



# Alcohol hand abuse: a cross-sectional survey of skin complaints and usage patterns at a large UK teaching hospital

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## DECLARATIONS

### Competing interests

None declared

### Funding

None

### Ethical approval

Not applicable

### Guarantor

PT

### Contributorship

KC and PT performed the initial survey and collation; KC also devised the access database which was completed and analysed by SNM; SMC, MRL and KH reviewed the data; KH provided the photographic illustrations; SNM compiled the completed paper

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### Reviewer

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## Summary

**Objectives** To investigate whether the regular use of alcohol hand gel was having a detrimental effect on hands of healthcare professionals and, if so, to what extent. The study also aimed to establish a link between individuals who felt their hands were suffering from persistent exposure to the gel and those who actively avoided using the gel.

**Design** A short descriptive questionnaire was distributed to healthcare professionals and those working within clinical areas within one trust (two teaching hospitals).

**Setting** Staff that worked or had duties within clinical areas that necessitated the use of alcohol hand gel.

**Participants** The survey was sent via email to all staff on the email database.

**Main outcome measure** To determine the number of staff that developed new onset skin conditions since the introduction of alcohol hand gel and of what proportion of this number actively or considered avoiding the hand gel.

**Results** Questionnaires were returned for analysis by 399 respondents. Eighty-eight percent of respondents felt that they had developed new onset skin conditions as a consequence of maintaining hand hygiene protocols. Nurses were the highest users of the hand gel, but interestingly were also the highest group to avoid or consider avoiding the hand gel (52% compared with 28%, 26% and 44% in the doctors, secretaries and healthcare assistants groups, respectively). Thus indicating more frequent use may cause increased problems.

**Conclusion** This study demonstrated that 88% of respondents stated that they had new-onset skin problems, of which half-felt that alcohol gel was the main contributing factor. There was a detrimental effect on compliance with alcohol gel hand hygiene protocols in this group. This reflects the real life difficulties of staff in their endeavour to reduce

hospital-acquired infections. Action is needed to improve the compliance with such a simple task and ensure that all is done to reduce nosocomial infection and reduce the potential financial burden.

## Introduction

Hand hygiene is widely accepted to be one of the most effective ways of reducing nosocomial infections within hospital settings. The use of low concentration alcohol gel<sup>1</sup> to provide quick and simple decontamination of non-soiled hands is popular within healthcare settings, with recent promotion throughout UK hospital trusts with the 'clean your hands' campaign.<sup>2</sup> This applies to all healthcare workers, including allied groups, administration staff and porters who enter and leave clinical areas as well as medical staff who have more direct and frequent patient contact.

Alcohol gel has become the simple alternative to traditional methods of soap and water to clean non-soiled hands. Alcohol gel dispensers can be conveniently placed at each patient's bedside and outside each clinical area, including wards, outpatient clinics and operating theatres; compared to the difficulty of placing washbasins within these areas. It also takes less time to use the gel than washing with soap and water, hence making it a presumed popular choice for busy staff members.

The potentially detrimental cutaneous effects of the repeated use of alcohol hand gels is not well researched. The gel should be routinely applied to fingers, hands and wrist areas before and after each and every patient contact, as well as when moving between clinical areas. Alcohol hand gel is promoted as a 'quick-fix' cleaning regime, however skin complaints among healthcare professionals, and referrals to dermatologists, especially for hand problems, are rising rapidly.<sup>3</sup> The problems associated with regular hand gel usage within hospitals are almost certainly widely underestimated. Hospital policies generally state that staff experiencing problems should attend occupational health for further assessment. There are a multitude of reasons as to why staff may chose not to use this route.

Alcohol hand gel is an irritant to skin,<sup>4</sup> and it is not surprising that eventually detrimental effects<sup>4,5</sup> may be suffered. This may include

increased dryness, skin cracking, flaking, brittle nails, fissuring and bleeding skin. It is also likely that in individuals predisposed to skin complaints, such as eczema and psoriasis, repeated daily applications of alcohol hand gel may exacerbate their skin condition. Atopic patients have an increased risk of carrying *Staphylococcus aureus* and we are not yet aware of the increased risk of bacterial carriage caused by the secondary drying effects of the gel.

As with any topical lotion, intolerance and allergy may occur.<sup>6</sup> Individuals who believe they are developing intolerance to the gel may actively choose to stop using it and reduce compliance with hand hygiene protocols.<sup>7</sup> Further complications may arise if the individual with established skin irritation chooses to switch to regular soap and water, as the repeated cycle of 'wet and dry' is well-known to further reduce skin hydration.<sup>3</sup> Individuals may actually choose to stop cleaning their hands altogether to reduce skin irritation.

The potential link between reported skin complaints in healthcare professionals and the use of alcohol hand gel warrants further investigation. This survey provides a cross-sectional analysis of alcohol hand gel usage and problems among staff at two busy acute hospitals. The survey aims to provide an insight into the opinions of those staff and their behaviours regarding the use of alcohol hand gel. This could serve as the baseline for further detailed research.

## Methods

An anonymous questionnaire was distributed at a single point in time to medical, nursing and other allied healthcare professionals from two acute hospitals (one trust) through their personal Trust email account. Only respondents who were users of alcohol hand gel were asked to respond. Once completed the questionnaire was returned, by post or email, to the research team for analysis.

The questionnaire consisted of 13 questions about the use of alcohol hand gel and any

previous and current skin problems. Demographic questions were kept to a minimum. Detailed questions were asked about recent and current skin problems and a short list of options were included for selection. These included dry skin (mild to severe), skin fissures, scaling, peeling, painful lesions, bleeding, brittle nails, skin infections, new-onset eczema and recurrent eczema flare-ups. The participants were asked their opinion on whether the regular use of alcohol gel had caused their skin problems, whether they would ever choose not to use the gel to help prevent these skin problems, if they had ever actively avoided the use of the gel to protect their hands, and if they felt more accessibility to hand moisturiser would help alleviate their skin problem.

Completed questionnaires were returned and the findings entered into a Microsoft Access database (2000). The multi-relational database was designed with the form function for categorical data input so that each answer was easily and accurately entered. This ensured that quantitative data could be analysed easily and without the bias that is often linked to qualitative data.

### Demographics

Questionnaires were returned for analysis by 399 respondents; 337 were women and 61 were men (one respondent omitted their sex). The average age of the respondents was 37.6 years (range 18–67 years). The average years worked for the Trust was 10.2 years. The range of healthcare

professions of the respondents are illustrated in Figure 1.

### Results

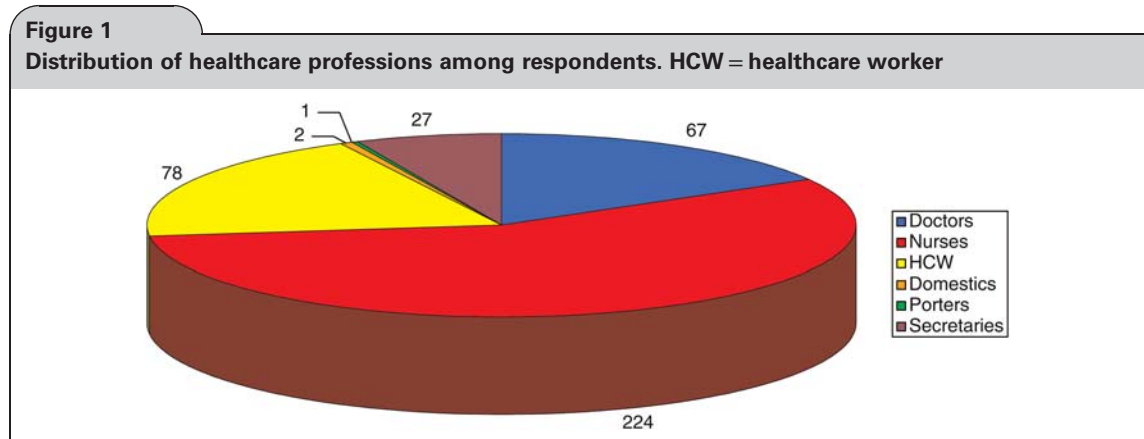
The majority of the respondents were nurses (56%), followed by healthcare assistants (20%) and doctors (17%). The response rate from the porters and domestics was low (0.75% combined).

Respondents reported high levels of average daily use. This was the highest for nursing staff (Mon–Fri: mean 20.63, range 0–170; weekend: mean 6.35, range 0–150) and doctors (Mon–Fri: mean 19.7, range 0–150; weekend: mean 9.35), but even secretarial staff reported average daily usage of 5.4 applications during Monday to Friday (Figure 2).

Using the paired t-test the average use for each day of the week was compared between doctors and nurses and then between nurses (the highest users) and secretaries (non-clinical workers). There was no significant difference between the doctors and nurses ( $P = 0.56$ ), however there was between the nurses and secretaries ( $P = 0.0013$ ), which is to be expected.

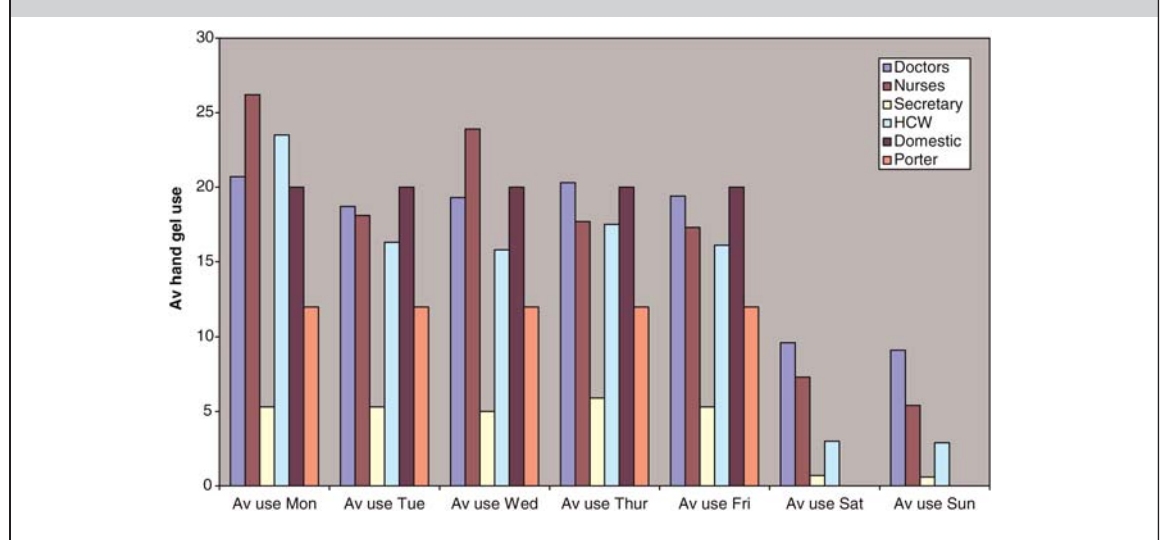
### Pre-existing skin complaints

There were 123 (31%) individuals who reported that they had a previous history of skin complaints. Of these, 44 (36%) reported contact eczema, 46 (37%) had allergic eczema, 18 (15%) had psoriasis and one (1%) had vitiligo. A further 16 (13%) respondents did not disclose the nature of their skin complaint. Overall 42% of



**Figure 2**

**Average daily frequency of application of hand gel respondents according to healthcare profession in the Trust. HCW = healthcare worker**



respondents with a pre-existing history of eczema reported recent or current cutaneous problems on their hands.

### New skin complaints affecting hands

Individuals were asked, in their own opinion, whether they had developed a skin complaint on their hands from the use of the alcohol gel. Of the 399 respondents, 88% did feel that in maintaining hand hygiene protocols, they had suffered a detrimental effect on their skin. Only 12% of the total respondents felt they had not experienced any effects to their skin from using the alcohol gel.

A comparison was made of the proportion of respondents in each healthcare profession who had pre-existing skin conditions or new onset skin conditions of the hands (Figure 3). This illustrated that the vast majority in each group described the development of *de novo* skin problems from hand gel usage. This potentially led to avoidance of the gel illustrated in Figure 4.

The percentage of pre-existing skin conditions in each profession, was uniform across the specialties, as were the development of new onset skin complaints. Although the secretaries have a low average daily frequency of gel use compared to other professions (Figure 2), their reporting of

new onset hand complaints is comparable to the other clinical workers.

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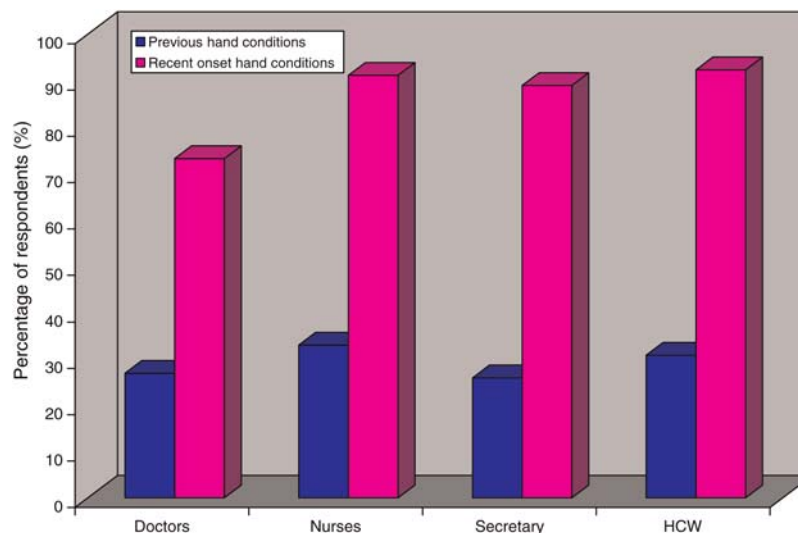
Seventy-two percent of the doctors and 74% of the secretaries would not avoid the hand gel even though they believed their hands were suffering compared to 48% of nurses and 56% of healthcare workers.

### Discussion

The percentage of pre-existing skin conditions in each profession was uniform across the specialties (Figure 3). Porters and domestics were not included as they comprised just 1% of the respondents. A significant number of the respondents in

**Figure 3**

**Percentage of each profession with pre-existing skin/hand conditions compared with new onset hand problems**

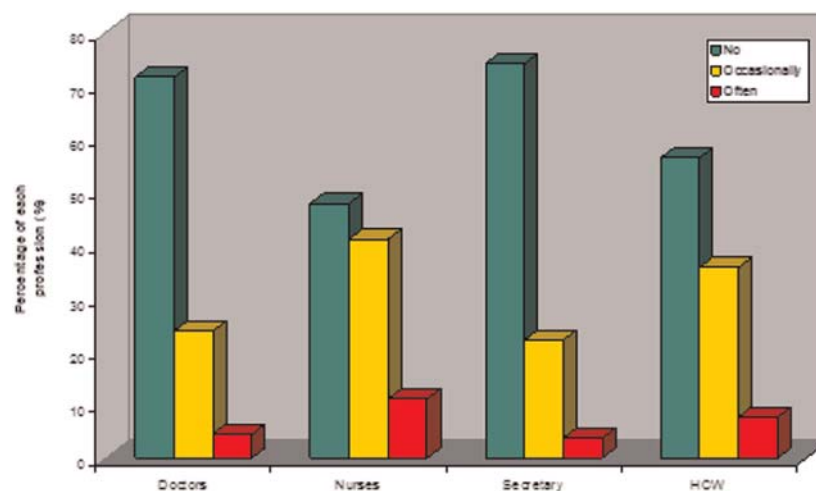


each group suffered from a variety of new onset hand problems. Although the secretaries have a low average daily frequency of gel use compared to other professions, their reporting of new onset hand complaints is comparable to the other clinical workers. It is difficult to objectively measure the severity of the hand complaint from a

questionnaire such as this. However we categorized the descriptions of current and recent skin complaints into mild, moderate and severe according to response. With these categories, on further analysis only 19% of the secretarial group suffered from severe problems compared with 40% and 44% in the doctors and nurses group,

**Figure 4**

**History of active avoidance of alcohol hand gel in staff who were suffering adverse effects from gel usage**



respectively. It can be deduced from this that regular use may readily lead to some form of mild skin condition, but the more frequent the use, the more severe the hand condition becomes. The nurses were shown to use the hand gel significantly more than the secretaries and their group reported more severe hand/skin changes.

The 2008 National staff survey<sup>8</sup> for the Trust got a response from just 272 staff. The Trust scored better than average for acute Trusts in the UK in relation to the availability of hand washing materials. The response to our cross-sectional survey on problems related to hand gel usage, conducted in the same year had a far greater response rate.

We heard many anecdotal stories from doctors which illustrated a typical pattern of exacerbation during periods of week-long on-call duties. These periods are associated with multiple daily ward rounds or patient contact, resulting in multiple applications of alcohol hand gel. Skin problems tended to reduce again with periods of annual leave before manifesting again on return to clinical duties.

Figure 5 illustrates the typical fissuring of the knuckles, dry skin and swelling that result from frequent use of alcohol hand gel. The pictures are taken three months apart in someone who did not have any pre-existing hand or skin conditions prior to the widespread introduction of hand gel across the Trust.

Fifty-two percent of the nurses had considered avoiding the gel at some point. This was an

unexpected finding in the nursing group as their continuing medical education stresses the importance of hand hygiene. As the nurses had the highest average daily frequency of hand gel usage, this may possibly indicate that the high avoidance rate is not due to lack of education on the spread of nosocomial infections, but the personal consequences they are suffering. In contrast, the secretarial group had the highest proportion (74%), who would not avoid using the hand gel. When the severity of their hand-related complaints are looked at in detail the majority are at the milder end of the spectrum in this group, and are therefore less likely to lead to the development of avoidance behaviour.

### Limitations

The study has several limitations. The questionnaires were sent to all healthcare professionals at a single point in time within the Trust for which an email account was identified. Many emails were automatically returned with, for example, an annual leave setting on some accounts. Others were not returned within the stipulated one-week timeframe for the survey. We also have no way of knowing the exact number of staff who use alcohol hand gel within the Trust and thus no denominator for accurate statistical comparison. There may also be a selection bias in returned surveys of respondents, who felt that the gel had had a detrimental effect on their

**Figure 5**

**The effects of regular cleansing with the hand gel on one of our medical team**



hands. It does however give a flavour of the type of behaviour potentially being exhibited by professional healthcare staff.

## Conclusions

This study highlights that many healthcare professionals do believe that alcohol gel is damaging their hands. Eighty-eight percent of respondents stated that they had new-onset skin problems and almost half of the respondents felt that alcohol gel was the main contributing factor. Although in depth statistical analysis and objective measurements of skin conditions could not be performed, the findings provide a useful picture as to the real-life difficulties of staff in their endeavour to reduce hospital acquired infections.

This raises the question of compliance within the hospital settings. This survey only focused on one trust within the UK, but the results clearly show that a more than acceptable number of individuals do believe that the repeated use of alcohol gel is damaging their hands. As a consequence of this, they are choosing not to use the gel.

A simple solution to the skin effects is the provision of a good quality moisturiser to alleviate symptoms and improve gel use compliance. If moisturiser is available, the quality, probably related to cost, is usually not sufficient to deal with the dryness. From a financial planning point of view it would be prudent to ensure good quality moisturiser is available rather than deal with the financial and clinical consequences of nosocomial infections.

Occupational health teams across the UK should conduct more in depth surveys with known denominators and validated objective measures of skin problem severity to address this issue. Staff require the support and time to attend occupational health or to seek specialist dermatological input in more severe cases. Action is needed to improve the compliance with such a simple task and ensure that all that can be done to reduce nosocomial infection and reduce the potential financial burden.

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