

Health Protection Scotland

SBAR: Hygiene Requirements in Outdoor Nurseries in Scotland

Situation	Health Protection Scotland have been requested by the Care Inspectorate and Inspiring Scotland to review the current evidence base in relation to hygiene requirements in the outdoor nursery setting and to see if this differs from the current practices set out in childcare guidance 'Infection Prevention and Control in Childcare Settings (Day Care and Childminding Settings)' ¹
Background	<p>In 2010 HPS produced an SBAR recommending that all outdoor nurseries ensure the provision of adequate toilet and hand washing facilities. Due to an increase in outdoor nurseries across Scotland, HPS have been asked to review the current evidence and advise if there are any additional infection control requirements in these settings.</p> <p>This SBAR is an update of the 2010 position. A rapid review methodology of current literature, guidance and legislation was conducted in order to make recommendations on hygiene requirements within outdoor nurseries.</p>
Assessment	<p>To assess the need for hygiene facilities including hand hygiene in outdoor nurseries, the following questions were asked:</p> <ul style="list-style-type: none"> • What are the legislative or mandatory requirements relating to hygiene provisions in outdoor nurseries? • What available guidance is applicable to hygiene provisions in outdoor nurseries? • What are the known risk factors for outdoor nurseries and other outdoor environments (e.g. petting zoos, city farms, open access farms)? • What is the evidence for any outbreaks related to hygiene non-compliance in childcare settings? • Should alcohol-based hand rubs (ABHR) be used in the childcare setting? • What are the known risk factors relating to ABHR use and children? • What is the efficacy of hand wipes, ABHR or non-ABHR compared to hand washing with soap and water? • What are the indications for hand hygiene?

- How should hand washing be performed?

Legislative requirements and guidance relating to hygiene (including hand hygiene)

In Scotland, legislation relating to provision of hygiene (including hand hygiene) facilities in childcare settings does not exist. Services regulated by the Care Inspectorate, including child care services, are required to have a 'hand hygiene policy/procedure/information' ² This is a requirement under the Scottish Social Care and Social Work Improvement Scotland (Requirements for Care Services) Regulations 2011. Hand hygiene in children's services is examined during inspections carried out by the Care Inspectorate.²

Guidance produced by SHPN 'Infection Prevention and Control in Childcare Settings' (2018) is taken into consideration when registering and regulating child care services. This guidance highlights the need for children to be taught how and why they should wash and dry their hands. In order to ensure adequate hand hygiene children and adults should use warm water and liquid soap to wash their hands. A communal bowl should never be used and hands should be dried thoroughly with paper towels.¹ Warm or tepid water is recommended as extreme temperatures may reduce compliance with adequate hand washing.³ Nappy changing areas must have hand washing facilities with a designated sink for hand washing.^{1;4}

The Scottish Government's 'Space to Grow' design guidance for early learning and childcare and out of school care services⁵ states "there should be proper provision for hand washing within the service... hand washing must be carried out at appropriate times, using the correct facilities, suitable products and the correct procedures." This guidance encourages the learning and promotion of hand hygiene and states that dedicated hand washing facilities should be available in kitchens, food preparation areas, toilets and nappy changing areas.⁵

The 'National Care Standards: early education and childcare up to the age of 16' covers services for children up to the age of 16 regulated under the Regulation of Care (Scotland) Act 2001. These standards highlight the need for adequate teaching and practice of hygiene in order for children to learn about healthy living and to control the spread of infectious diseases within this setting and states that staff should "take measures to control the spread of infection".⁶

Legislation and guidance specific to outdoor settings

The Care Inspectorate's 'My world outdoors' 2016 guidance⁷ discusses good practice within childcare in outdoor settings and the provisions which should be considered. It states that the SHPN guidance¹ on hand hygiene should be shared with parents and staff and that best practice is to use running water and liquid soap for

hand hygiene. Although it recognises that there may be circumstances where the use of running water is not possible, services must consult with parents and carers to arrange the best alternative for hand hygiene.⁷ Additionally, toileting and nappy changing arrangements must be discussed and agreed with parents along with consultation with local Environmental Health services.

The Health and Safety Executive (HSE) Agricultural Information Sheet⁸ highlights the need for effective hand hygiene and the provision of hand washing facilities in order to prevent ill health when visiting outdoor settings. This guidance also provides information to teachers and those responsible for children on school visits to open farms and other agricultural settings highlighting the risks associated with rural settings and the indications for hand washing.⁸

Other guidelines support these recommendations and highlight that adequate and suitable washing facilities should be available and used by visitors to outdoor/animal attractions.^{9;10} Teachers are advised to encourage hand washing before and after eating, after contact with animals, before leaving the site and after changing footwear.^{10;11}

Infection risks associated with outdoor environments

Animals (including wild animals) may shed pathogens capable of causing human disease into their environment, without displaying any clinical symptoms of disease.^{10;12} Organisms that may pose a risk to humans include *E. coli*, *Campylobacter* spp. and *Salmonella* spp. and these may be present in animal and bird faeces.¹³ Multiple reports and guidance documents are available on the risks and transmission of verotoxigenic or shiga-toxin *Escherichia coli* (STEC). The most common strain of STEC within the UK is *E. coli* O157 which is transmitted through the faecal-oral (contact) route.¹⁴ There is an exceptionally high incidence of *E. coli* O157 within Scotland¹⁵ and it has a low infectious dose meaning that contact with contaminated environments can easily lead to infection.¹⁴ In wet conditions, *E. coli* O157 can be spread more easily from hands, footwear and other contaminated surfaces. This increases the risk of pathogens passing into the mouth or contaminating food and water.¹³ Children under the age of five and the elderly are particularly vulnerable to *E. coli* infection and the illness it causes can be serious and in some cases fatal. Those who recover from illness due to *E. coli* O157 can be left with permanent damage to the kidneys or brain.¹⁶

Cryptosporidium species can cause gastrointestinal disease in animals and humans. Transmission from animals to humans is well documented and occurs through the faecal-oral route (contact), either directly or through contaminated environments, food and water. *Cryptosporidium* is well documented in farmed, domestic and wild animals.¹⁷

Evidence of outbreaks related to poor or inadequate hygiene within childcare settings or outdoor environments

No published reports of outbreaks in outdoor nursery settings were identified in the peer reviewed literature however many reports and studies were identified which examined outbreaks, mostly of enteric pathogens, in child care settings and outdoor environments such as open farms and petting farms.^{13;15-31} The pathogens associated with these outbreaks include STEC, *Salmonella*, *Campylobacter* and *Cryptosporidium*. The most common types of infection within childcare are gastrointestinal infections. Person-to-person transmission can occur through the faecal-oral (contact) route by hand-to-mouth transfer or via food preparation.³² Enteric outbreaks may be exacerbated in this setting because children are likely to be in close contact with each other, are likely to put toys and equipment in their mouths and are less likely to wash their hands properly after using the toilet.³³

E. coli O157 infections frequently occur in childcare settings,³³ individuals can develop gastrointestinal symptoms and in severe cases haemolytic-uraemic syndrome or fatalities in vulnerable populations.¹⁸ Between 1996 and 2008 animal contact accounted for the majority of *E. coli* O157 outbreaks within Scotland.¹⁵ Often, the faecal-oral route (contact) is suspected in outbreaks, highlighting the need for adequate facilities to ensure appropriate disposal of stools and adequate hand hygiene.²²

Poor hand hygiene has been linked to outbreaks in outdoor settings.^{16;23;27-29} Two outbreaks were described in a report where two nurseries had visited farms in 2009. The pathogens responsible for these outbreaks were *Campylobacter jejuni*, *E. coli* O26 and *E. coli* O76. The sources of these pathogens were lambs and cattle at the farm. In both nurseries, children had close contact with these animals and did not wash their hands before their meals. In one nursery the staff brought hand disinfectant that the children used before eating their meals.²⁷ An educational farm programme was associated with recurrent outbreaks of cryptosporidiosis in 2003 where poor hand washing was reported following care of animals at the farm. The removal of visibly soiled boots and coveralls after washing hands was also reported.²⁸ Additionally, an outbreak of 46 cases of cryptosporidiosis was linked to lambs at a petting farm in England. Non-compliance with hand washing, possibly due to a lack of verbal advice on appropriate hand hygiene was found to be associated with infection.²⁹

Alcohol based hand rubs and non-alcohol based hand rubs

Following an outbreak of *E. coli* O157 involving at an open farm in Surrey, the Griffin report sought to highlight the need for hand washing facilities in such settings.¹⁶ The use of alcohol based hand rubs (ABHRs) and non-ABHRs is discouraged and hand washing is recommended as a necessity, particularly in at-risk populations such as children under the age of five. The report highlighted several

individuals infected with *E. coli* O157 who had used ABHRs but had not washed their hands. There is evidence to support the use of ABHR in addition (but not as an alternative) to hand washing in a variety of childcare settings, including child day care settings, primary and secondary schools.^{16;34-44}

Adverse effects of ABHR use around children

A limited number of papers were identified which examined the risks associated with ABHR use in children. An RCT studying the effects of ABHR use in an elementary school suggests that the main risk is for irritation of children's eyes, similar to other washing products. Additionally, the authors suggest that children with underlying eczema or other chronic skin conditions should not use ABHR.³⁹ A non-randomised trial examining the use of non-ABHR states that the main risks associated with ABHR are that it is flammable, therefore a fire hazard, and that it can potentially dry and irritate the skin.⁴⁵

A retrospective study examining the database of the Texas Poison Center Network (TPCN) sought to identify any unintentional exposures to ABHR by children under 6 years old and their effects. The overwhelming majority of exposures recorded were reported to be mild with no or minimal toxicity. Although this study suggests that toxicity may be minimal, only data available from the database was reviewed which may mean only mild exposures were seen as more severe cases may have bypassed the TPCN and sought medical help elsewhere.⁴⁶ A single cohort/case series examined the safety of ABHR use in a child day care centre by measuring alcohol levels of expiratory air using a police breathalyser at 15 minutes and 60 minutes after applying ABHR. Observations of children making frequent contact with their eyes, nose and mouth were recorded however no children exhibited an alcohol level greater than the alcometer's measurement threshold.⁴⁷

Hygiene Efficacy

Evidence for the effectiveness of hand washing compared to ABHR is described in the NIPCM literature reviews. As per the NIPCM, ABHR must not be used alone for hand hygiene if hands are visibly soiled or dirty, or if a patient has gastrointestinal symptoms such as vomiting or diarrhoea.^{3;48}

A high quality systematic review states that interventions designed to encourage and promote hand washing, with soap and water, are effective in reducing diarrhoeal episodes by approximately 33%.⁴⁹ Similarly, a meta-analysis states that the principal barrier for preventing enteric pathogens is effective hand washing and the safe disposal of stools (faeces). It acknowledges that while further research is required, the available evidence suggests that hand washing with soap and water is associated with a 47% (95% CI 24-63%) decrease in the risk of diarrhoea; furthermore it suggests that hand washing was also associated with a 48-59% reduction of risk

for more severe enteric outcomes.⁵⁰ An RCT found hand washing with soap and water was shown to be efficacious in a number of settings in reducing gastrointestinal and upper respiratory tract infections. Hand washing with soap and water resulted in a 50% reduction in gastrointestinal and upper respiratory tract infections and the use of antibacterial soap was not associated with any increased benefit. The study suggests that the mechanical action involved in washing hands is more significant and important than the addition of antibacterials.⁵¹ Whilst there are limitations inherent in these studies they are consistent in their recommendation that hand washing with soap and water is effective in reducing both gastrointestinal and upper respiratory tract infections.

An experimental study examined the effectiveness of using an antibacterial soap for hand washing after changing nappies.⁵² The authors conclude that whilst there is a need for further research, antibacterial soaps may be slightly more effective in reducing contamination on hands after changing a nappy. However, a robust high quality RCT, which examines the effectiveness of antibacterial cleaning and hand washing products concludes that antibacterial products are not effective in reducing rates of gastrointestinal and upper respiratory tract infections in a population of healthy individuals, including those under the age of 5.⁵³

An RCT on the effects of installing equipment for diaper-changing, hand washing and food preparation found that installation of such equipment in child care centres significantly reduced the frequency of diarrheal illness and days of days of illness when compared with control child care centres.⁵⁴ This highlights the need for appropriate facilities in order to facilitate good hand hygiene and hygienic practices.

Hand wipes

Three low quality studies assessing the antimicrobial efficacy of hand wipes were found which present conflicting results.⁵⁵⁻⁵⁷ One tested non-antimicrobial hand wipes and hand wipes impregnated with an antimicrobial agent compared with hand washing with soap. The authors reported that while the non-antimicrobial wipes were not as effective as soap and water, the antimicrobial wipes were as effective at reducing *E. coli* contamination of hands when applied for 60 seconds.⁵⁶ Another found hand wipes to be superior in the removal of *S. marcescens* and *G. stearothermophilus*; however the ABHR used in this study was of low alcohol content.⁵⁵ Another study found hand wipes to be less effective than ABHR and hand washing at reducing *S. marcescens* and found that they did not reduce the contamination of MS2 bacteriophage which is often used as a substitute for norovirus in studies. In this study a control of washing hands with water alone was more effective than hand wipes.⁵⁷

Although hand wipes may be used in the absence of water, they should not be considered as a primary method of hand hygiene and should be used in conjunction with ABHR. If wipes are being used in

situations where running water is not available, it is recommended that hands are washed with soap and water at the earliest opportunity.⁴⁸

No evidence or studies on hand wipes were identified which specifically examined childcare or outdoor nursery settings.

Evidence for the use of water temperature

One study investigating the temperature of water found that temperatures from 15°C to 38°C did not have a significant effect on reducing bacteria during hand washing.⁵⁸ However, the sample size for this study was small and used artificial conditions. Therefore, there is strong potential that a larger sample size would alter the outcome. Additionally, the authors reference two other studies in their discussion; one has a similar design and supported their findings and the second contradicted their findings and found a small but significant difference between warm and cool water. There is limited evidence to determine whether extremes of temperature affect compliance or duration of hand washing but expert consensus determined that compliance may be improved by washing with warm/tepid water rather than hot or cold.³

An *E. coli* O157 outbreak at Rose Lodge Nursery in Aboyne occurred in 2012. An investigation into this outbreak identified a “failure of hand hygiene within the nursery”. The nursery was advised that the water supplied to the hand washing sink in the nappy changing area may have been too hot for effective hand hygiene. Additionally, a communal bowl was used for hand washing in the baby room. The nursery was advised to stop using this bowl for hand washing.²⁴ This outbreak highlighted the importance of appropriate hand washing facilities within childcare settings. In particular it highlights the need for warm tepid water rather than hot water. Hot (or cold) water can reduce the compliance of hand hygiene and as such reduces the efficacy of hand washing in controlling infection risks.³

Indications for hand hygiene

Based on the evidence identified for this document, the non-clinical indications for hand hygiene i.e. hand washing can be summarised thus:

- After using the toilet^{33;36;37;39;42;45;51}
- Before and after eating, drinking or preparing food^{8;16;23;33;34;36;37;39;41;42;45;51}
- After sneezing, nose blowing or coughing^{36;42;45}
- If hands are soiled/dirty^{10;37}
- After leaving animal contact areas^{8;10;16}
- After removing footwear^{8;10;16}

	<ul style="list-style-type: none"> • After outside activities³³ • After changing a nappy³³ • After entering and leaving a classroom – including first thing in the morning and before going home. ^{33;36;39;41;45} • After touching nose, eyes or mouth. ^{33;39} <p>How should hand washing be performed?</p> <p>Public Health England (PHE) have published 'Guidance on Infection Control and Communicable Diseases in Schools, Nurseries and Other Childcare Settings' which highlights hand washing as one of the most important ways to control the spread of infection. Staff and pupils are advised to wash their hands after using the toilet, before eating or handling food and after touching animals. Warm water and liquid soap is recommended before drying thoroughly with paper towels.⁵⁹</p> <p>Infection Prevention and Control in Childcare Settings guidance from SHPN highlights the need for warm water and liquid soap. Hands should be dried thoroughly using paper towels. "When away from the childcare facility, and if there is no running water available, hand wipes may be used (Children and staff should wash their hands at the first available opportunity)".¹</p> <p>According to the HPS hand washing literature review which can be found at http://www.nipcm.hps.scot.nhs.uk/resources/literature-reviews/standard-infection-control-precautions-literature-reviews/ any cuts or abrasions should be covered with a waterproof dressing before commencing hand washing. Hands should be washed as follows:</p> <ul style="list-style-type: none"> • Wet hands under running warm/tepid water. • Apply the manufacturers recommended quantity of liquid soap – normally via a measured dispenser. • Rub hands together for at least 15 seconds, ensuring all surfaces of the hands are covered with lather. • Rinse hands well under running water. • Dry hands thoroughly using a disposable paper towel. • Turn off the tap(s) using elbow or a paper towel to prevent contamination of clean hands. <p>Hands should then be dried using soft, absorbent, disposable paper towels. Towel dispensers should ideally be located close to the sink but beyond the risk of splash contamination.³</p>
<p>Recommendations</p>	<p>In summary based on the above assessment of the literature HPS supports the current hygiene practices outlined in the SHPN "Infection Prevention and Control in Childcare Settings (Day Care and Childminding Settings)" this includes:</p>

1. Hand hygiene facilities must be available including warm running water, liquid soap and disposable hand towels and should be undertaken:

- After using the toilet/changing a nappy
- Before and after eating, drinking or preparing food
- After sneezing, nose blowing or coughing
- If hands are soiled/dirty
- Before going home

Water should be warm or tepid to optimise compliance with hand washing practices. If water is too cold or too hot, compliance and therefore efficacy of hand washing is compromised.

2. Access to toilet facilities which must include hand hygiene requirements

3. Children should be educated in hand hygiene practices using a learning resource such as the children's pack from Scotland's National Hand Hygiene Campaign 'Germs. Wash your hands of them.' which is aimed at children between the ages of three and six and includes materials and information to encourage children to learn about the importance of hand hygiene and how to use hand washing every day.

<http://www.washyourhandsofthem.com/the-campaign/childrens-pack.aspx>

Additionally, e-Bug is an online learning resource aimed at primary and secondary school children which teaches children and young adults about microorganisms and the spread and control of infection. www.e-bug.eu.

4. Childcare providers have the responsibility to discuss hand hygiene policies with parents and carers and inform them of the best practice as recommended by SHPN. The use of hand wipes should not be considered as an alternative to hand hygiene practice or facilities but could be used in situations for example when there is no available running water (as a result of short term unforeseen circumstances). In such circumstances hand wipes may be used followed by ABHR and hands should be washed at the first available opportunity.

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