



Short report

Service evaluation of alcohol-release door plates: an addition to hand hygiene

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ARTICLE INFO

Article history:

Received 4 April 2019

Accepted 30 April 2019

Available online 7 May 2019

Keywords:

Hand hygiene

Decontamination

Doorplates

Environment



SUMMARY

A service evaluation was designed to examine the effect of installation of alcohol-releasing Surfaceskins doorplates on routine alcohol hand gel hygiene use by healthcare workers. There was an approximate doubling increase in healthcare worker use of alcohol hand gel dispensers following the installation of Surfaceskins doorplates in two operating theatre suites. No evidence was found that Surfaceskins doorplates replaced routine hand hygiene. It is concluded that these devices represent a useful adjunct to routine hand hygiene practice in healthcare environments, and potentially in other settings (e.g. washrooms, restaurants) where frequent contact with doors could undermine infection prevention practice.

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Introduction

Hand hygiene is a fundamental part of infection prevention, but may be compromised by contact with contaminated, especially frequently touched, environmental surfaces. Surfaceskins, which are alcohol gel-impregnated push pads (doorplates), have been designed to reduce bacterial contamination that follows (especially frequent) door use. In laboratory tests, *Staphylococcus aureus*, *Escherichia coli*, or *Enterococcus faecalis* were killed when deposited on to Surfaceskins but not on to standard doorplates; bacterial counts were significantly reduced on Surfaceskins doorplates [1].

Surfaceskins doorplates are commercially available, easy to install, and require minimal maintenance. The Surfaceskins

doorplate is composed of a disposable alcohol gel-filled pad with a porous membrane on the top, fitting into a permanent plastic holder that is door-mounted. When hand pressure is applied, a small amount of alcohol gel is released on to the device surface, which is deposited on to the hand. The Surfaceskins doorplates are typically replaced weekly, as they have sufficient alcohol gel for about 1000 activations. The devices cost about £5 each, but this price may be less with larger use/orders.

Reducing microbial contamination of frequently touched door surfaces, and therefore bacterial transfer via hands, could feasibly reduce the risk of healthcare-associated and other infections. Importantly, however, Surfaceskins doorplates are intended as an adjunct to, not a substitute for, hand hygiene, to help reduce the spread of potential pathogens and therefore infection risk. In order to test this claim, we aimed to measure, via a service evaluation, whether Surfaceskins doorplates altered the behaviour of healthcare workers with respect to

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their frequency of use of routine alcohol gel-based hand hygiene.

Methods

The service evaluation took place between June and October 2018 in two operating theatre complexes (OT3 and OT6) at Leeds Nuffield Health, UK; each of these comprised a (connecting) anaesthetic room, operating room, scrub area, and preparation room. There was a total of seven alcohol hand gel dispensers and five doors in each of these operating theatre complexes. The evaluation of hand hygiene practice was divided into five four-week periods (periods 1–5), as outlined in Figure 1. Surfaceskins doorplates were installed first in OT3 and then in OT6, on each occasion preceded by an education campaign. The education comprised several short sessions at the morning safety huddles to respective teams, summarizing the product, its purpose, and indications for use. No other hand hygiene awareness or educational campaigns were ongoing in the hospital at the time of the service evaluation. A company-led poster was positioned in the vicinity of the service evaluation area. Each of the Surfaceskins devices used in this evaluation had the message 'Help Control Infection: Use Gel Dispensers, Use Surfaceskins' printed on to the products holster. In addition, all consultant medical staff were written to before the start of the service evaluation to explain the rationale and schedule.

Theatre footfall (potential opportunities to carry out hand hygiene) and quantitative hand hygiene (activations of an alcohol hand gel dispenser) were measured discretely using electronic devices (door counters; Eve Wireless Contact Sensor,

UK) and alcohol gel transducer pressure sensors (DebMed, SC Johnson Professional, UK), respectively. One of the seven alcohol hand gel dispensers (outside of a theatre exit door) in each theatre complex was not monitored. The dispenser not included was outside of the theatre and so was subject to use by non-theatre (non-device-educated) staff. A baseline decision was therefore taken not to monitor the use of this dispenser.

Ethical approval was not required for this service evaluation, but organizational managerial approval was obtained.

Results and discussion

The changes in hand hygiene that occurred in relation to availability or non-availability of Surfaceskins doorplates are shown in Figure 2. There was an almost doubling (80.7%) increase in average hand gel activations comparing the lead-in versus Surfaceskins in use periods. By comparison, average hand gel activations in the periods when Surfaceskins were not in use (i.e. lead-in versus washout periods) was almost identical (1.7% difference). Similar magnitudes of effects on hand hygiene were seen in the two settings. Together these results represent good evidence that the presence of Surfaceskins doorplates, backed up by education on their use and aims, is associated with a positive effect on conventional alcohol hygiene. It is important to document that a positive effect occurs, and indeed to show that a converse (unintentional) reduction in hand hygiene use is not seen.

It was not determined whether the release of device gel/sensation itself or the written message on the device (or a combination of both) was responsible for the marked increase

Period 1: Lead in OT3	OT3 Staff receive Surfaceskins product information and education	OT6/staff – no intervention	Overall traffic and hand hygiene practice measured in OT3 & OT6
Period 2: Intervention OT3	Surfaceskins doorplates installed in OT3	OT6/staff – no intervention	Overall traffic and hand hygiene practice measured in OT3 & OT6
Period 3: Lead in OT6	OT6 Staff receive Surfaceskins product information and education	OT3 staff – no intervention (Surfaceskins removed)	Overall traffic and hand hygiene practice measured in OT3 & OT6
Period 4: Intervention OT6	Surfaceskins doorplates installed in OT6	OT3 staff – no intervention	Overall traffic and hand hygiene practice measured in OT3 & OT6
Period 5: Washout both OTs	OT6 staff – no intervention (Surfaceskins removed)	OT3/6 – no intervention	Overall traffic and hand hygiene practice measured in OT3 & OT6

Figure 1. Service evaluation of Surfaceskins doorplates on use of alcohol hand gel-based hygiene in two operating theatre complexes (OT3 and OT6).

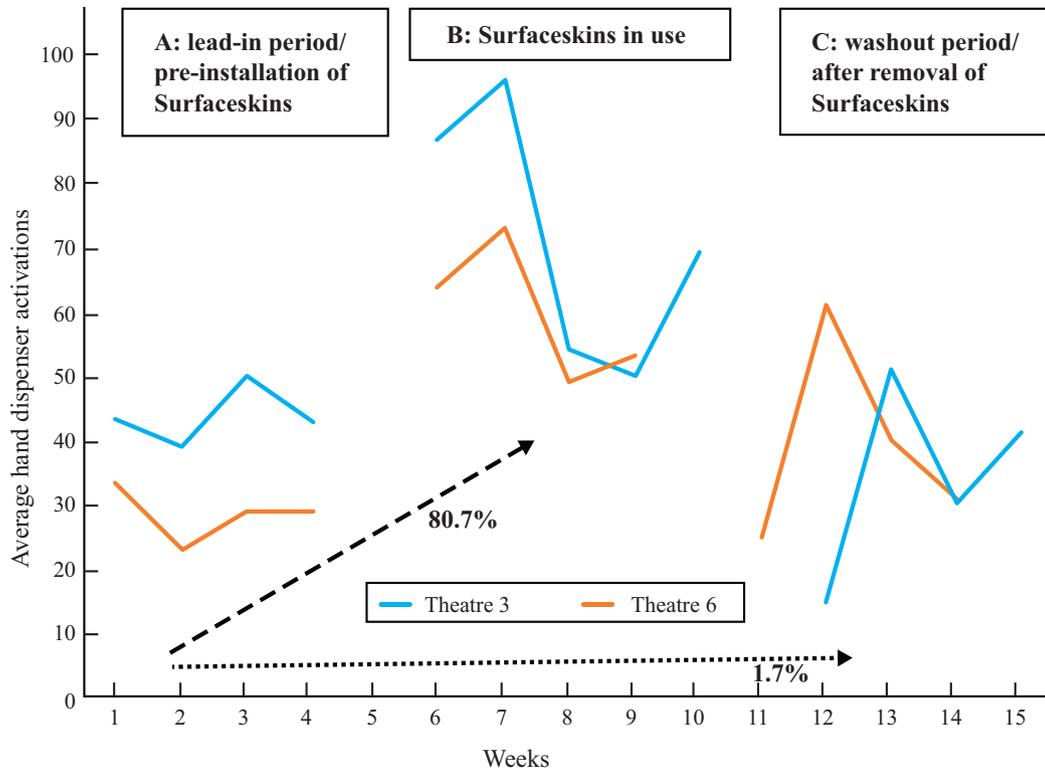


Figure 2. Effects of presence of Surfaceskins doorplates (period B) compared with lead-in and washout periods (period A and C, respectively) on average alcohol hand gel activations in two operating theatres (Theatre 3, blue lines; Theatre 6, red lines). The dotted lines show the percentage increases in average hand gel activations comparing the lead-in versus in-use periods (80.7%) and lead-in versus washout periods (1.7%).

in use of conventional alcohol hand gel. Nevertheless, the presence of the Surfaceskins doorplates and/or the message on the device likely act as prompts to use conventional alcohol hand gel more frequently. The results provide confidence that these devices can truly act as an adjunct to hand hygiene, as opposed to a replacement for conventional alcohol gel use. Thus, taken together with in-vitro evidence of the effectiveness, Surfaceskins devices may help to address the issue of hand contamination, and therefore transfer of microbes, that may occur when pushing open doors [1].

The operating theatre complexes ('controlled' settings) were chosen for our service evaluation as they represent well-defined groups of healthcare workers who can be informed about the doorplate intervention and then measured in practice (discretely). It is acknowledged that the chosen operating theatre complexes have differences with respect to hand hygiene practice compared with general healthcare settings. Operating theatre staff have options for hand hygiene/practice that may not exist in general healthcare settings. As such, the magnitude of positive effect that can be expected to occur when Surfaceskins doorplates (plus education) are introduced will vary according to the setting and baseline level of compliance with optimal hand hygiene practice. Nevertheless, the fact that the presence of Surfaceskins doorplates had a positive effect on hand hygiene practice is reassuring.

We emphasize that tailored education and messaging should take place to increase the likelihood that these devices are used appropriately, and to minimize the chance of inappropriate use (i.e. the devices being used as a substitute for conventional hand hygiene). We did not set out to determine whether the

effect of Surfaceskins doorplates on hand hygiene practice was sustainable in the medium to long term. Clearly, if long-term positive effects are to be realized then education and reinforcement, as is necessary with standard hand hygiene practice, would likely be necessary. The ability to print on to Surfaceskins doorplates is an advantage, in this case with respect to reinforcing the need to carry out conventional hand hygiene.

In conclusion, the results of this service evaluation suggest that Surfaceskins doorplates represent a useful adjunct to routine hand hygiene, both in healthcare environments and other settings (e.g. washrooms, restaurants) where frequent contact with doors could undermine infection prevention practice. No evidence was found that these devices replaced routine hand hygiene and indeed there was a marked increase in healthcare worker use of alcohol hand gel dispensers in this setting.

Acknowledgements

We thank the Theatre Manager, Mr A. Bleasby, and the surgical teams using the two operating theatres where this service evaluation took place. We thank DebMed, SC Johnson Professional, UK for providing the hand gel compliance monitors. Finally, we thank Surfaceskins for provision of the door motion sensors, and alcohol-release doorplates and related education and training.

Conflict of interest statement

M.H.W. has received consulting fees from Abbott Laboratories, Actelion, Antabio, AiCuris, Astellas, AstraZeneca,

Bayer, Biomérieux, Cambimune, Cerexa, Da Volterra, The European Tissue Symposium, Ferring, The Medicines Company, Menarini, Merck, Meridian, Motif Biosciences, Nabriva, Paratek, Pfizer, Phico Therapeutics, Qiagen, Roche, Seres, Spero, Surfaceskins, Sanofi–Pasteur, Seres, Summit, Synthetic Biologics and Valneva; lecture fees from Abbott, Alere, Allergan, Astellas, AstraZeneca, Merck, Nabriva, Pfizer, Roche & Seres; and grant support from Abbott, Actelion, Astellas, Biomérieux, Cubist, Da Volterra, Merck, MicroPharm, Morphochem AG, Motif Biosciences, Nabriva, Paratek, Pfizer, Sanofi–Pasteur, Seres, Summit, Surfaceskins, and The European Tissue Symposium.

Funding sources

Surfaceskins doorplates, door motion sensors and hand gel compliance monitors were provided gratis. No other funding was provided for this service evaluation.

References

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