should wear protective clothing eg waterproof aprons and gloves. Any exposed lesion should always be covered with a waterproof dressing. Although care needs to be given to proper protection at all times, the use of surgical face masks is not considered necessary. Hand washing and changing facilities must be provided in accordance with current legislation and clean overalls should be available to staff at each new shift or work period change.
- 7.2 Staff should be fully trained in all laundry operations. Guidelines setting out cleaning and operational procedures for plant, equipment and laundry buildings should be made available.
- 7.3 Detailed policy on the occupational health supervision of laundry staff should be determined locally in the light of guidance given in such documents as HN(82)33, HC(78)3 and on vaccination for NHS staff.

## 8. BATCH CONTINUOUS WASHING MACHINES

- 8.1 All batch continuous washing machines must be fitted with the necessary controls and interlocks to ensure work being processed is not recontaminated during the rinsing stages of the wash process. To satisfy this requirement, rinse sections must be thermally disinfected before production commences each working day.
  - 8.2 The apparatus used to thermally disinfect rinse sections of the batch continuous washing machine must be interlocked with the normal running control of the machine in order to prevent the machine being set to work before the thermal disinfection of the cool stages of the machine have been satisfactorily completed. The requirements are as follows:-
    - i. All sections of the machines, following the high temperature sections, which do not reach a minimum temperature of 65°C (150°F), shall receive a thermal disinfection cycle. The disinfection cycle shall be considered satisfactory when the water temperature has been raised to 65°C (150°F) and held at this temperature for a period of not less than 10 minutes or at a temperature of 71°C (160°F) for a period of not less
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than 3 minutes. During the period of thermal disinfection of the rinse stages, it is essential that the machine cage/drum rotates to ensure that all surfaces are in contact with high temperature liquids. The disinfection process should be controlled by a timer.

- ii. A timer shall be incorporated into the control system to override the necessity to proceed through the thermal disinfection of the cool stages of the machine if the machine is stopped for short periods during the day. This timer however shall be so interconnected that if the machine is shut down for a period of 3 hours or more the cool stage thermal disinfection cycle will proceed, and at the same time "lock out" the washing controls. The "lock out" shall include any mechanical devices, interlocked with the washing cycle or not, for feeding work into the machine.
  - iii. It is expected that the cool stage disinfection cycle will be initiated by a single button operation and that the cycling of any steam and/or water control valves necessary to raise the temperature of these stages to that required for thermal disinfection shall be automatic in operation. The incorporation of hand operated valves in this system is not acceptable.
- 8.3 Due to the growth of bacteria which may take place overnight, it will be necessary to run out all linen from the batch continuous washing machine at the end of the day to avoid re-infection. The adequacy of disinfection procedures must also be considered in the following ancillary areas:-
- i. Tanks which are used to collect water for reuse within the batch continuous washer, from the extraction device, or the conveyor leading from the washer to the extractor to the shuttle, shuttle platform and tumblers.
  - ii. If the installation of a heat exchanger in the recovered water system is envisaged, special consideration to thermal disinfection needs must be given.
  - iii. Machinery should be kept clean and free from algae.
  - iv. Attention to the cleaning and regular disinfection of all conveyor belting and surfaces used to transfer clean, processed work from the press/extraction device to tumblers is essential to avoid re-contamination of the work.
  - v. Under no circumstances should infected linen be processed in batch continuous washing machines. These may suffer blockage at any stage, though the pre-wash section is the most likely. The prewash sections cannot be thermally disinfected as a routine. In the event of a blockage neither the prewash sections nor the wash sections would be safe to enter without exposing staff to an unacceptable level of risk. Until such blockages could be removed the machine could not be operated or any thermal disinfection routine undertaken. Washer extractor systems should be used for infected linen or foul linen where this has been categorised with infected
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linen following advice at local level from the local infection control committee.

**Circulars mentioned in this document**

- HC(87)30            Hospital Laundry Arrangements For Used And Infected Linen
- HC(91)33            Decontamination Of Equipment, Linen Or Other Surfaces Contaminated With Hepatitis B And/Or Human Immunodeficiency Viruses
- Memorandum On The Control of Viral Haemorrhagic Fevers, HMSO 1986
- HN(82)33            Occupational Health Services For NHS Staff
- HC(78)3             Control Of Tuberculosis in NHS Employees: Limitation of X-Ray Examinations
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## COLOUR CODING

1. All DMUs and Trusts are asked to work towards implementing the National Colour Standard.
  2. The following procedures should be adopted by ward and theatre staff:-
    - a. Used (Soiled and Foul) linen (Category 2.1.1) - containers should be coloured white or off white.
    - b. Infected linen (Category 2.1.2) - containers should be coloured red or, at least, include red as a prominent feature on a white or off white background. Additionally the container should carry a bold legend on a prominent yellow label such as INFECTED LINEN. It should be noted that some red bags used for this purpose may not be colour-fast.
    - c. Heat-labile (Category 2.1.3) - containers should be coloured white with a prominent orange stripe.
  3. The use of red for infected material should be regarded as mandatory and the use of blue or yellow for this type of laundry should be avoided.
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