

**SBAR: Laundering of Heat-labile Personal Items (clothing) in Health and Social Care**

<p><b>Situation</b></p>	<p>HPS ICT has recently updated the ‘Safe Management of Linen’ SICPs literature review (2016).<sup>1</sup> The current literature review is hospital-focussed; following health and social care integration it is important that guidance is cognisant of social care settings where a higher volume of heat-labile items (patient clothing) may be processed. HPS was asked to identify potential alternative methods/additional recommendations for processing heat-labile items such as clothing, particularly, the process for laundering these items in ‘domestic-type’ washing machines that may be in use in certain facilities such as mental health or rehabilitation.</p> <p>This SBAR aims to review the optimum methods for the safe laundering of heat-labile personal items such as patients clothing in health and social care settings. This SBAR does not aim to provide alternative methods for laundering infectious linen, heat-labile or otherwise. Infectious linen must always be subjected to disinfection as described in the National Infection Prevention and Control Manual (NIPCM) using a dedicated laundry facility or semi-industrial washing machine. Alternatively, in hospital settings personal items such as clothing can be sent home with the patient or a relative and laundered according to the ‘washing clothes at home’ leaflet; or personal items can be disposed of in the appropriate waste stream if this is the patient’s/relative’s preference.</p>
<p><b>Background</b></p>	<p>It has been raised by stakeholders that there is a lack of guidance for the management of heat-labile personal items (clothing) in NHSScotland, particularly those that are contaminated with body fluids. A recent survey facilitated by the NHSScotland Linen Services Expert Group across boards found some inconsistency in current practice across NHSScotland.</p> <p><b>Linen categories:</b></p> <p>The NIPCM defines used linen as all linen that is not contaminated with either blood or body fluids; and infected linen as all linen used by a person known, or</p>

suspected to be infectious and linen that is contaminated with either blood or body fluids. Heat labile linen is all linen that may be damaged (shrinkage/stretching) by thermal disinfection.

**Disinfection of linen:**

All linen must be disinfected between patient uses, in NHS Scotland thermal disinfection is the preferred method and this is achieved by washing at 65°C for no less than 10 minutes or 71°C for no less than 3 minutes. Thermal disinfection is unsuitable for heat-labile items. Alternatively, chemical disinfection may be performed by the addition of 150ppm available chlorine to the penultimate rinse cycle, however, it is difficult to achieve consistency using this method and chlorine releasing agents may damage linen and/or equipment when used incorrectly. Either of these methods may be used within a dedicated laundry facility, or using a semi-industrial washing machine on site. However, neither method is achievable in a domestic-type washing machine. Domestic washing machines typically have unreliable temperature control and may not be capable of reaching and holding the temperatures required for thermal disinfection. It is also not possible to perform chemical disinfection using 150ppm available chlorine in a domestic machine; consistently achieving the correct concentration of available chlorine at the correct time is not possible. In addition, chlorine releasing agents may need to be added manually during the wash cycle creating potential safety issues.

Current processes for laundering patients heat labile personal items that are considered infectious:

Currently, all linen (including heat-labile personal items) that is contaminated with blood or body fluids is considered infectious. In a hospital setting the item(s) would be sent home with a relative if that is their preference, a 'personal wash' may be offered to some patients e.g. those without relatives, however, there is regional variation in provision and availability. In residential care, clothing would not be sent home with a relative, instead the items would be processed using a dedicated industrial facility (contracted out) or on site using a semi-industrial washing machine. There is concern that individuals' personal items are being damaged (shrinkage/stretching) or destroyed by thermal disinfection and that in the case of low risk care settings (such as care homes) this is unnecessary.

N.B. Domestic machines must never be used to process infectious linen in

	<p>NHSScotland health and social care settings.</p>
<p><b>Assessment</b></p>	<p>A literature search was conducted to answer the research question ‘what is the process for laundering heat-labile personal items in health and social care settings?’ A small quantity of low level evidence was identified that assessed methods for improving effectiveness of laundering at low temperatures in domestic-type washing machines.</p> <p>A non-systematic review by Bloomfield et al (2013) assessed the effectiveness of laundering processes in domestic settings, with particular focus on the effectiveness of temperature, dilution, detachment (agitation) and detergent formulation on the reduction of microbial load on fabrics; and the potential for cross-transmission between items in the wash when laundering processes are ineffective.</p> <p>In a number of the included studies lower wash temperatures were associated with higher transfer of bacteria between items.<sup>2</sup> The authors suggest that effectiveness of laundering at low temperatures can be improved by optimizing detachment through agitation and dilution i.e. increasing the number of rinse and spin cycles.<sup>2</sup> The speed (rpm) of spinning cycles was not assessed; however, it seems plausible that higher speeds would increase agitation and detachment of microbes. In addition, tumble drying at higher temperatures (40°C), and steam ironing further decreases microbial load.</p> <p>Activated oxygen bleach (AOB) was shown to effectively compensate for lower wash temperatures in a number of studies.<sup>2-4</sup> An experimental study by Honisch et al (2014) found that it was possible to compensate for lower wash temperatures (20°C to 60°C) by extending the wash cycle time or by adding activated oxygen bleach (AOB) to the wash in a typical domestic machine. When using detergent without AOB longer wash cycles were required to compensate for lower temperatures and achieve maximal log reduction in test organisms. When detergent containing AOB was used lower temperatures and shorter wash cycles could be used to achieve maximal log reduction in test organisms. The Bloomfield et al (2013) review also found that the addition of AOB to laundry detergent compensated for lower wash temperatures.<sup>2</sup> However, none of the identified studies assessed effectiveness of AOB compared to 150ppm available chlorine and therefore there is insufficient evidence to suggest this would be a suitable alternative for chemical disinfection. It should be noted</p>

that most powdered laundry detergents contain AOB as standard, this information will be provided on the pack; AOB may be considered as an adjunct to the standard domestic laundry process at a local level if these products are deemed suitable for both the service users and their clothing.<sup>2</sup>

The evidence identified above suggests that processing of heat-labile personal items in domestic washing machines can be improved by increasing physical removal of microorganisms and soil by agitation and dilution and prevention of cross-transmission during the wash cycle by separating items from different individuals.<sup>2;3</sup>

Currently, it is considered safe to send patients clothing that is contaminated with body fluids home to be washed, if that is the patient's/relative's preference. The Department of Health classification of 'used' linen includes items that may on occasion be contaminated with body fluids but not items from patients with a suspected or confirmed infection.<sup>5</sup> This is not consistent with the definitions for 'used' and 'infectious' linen as set out in the National Infection Prevention and Control Manual. In some situations e.g. residential care, some items with minor contamination (not heavily soiled) with body fluids may not be considered 'infectious', for example if a person is known to be incontinent, or if vomiting occurs as a known side effect of a given medication. It may be acceptable to process such items at lower temperatures, however a documented risk assessment must be performed and additional steps taken to reduce risk such as laundering contaminated items separately and disinfecting the machine.

<p><b>Recommendation</b></p>	<p>Given the lack of strong scientific evidence, the following recommendations have been agreed as a pragmatic approach to the safe laundering of clothing in health and social care. At this time these additional recommendations (options 4 and 5) have not been adopted into the NIPCM or its accompanying 'safe management of linen in the hospital setting' literature review, however, this will remain under review.</p> <p><b>Option 1 (infectious):</b> If acceptable to the patient and/or their relative(s) send patient's clothing home along with the 'washing clothes at home' leaflet.<sup>1</sup></p> <p><b>Option 2 (infectious):</b> Launder clothing in a personal wash carried out in a semi-industrial machine. Availability and provision of this service may vary between boards, contact facilities management in the first instance. Follow local policy for carrying out a personal wash ensuring that items are segregated into the designated colour coded laundry bags at the ward/care area level and labelled (including the owner's name).</p> <p><b>Option 3 (infectious):</b> If clothing is considered infectious and options 1 and 2 are unsuitable/unavailable the item should be disposed of in the appropriate waste stream following discussion with the patient or their relative(s).</p> <p><b>Option 4 (used):</b> The following option is for use in settings where a domestic washing machine is in use as standard for laundering patients personal items (clothing). A dedicated laundry service or on-site semi-industrial machine is the preferred option.<sup>6</sup></p> <p>Standard domestic wash cycle for <b>used</b>, heat-labile personal items:</p> <ul style="list-style-type: none"> <li>• Use the highest temperature tolerated by the fabric according to the care label (usually 40°C).<sup>1-3;5-7</sup></li> <li>• Standard wash cycles should be used at all times i.e. not 'quick wash'.<sup>2;4</sup></li> <li>• 'Eco' or energy saving settings must not be used.<sup>2</sup></li> <li>• The cycle must include a minimum of two (ideally three) rinse and spin cycles using the highest available revolutions per minute (rpm) setting.<sup>2;4</sup></li> <li>• *Clothing belonging to the individual should be washed separately from items belonging to any other person.<sup>3</sup></li> <li>• Laundered clothes should be machine dried as soon as possible after washing and ironed if possible.<sup>2;5-7</sup></li> </ul>
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\*This may not currently be achievable in all care settings however it is considered good practice.

**Option 5 (contaminated but not considered infectious following risk assessment):** If considered appropriate for the care setting (low risk e.g. care home) heat-labile personal items that are contaminated with small quantities of body fluid may be processed at lower temperatures (30-40°C) in a semi-industrial or domestic machine following a risk assessment. The following additional steps must be taken:

- Wash contaminated item(s) separately from all other items, including used/worn items from the same individual.<sup>2</sup>
- Add a prewash cycle and extra rinse cycle if available.<sup>2</sup>
- Disinfect machine after use (either chemically or by running an empty cycle on the hottest available temperature) and before processing any other items.

## Reference List

- (1) Health Protection Scotland. Standard Infection Control Precautions Literature Review: Safe management of linen in the hospital setting. 2016.
- (2) Bloomfield SF, Exner M, Signorelli C, Scott EA. Effectiveness of laundering processes used in domestic (home) settings. 2013. International Scientific Forum on Home Hygiene.
- (3) Bloomfield SF, Exner M, Signorelli C, Nath KJ, Scott EA. The Infection risks associated with clothing and household linens in home and everyday life settings, and the role of laundry. 2013. International Scientific Forum on home Hygiene.
- (4) Honisch M, Stamminger R, Bockmuhl DP. Impact of wash cycle, temperature and detergent formulation on the hygiene effectiveness of domestic laundering. *Journal of Applied Microbiology* 2014;117:1787-97.
- (5) Department of Health. Choice Framework for Local Policy and Procedures 01-04 - Decontamination of linen for health and social care: Social care. 2013.
- (6) Health Protection Scotland. National guidance for the safe management of linen in NHSScotland health and care environment for laundry services/distribution. 2016.
- (7) Department of Health. Choice Framework for Local Policy and Procedures 01-04 - Decontamination of linen for health and social care: management and provision. 2013.