

Standard Infection Control Precautions Literature Review: Management of blood and body fluid spillages in health and care settings

Version: 3.0
Owner/Author: Infection Control Team
Review Date: Financial Year 2023/2024

SICP Literature Review: Management of blood and body
fluid spillages in health and care settings

DOCUMENT CONTROL SHEET

Key Information:		
Title:	Standard Infection Control Precautions (SICPs) Literature Review: Management of blood and body fluid spillages in health and care settings	
Date Published/Issued:	July 2020	
Date Effective From:	July 2020	
Version/Issue Number:	3.0	
Document Type:	Literature Review	
Document status:	Final	
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	Division:	HPS
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Version History:
This literature review will be updated in real time if any significant changes are found in the professional literature or from national guidance/policy.

Version	Date	Summary of changes	Changes marked
1.0	January 2012	Defined as final	
1.1	September 2015	Draft for consultation	
2.0	September 2015	Final for publication	
3.0	July 2020	<p>Literature review updated based on current available evidence. Produced using the two person NIPCM methodology.</p> <p>The following objectives have been added:</p> <ul style="list-style-type: none"> • Are there any legislative/mandatory requirements relating to the management of blood and body fluid spillages? • What detergents/disinfectants should be used in the management of blood and body fluid spillages? 	

Approvals – this document requires the following approvals

Version	Date Approved	Name	Job Title	Division
3.0	July 2020	Steering (Expert Advisory) Group for SICPs and TBPs		
1.0	January 2012	Steering (Expert Advisory) Group for SICPs and TBPs		

SICP Literature Review: Management of blood and body
fluid spillages in health and care settings

HPS ICT Document Information Grid	
Purpose:	To inform the Standard Infection Control Precautions (SICPs) section on the management of blood and body fluid spillages in health and care settings in the National Infection Prevention and Control Manual
Target audience:	All NHS staff involved in the prevention and control of infection in NHS Scotland.
Circulation list:	Infection Control Managers, Infection Prevention and Control Teams, Public Health Teams
Description:	This literature review examines the available professional literature on blood and body fluid spillages in the health and care settings.
Update/review schedule:	Updated as new evidence emerges with changes made to recommendations as required.
Cross reference:	<p>National Infection Prevention and Control Manual (NIPCM) http://www.nipcm.hps.scot.nhs.uk/</p> <p>Standard Infection Control Precautions Literature Review: Occupational exposure management (including sharps)</p> <p>Appendix 9 – Best Practice Management of Blood and Body Fluid Spillages</p> <p>NHS National Services Scotland: Safety Action Notice Ref SAN(SC)19/03 - Risk of death and severe harm from ingesting superabsorbent polymer gel granules</p>
Update level:	<p>Practice – No significant change to practice</p> <p>Research – No change to research section</p>

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1 Objectives

The aim of this review is to examine the extant scientific literature regarding the management of blood and body fluid spillages in health and care settings to form evidence based recommendations for practice.

The specific objectives of the review are to determine:

- Are there any legislative/mandatory requirements relating to the management of blood and body fluid spillages?
- Why manage blood and body fluid spillages?
- Who should manage blood and body fluid spillages?
- How should blood and body fluid spillages be managed?
- What detergents/disinfectants should be used in the management of blood and body fluid spillages?
- Are there special requirements for the management of blood and body fluid spillages on soft furnishings?

2 Methodology

This systematic review was produced using a defined methodology as described in the [National Infection Prevention and Control Manual: Methodology](#).

3 Discussion

3.1 Implications for practice

Minimal primary research was found regarding the procedures required for the management of blood and body fluid spillages within the limits of this review. The procedures are detailed in a number of guidance/expert opinion based documents and as such these should be considered at an evidence rating of Category C.

Are there any legislative/mandatory requirements relating to the management of blood and body fluid spillages?

There are no direct legislative requirements relating to the management of blood and body fluid spillages however [The Health and Safety at Work etc. Act \(1974\)](#),¹ [The Control of Substances Hazardous to Health \(2002 as amended\) regulations \(COSHH\)](#),² [Personal Protective Equipment at Work Regulations 1992 \(as amended\)](#)³ and [The Personal Protective Equipment Regulations 2002](#)⁴ legislate that employers (i.e. NHSScotland) must provide safe personal protective equipment (PPE) which affords adequate protection against the risks associated with the task

being undertaken and that employees are given suitable information, instruction and training to make effective use of the PPE provided to them. Employees (i.e. healthcare workers) have a responsibility to comply by ensuring that suitable PPE is worn correctly for the task being carried out. Additionally the [Reporting of Injuries, Diseases and Dangerous Occurrences Regulations \(RIDDOR\) 2013](#)⁵ places duties on employers to report infections and dangerous occurrences with biological agents at work that could cause severe infection including blood borne viruses (BBVs). Blood and body fluid spillages that result in occupational exposure to a source that is known or found to be contaminated with BBVs should be reported to the Health and Safety Executive under RIDDOR.^{5, 6} Refer to the [National Infection Prevention and Control Manual's Standard Infection Control Precautions Literature Review: Occupational exposure management \(including sharps\)](#) for more information.

Why manage blood and body fluid spillages?

A review by Peate⁷ defined a body fluid as “any fluid found in, produced by, or excreted from the human body which includes blood, urine, faeces, saliva, tears, breast milk, cerebrospinal fluid (CSF), semen, vaginal fluid, amniotic fluid, pleural fluid, peritoneal fluid, bile, digestive juices, vomit and pus”. In terms of standard infection control precautions practice, body fluids are considered hazardous as they may contain infectious microorganisms and should be dealt with immediately.⁶⁻¹¹

The Advisory Committee for Dangerous Pathogens (ACDP)⁶ has identified body fluids that may contain blood-borne viruses (BBVs):

TABLE 1: Body fluids that may contain BBVs

- | | |
|-----------------------|--|
| • Blood | • Semen |
| • Cerebrospinal fluid | • Breast milk |
| • Pleural fluid | • Amniotic fluid |
| • Peritoneal fluid | • Vaginal secretions |
| • Pericardial fluid | • Any body fluids containing blood (bloodstained) |
| • Synovial fluid | |

The main BBVs of concern are hepatitis B virus (HBV), hepatitis C virus, hepatitis D virus and human immunodeficiency virus (HIV).⁶

Body fluids presenting minimal risk of BBVs unless they are contaminated with blood (bloodstained) include urine, faeces, saliva, sputum, tears, sweat and vomit.⁶

Who should manage blood and body fluid spillages?

Clinical and nominated staff members should deal with blood and body fluid spillages.¹¹

It is important that adequate training is given to all staff members involved in the management of blood and body fluid spillages to ensure both the protection of the staff member undertaking the cleaning and all others that may be affected by the spillage.^{11, 12}

How should blood and body fluid spillages be managed?

Procedures for dealing with blood and body fluid spillages are suggested in the literature, but the level of evidence is low and there are some differences in the methodologies. Nonetheless, it is consistently recommended in the literature that:

- Local policy should clearly state the recommended procedures (e.g. spill kits) and the disinfectants to be used for dealing with blood and body fluid spillages.¹⁰
- Appropriate personal protective equipment (e.g. non-sterile disposable gloves/aprons) must be worn when dealing with blood and body fluid spillages.^{7-9, 12}
- If the spillage is extensive or splashing is likely to occur while cleaning up, additional PPE should be worn (e.g. eye and face protection)¹⁰
- Organic matter should be removed using disposable absorbent towels before disposal into the appropriate healthcare (clinical) waste stream.^{10, 12-14}
- The area should be disinfected using appropriate granules or solution (e.g. chlorine releasing agents) prepared in accordance with the manufacturers' instructions and left for the required contact time.^{7, 9, 10, 13-15}
- Then the area should be cleaned using water and general purpose detergent and dried or allowed to air dry.^{7, 9, 10, 13, 14}
- All waste materials such as contaminated paper towels and used PPE should be disposed of as healthcare (clinical) waste after use.^{7, 9, 10, 13, 14}
- Hand hygiene should be performed.^{9, 10}

The National Infection Prevention and Control Manual (NIPCM) has produced a flowchart for management of blood and body fluid spillages which can be found in [Appendix 9 – Best Practice – Management of blood and body fluid spillages](#).

The technique required for dealing with a spillage of blood differs according to the amount of blood spilt⁸ and the method of decontamination (i.e. the use of a solution or the use of a granule based disinfectant). Procedures for using a granule based disinfectant for the control of spillages are suggested in the literature and are based on expert opinion. Chlorine releasing granules should be applied directly to the spill and left for the required contact time (manufacturer's instructions) before clearing up with disposable cloths or paper towels. Alternatively, the spill may be covered with paper towels which are then gently flooded with a disinfectant solution at 10,000ppm av.cl. and left for the required contact time.^{7, 9, 10} Following

disinfection using either method, the gross contamination (including towels) must be discarded as healthcare (clinical) waste.^{7, 9, 10, 13, 14} The surface is then either further disinfected or cleaned with detergent; however by which method is unclear; ^{7-9, 13, 14} in NHS Scotland it is recommended that surfaces are further cleaned with detergent after disinfection, this is in line with other UK guidance.¹⁰

It is suggested that small spills e.g. drops of blood, are dealt with by wiping with a disposable towel soaked in disinfectant (containing 10,000ppm av.cl.), followed by detergent.^{10, 15}

The procedures suggested for dealing with most body fluid spillages are the same as for the management of blood spillages (i.e. remove gross contamination, disinfect, clean area with detergent).^{7, 9, 10, 12-14}

When dealing with urine spillages it is important that these are not treated using a chlorine releasing agent as this can result in the release of chlorine gas.^{7, 8, 10, 12} It is therefore suggested that these spills are first absorbed using paper towels (a gelling agent** may be used to solidify the spill), disposed of as healthcare (clinical) waste, and the area washed with either detergent⁷ or disinfectant⁹, however the preferred method is not clear.

****Safety Action Notice:** The use of superabsorbent polymer gel granules (including sachets, mats and loose powder) to solidify/reduce spillage is restricted. Refer to NHS National Services Scotland [Safety Action Notice SAN\(SC\)19/03](#) for further information.

Hall⁹ suggests it may be useful to provide spill kits in areas where spills are most likely to occur. It is recommended that the instructions on how to deal with spillages and the associated materials required e.g. PPE, cleaning solutions, waste bags, should be included in spill kits. A nominated staff member should carry out checks on these kits to ensure that all of the components are present and in date.

What detergents/disinfectants should be used in the management of blood and body fluid spillages?

Chitnis *et al*¹³ found a satisfactory reduction of both gram-positive and gram-negative bacteria using 10,000ppm hypochlorite solution with prepared blood and body fluid specimens. Freshly prepared chlorine releasing agents containing 10,000ppm av. cl. has been consistently recommended in the literature for managing all sizes of blood spillages^{7, 9, 10, 12, 13} while some advocate its usage as standard for managing both blood and body fluid spillages.^{7, 9, 13, 16}

However, there were inconsistencies in the literature regarding the concentration of chlorine releasing agents used for body fluid spillages. Fraise *et al*¹⁷ suggested using a concentration of 1,000ppm av. cl. for spillages of body fluids but if the spill is bloodstained or suspected to be contaminated with HIV or HBV then 10,000ppm av.cl. should be used whereas if the hospital's HIV or HBV rate is low then detergent only may be used.

Another variation was the recommendation from the Centers of Disease Control and Prevention (CDC) for spills of blood or other potentially infectious materials (OPIM). If using sodium hypochlorite solutions at varying concentrations (e.g. 5.25%-6.15%), the CDC recommends

using a 1:100 dilution for a small spill of blood or OPIM (<10ml) and a 1:10 dilution for large spills (>10ml) of blood or OPIM.^{8, 14}

Chlorine releasing agents such as sodium hypochlorite solutions (NaOCl) or sodium dichloroisocyanurate (NaDCC) granules/tablets are inexpensive and effective against broad-spectrum microorganisms including BBVs such as HIV and HBV.⁸ They should be used in accordance with manufacturer's instructions and should not be mixed with anionic detergents or hot water as this can result in the release of chlorine gas.^{7, 9, 11, 12} Prepared solutions should be labelled with the date and time it was made and should be discarded at the end of the task or at the end of the day (kept for no more than 24 hours).^{12, 14} The efficacy of sodium hypochlorite is reduced in the presence of organic matter (e.g. mucous and urine) therefore it is recommended to first remove visible organic matter with paper towels before cleaning and disinfecting the area. Used paper towels should be discarded into the appropriate healthcare (clinical) waste stream.^{8-10, 13, 14}

Are there special requirements for the management of blood and body fluid spillages on soft furnishings?

Soft furnishings may be damaged by disinfectant products such as sodium hypochlorite. The Health and Safety Executive (HSE)¹⁰, Hall⁹ and Beckett¹² recommend that contaminated soft furnishings and carpets unable to tolerate chemical disinfection should be cleaned using warm water and a detergent or steam cleaned.^{6, 9, 10, 12} If it is not possible to use either of these methods, it may be necessary to dispose of contaminated soft furnishings.^{6, 10}

3.2 Implications for research

Much of the relevant literature published examines the use of disinfectants in relation to environmental contamination and their ability to kill pathogens in such situations. There remains a paucity of peer-reviewed scientific studies in this area of infection prevention and control. The majority of information available is the form of guidance that apply more in healthcare settings than community settings. An updated literature base looking at the efficacy of novel disinfectants for managing blood and body fluid spillages could be a useful addition to the currently available evidence base.

4 Recommendations

This review makes the following recommendations based on an assessment of the extant professional literature on the management of blood and body fluid spillages in health and care settings.

Are there any legislative/mandatory requirements relating to the management of blood and body fluid spillages?

There are no direct legislative requirements relating to the management of blood and body fluid spillages however UK legislation require employers to provide safe personal protective equipment (PPE) that affords adequate protection against the risks associated with the task being undertaken and provide employees with information, instruction and training in its usage. The following legislations relate to management of blood and body fluid spillages:

- [The Health and Safety at Work etc. Act 1974](#)
- [The Control of Substances Hazardous to Health Regulations 2002 \(as amended\) \(COSHH\)](#)
- [The Personal Protective Equipment at Work Regulations 1992](#)
- [The Personal Protective Equipment Regulations 2002](#)
- [Reporting of Injuries, Diseases and Dangerous Occurrences Regulations \(RIDDOR\) 2013](#)

(Mandatory)

Why manage blood and body fluid spillages?

Blood and body fluids are considered hazardous as they may contain infectious microorganisms and should be dealt with immediately.

(Category B)

Who should manage blood and body fluid spillages?

Staff trained in the correct procedure for managing blood and body fluid spillages.

(Mandatory)

Adequate training must be given to all staff members involved in the management of blood and body fluid spillages.

(Category B)

How should blood and body fluid spillages be managed?

Follow local policy for the recommended procedures (e.g. spill kits) and disinfectants to be used for dealing with blood and body fluid spillages.

Appropriate personal protective equipment (e.g. non-sterile disposable gloves/apron) should be worn when dealing with blood and body fluid spillages.

If the spillage is extensive or splashing is likely to occur while cleaning up, additional PPE should be worn (e.g. eye and face protection).

Products (e.g. chlorine releasing solutions/granules) for management of blood and body fluid spillages should always be prepared and used in accordance with manufacturers' instructions.

Organic matter should be removed using disposable absorbent towels, before disposal into the appropriate healthcare (clinical) waste stream.

Blood and body fluid spillages should be directly treated with chlorine releasing agents such as granules. If granules are not available place disposable paper towels over spillage to absorb and contain it before applying solution of 10,000 parts per million available chlorine (ppm av cl) solution to the towels.

Follow manufacturers' instructions on contact time or leave for 3 minutes.

(Category B)

After disinfecting the spillages, wash the area with disposable towels and a solution of general purpose detergent and water. Dry the area or allow to air dry.

(Category C)

All waste, including used PPE, should be discarded into the correct healthcare (clinical) waste stream.

(Mandatory)

Hand hygiene should be performed.

(Category B)

Spill kits should be provided in areas where blood and body fluid spills are most likely to occur e.g. Emergency Department (A&E), theatre. (These should be regularly checked to ensure all components are present and in date).

(Category C)

For spillages containing ONLY urine/faeces/vomit/sputum

Urine spillages should not be directly treated with a chlorine releasing agent due to release of chlorine gas.

Use paper towels to soak up the urine spillages/gross contamination, a gelling agent** (caution, see below) may be used to solidify the spill, then dispose of as healthcare waste.

Decontaminate area with a solution of 1,000 parts per million available chlorine (ppm av cl) solution or use a combined detergent/chlorine releasing solution with a concentration of 1,000 ppm av cl.

Follow manufacturers' instructions on contact time.

(Category B)

****Safety Action Notice:** The use of superabsorbent polymer gel granules (including sachets, mats and loose powder) to reduce/solidify spillage is restricted. Refer to NHS National Service Scotland [Safety Action Notice SAN\(SC\)19/03](#) for further information.

After disinfecting the spillages, wash the area with disposable towels and a solution of general purpose detergent and water. Dry the area or allow to air dry.

(Category C)

All waste, including used PPE, should be discarded into the correct healthcare (clinical) waste stream.

(Mandatory)

Hand hygiene should be performed

(Category B)

What detergents/disinfectants should be used in the management of blood and body fluid spillages?

Disinfectants should be freshly prepared and made according to manufacturer's instructions.

Regardless of the size of the spill, the following detergents/disinfectants should be used in the management of blood and body fluid (as specified in Box 1) spillages:

- 10,000 parts per million available chlorine (ppm av. cl.) solutions from chlorine releasing agents such as sodium dichloroisocyanurate (NaDCC) or sodium hypochlorite
- Follow manufacturer's instructions on contact time

For spillages of urine, faeces, vomit, sputum (non-blood stained):

- 1,000 parts per million available chlorine (ppm av. cl.) solutions or use a combined detergent/chlorine releasing solution with a concentration of 1,000 ppm av. cl.
- Follow manufacturer's instructions on contact time

(Category B)

Do **not** use chlorine based disinfectants directly to large spillages of urine (unless blood stained) as this will release chlorine gas.

(Category B)

Are there special requirements for the management of blood and body fluid spillages on soft furnishings?

Soft furnishings that can withstand disinfection with chlorine releasing solutions should be cleaned using the recommended concentration solution.

Soft furnishings that cannot withstand chlorine releasing agents should be subject to a risk assessment prior to decontamination and cleaned with warm water and a solution of detergent followed by steam cleaning.

If soiling with blood or body fluids has occurred and items are incapable of being adequately decontaminated, then they should be disposed of.

(Category C)

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Appendix 1: Grades of Recommendation

Final recommendations are given a grade to highlight the strength of evidence underpinning them, the NIPCM grades of recommendations are as follows:

Grade	Descriptor	Levels of evidence
Mandatory	'Recommendations' that are directives from government policy, regulations or legislation	N/A
Category A	Based on high to moderate quality evidence	SIGN level 1++, 1+, 2++, 2+, AGREE strongly recommend
Category B	Based on low to moderate quality of evidence which suggest net clinical benefits over harm	SIGN level 2+, 3, 4, AGREE recommend
Category C	Expert opinion, these may be formed by the NIPC groups when there is no robust professional or scientific literature available to inform guidance.	SIGN level 4, or opinion of NIPC group
No recommendation	Insufficient evidence to recommend one way or another	N/A