

July 2022

Preventive washing as a simple measure to prevent infection

Washing without water replaces wash bowls in intensive care units

Cleanliness and hygiene promote health and protect against infections. What is true in everyday life has also become routine in intensive care units (ICUs) globally. Daily washing of patients as part of standard care is part of everyday practice and is also recommended by the German Commission for Hospital Hygiene and Infection Prevention (KRINKO).

It is estimated that 8.9 million people in Europe alone contract a nosocomial infection each year¹, which is associated with additional costs of EUR 7 billion.³ The risk of

nosocomial infections is particularly high in intensive care units. According to a survey carried out by the European CDC (ECDC) in 2017, 8.3% of all ICU patients with inpatient stays of more than 2 days suffered a nosocomial infection. 3.7% of these were serious bloodstream infections (BSIs).² Given that the skin is an important source for infection, anti-septic washing in ICUs is becoming increasingly important as reflected in both, national and international guidelines.



KRINKO recommends ...

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“ ... performing antiseptic body washes for the decolonization of the skin (Cat. II) using an antiseptic with proven efficacy [...] and good skin tolerability (Cat. II)⁴

“ [...] carrying out daily antiseptic whole-body washes of patients in intensive care units of internal medicine wards as part of standard care to prevent bloodstream infections (Cat. IB)⁶

“ antiseptic body washes to prevent VRE infections in patients with high CVC use rates [...]⁵

Antiseptic washing is used for universal decolonization. As such, it is particularly useful for removing multidrug resistant organisms, which are difficult to treat with antibiotics alone and, therefore, frequently

cause life-threatening infections. According to the ECDC, nosocomial infections requiring anti-bacterial treatment amounted to 500,000 patient-days.²



... lower costs

- Through a reduction in purchasing/storing and sanitizing costs, for example, for wash bowls, washcloths, dry wipes.
- Decontamination with wash mitts is cheaper than systemic treatment with antibiotics.⁸

... reduction of infection risk.^{6,10}

The WHO recommends ...

schülke +



World Health Organization

“ mupirocin nasal ointment in combination with chlorhexidine (CHG)-containing body washes in MRSA carriers pre-surgery.⁷

There are two methods available for patient body washes in intensive care units. One is the rinse-off method with water and soap which is still frequently practised. For the rinse-off method, large bowls of water are used and the patient is then washed with wet, disposable washcloths and wash lotion. Subsequently, the skin is dried off with dry wipes. The leave-on method uses impregnated antiseptic wipes or wash mitts. As there is no extra step of dry-wiping required, the antiseptic remains on the skin and, thus, contributes to a

prolonged antibacterial effect (residual effect).

In a survey on the practicability and effectiveness of the two methods, all nursing staff questioned said they preferred the finished product. Patient washing with impregnated wipes took less time, was easier in the handling and required less material.⁹ Additionally, 75% of the questioned nursing staff stated that using the impregnated wipes was more pleasant for the patient.⁹



... less time-consuming and less effort

- No preparation of wash bowls, washcloths etc. required as compared to rinse-off products.
- Average nursing care time is reduced from approx. 4 min to 3 min.⁹



... no bacterial cross-contamination

- Octenidine- or chlorhexidine-based products help to reduce bacterial cross-contamination.

The WHO states that the use of CHG wipes can help to reduce bloodstream infections more effectively than the use of CHG-containing soaps.⁷



Wash mitts leave significantly more antiseptic on the skin.



Prospective, randomised cohort study

- 72 intensive care units
- Over 70,000 patients



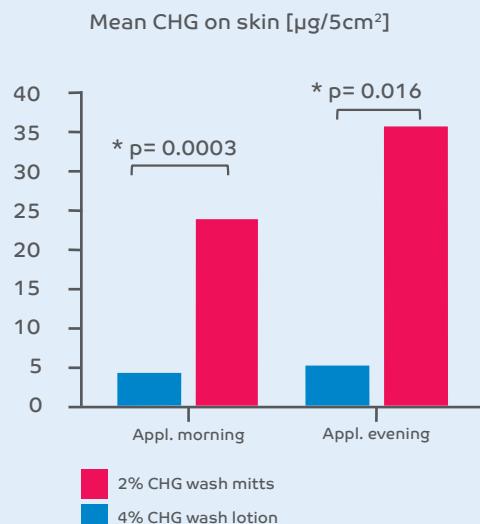
Subjects Day 1

- 4% CHG wash solution
- Showering with wash solution

Subjects Day 8

- 2% CHG wash mitts
- Application according to a fixed scheme

Ryder et al. (2007) investigated the amount of chlorhexidine (CHG) remaining on the skin after use of a 4% CHG wash solution compared to wash mitts impregnated with 2% CHG. They found that the amount of CHG remaining on the skin was significantly higher ($p=0.0003$.) for the wash mitts than the rinse-off product. Additionally, the amount of CHG increased significantly with multiple use ($p=0.016$).¹¹



CHG: chlorhexidine / Appl.: Application

Figure adapted from: Ryder M., Improving Skin Antiseptis: 2% No-Rinse CHG Cloths Improve Antiseptic Persistence on Patient Skin Over 4% CHG Rinse-Off Solution, 2007, Conference Poster

Universal patient decolonization reduces the risk of bloodstream infections significantly, by more than 40%.



Cluster-randomised clinical trial

- 72 intensive care units



23,480 patients

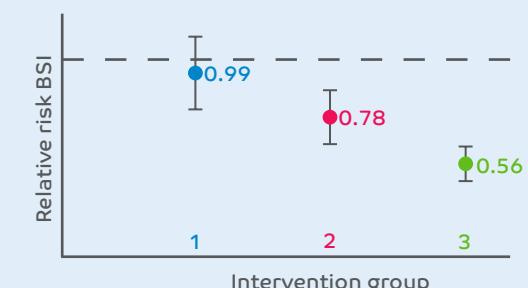
- MRSA screening
- Isolation, no decolonization

22,105 patients

- MRSA screening
- Isolation, targeted decolonization

26,024 patients

- No MRSA screening
- Universal decolonization



In a first major study, Huang et al. (2013) investigated the effect of various sanitization strategies on bloodstream infections (BSIs) caused by MRSA. The study found that universal decolonization, which included patients regardless of their MRSA status, was superior to the other strategies. The risk of BSI was reduced by over 40% in this group (relative risk 0.56).¹²

MRSA: Methicillin-resistant *Staphylococcus aureus* p-value: $p \leq 0.001$

Figure adapted from: Huang SS, Septimus E, Kleinman K, Moody J, Hickok J, Avery TR, Lankiewicz J, Gombos A, Terpstra L, Hartford F, Hayden MK, Jernigan JA, Weinstein RA, Fraser VJ, Haffenreffer K, Cui E, Kaganov RE, Lolans K, Perlis JB, Platt R; CDC Prevention Epicenters Program; AHRQ DECIDE Network and Healthcare-Associated Infections Program. Targeted versus universal decolonization to prevent ICU infection. Maurer M et al. N Engl J Med 2013; 368: 2013 Jun 13;368(24):2255-65. doi: 10.1056/NEJMoa1207290. Epub 2013 May 29. Erratum in: N Engl J Med. 2013 Aug 8;369(6):587. Erratum in: N Engl J Med. 2014 Feb 27;370(9):886. PMID: 23718152





Daily washing with 2% CHG impregnated wipes significantly reduces bloodstream infections.

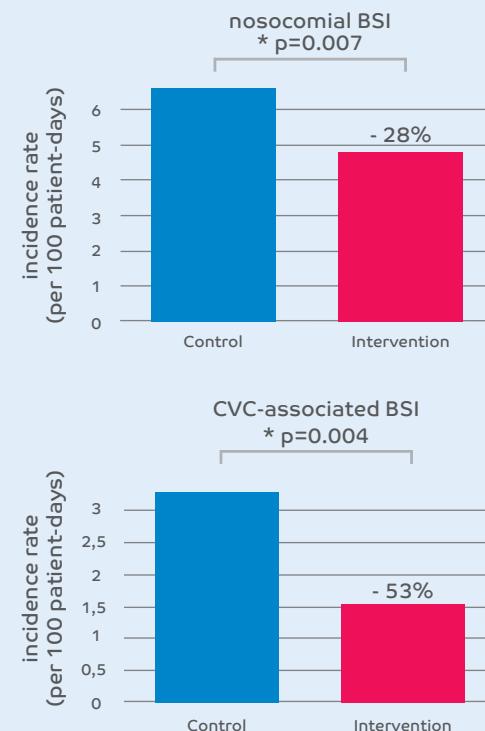


Clinical, multicentric, cluster-randomised cross-over study

- 9 intensive care units and bone marrow transplant centres
- 6 hospitals
- Approx. 8,000 patients

- Daily washing
- 2% chlorhexidine-containing wipes
- Daily washing
- Non-antimicrobial wipes

Preventive washing with 2% CHG impregnated wipes was also shown to be effective against BSI by Climo et al. (2013). Daily washing reduced the number of nosocomial BSIs by 28% ($p=0.007$) and catheter (CVC)-associated BSIs were even reduced by 53% ($p=0.004$).¹³



BSI: Bloodstream infection CHG: Chlorhexidine Control: daily washing with non-antimicrobial wipes CVC: Central venous catheter MDRO: Multidrug-resistant organism Intervention: daily washing with antimicrobial wipes

Figure adapted from: Climo MW, Yokoe DS, Warren DK, Perl TM, Bolon M, Herwaldt LA, Weinstein RA, Sepkowitz KA, Jernigan JA, Sanogo K, Wong ES. Effect of daily chlorhexidine bathing on hospital-acquired infection. *N Engl J Med.* 2013 Feb 7;368(6):533-42. doi:10.1056/NEJMoa1113849. Erratum in: *N Engl J Med.* 2013 Jun 13;368(24):2341. PMID: 23388005; PMCID: PMC5703051

Preventive washing with CHG has a clear advantage in reducing bloodstream infections.

Musuza et al. (2019) carried out a meta-analysis on the effect of preventive washing with CHG on nosocomial BSIs. The authors' overall conclusion was that the risk of nosocomial BSI was reduced by 37% by preventive washing with 2% CHG.¹⁴

It is known that MRSA sensitivity to CHG can be reduced by washing with CHG-containing products. So far, this adaptation has not yet been observed for octenidine.¹⁵ A lower sensitivity to antibiotics (polymyxin, gentamicin) was also evident in some clinical isolates when exposed to CHG, which was not observed for octenidine.^{16,17}

2% CHG-impregnated wash mitts

Bleasdale 2007
Holder 2009
Popovich 2009
Dixon 2010
Evans 2010
Popovich 2010
Kassakian 2011
Montecalvo 2012
Climo 2013
Huang 2013
Martines-Resendez 2014
Cassir 2015
Hayden 2015
Noto 2015
Abboud 2016
Amirov 2016
Boonyasiri 2016
Duszysfiska 2017
Total



Figure adapted from: Musuza JS, Guru PK, O'Horo JC, Bongiorno CM, Korobkin MA, Gangnon RE, Safdar N. The impact of chlorhexidine bathing on hospital-acquired bloodstream infections: a systematic review and meta-analysis. *BMC Infect Dis.* 2019 May 14;19(1):416. doi: 10.1186/s12879-019-4002-7. PMID: 31088521; PMCID: PMC6518712.





Bloodstream infections and MDRO colonization significantly reduced after decolonization with octenidine.

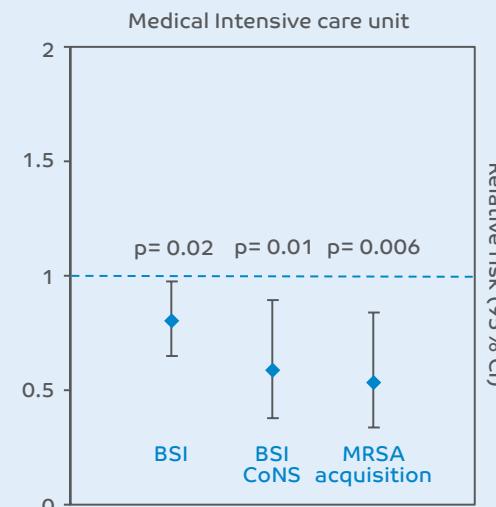


Prospective cohort study over 25 months

- 17 intensive care units at Charité Berlin
- Approx. 30,000 patients
- 5 days octenidine-containing nasal gel
- Daily use of octenidine-containing wash mitts during study period



Gastmeier et al. (2016) investigated the effect of universal decolonization with octenidine-containing wash mitts on the incidence of BSI in surgical and medical intensive care units. BSIs were significantly reduced in medical intensive care units, with the number of BSI cases decreasing from 5.03 to 3.98/1000 patient-days. This was equivalent to a reduction of 21% (relative risk 0.79). Acquisition of MRSA was reduced by up to 47% (relative risk 0.53).¹⁸



BSI: Bloodstream infection MRSA: Methicillin-resistant *Staphylococcus aureus* CI: Confidence interval

BSI CoNS: Bloodstream infection with coagulase-negative staphylococci

Figure adapted from: Gastmeier P, Kämpf KP, Behnke M, Geffers C, Schwab F. An observational study of the universal use of octenidine to decrease nosocomial bloodstream infections and MDR organisms. J Antimicrob Chemother. 2016 Sep;71(9):2569-76. doi: 10.1093/jac/dkw170. Epub 2016 May 27. PMID: 27234462.

Preventive washing with octenisan® has a positive effect on reducing nosocomial VRE cases.

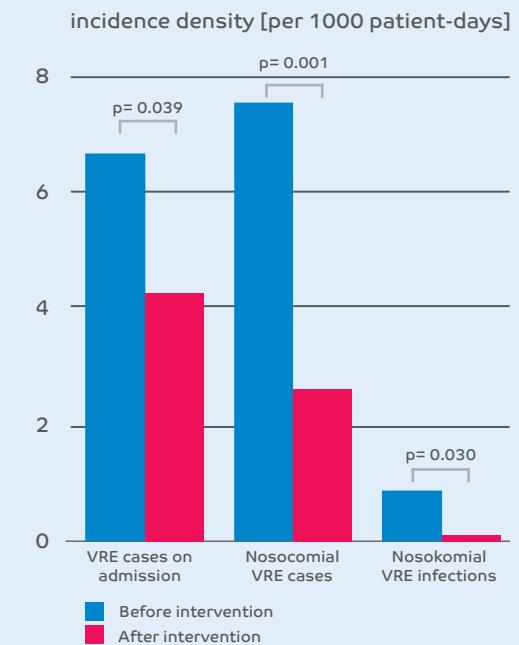


Before-after intervention study

- Intensive care units in Cologne Hospital
- Before intervention up to August 2013
- Screening for VRE on admission and every 2 days
- Intervention from August 2013 onwards
- Daily washing with octenisan®
- Screening for VRE on admission and every 2 days



Other multidrug-resistant bacteria (MDRO) can also be successfully controlled with antiseptic washes. These include vancomycin-resistant enterococci (VRE). By introducing universal decolonization with an octenidine-containing wash lotion, the number of VRE cases was reduced from 7.55 to 2.61/1000 patient-days ($p=0.001$). This was equivalent to a reduction of approx. 66%. VRE infections also decreased significantly from 0.85 to 0.13/1000 patient-days ($p=0.03$). Through the intervention, BSIs were reduced from 2.98 to 2.06/1000 patient-days ($p=0.15$).¹⁹



VRE: Vancomycin-resistant *Enterococcus faecium*

Figure adapted from: Messler S, Klare I, Wappler F, Werner G, Ligges U, Sakka SG, Mattner F. Reduction of nosocomial bloodstream infections and nosocomial vancomycin-resistant Enterococcus faecium on an intensive care unit after introduction of antiseptic octenidine-based bathing. J Hosp Infect. 2019 Mar;101(3):264-271. doi: 10.1016/j.jhin.2018.10.023. Epub 2018 Nov 5. PMID: 30408504.





Advantages at a glance



Data shows significant reduction in nosocomial infections with preventive washing

- Significant reduction in colonization and infections with antibiotic-resistant bacteria as well as the risk of bloodstream infections.
- Benefit also confirmed by meta-analyses.
- Significantly more antiseptic remains on the skin with ready-to-use wash mitts as compared with a wash solution.
- Cumulative effect with multiple use.



Included in international (WHO) and national (e.g. German KRINKO) guidelines

- Whole-body, antiseptic patient washes are recommended for infection prevention and decolonization of antibiotic-resistant bacteria such as MRSA and VRE.



Lower costs

- Decolonization with wash mitts is cheaper than systemic treatment with antibiotics.



Less time-consuming and less effort for nursing staff

- Wash mitts are ready-to-use products and easy to apply.
- No preparation of wash bowls and washcloths, saving working time.



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