

DISINFANTS

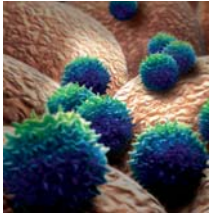
BODE SCIENCE CENTER

Every moment counts.
The Hand Hygiene Initiative
of HARTMANN and the
BODE SCIENCE CENTER.



Does the new norovirus variant “Sydney 2012” require special hygiene measures?

“Sydney 2012” is held responsible for the majority of recent norovirus infections around the globe. According to current knowledge, adhering to the established hygiene regimen for noroviruses is sufficient.



Little immunity from new type of virus

Gastroenteritis triggered by noroviruses generally peaks during the winter months and manifests with, for example, projectile vomiting. Norovirus is the most frequent causing agent of viral gastrointestinal diseases – and is highly adaptable. In its warning, “NoroNet”, a network of international infection experts, points to many norovirus cases notified in the Netherlands, the UK and Japan at the end of 2012. First molecular examinations indicate that the increased number of cases may be attributed to the emergence of “Sydney 2012”, a new variant of genotype GII.4 [1].

After a norovirus infection, the human body usually is immune to the pathogen for some time – but only to the special viral strain. However, norovirus variants such as the “Sydney 2012” variant first seen in Australia, differ from known strains with regard to their genetic make-up. Hence, people having recovered from a norovirus infection are also susceptible to the new type of pathogen. Beyond this, no special potential risk has been discovered yet – according to current knowledge, the virus subtype does not seem to be more virulent than known norovirus strains.

Norovirus type “Sydney 2012”: prophylaxis and measures in case of an outbreak

Correspondingly, there are no specific hygiene measures that differ from the existing RKI recommendations.

Hygiene standards usual for noroviruses should be followed when dealing with “Sydney 2012”. Adequate hand hygiene and avoiding direct body contact with infected people can contain the spread of the virus. People affected should be isolated immediately in a room with own toilet – cohort isolation may be reasonable as well. In addition, it is imperative to comply with barrier precautions.

In case of a norovirus outbreak, the Robert Koch-Institute (RKI) recommends using a virucidal disinfectant [2]. For hand disinfectants, the RKI stipulates virucidal activity in accordance with the guidelines of the DVV/RKI [3]. Officially ordered disinfection measures in case of norovirus outbreaks require products that are listed by the RKI for the inactivation of viruses (activity area B).

For people with intact immune system, the symptoms of a norovirus infection are unpleasant, but usually not dangerous – the disease subsides within a few days. However, for elderly and immuno-compromised people, the water loss can be life-threatening [4].

Sources

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Additional information and hygiene tips on noroviruses are available at www.bode-science-center.com under CENTER.

Editorial



Dear Reader,

What it is that keeps health-care workers from disinfecting their hands? Exactly this question virtually triggered a wave of research over the past years.

Studies on compliance show: hand disinfection itself is easy, but practically implementing it is not. Recognising the right moment for hand disinfection during complex nursing activities indeed is a real challenge.

Together with its BODE SCIENCE CENTER, PAUL HARTMANN AG stepped up to simplify hand hygiene in daily routine. The highlight of the efforts: a newly developed e-learning programme that follows the "5 Moments" of WHO and helps recognising the right situations for hand disinfection. The tool is supported by training lessons and checklists for dispenser placement – because it is also the "hardware", i.e. the availability of products that counts for the compliance to have an upward trend.

You will find the "5 Moments E-Learning Tool" with its excellent computer-animated design, as well as the checklists and studies reflecting the current state of compliance research on the BODE SCIENCE CENTER website at www.bode-science-center.com.

Join in and improve the compliance in your facility.

Yours sincerely,

Claudia James

Director BODE SCIENCE CENTER

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Hand hygiene campaign – Every moment counts



Every moment counts

Your 5 moments
for hand disinfection

Today, it is common knowledge that hand hygiene is key to the prevention of nosocomial infections. For infection control practitioners it is nevertheless difficult to lastingly increase the willingness to disinfect hands. PAUL HARTMANN AG and its BODE SCIENCE CENTER identified the most common barriers to hand disinfection and developed new innovative solutions. Highlight: an animated e-learning programme.

“Nothing is good, unless one does it” – the philosophy of life of famous German writer Erich Kästner hardly applies to anything better than hand disinfection. Nursing and medical staff only disinfect their hands in around 50 per cent of the situations actually requiring hand disinfection. Before aseptic procedures and touching a patient – the most important indications of all to protect patients – the compliance is lowest [1].

So, what is it that keeps employees from acting correctly in the right situations and disinfecting their hands? A complicated question that PAUL HARTMANN AG and its BODE SCIENCE CENTER faced up to. In surveys and interviews, hygienists and nursing staff primarily identified the following barriers:



Barrier #1

The moment actually requiring hand disinfection is not recognised during performing complex nursing tasks.

Barrier #2

In the moment requiring hand disinfection there is no hand disinfectant available immediately.

Barrier #3

Knowledge of the right moments for hand disinfection does not last, as training measures do not sufficiently reach employees.

Based on these findings, PAUL HARTMANN AG developed a hand hygiene campaign jointly with its BODE SCIENCE CENTER. The campaign comprises materials such as checklists, a unique e-learning programme and hand disinfectant dispensers that demonstrably increase the willingness to disinfect hands by 50 per cent.



Recognising the right moment

In all the efforts to improve compliance, there is a widespread conviction that more is not always better. It is not about disinfecting the hands more often, but in the right moment and for the right reason.

The “My 5 Moments for Hand Hygiene” model, which was developed by WHO, defines these. In Germany, the Clean Hands Campaign (“AKTION Saubere Hände”) has the goal to integrate this concept in healthcare facilities.

At the heart of the action

Focus is on situations that entail the risk of pathogen transmission, which can be prevented by hand disinfection. The concept divides these indications into five groups:

- 1) **BEFORE** touching a patient
- 2) **BEFORE** aseptic procedures
- 3) **AFTER** body fluid exposure risk
- 4) **AFTER** touching a patient
- 5) **AFTER** touching patient surroundings

Probably the most important issue: the moments mainly occur at the heart of the action – that is where patients or residents and nursing or medical staff meet and where there is the highest risk of infection, e.g. due to invasive tasks.

Easy but not simple

Even though hand disinfection is an easy infection control measure which, in contrast to, for example, instrument reprocessing does not require much specific knowledge, it is not simple at all.

Hand disinfection is no isolated action, but is always linked to medical or nursing tasks. These are often complex – even measuring vital functions consists of many individual steps involving different risks of infection.

Learning in the process

One single medical or nursing activity may require several hand disinfection procedures to protect the patient or personnel. It is exactly this complexity that makes it difficult for healthcare providers to recognise the right moments for hand disinfection in daily routine.

According to studies, a promising approach seems to be to integrate hand disinfection in the standard operating procedures (SOPs) and train the whole process. This approach directly takes up the employees’ experienced day-to-day work [2].

Beside teaching of these SOPs, i.e. learning directly at the patient’s / resident’s bed, is resource-intensive and not practicable on a large scale. The solution: PAUL HARTMANN AG and its BODE SCIENCE CENTER have developed a unique training programme to promote compliance with hand hygiene. This is an e-learning tool that uses precise nursing activities including their many individual steps to help recognise and understand the moments for hand disinfection: the “5 Moments E-Learning Tool”.

Sources

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The “5 Moments E-Learning Tool”

Precise nursing tasks, great animation, substantiated background information and feedback: the BODE SCIENCE CENTER’s e-learning tool on the “5 Moments” motivates and conveys the right moments of hand disinfection.



Every moment counts

Your 5 moments for hand disinfection

E-learning programmes are highly popular, offering advantages such as high flexibility and swift availability. Tools, which simulate real application situations, interactively involve the learner, work with qualified feedback and are operated in a simple and intuitive way, ensure lasting learning success. And these are precisely the distinct features of the BODE SCIENCE CENTER’s “5 Moments E-Learning Tool” on hand hygiene, which besides hand disinfection also trains the correct handwashing procedure and glove use.

Lasting effect

Because the programme works with high-quality computer animations and is based on the recommendations of WHO, CDC, RKI, “AKTION Saubere Hände” (Clean Hands Campaign), and recent findings of learning and motivation research.

For the e-learning programme to perfectly complement conventional training measures and increase their effect.

The tool’s modules, for example, “Measuring blood pressure” and “Placing a peripheral venous catheter” simulate precise caregiving tasks. The participants decide directly in the process when it is necessary to perform hand disinfection, to use gloves or to wash hands.

Participating facilities win employees with a high level of commitment to hand hygiene.

The “5 Moments E-Learning Tool” including the Conditions of Participation and lessons is now available at www.bode-science-center.com.

One year full of right moments: the e-learning modules at a glance

Module 1: Started on 15 Jan 2013

Measuring blood pressure catheter Placing a peripheral venous

Module 2: Will start on 15 Apr 2013

Washing a patient Changing a dressing

Module 3: Will start on 15 July 2013

Connecting infusions Urinary catheterisation

Module 4: Will start on 15 Oct 2013

Taking the pulse Suctioning a tracheotomy

Seizing the right moment

For hand hygiene not to be left behind, but to be optimised using the shortest way: PAUL HARTMANN AG's checklists for right dispenser placement support facilities to increase the willingness to disinfect hands and thus improve patient protection. Dispensers coming in signal colours or with sensor-controlled technology provide additional effects and increase compliance rates by up to 50 per cent.

The availability of hand disinfectants is one basic requirement of hand disinfection. Key factors include the number of dispenser and their correct placement. Dosing dispensers ensure the availability of hand disinfectants, their hygienic dispensing and correct dosing.

Placement according to the 5 Moments

Best hand hygiene results are achieved, when the dispenser locations are selected following the WHO's two "BEFORE" and three "AFTER" indications. That is where PAUL HARTMANN AG's checklists for dispenser placement come into action: the dispenser locations are directly geared to the "5 Moments" to ensure the availability of hand disinfectants in situations actually requiring hand disinfection to prevent the transmission of pathogens.

There are dispenser checklists for hospitals and nursing facilities and they contain detailed location recommendations according to the "5 Moments for Hand Disinfection". Additionally, it is possible to note if dispensers are available and whether they are equipped with a counter. The checklists can be used as master copy for all areas.

The PAUL HARTMANN AG checklists for ideal dispenser placement according to the "5 Moments for Hand Disinfection" are available for download at www.bode-science-center.com.

Dispensers with touchless technology and signal colours increase compliance by 50 per cent

According to a study, the use of sensor-controlled hand disinfectant dispensers and dispensers coming in signal colours lead to an increase in compliance by more than 50 per cent. The number of dispensers remained constant. Please visit the BODE SCIENCE CENTER website (Science/Compliance) to read summaries of this and other studies.



Advantage in compliance through technology

It is not new that the number of dispensers decisively influences compliance with hand hygiene. However, there is a new study of the University Hospital Aachen, Germany, delivering surprising results: dispensers with sensor-controlled technology alone are able to increase the willingness to disinfect hands by more than 50 per cent [1]. DISINFACTS spoke with the head of the study, private lecturer Dr. med. Simone Scheithauer.



Is this positive effect on the compliance the result of a temporary fascination for technology?

Priv. Doz. Dr. med. Simone Scheithauer: Based on our data, we are able to reliably exclude this. We could observe the increase in compliance constantly over the whole study period of 12 weeks, with levels still remaining steady. Currently, the hand disinfectant consumption exceeds the 90th percentile of the reference data of the Hand-KISS module within the German Hospital Infection Surveillance System (KISS). This reflects the possibility of a lasting increase in compliance by sensor-controlled technology.

How do you explain this phenomenon?

After introducing touchless dispensers in a medical intensive care unit at your hospital, hand disinfection went up by an average of 53 per cent per patient day. Can this result really be linked to the dispensers' technical features?

Priv. Doz. Dr. med. Simone Scheithauer: For our study, the number and locations of the dosing dispensers remained exactly the same. We only replaced the previous dispensers with sensor-controlled dispensers equipped with counters. And there were no additional interventions such as systematic training. Hence, we can in fact attribute the increased consumption of hand disinfectant to the touchless technology – indeed a surprising result, also for us.

Priv. Doz. Dr. med. Simone Scheithauer: Rationally, there are two reasons. The new dispensers' handling and user convenience is better: touchless dispensers can be operated with one hand only or healthcare workers can put both hands under it at the same time. And it saves time. Sensor-controlled dispensers integrate more smoothly into daily routine and their functions seem to be more intuitive: they do not require any hand-arm coordination like manual dispensers do and the automated dispensing is easily and conveniently done in passing.

Disinfection done in passing – what about the hand disinfection’s quality here?

Priv. Doz. Dr. med. Simone Scheithauer: Care must be taken that the hands are thoroughly covered within the 30-second rub-in time of hygienic hand disinfection. This implies the application of enough product per dispenser actuation. There is a study that, for example, showed that 0.7 ml per actuation is not enough to ensure good coverage. So, the 3 ml known from the test methods – 1.5 ml per actuation – is a good mean value, which we also used for our dispensers.

Can touchless dispensers replace other, costly interventions to increase the compliance rate?

Priv. Doz. Dr. med. Simone Scheithauer: A multi-modal approach for improving compliance is, beyond doubt, the gold standard; training, posters, etc. will remain indispensable. But when it is possible to additionally increase the compliance rate by applying a simple technology, then this optimises hand hygiene in a cost-effective way. Used with counter or even linked with WLAN technology, these dispensers may become an alternative to assessing compliance by resource-intensive observation. However, it must be said that this technology does not provide any information on indication-specific compliance, workflow errors, or non-indicated hand disinfection procedures.

The ward in your study was equipped with more dispensers than recommended by the German “AKTION Saubere Hände” (Clean Hands Campaign). So does that mean, the more the better?

Dr. med. Simone Scheithauer: There are 14 patients in this ward. Of our 32 dispensers, 24 are in the patient rooms. The rest are at other locations relevant to infection protection, for example, spaces for preparing medications. This high availability ensures that employees always have access to hand disinfectants where it is important to prevent infections, usually at the Point of Care that is. Our sensor-controlled dispensers located near patients are used twice as much as those in corridors. This is due to the fact that employees do not need to actively bear hand disinfection in mind, but have the opportunity right in front of them. This particularly considers the hand disinfection’s BEFORE indications that are important for protecting patients against nosocomial infections, which precisely is the primary goal of hand hygiene.

Dr. med Simone Scheithauer, thank you very much for this interview.

1. Scheithauer S. et al.
Steigerung des Verbrauchs an Händehygienedesinfektionsmittel nach Einführung berührungsfreier Desinfektionsmittelspender.
Hyg Med 2011; 36 (12): 496-498.



Private lecturer Dr. med. Simone Scheithauer.

Senior physician, medical specialist in microbiology, virology and infection epidemiology, and medical specialist in hygiene and environmental medicine at the University Hospital Aachen, Germany.

Efficacy of surgical hand scrub products based on chlorhexidine is largely overestimated without neutralising agents in the sampling fluid.

Kampf G, Reichel M, Hollingsworth A, Bashir M. Am J Infect Control. 2013 Jan;41(1):e1-5

In contrary to the European Norm (EN) 12791 for surgical hand disinfectant efficacy testing, the US Tentative Final Monograph (TFM) for healthcare antiseptic products does not stipulate the use of neutralising agents in the sampling fluid. As many surgical hand antiseptics contain chlorhexidine gluconate (CHG), which is non-volatile, it is imperative that antimicrobial activity is immediately quenched in the sampling fluid. Hence, there has been doubt whether efficacy testing in accordance with the US method produces efficacy data that are overestimated.

It is for this reason that Kampf et al. conducted a study to determine the efficacy of two different CHG-containing hand antiseptics, which were approved for surgical hand antisepsis by the US Food and Drug Administration (FDA), using the TFM test method with and without adding neutralisers to the sampling fluid.

To measure their efficacy, Avagard CHG (61 % ethanol and 1 % CHG; 3M) and Hibiclens (4 % CHG; Mölnlycke Healthcare) were applied 11 times over a period of 5 days. Both formulations were used as recommended by the manufacturers. Directly after application, one hand was sampled (glove juice sampling procedure); the other hand was gloved and

sampled six hours later. For one group of the test subjects, both sampling fluid and dilution fluid contained neutralising agents (NAs); for the second group, only the dilution fluid contained NAs. The third group, for which NAs were also added to the dilution fluid only, additionally applied cream after the final scrub on days 1 to 4. After a 72-hour incubation of the samples on TSA, colonies were counted and data recorded. Afterwards, analysis of variance (ANOVA) was performed to compare the mean values between the three study arms for both products and all sampling times. Neutralisation was validated according to the American Society for Testing and Materials (ASTM) E1054 standard using *Staphylococcus epidermidis*.

The results show that both products are very effective, with a mean log₁₀ reduction in skin flora by 3.32 ± 0.53 for Avagard CHG and 3.68 ± 0.52 for Hibiclens on the fifth day as long as no NA is added to the sampling fluid. With NAs in the sampling fluid, both products were significantly less effective: 2.75 ± 0.55 for Avagard CHG and 3.14 ± 0.50 for Hibiclens. The average overestimation of efficacy – due to the lack of NAs in the sampling fluid – therefore was between 0.3 and 1.1 log₁₀.

With their study, Kampf et al. demonstrate that sampling without the addition of neutralising agents produce false-positive results for the two products Avagard CHG and Hibiclens, and similar results are likely for other surgical hand disinfectants or scrubs containing CHG at comparable concentrations.

An overrating of the efficacy may jeopardise patient safety, as the product may not be effective enough on the hands to prevent cross transmission. Hence, the authors wonder why the FDA method and most ASTM standards on hand hygiene do not yet require the use of NAs, at least in the sampling fluid.. To ensure correct evaluation of product efficacy, Kampf et al. suggest NAs to be included in test methods as mandatory and to critically assess all efficacy studies on CHG-containing products carried out without NAs in the sampling fluid.

Considering the disadvantages of CHG such as allergies, skin irritation and resistance to Gram-negative bacteria, the authors recommend that future

research determines whether CHG is beneficial for hand antiseptics – particularly in view of that there is increasing evidence that appropriate concentrations of alcohol are just as or more effective than CHG. Furthermore, alcohol has never been attributed to acquired resistances and has little potential for skin irritation.

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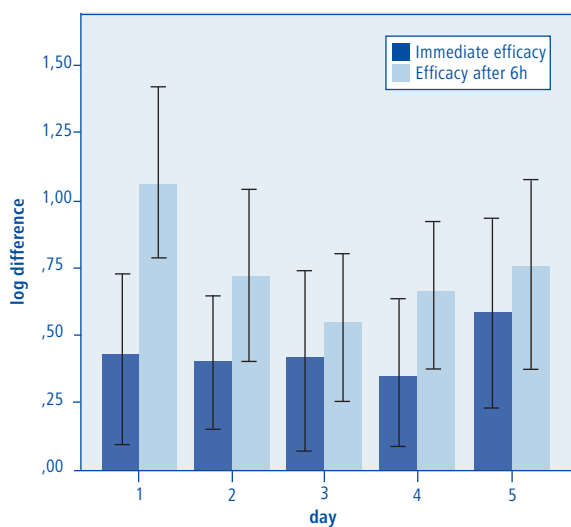


Fig 1. Overestimation of the immediate efficacy and efficacy after 6 hours (mean with 95% confidence interval) caused by lack of NAs in the sampling fluid of Avagard CHG used for surgical hand disinfection over 5 days.

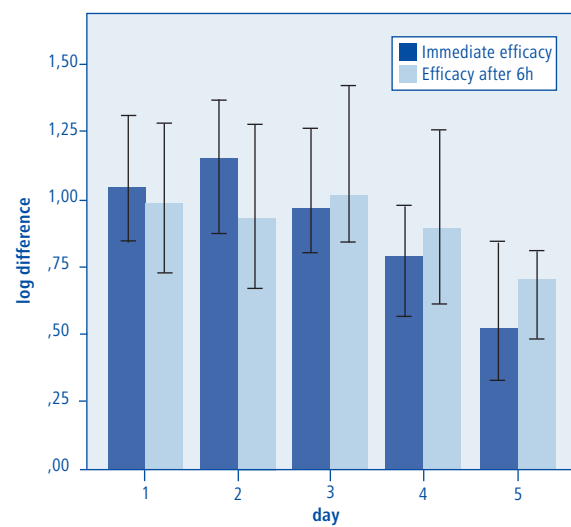


Fig 2. Overestimation of the immediate efficacy and the efficacy after 6 hours (mean with 95% confidence interval) caused by lack of NAs in the sampling fluid of Hibiclens used for surgical hand disinfection over 5 days.

Contaminated disinfection solutions in wipes dispensers: new data confirm the need for a “system solution”

Wipes dispensers for surface disinfection that are not reprocessed properly before reuse may promote contamination of the use-solution. This problem only occurs with products based on surface-active substances without aldehyde. New data of the BODE SCIENCE CENTER now confirm: the risk of contamination does not depend on the manufacturer or individual formulation.



In November 2012, the Disinfectant Commission in the German Association for Applied Hygiene (VAH) indicated that wipes dispensers for surface disinfection, which are not reprocessed properly before reuse, may promote the formation of biofilms.

Own studies of the BODE SCIENCE CENTER showed that microbial contamination of the use-solution in wipes dispensers primarily is caused by Gram-negative pathogens and, without exception, is linked to surface disinfectants that are based on surface-active substances and contain no additional aldehyde as active ingredient (e.g. QAC, amines, amphoteric surfactants, glucoprotamine, etc.). According to present knowledge, aldehyde or alcohol-based products are not affected.

Contaminated solutions found in dispensers used in clinical practice – independent of manufacturer and product

On average, more than 40 per cent of the examined use-solutions in dispensers coming from hospitals and practices proved to be highly contaminated

(approx. 10^6 – 10^7 bacteria per ml). *Achromobacter* spp. was identified almost always, but the different clones suggest that a common source is very unlikely. Under the selection pressure, the microorganisms had adapted to the disinfectant solution: even after five passages on agar plates, the same isolates were much more sensitive to the use-solution with the same disinfectant (increase in efficacy by 2 to 5 log₁₀ steps). These isolates were also able to proliferate in different freshly prepared disinfectant solutions (different manufacturers) at room temperature within 1 to 2 weeks.

Especially the examination of disinfectant solutions actually in use delivered new insights on their contamination and the consequences for the reprocessing of wipes dispensers:

- All contaminated use-solutions belonged to the product group of surface-active ingredients without additional aldehyde.
- Contaminated solutions were found in dispenser systems in different clinics in different Federal states, independent of manufacturer or formulation.
- It is highly likely that the isolated microorganisms do not come from the same source – no clonal identity was determined between isolates from different clinics.
- All dispenser systems had been reprocessed insufficiently.

Reprocessing of contaminated clinical dispensers is challenging

Additionally, the examinations showed that it is much more difficult to reliably reprocess wipes dispensers that had been used with the above mentioned formulations for months or years already and had been reprocessed inadequately than new dispensers being contaminated in the lab artificially. The suspected cause is the formation of biofilm and niches in the dispenser (signs of wear and tear). In view of these facts, the different reprocessing procedures that the manufacturers for wipes dispensers are to be viewed with a critical eye. Procedures covering clinical reality for sure provide best protection against recontamination and thus ensure patient safety.

Safe reprocessing possible

The BODE SCIENCE CENTER's examinations demonstrate that it is possible to reliably prevent recontamination of use-solutions in wipes dispensers over the standing time of 28 days. Two manual and one simple automated method yielding safe reprocessing results have been developed. All procedures have been verified comprehensively.

Conclusion: Basically, all wipes dispensers need to be reprocessed not later than after the expiry of the standing time and before they are used again – independent of manufacturer and formulation. The effectiveness of the reprocessing procedure (no recontamination of the disinfectant solution after the standing time) should be confirmed by hygienic microbiological examinations.

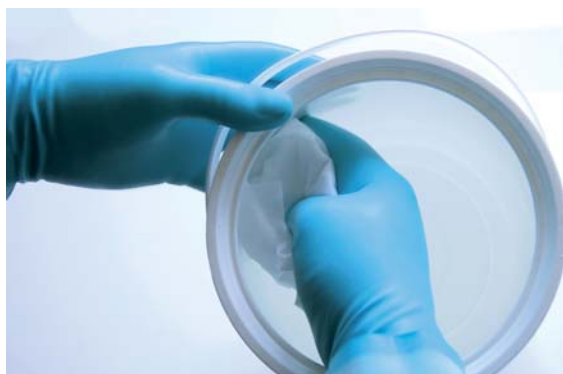
To download the reprocessing procedures the BODE SCIENCE CENTER developed for wipes dispensers please go to www.bode-science-center.com (BODE and CENTER). And the Contact Point is happy to answer any additional questions on the reprocessing of wipes dispensers:

Fax: +49 40 54006-777

Mon-Thurs: 8:00-16:30

Fri: 8:00-15:00

Email: contact@bode-science-center.com



Please note: This article is based on the speech "Safe reprocessing of wipes dispensers for surface disinfectants", which Prof. Dr. Günter Kampf, Director Science, BODE SCIENCE CENTER gave at the 10th ULM SYMPOSIUM ON NOSOCOMIAL INFECTIONS, 19 to 22 March 2013.

Due to reasons pursuant to publication law, we cannot give additional details at this point in time. Those interested in receiving further details of the examinations exceeding the first publication are invited to subscribe to the newsletter at www.bode-science-center.com.

A matter of attitude

Pleasant scent, nice music and kind words – a recent study shows how positive experiences influence personal attitudes and thus increase hand hygiene compliance [1].



Speech is silver – action is golden. This motto also and especially applies to hand disinfection. Although healthcare professionals indicate in surveys that they believe in the necessity of hand disinfection, actual hand hygiene compliance is anything but satisfactory. The average compliance rate is 50 per cent only, which means that every other hand disinfection is not carried out when indicated.

This discrepancy between attitude and evident low compliance rate prompted Diefenbacher et al. to conduct a study. For this, the scientists fell back on findings from social psychology, which differentiates between two types of attitudes. On the one hand, there is the direct, conscious or “explicit” attitude, usually causing rational and planned action. And then there is the “implicit” attitude forming the basis of unconscious, rather impulsive behaviour.

The scientists believed that it is the unconscious, implicit attitude towards hand disinfection that determines actual hand disinfection action in daily routine. One reason, according to the authors, is the high time pressure and physical and cognitive strains healthcare workers have to cope with.

Implicit beats explicit

In several examination steps (see “Methods”), the scientists succeeded in identifying the employees’ explicit and implicit attitudes towards hand hygiene. Without exception, the analysis revealed a positive explicit attitude towards hand hygiene: on a scale from 1 (= “do not agree”) to 7 (= “fully agree”), the mean value was 6. However, the explicit attitude not always corresponded to actual hand disinfection behaviour. Though the implicit attitude was negative for one fifth of the respondents, it was clearly in the positive range overall.

The following result was particularly interesting: those having a positive implicit attitude also disinfected their hands more often. The explicit attitude, however, was not linked to an improved hand hygiene behaviour. So, the hypothesis of Diefenbacher et al. has been confirmed: the unconscious, implicit attitude has decisive influence on hand hygiene practices and may serve as predictor of actual hand hygiene behaviour.



Making hand hygiene “perceptible”

This study offers path-breaking findings, particularly regarding future intervention campaigns for improving hand hygiene compliance. Hence, common measures such as training and information events on hand hygiene should not only impart knowledge, but also positively influence the implicit attitudes.

For this, it is crucial that hand hygiene is “perceptible” and associated with pleasant impressions. Because when experiencing something positive repeatedly during the respective activity, that certain behaviour, for example, hand disinfection is linked to positive thoughts. Thus, positive experiences, for instance, a pleasantly scented hand disinfectant, nice music or favourable words may automatically stir up positive associations with hand hygiene. And all this, in turn, results in improved hand hygiene behaviour.

Methods

As part of a field study, the first step comprised the collection of data on the hand hygiene behaviour of medical staff (three physicians and 64 nursing staff members) in a clinic in Southern Germany. Afterwards, the implicit attitude was measured by observing the test persons’ reaction to hand hygiene images (“evaluative priming”). In addition, the explicit attitude (level of acceptance or refusal of different aspects of hand hygiene) was determined in direct interviews. The implicit and explicit attitudes were then related to the actual hand disinfection behaviour by a statistical analysis (multiple regression analysis).

However, the best implicit attitude is of little use, if hand disinfectants are not easily accessible. Hence, healthcare facilities should always ensure to place hand disinfectants at locations easy to access and attach great importance to hand hygiene in daily routine in terms of time.

Sources

1. Diefenbacher Svenja et al.: Implicit attitude towards hand hygiene as relevant predictor of hand hygiene behavior. *HygMed* 2012; 37 [11]: 448–455..

Please visit the BODE SCIENCE CENTER website to download the complete study.

Surface disinfection: monitoring improves quality

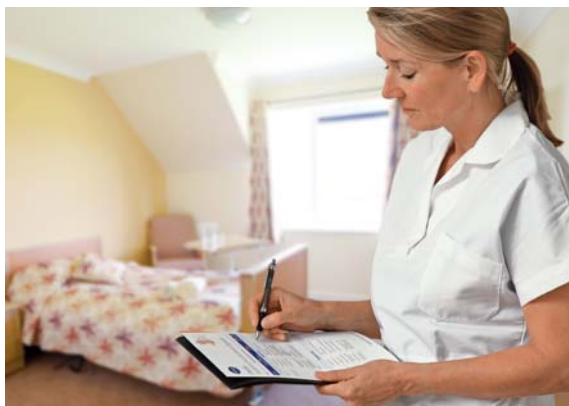
In terms of staffing, protective and work clothing, and hygiene plans, Frankfurt hospitals and geriatric nursing homes already are in an ideal position. This is the result of examinations the municipal health authority conducted of the quality of surface hygiene [1,2]. According to the experts, however, there is room for improvement concerning workflows and work instructions. Their recommendations on, for example, applying optical monitoring also help other facilities in Germany.

Surface hygiene has a central role in preventing nosocomial infections and is checked during site inspections by health authorities [3]. Site inspections of the Frankfurt health authority showed that, in addition to good training, in-house checks of cleaning and disinfection are an effective measure to improve quality.

Lead by private lecturer Dr. Ursel Heudorf, the authority carried out quality audits reviewing surface cleaning and disinfection in 17 hospitals (2009 and 2010) and 41 geriatric nursing homes (2011). In 2009, the audits in the clinics brought significant structural deficiencies to light, for example, improper education of supervisors and insufficient training of employees.

All-important: good organisation and qualification

In addition, the experts considered it problematic that near-patient surfaces often were only cleaned, rather than disinfected. In many cases, damaged surfaces did not allow adequate disinfection, or necessary exposure times were not adhered to.



Errors were more common in infection rooms than in "normal" rooms, and 75 per cent of the Frankfurt hospitals did not have surface disinfectants active against bacterial spores.

Follow-up audits one year later revealed rigorous improvements. Intensive and practical training with clear focus on practical guidance ("Frankfurt Model") [4] and workflow improvements considerably contributed to increased quality.

Controls improve quality

For the Frankfurt experts, one important reason for these improvements is regular in-house controls of the cleaning service conducted by, for example, the utility department. The site inspections in the nursing facilities confirmed how reasonable these regular checks are. In the 41 geriatric nursing homes the Frankfurt health authority inspected in 2011, the experts focused on organisational preconditions such as the provision of protective clothing, and the result quality.

The latter was determined by optical monitoring with HARTMANN's GlowCheck. In each home, various areas were marked with fluorescent dye in advance. Subsequent inspection showed that only 262 (44 %) of the 595 check marks had been removed by cleaning or disinfection. Additional direct observation revealed that not even half of the inspected



hand-contact surfaces (e.g. commode chairs, lifting aids handwashing areas, tubs) had been disinfected adequately. Additional shortcomings were detected for the work management: in almost one third of the homes, there were no pathogen-related work instructions, e.g. for *Clostridium difficile* and noroviruses.

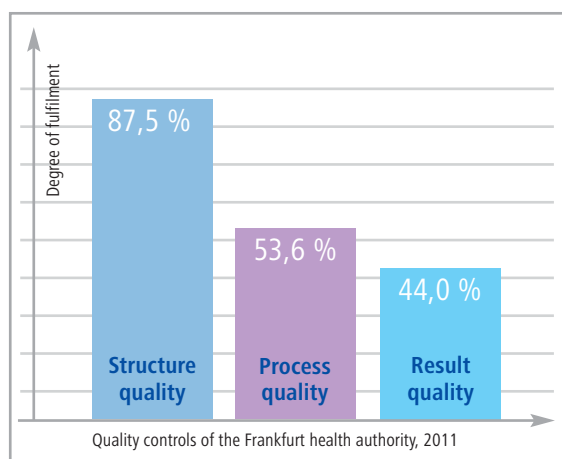
GlowCheck: the low-cost procedure for quality testing

Another advantage of this method is that it directly and didactically demonstrates employees where there are weak points or how surfaces are cleaned properly. To maximise success, hygiene checks with GlowCheck should always be linked to constructive feedback including precise advice.

Because those things applying to training, definitely apply to controls as well: the more practice-oriented and comprehensible the message, the more lasting the effect.

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Surface hygiene inspection results in Frankfurt geriatric nursing homes



Structure quality: staffing; work and protective clothing; hygiene, cleaning and disinfection plan

Process quality: cleaning quality determined by on-site observations of work

Result quality: cleaning quality determined by optical monitoring (GlowCheck)

Mere enthusiasm for research

Pharmaceutics, polenta and purple snails – three topics that stand exemplarily for Bartolomeo Bizio's inexhaustible exploratory urge. Today, the Italian scientist is considered one of the initiators of microbiology. He particularly achieved renown by discovering *Serratia marcescens*.



Is it a wonder or rather the contrary – a visitation of Satan? This was the question the distraught inhabitants of the small North Italian village Legnaro asked in August 1819. Cause of all this excitement were some inexplicable blood-like stains that had appeared on the maize polenta of farmer Antonio Pittarello. The church did not wait very long and sent a priest to investigate this phenomenon. And the University of Padua assigned a scientific commission to explore this peculiar incident. But it was a third person, who finally answered the question: pharmacist and scientist Bartolomeo Bizio.

In his scripture published in 1823, the young researcher proved that the red staining of the polenta was a pigment caused by a microorganism, even though he mistakenly believed it was a fungus. In honour of Florentine physicist Serafino Serrati, Bartolomeo Bizio called his discovery *Serratia marcescens*, which was identified as bacterium later. He chose the epithet *marcescens* (Latin for “decaying”), because of the pigment's rapid deterioration due to its sensitivity to light. This and other researches are the reason for Bartolomeo Bizio being regarded as one of the initiators of microbiology and precursor of Louis Pasteur.

On the track of natural phenomenons

Bartolomeo Bizio was born on 30 October 1791 in Costozza die Longare near the North Italian city of Vicenza. His family's economic difficulties forced him to leave school early and support his father in the tailor workshop.



Purple snail: Bartolomeo Bizio also explored the origin of the purple dye.

But the young Italian's thirst for knowledge was tremendous: in his spare time, he read everything on natural sciences he could get his fingers on and keenly observed many different natural phenomena.

In 1809, the pharmacy Zanichelli in Padua accepted Bartolomeo Bizio as apprentice. At the same time, the move to the university town allowed him to deepen his studies of physics and chemistry. In 1819, he registered at university officially and, one year later, graduated in pharmaceuticals. But his thirst for knowledge had by far not been satisfied yet. On the contrary: in 1833, he not only completed his studies of philosophy, but also obtained a chair in applied chemistry in Venice. Learning, research and experimentation ran like a golden thread through Bartolomeo Bizio's life.

Limitless fondness for experimenting

Especially the experimental activities distinguish the working method of Bartolomeo Bizio. Thus, his research ranged from examinations of positive solution heat, experiments with purple snails to studies on the surface tension of liquids. From 1827 to 1861, he wrote as many as 110 scientific publications. His most important work "Dinamica chimica", however, remained unfinished. On 27 September 1862, Bartolomeo Bizio died in Venice. His son Giovanni Bizio, who also worked as chemist, finally finalised his book.

In Italy's scientific community, Bartolomeo Bizio's accomplishments received great recognition. The researcher was loaded with honours and awards. From today's point of view, his studies are particularly remarkable, because natural scientific knowledge of chemists and physicists had still been quite limited in the first half of the 19th century.

Serratia marcescens: elicitor of infectious diseases

The discovery of *Serratia marcescens* is considered a special highlight of Bartolomeo Bizio's scientific career. The facultative anaerobic, Gram-negative, rod-shaped bacteria belong to the family of Enterobacteriaceae. Today, these bacteria are known for triggering nosocomial infections and are especially dangerous for people with weakened immune system. Hence, *Serratia* species are often a problem in neonatal and paediatric intensive care units. Additionally, they belong to the ESBL-producing strains (ESBL = extended-spectrum beta-lactamase) and therefore are multi-resistant to antibiotics with broad spectrum of activity.

In order to honour Bartolomeo Bizio for the discovery of *Serratia marcescens*, a species of Gram-negative bacteria discovered on the Kuril Islands was called "Bizionia" – an appraisal of Bartolomeo Bizio's important contribution to the development of microbiology.

Sources

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1.



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3.



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GlowCheck: hygiene checks made easy

Those wanting an easy, quick and low-cost solution for monitoring the quality of surface hygiene is well advised to use the GlowCheck system.

GlowCheck offers a procedure for optically monitoring cleaning and disinfection measures. It is based on a combination of fluorescent special colour and UV light. The check marks can be made visible with a black-light torch and usually are easy to wipe off. The method gives a quick overview of the effectiveness of cleaning and disinfection measures.

1) The special fluorescent GlowCheck colour is for filling the self-inking stamp. Use the attached pipette to conveniently take the colour from the bottle. A few drops are enough to refill the stamp pad.

2) Mark the desired areas with the "HYGIENE CHECK!" stamp. In case of doubt, test whether the colour can be removed without leaving residues in an inconspicuous area.

In particularly hygiene-sensitive areas it may be necessary to disinfect the surface before and the stamp after stamping. For this, keep the self-inking stamp in stamping position and thoroughly wipe the die plate with a pre-soaked disposable tissue, e.g. Bacillo!® Tissues.

3) In daylight, the check marks are not visible, but intensively shine as soon as they are illuminated with the black-light torch.

4) Use the GlowCheck marker to additionally note something next to the stamp, e.g. date and time.

5) The GlowCheck pump spray is suitable for larger surfaces and especially hygiene-sensitive areas.

You will find detailed information on GlowCheck under Products at www.bode-chemie.com.



Quality through expert knowledge and decades of application expertise: Based on our scientific know-how, own research projects and an international network, we develop optimised, economically attractive prevention measures. **Research for infection protection.**

