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

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Summary

We designed a service evaluation 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. We found no evidence that Surfaceskins doorplates replaced routine hand hygiene. We conclude 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.

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 onto Surfaceskins but not on 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 onto the device surface, which is deposited onto the hand. The Surfaceskins doorplates are typically replaced weekly, as they have sufficient alcohol gel for approximately 1000 activations.

Reducing microbial contamination of frequently touched door surfaces, and so 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 so 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 their frequency of use of routine alcohol gel based hand hygiene.

Methods

The service evaluation took place between June-October 2018 in two operating theatres complexes (OT3 and OT6) at Leeds Nuffield Hospital, UK; each of these comprised a (connecting) anaesthetic room, operating room, scrub area and preparation room. There was a total of 7 alcohol hand gel dispensers and 5 doors in each of these operating theatre complexes. The evaluation of hand hygiene practice was divided into five 4-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, summarising 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 onto the products holster. In addition, all consultant medical staff were written to prior to 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 7 alcohol hand gel dispensers (outside of a theatre exit door) in each theatre complex was not monitored.

Ethical approval was not required for this service evaluation, but organisational 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 use 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 the use of conventional alcohol hygiene use. 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. 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 can potentially help to address the issue of hand contamination, and so transfer of microbes, that can occur when pushing open doors.

We chose the operating theatre complexes ('controlled' settings) for our service evaluation as they represent well defined groups of HCWs who can be informed about the doorplate intervention and then practice measured (discretely). We acknowledge 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 emphasise that tailored education and messaging should take place to increase the likelihood that these devices are used appropriately, and to minimise 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 realised then education and reinforcement, as is necessary with standard hand hygiene practice, would likely be necessary. The ability to print onto Surfaceskins doorplates is an advantage, in this case with respect to reinforcing the need to carry out conventional hand hygiene.

We conclude that 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. We found no evidence that these devices replaced routine hand hygiene and indeed showed a marked increase in healthcare worker use of alcohol hand gel dispensers in this setting.

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Conflicts of interest

MHW has received consulting fees from Abbott Laboratories, Actelion, Antabio, AiCuris, Astellas, Astra-Zeneca, Bayer, Biomèrieux, 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, Astra-Zeneca, 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.

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Figure 1.

Schematic of service evaluation of effects of Surfaceskins doorplates on use of alcohol hand gel based hygiene in two operating theatre complexes (OT3 and OT6).

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 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 (OT3 and OT6). The dotted lines show the % increases in average hand gel activations comparing the lead-in vs in use periods (80.7%) and lead-in vs washout periods (1.7%).

