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Public perceptions of the use of gloves by healthcare workers and comparison with perceptions of student nurses

Wilson, Jennie ORCID: <https://orcid.org/0000-0002-4713-9662>, Bak, Aggie, Whitfield, Andrea, Dunnett, Andrew and Loveday, Heather ORCID: <https://orcid.org/0000-0003-2259-8149> (2017) Public perceptions of the use of gloves by healthcare workers and comparison with perceptions of student nurses. *Journal of Infection Prevention*, 18 (3). pp. 123-132. ISSN 1757-1774

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Public perceptions of the use of gloves by healthcare workers and comparison with perceptions of student nurses

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Abstract:	<p>Introduction: There is evidence that non-sterile clinical gloves (NSCG) are over-used by healthcare workers (HCWs) and are associated with cross-contamination. This study aimed to determine attitudes of student nurses and members of the public to the use of NSCG.</p> <p>Methods: Third-year student nurses completed a questionnaire indicating tasks for which they would wear NSCG and influences on their decision. Correlations between tasks were identified using exploratory factor analysis. An online survey of the public was conducted using snowball sampling method.</p> <p>Results: 67 students completed the questionnaire; they indicated use of NSCG for low risk tasks and reported their own judgment as the main influence on their decision to wear them. Correlated tasks included 'perceived to be risky' or 'definitive indication for gloves/no gloves', and 'related to personal hygiene'. 142 respondents completed the public survey. They reported being uncomfortable with HCW wearing gloves for some personal tasks e.g. assisting to toilet, dressing, but 94% preferred their use for washing 'private parts'; 29% had observed inappropriate glove use by HCWs during recent contact with healthcare.</p> <p>Conclusion: Student nurses reported using NSCG routinely for tasks for which they are neither required nor recommended. The public observe inappropriate glove use and are uncomfortable with their use for some personal tasks.</p>

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4 **perceptions of student nurses**
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13 study aimed to determine attitudes of student nurses and members of the public to
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37 are neither required nor recommended. The public observe inappropriate glove use
38 and are uncomfortable with their use for some personal tasks.
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48 **Introduction**
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50 The use of non-sterile clinical gloves (NSCG) in healthcare settings emerged in the mid-1980s
51 as a measure to protect healthcare workers (HCW) from exposure to blood borne viruses in
52 blood and body fluids (Centers for Disease Prevention & Control, 1988). The concept of
53 'universal precautions' recommended the use of protective clothing for direct contact with
54 blood and blood stained body fluids. This guidance was subsequently developed into the
55 concept of Standard Precautions which advises that personal protective equipment (PPE)
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3 should be used for procedures where a risk of direct contact with any blood and body fluids
4 (BBF) is anticipated (Loveday et al, 2014a; RCN 2012, Seigel et al, 2007). These policies were
5 based on the concept that pathogens that cause healthcare associated infections are most
6 likely to be present in body fluids and using PPE in these situations reduces the risk of
7 transference. Subsequently, the World Health Organization (WHO) guideline on hand
8 hygiene recognised the potential for NSCG to be over-used and provided guidance on when
9 gloves are indicated and when they are not required (WHO, 2009). However, recent studies
10 suggest that the use of NSCG has extended to a wide range of care activities that do not
11 involve direct contact with BBF and their use has been associated with a risk of cross
12 contamination because they are put on too early, removed too late and acquire pathogens
13 during use that can then be transferred to susceptible sites, or other surfaces and patients
14 (Flores & Pevalin, 2006; Loveday et al, 2014; Girou et al, 2004; Snyder et al, 2008; Fuller et
15 al, 2011).

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26 There is therefore a need to address how HCW use gloves to ensure that they are used
27 appropriately and safely. To be successful, strategies focused on changing this behavior
28 need to take account of the key drivers of glove use behavior. In a previous study involving
29 interviews with healthcare workers we identified that both emotion and socialisation were
30 important drivers of glove-use behavior (Loveday et al, 2014b). Whilst the main emotional
31 drivers were linked to self-protection, perception of patient preference was also cited as a
32 factor that influenced HCW to use of NSCG. HCW expressed views that patients preferred to
33 see them wearing gloves as they conferred a sense of hygiene but also provided a form of
34 emotional barrier against 'intimacy', for example for washing genital areas. However, HCW
35 also recognised that glove use interferes with the 'therapeutic touch' and could give patients
36 the impression that they were somehow 'dirty' or contagious (Loveday et al, 2014b).

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45 There is a paucity of evidence about what the public actually think about HCW use of gloves
46 and whether healthcare worker perceptions of patient preference is borne out by their
47 opinions. The aim of this study was therefore to explore the perceptions of the public about
48 HCW use of gloves and their experience of glove use in healthcare settings. In addition, we
49 have explored the views of student nurses nearing the end of their training about situations
50 when they would wear NSCG to determine the extent to which their attitudes matched
51 those of patients and what influenced their decision-making. The information captured by
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3 this study will help inform infection prevention strategies directed at improving the use of
4 NSCG to ensure that care delivered is both safe and acceptable to patients.
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7 8 **Methods**

9 10 *Survey of student nurses attitudes to use of NSCG*

11 A cohort of student nurses in their third year of training were asked to complete a
12 questionnaire about their use of NSCG when they attended a university-based practical
13 class. Participants were asked to indicate which of 46 different clinical tasks they would
14 routinely wear NSCG and to select all relevant influences on their decision to wear NSCG
15 from eight options. The students had not received any specific information or training about
16 the use or misuse of NSCG other than that which formed part of their normal clinical
17 training.
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23 24 *Survey of public perceptions of the use of NSCG by HCW*

25 Members of the public were recruited via social media from contacts of the research team,
26 members of an HCAI service-user research forum (SURF) (Whitfield, 2015), public
27 involvement contacts of the research team and from a notice in the University e-newsletter.
28 Participants were asked to complete an online survey in SurveyMonkey®, which was
29 developed with input from the HCAI SURF group. The survey aimed to explore the views on
30 whether public would like HCW to wear gloves for a range of clinical activities. In addition,
31 respondents who indicated experience of being in hospital within the last six months were
32 asked for their views on activities they had observed HCW undertaking whilst using gloves
33 and whether they felt this was appropriate, their views on specific activities they had
34 observed HCW using or not wearing gloves, whether they had ever challenged a HCW about
35 their use of gloves and other comments they wished to make about HCW glove use (see
36 Table 1). Demographic data on age and gender was recorded. Free text comments were
37 reviewed and content extracted to provide context to responses and represent general
38 views of survey participants.
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49 Both surveys included an assurance about maintaining confidentiality of the responses and
50 consent was implied if participants chose to complete the survey. Ethical approval to
51 conduct the survey of the public and interviews with student nurses was obtained from the
52 College of Nursing, Midwifery and Healthcare Research Committee (CRSEC15).
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Exploratory factor analysis

Exploratory Factor Analysis is a technique that attempts to uncover the underlying reasons (so-called 'latent variables') that cause people to act (or respond) in a certain way. In this research respondents were asked about their behaviour (wear/do not wear gloves) when performing each of 46 tasks. But many of these tasks were similar and if the responses were consistent, similar responses should be given for similar tasks. By grouping together responses that are related (correlated) it may be possible to make inferences about the reasons behind these responses. Factor loadings were calculated for four factors. These factor loadings, which vary between minus one and plus one, can be interpreted as the correlation between a variable and a factor. If a variable is highly correlated (near to plus one or minus one) with Factor A, but not correlated with Factor B then that variable is said to 'load' onto Factor A. Loadings of more than 0.5 and less than -0.5 are considered high.

Results

Survey of nursing students

All of the 67 students in the class completed the questionnaire. The mean age of respondents was 29.5 (SD±8.2), of whom 36 (63%) were aged 21 – 30, 15 (26%) 31 – 40 and 6 (10.5%) over 40. The mean number of years working in healthcare settings was 4.6 years (SD±3.2). Responses about the routine use of clinical gloves for the 46 tasks are shown in Figure 1. Whilst these responses indicated that almost all students would routinely wear NSCG for tasks involving contact with BBF such as removing an IV cannula and handling a bedpan, fewer reported using them for suctioning. The responses demonstrated inconsistencies in reported behavior. For example, more students would wear gloves for washing an adult (59; 88.1%) than a baby (17; 25.4%) and changing a nappy (41; 61.2%) than an incontinence pad (66; 98.5%). In addition, there were many examples of tasks for which at least 40% of respondents indicated they would routinely wear NSCG but where their use would not be necessary e.g. giving IM/SC injection (51; 76%), dressing a patient (27; 40%), taking MRSA swabs (53; 79%), handling used but not soiled linen (45; 67%), attaching/detaching an IV line (55; 82%), assisting a patient onto a commode/toilet (44; 65.7%). A smaller proportion of student nurses would wear gloves for very low risk tasks such as feeding patients (6; 8.9%), administering oral medication (4; 6%) or taking blood pressures (3; 4.5%). Table 2 provides examples of where gloves are reported to be used routinely for procedures where their use is not indicated.

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3 The four factors identified in the exploratory factor analysis provide some possible insights
4 into decision making by student nurses about the use of NSCG (see Table 3). The tasks listed
5 under each factor are highly correlated i.e. the responses given for the set of tasks within a
6 factor are consistent. This suggests that a respondent who chooses to wear gloves for
7 'handling drainage tubes' is also going to choose to wear them for 'suctioning' or 'attaching
8 an NG tube'. In the case of Factor 1, these are procedures perceived to be 'risky', although
9 some do not involve a risk of exposure to BBF such as taking MRSA swabs, attaching an NG
10 feed or IM/SC injections. Factor 2 reflects tasks for which there is likely to be a strong
11 tendency to either wear gloves (e.g. changing an incontinence pad) or not wear gloves (e.g.
12 feeding a patient). Factor 3 reflects procedures where there is not a risk of exposure to BBF
13 but for which some student nurses would consistently wear gloves and Factor 4 comprises
14 tasks linked to personal hygiene for which it is routinely perceived that gloves are required
15 regardless of potential exposure to BBF.
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25 Interestingly, 'washing a baby' is not correlated with the personal hygiene (Factor 4) and
26 changing a nappy is not correlated with Factors 1 or 2 (procedures perceived to be risky or a
27 strong tendency to wear/not wear gloves). This suggests that student nurses do not
28 categorise the risk of exposure to BBF or 'dirt' for these tasks in the same way that they
29 would for adult patients.
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35 The students indicated that the most common influence on their decision to use NSCG was
36 their own judgment (63; 94%), followed by policy (59; 88.1%), lecturers/trainers (34; 50.7%)
37 and senior staff in their placements (26; 38.8%) (See Figure 2).
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42 *Public survey*

43 A total of 142 responses to the survey were received from members of the public. The
44 mean age of the respondents was 49.2 (SD±11.7), and the majority (87; 61%) were female.
45 Eighty respondents (56%) indicated that they had experienced a visit to hospital within the
46 last 6 months and reported 107 activities where HCW had worn gloves to care for them. The
47 most common reported activities were minor invasive procedures (28; 26.2%) and
48 phlebotomy (27; 25.2%) (Table 4). However, whilst most respondents thought that glove
49 use was appropriate, for 23.4% (25/107) of reported activities their use was considered
50 inappropriate. Of the respondents who had been in hospital in the last six months, 29%
51 (23/80) indicated that they had observed inappropriate use of gloves.
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3 All 142 respondents were asked about procedures that they would like HCW to wear gloves
4 for (Figure 3 and Table 2). They primarily indicated activities that would be recommended
5 by standard precautions policies e.g. changing wound dressing (135; 95.1%), taking blood
6 sample (124; 87.3%) and helping off the toilet (101; 71.1%). Respondents reported being
7 uncomfortable with healthcare workers undertaking personal tasks wearing gloves, such as
8 helping walk to the toilet (107; 74.6%), doctor listening to chest (98; 69%), helping to dress
9 (95; 66.9%), helping to eat (107; 74.6%) or serving tea and coffee (111; 78.2%). For some less
10 personal tasks, such as cleaning a bedside table and making beds, a high proportion of
11 respondents would not mind either way if HCW used gloves (Figure 3). Although 58.5%
12 (82/142) of respondents said they would prefer HCW to use gloves to give them a wash,
13 there was stronger support for the use of gloves (133; 93.7%) for washing 'private parts'.
14 For most comparable procedures, the student nurses' responses corresponded with those of
15 the public. For some personal tasks such as assisting to toilet, dressing and cleaning the bed
16 areas, a higher proportion of the public were uncomfortable with HCW wearing gloves (see
17 Table 2), but the student nurses indicated they often did so. The proportion of the public
18 who would prefer HCW to wear gloves for washing them was less than that reported by
19 student nurses (58.5% vs 88.1%). However, the proportion of both the public and student
20 nurses preferring the glove use for washing genital areas was similar (93.7% vs 95.5%).
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34 A total of 38 (27%) respondents commented on the observed use of gloves by HCW. The
35 majority (24; 63%) conveyed a negative opinion of glove use including: a perception that
36 HCW over-used gloves (n = 8), that they were not changed between tasks or patients (n=7),
37 were used to protect the HCW rather than the patient (n=2) and in place of hand hygiene
38 (n= 3). Concerns were also raised about exposure of patients to latex and that patients were
39 never asked if they had a latex allergy. However, 24% (9/38) of comments were positive
40 about HCW glove use, with respondents confident that HCW knew when to wear gloves and
41 associated their use with the prevention of infection (n=7), a perception that gloves were
42 important to reduce damage to hands (n=1) and that routine use prevented attention being
43 drawn to patients with infections (n=1).
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52 The 25 respondents with recent experience of healthcare also gave examples of
53 inappropriate use of NSCG including: bed making (n= 8), writing notes/ on phone (n=5),
54 observations (n=4), walking around ward/toilet (n=3), washing (n=2) and patient
55 examination (n=1). One respondent commented that *'they did not change gloves between*
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3 *patients', another that 'they were put on way to soon' and another that 'they were wearing*
4 *gloves for the whole of my consultation, they didn't wash their hands yet touched a large*
5 *number of items in the room including a keyboard and phone'.*
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10 A total of 29 (20.4%) patients recalled occasions where they had challenged a HCW about
11 their glove use. Most of these (11; 37.9%) involved situations where the need to use gloves
12 was questioned or gloves not being changed between procedures/patients was challenged
13 (7; 24.1%). However, on 31% (9/29) of occasions respondents challenged HCW about the
14 need for them to wear gloves for contact with body fluids or a patient under isolation
15 precautions. The following examples illustrate how such challenges may not be well
16 received by the HCW:
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22 *'I asked the Dr to change his gloves after he answered the phone in them, adjusted*
23 *my table to his height, collected the blood bottles and opened doors before he tried*
24 *to take my blood so I insisted he changed his gloves. I was told by the Dr that the*
25 *gloves were for his benefit not mine! I politely but firmly insisted he change them and*
26 *he did...in a very dramatic fashion!' [R3]*
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32 *A nurse taking a blood sample wasn't wearing gloves – I had assumed it was*
33 *standard practice. I didn't really get an answer when I asked her why not (it wasn't a*
34 *challenge just a question) [R24]*
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39 *'They asked me to talk to the practice manager and made me feel uncomfortable. I*
40 *didn't see them wash their hands and I was about to have an injection. The practice*
41 *manager asked them to take off the gloves and wash their hands. Not a nice*
42 *experience at all.'* [R22]
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50 Discussion

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52 This study has demonstrated that whilst almost all student nurses reported using NSCG
53 appropriately for procedures involving a risk of contact with BBF, a significant proportion
54 also routinely used NSCG for a wide range of low risk tasks and procedures for which they
55 are neither required nor recommended, such as washing patients, helping them onto a
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3 commode or helping them to dress (WHO, 2009). Some appear to routinely wear them for
4 almost all tasks. This suggests that the rationale of student nurses for using NSCG is not
5 based on accurate assessment of risk of exposure to BBF. For example, the survey
6 demonstrated that almost all would wear NSCG routinely for washing adult patients, yet
7 only a quarter would wear them for washing a baby. Not only are NSCG not required for
8 washing patients (in the absence of BBF), but the microbial flora of a baby's skin closely
9 resembles the denser population of moist sites on adult skin (Orange et al, 2015). In
10 addition, unlike the skin of an adult patient, a baby's skin is almost inevitably contaminated
11 with BBF, yet the study suggests that BBF from babies is perceived to have a lower risk that
12 that of adults, with respondents significantly more likely to use gloves to change an
13 incontinence pad than a baby's nappy. The perception that certain sorts of tasks require the
14 use of gloves regardless of the actual risk of exposure to BBF is also borne out by the factor
15 analysis which demonstrated that a significant proportion of student nurses were likely to
16 consistently wear gloves for delivering 'personal hygiene' and other low risk tasks perceived
17 to be 'risky'.
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29 The findings in our study are supported by those reported by Radcliffe & Smith (2014) who
30 in a survey of 89 third year student nurses found 88% would use gloves for washing a
31 patient, 98% for washing their genital area and 55% for changing patient clothing and
32 serving food. Another qualitative study based on clinical scenarios also found that student
33 nurses did not use an evidence-based rationale to inform their hand hygiene or glove-use
34 choices, and more worryingly, the attitudes of infection control specialists included in the
35 study were similar (Lee, 2014).
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42 In the case of attaching an intravenous line, for which NSCG would be worn by over 80% of
43 respondents, there may be a perception that gloves are required because this is an 'aseptic
44 task'. The use of NSCG in this situation is superfluous, given that they are not sterile.
45 Touching of the sterile components of the IV device should be avoided with either hands or
46 NSCG and use of alcohol hand gel immediately prior to undertaking the procedure would be
47 appropriate. The use of NSCG for such procedures may actually increase the risk of
48 contamination, given that they are frequently put on too early and not changed between
49 procedures and therefore at the point of use are likely to be contaminated (Loveday et al,
50 2014b; Wilson et al, 2015; Girou et al, 2004; Snyder et al, 2008). The assumption that NSCG
51 taken from a box are uncontaminated is not borne out by evidence, with 50% found to be
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3 contaminated by skin commensals and 13% by pathogens (Hughes et al, 2013). In the case of
4 taking MRSA swabs, again the rationale for the use of NSCG is obscure, given that the nares
5 are not touched except with the end of a swab; yet 79% of student nurses reported using
6 gloves for this task.
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11 Policy was cited by almost 90% of student nurses as an influence on their decision to wear
12 NSCG. This is interesting given that many of the situations in which they indicated they
13 would routinely use gloves would not be justified by infection control policy. This suggests
14 that either the student nurses were not familiar with the content of policies, or the policies
15 do not contain clear recommendations about the use of gloves and underpinning principles
16 of risk assessment. Indeed, Mitchell & Smith (2014) found that students are confused about
17 the appropriate use of NSCG and would prefer to be given specific instructions on when and
18 when not to wear them.
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26 The practice of nursing students is often attributed to the instruction from their tutors yet
27 only half of the respondents cited their tutors as an influence on their practice. Other
28 studies have suggested that mentors are a key influence, with students adopting the
29 practice of others that they work with in order to 'fit in' (Lee, 2013; Barrett & Randle, 2008;
30 Mitchell & Smith, 2013). However, in our study less than 40% of students indicated their
31 decision as influenced by other staff. The most frequently cited influence (94%) on the
32 decision to use NSCG was students' own judgment. This resonates with other work which
33 has found that HCW perceive the decision to wear NSCG as a personal one, that others do
34 not have the right to challenge, and NSCG are used in response to an aversion to touching
35 patients (Loveday et al, 2014b; Lee, 2014). This suggests that the improvement strategies
36 such as those used to address hand hygiene, which rely on education and encouraging
37 challenge by peers, are unlikely to be effective in changing glove-use behavior. Infection
38 control policy needs to be much clearer in directing how and when gloves should be used
39 and not used so that there is less room for 'personal preference' and more support for
40 challenging inappropriate use.
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52 Whitby et al (2006) describes hand hygiene in healthcare settings as a ritualised behavior
53 that is performed mainly for self-protection and strongly influenced by emotional
54 perceptions about dirtiness and cleanliness that relates to both situations and other people.
55 For example, they found that a family source was considered to be much less harmful than
56 nonfamily and public sources, and there was a strong intention to perform hand hygiene
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3 when hands have been somewhere considered to be 'emotionally dirty' such as groins,
4 genitals, axillae. Our findings on the use of NSCG resonates with these findings, in particular
5 the strong intention to use NSCG for contact with genital areas, and suggests that NSCG are
6 used as a 'protective' barrier to this emotional response (Mitchell & Smith, 2013; Lee, 2014;
7 Loveday et al, 2014b). There are significant dangers associated with widespread use of NSCG
8 in place of hand hygiene. Since they are perceived to protect the hands, they are likely to
9 diminish the usual triggers for hand hygiene i.e. glove removal, and this may explain the high
10 risk of cross contamination associated with their use (Loveday et al, 2014b; Wilson et al,
11 2015).

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19 This study is the first to attempt to establish the views of patients and users of healthcare
20 services about the use of NSCG by HCW. The members of the public in this survey
21 recognised the need for HCW to use NSCG for procedures involving contact with BBF e.g.
22 changing wound dressing, taking blood, and that gloves contributed to reducing the risk of
23 healthcare associated infections. However, the public responders were uncomfortable with
24 their use for some personal tasks for which a high proportion of nursing students would
25 routinely wear NSCG e.g. helping onto the toilet or to dress. Surprisingly, 58% of
26 respondents in the public survey preferred HCW to wear gloves for washing, although
27 almost 90% of student nurses would use NSCG for this task, and a very high proportion of
28 both student nurses and the public survey respondents preferred the use of gloves for
29 washing genital areas. This suggests that the psychological barrier perceived by HCW is
30 similarly recognised by their patients and whilst NSCG may not be indicated for infection
31 control reasons, there is a clear patient preference for HCW to use them in this situation
32 (Loveday et al, 2014b).

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43 This study has provided evidence that patients notice inappropriate use of gloves by HCWs.
44 A third of respondents with recent experience of healthcare had observed HCW use gloves
45 inappropriately. These respondents had a clear sense of situations where NSCG were used
46 but not required, identifying needle-free IV systems and examinations with no contact with
47 BBF as not requiring gloves, as well as less personal tasks such as pushing a wheelchair and
48 bed making. Comments made by respondents, regardless of whether they had recent
49 experience of healthcare, indicated that many perceived that HCW over-used NSCG and did
50 not change them between tasks or patients.
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3 Whilst patients or their carers might observe care being delivered with potentially
4 contaminated gloves, challenging inappropriate use of NSCG may be difficult. This study has
5 provided some stark examples of how the reasonable concerns of patients are not
6 recognised by the staff members concerned. This is probably hardly surprising given the
7 absence of rationale associated with the use of NSCG and the lack of recognition by HCW,
8 who are primarily using them as a barrier for themselves, that they become contaminated
9 by the things they touch. In addition, there is evidence that patients have concerns about
10 confronting HCW because of wanting to avoid trouble or fears that it might adversely affect
11 their care (Seale et al, 2015).
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18 19 *Limitations of this study*

20 This was a small sample of nursing students from single university and therefore may not be
21 representative of all students or other HCW. The sampling procedure for public survey was
22 a convenience method and it is not possible to determine how representative this sample is
23 of patients or the general public. Some respondents were members of service user groups
24 and therefore likely to have an interest in HCAI and gloves.
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30 31 *Implications of study for infection control practitioners*

32 This study has illustrated that nursing students routinely use NSCG in a wide variety of
33 situations where they are not indicated. Their use as a barrier to protect HCW from
34 perceived hazards needs to be challenged given that inappropriate use increases the risk of
35 infection to the patient and reduces hand hygiene. However, patient's preference for the
36 psychological barrier that gloves provide in relation to intimate contact should also be taken
37 into account. As personal judgment appears to strongly influence decisions about glove use,
38 policies should give explicit advice about situations where NSCG are and are not required;
39 the underpinning principles of risk assessment in clinical settings; and the dangers of cross
40 contamination associated with the misuse of NSCG. These policies should also address the
41 strong desire of patients for HCW to wear gloves in some situations but communicate this
42 rationale clearly. Mechanisms to support both HCW and patients to challenge inappropriate
43 use of NSCG need to be developed and embedded across all care settings.
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55 **References**

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1
2
3 Barrett, R. and Randle, J., 2008. Hand hygiene practices: nursing students' perceptions.
4 *Journal of Clinical Nursing*, July, vol. 17, no. 14, pp. 1851-1857.
5

6 Centers for Disease Control, 1988. Update: universal precautions for prevention of
7 transmission of human immunodeficiency virus, hepatitis B virus and other blood borne
8 pathogens in healthcare settings. *Morbidity and Mortality Weekly Report*, Update: universal
9 precautions for prevention of transmission of human immunodeficiency virus, hepatitis B
10 virus and other blood borne pathogens in healthcare settings, vol. 37, pp. 377-388.
11

12 Flores, A. and Pevalin, D.J., 2006. Healthcare workers' compliance with glove use and the
13 effect of glove use on hand hygiene compliance. *British Journal of Infection Control*, vol. 7,
14 no. 6, pp. 15-19.
15

16 Fuller, C., Savage, J., Besser, S., Hayward, A., Cookson, B., Cooper, B. and Stone, S., 2011.
17 "The Dirty Hand in the Latex Glove": A Study of Hand Hygiene Compliance When Gloves Are
18 Worn. *Infection Control and Hospital Epidemiology*, vol. 32, no. 12, pp. 1194-1199
19

20 Hughes, K.A., Cornwall, J., Theis, J. and Brooks, H.J.L., 2013. Bacterial contamination of
21 unused, disposable non-sterile gloves on a hospital orthopaedic ward. *The Australasian
22 Medical Journal*, vol. 6, no. 6, pp. 331.
23

24 Lee, K., 2013. Student and infection prevention and control nurses' hand hygiene decision
25 making in simulated clinical scenarios: a qualitative research study of hand washing, gel and
26 glove use choices. *Journal of Infection Prevention*, vol. 14, no. 3, pp. 96-103
27

28 Loveday, H., Lynam, S., Singleton, J. and Wilson, J., 2014. Clinical glove use: healthcare
29 workers actions and perceptions. *Journal of Hospital Infection*, vol. 86, no. 2, pp. 110-116.
30

31 Loveday, H., Wilson, J., Pratt, R., Golsorkhi, M., Tingle, A., Bak, A., Browne, J., Prieto, J.A. and
32 Wilcox, M., 2014. epic3: national evidence-based guidelines for preventing healthcare-
33 associated infections in NHS hospitals in England. *Journal of Hospital Infection*, vol. 86,
34 Suppl. 1, pp. S1-70
35

36 Oranges T., Dini V. and Romanelli, M., 2015. Skin physiology of the neonate and infant:
37 Clinical implications. *Advances in Wound Care*, 01 Oct 2015, vol. 4, no. 10, pp. 587-595.
38

39 Royal College of Nursing, 2012. *Tools of the trade: RCN guidance for healthcare staff on
40 glove use and the prevention of contact dermatitis*. London: Royal College of Nursing.
41

42 Seale, H., Travaglia, J., Chughtai, A., Phillipson, L., Novytska, Y. and Kaur, R., 2015. 'I don't
43 want to cause any trouble': the attitudes of hospital patients towards patient empowerment
44 strategies to reduce healthcare-acquired infections. *Journal of Infection Prevention*, vol. 16,
45 no. 4, pp. 167-173.
46

47 Siegel, J.D., Rhinehart, E., Jackson, M., Chiarello, L., Health Care Infect Control Practices and
48 Health Care Infection Control Practices Advisory Committee, 2007. 2007 Guideline for
49 Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings.
50 *American Journal of Infection Control*, vol. 35, no. 10, pp. S65-S164.
51

52 Snyder, G., Thom, K., Furuno, J., Perencevich, E., Roghmann, M., Strauss, S., Netzer, G. and
53 Harris, A., 2008. Detection of methicillin-resistant *Staphylococcus aureus* and vancomycin-
54
55
56
57
58
59
60

1
2
3 resistant enterococci on the gowns and gloves of healthcare workers. *Infection Control and*
4 *Hospital Epidemiology*, vol. 29, no. 7, pp. 583-589

5
6 Whitby, M., McLaws, M. and Ross, M., 2006. Why Healthcare workers don't wash their
7 hands: A Behavioral explanation. *Infection Control and Hospital Epidemiology*, vol. 27, no. 5,
8 pp. 484-492.

9
10 Whitfield, A., 2015. Different perspectives, same goals. *Journal of Infection Prevention*, vol.
11 16, no. 5, pp. 197-198

12
13
14 Wilson, J., Prieto, J., Singleton, J., O'Connor, V., Lynam, S. and Loveday, H., 2015. The misuse
15 and overuse of non-sterile gloves: application of an audit tool to define the problem. *Journal*
16 *of Infection Prevention*, vol. 16, no. 1, pp. 24-31.

17
18 World Health Organization, 2009. *WHO Patient Safety. WHO guidelines on hand hygiene in*
19 *health care*. Geneva: World Health Organization.

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27 **Tables/figures**

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For Peer Review

Table 1: Questions included in public survey on healthcare worker use of clinical gloves

1. In the last six months have you had personal experience of being a patient in an NHS hospital (either as an inpatient or as an outpatient)? *[If 'Yes' answer all Qs; if 'No' answer Qs 6 (+/- 7), 8 (+/- 9), 10 – 13]*
2. Thinking back to the time/s when you have been in a hospital, over the last six months, can you recall at least one occasion when a health professional wore gloves when caring for you? Examples of 'health professionals' are doctors, nurses, healthcare assistants and physiotherapists.
3. Please briefly describe what activities the health professionals were undertaking while wearing gloves, for example 'changing my dressing, taking a blood sample etc.'
4. For each of the examples you have given above, please indicate if you feel it was/ wasn't appropriate for gloves to be worn.
5. Finally, for each of the examples you have given, please state why you felt it was or wasn't appropriate for gloves to be worn
6. Can you think of any occasion where you have seen a health professional undertaking an activity where they WERE NOT wearing gloves and you think they should have been? (This could have been during your care, the care of someone else or while the health professional was undertaking some other activity.)
7. You said you have seen a health professional undertaking an activity where they were not wearing gloves and you think they should have been. Please tell us what they were doing?
8. Can you think of any occasion where you have seen a health professional wearing gloves when you think they SHOULD NOT have been? (This could have been during your care, the care of someone else, or while the health professional was undertaking some other activity.)
9. You said you have seen a health professional wearing gloves when you think they should not have been. Please tell us what they were doing?
10. Health professionals (HPs) carry out a number of activities, in the examples given below please indicate how you would feel about them wearing gloves while doing so (*select from: I would like the HPs to wear gloves for this/I would feel uncomfortable with the HPs wearing gloves for this/I wouldn't mind either way*)
 - Taking my blood pressure
 - Giving me an injection
 - Making my bed
 - Giving me medication (tablets)
 - Helping me to eat
 - Taking a sample of my blood
 - Helping me off the toilet
 - Giving me a wash
 - Helping me walk to the toilet
 - Washing my private areas (genitals)
 - Changing my wound dressing
 - A doctor listening to my chest with a stethoscope
 - Helping me to get undressed for theatre
 - Cleaning my bedside table
 - Serving me tea and coffee
11. Do you want to make any other comments about health professionals' use of gloves?
12. Have you ever challenged a health professional about their use of gloves while caring for you or a friend /relative?
13. You said that you have challenged a health professional about their use of gloves. Please tell us about this.

Table 2: Comparison of student nurse and public perception of appropriate use of non-sterile clinical gloves (separated into those where gloves are and are not indicated)

Task	Student nurses would routinely wear gloves (n = 67)		Public would prefer HCW to wear gloves (n = 142)	
	No.	%	No.	%
Procedures where gloves ARE indicated				
Removing urine catheter	67	100.0	-	-
Collecting a bedpan/urinal	66	98.5	-	-
Changing an incontinence pad	66	98.5	-	-
Dressing a wound	66	98.5	135	95.1
Decontaminating a commode	66	98.5	-	-
Removing an IV cannula	65	97.0	-	-
Emptying urinary catheter	65	97.0	-	-
Checking blood glucose	62	92.5	-	-
Suctioning	60	89.5	-	-
Changing a baby's nappy	41	61.2	-	-
Procedures where gloves ARE NOT indicated				
Washing a patients' genital areas	64	95.5	133	93.7
Washing/ bathing/showering patient	59	88.1	83	58.5
Attaching/detaching IV line	55	82.1	-	-
Taking MRSA swabs	53	79.1	-	-
Giving IM/SC injection	51	76.1	93	65.5
Handling used (not soiled) bed linen	45	67.0	7	4.9
Assisting patient onto toilet/commode	44	65.7	9	6.3
Assisting patient transfer from commode to bed/chair	43	64.2	101	71.1
Cleaning/tidying patient bed space	27	40.1	37	26.1
Dressing/undressing a patient	27	40.0	12	8.5
Washing a baby	17	25.4	-	-
Helping patient transfer from bed to chair	10	14.9	-	-
Feeding a patient	6	8.9	12	8.5
Handling clean bed linen	4	6.0	-	-
Administering oral medication	4	6.0	15	10.6
Taking blood pressure	3	4.5	4	2.8

Table 3: Exploratory factor analysis of student nurses reported routine use of non-sterile clinical gloves

All coefficients greater than 0.5 and positive except * which are negative

Factor 1	Factor 2	Factor 3	Factor 4
Perceived to be 'risky'	Definitive indication for 'gloves' or 'no gloves'	Low risk task but wear gloves	Personal hygiene
Handling drainage tubes	Taking temperature	Repositioning patient in bed	Wash a patient
Handling clinical waste bags	Taking blood pressure	Cleaning/tidying patient space	Assisting patient with personal hygiene
Giving IM/SC injections	Changing continence pad*	Dressing/undressing patient	Emptying patient wash bowl
Suctioning	Inserting IV cannula*	Hoisting a patient	Assisting patient onto commode/toilet
Attach NG feed	Helping patient transfer from bed to chair		Assisting patient from commode to chair/bed
Giving mouth care	Feeding patient		
Emptying urine drainage bag			

Table 4: Activities where members of the public observed healthcare workers wearing gloves and their opinion on appropriateness

Procedure	Activity where glove use reported	Glove use considered inappropriate		Comments
	<i>No. Respondents</i>	<i>No.</i>	<i>%</i>	
Administrative task	5	4	80	They had gloves on the whole time they treated me; No need for gloves when writing notes
Bed making	6	4	66.6	The bed wasn't soiled
Handling body fluids	6	1	17	I didn't see the need as I only need assistance and wasn't touched
Injections/IVs	8	2	25	Not required as a non-needle system just attaching a drip line to the end of a venflon
Minor invasive procedure	28	1	3.6	I didn't see them wash their hands and think it was for their protection not mine
Phlebotomy	27	5	18.5	No risk as used safer device; would not appear to be body fluid present
Non-invasive care	6	2	33.3	No need for wearing gloves when pushing wheel chair
Clinical examination	12	3	2.8	No lesions or open wounds visible; scar was fine, no bodily fluids present
Dressings	6	0	0	
Washing	3	3	100	I am quite clean; Unless the HCA needed protecting from the washing cream or me from them, it made the task more difficult and probably unnecessarily exposed me to latex
Total	107	25		

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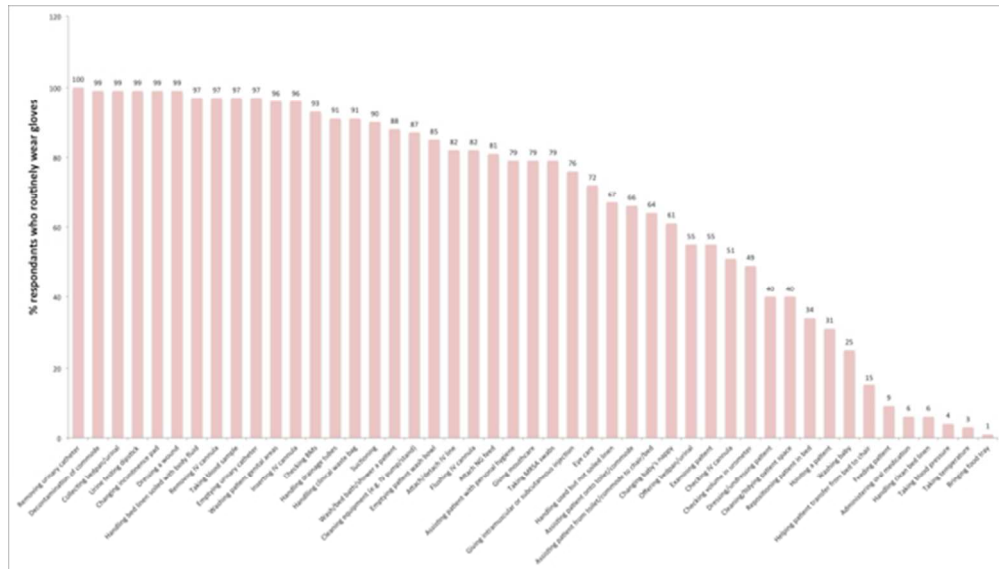


Figure 1: Percentage of student nurses who would routinely wear non-sterile clinical gloves for different clinical tasks

225x128mm (72 x 72 DPI)

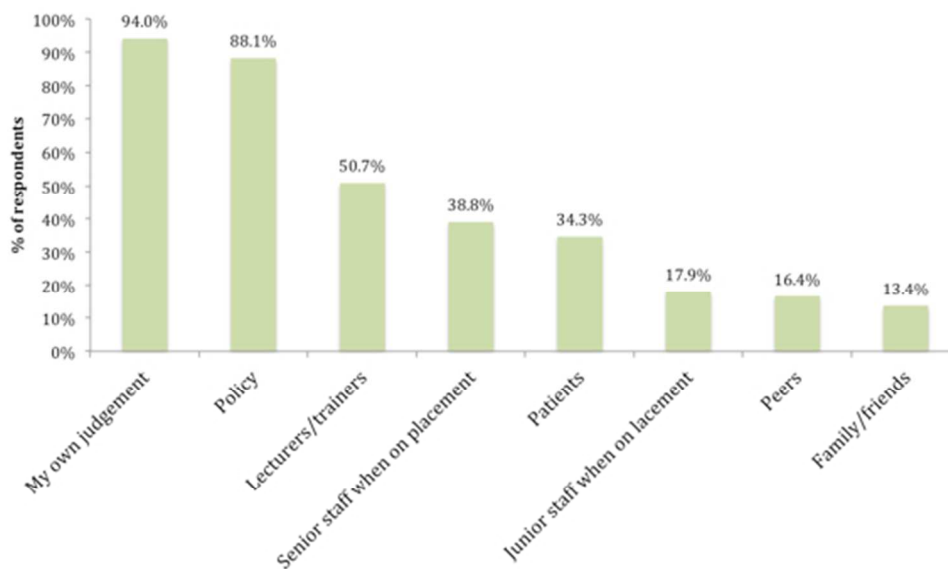


Figure 2: Influences on the decision of student nurses to wear non-sterile clinical gloves

209x123mm (72 x 72 DPI)

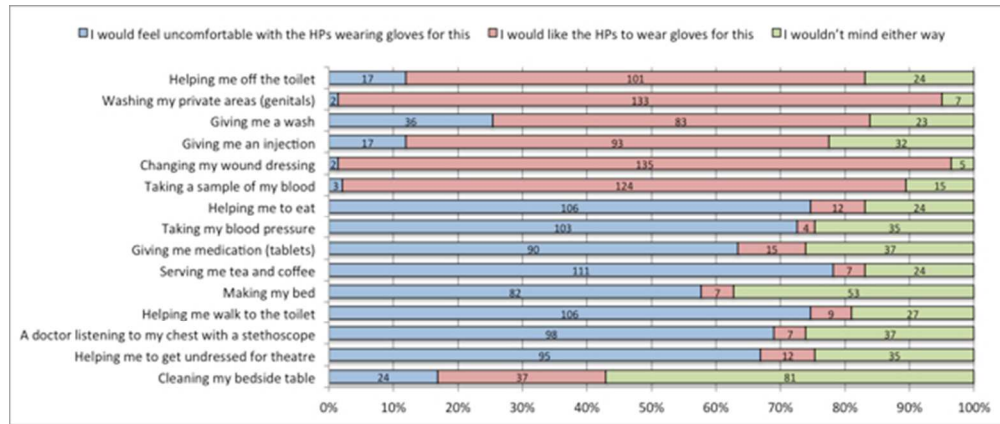


Figure 3: Public views on use of clinical gloves for 15 activities performed by healthcare workers

225x94mm (72 x 72 DPI)

Peer Review