The Prevention of infectious bioaerosols in clinical risk areas

Disinfection devices for sink drains

Medical hygiene wash stations

find & kill. not play.™
Clinical sanitary disinfection and outbreak intervention

BIOREC
Dr. SCHLUTTIG
Infectious aerosols from sink drains

On average, sink drains beneath washbasins in hospitals and clinics contain $10^5$ - $10^{10}$ cfu/ml of bacteria, of which approx. $10^3$ - $10^5$ cfu/ml are gramnegative rods (frequent carriers of the waterborne bacteria Pseudomonas, Klebsiella, Acinetobacter, Stenotrophomonas etc.) (DÖRING et al. 1989, 1991).

When water runs into the sink drain, aerosols form. These contain all types of bacteria located in the siphon’s interior, which are invariably released into the surrounding air as the aerosols form. As a result, sink drains constitute open, actively emitting pathogen reservoirs. The higher the sink drain’s microbial load, the more pathogens are emitted into the surrounding air with the aerosols and are thus transferred to the hands of the nursing staff and subsequently to patients (DÖRING et al. 1989 und 1991; SISSOKO et al. 2005).

KRAMER and colleagues at the University Hospital in Greifswald have proved that sink drains beneath washbasins constitute actively emitting sources of the nosocomial colonisation of patients with pathogenic bacteria, and that they can be eliminated as emission sources via continuous disinfection (KRAMER et al. 2005; SISSOKO et al. 2005).

SISSOKO and colleagues demonstrated that nosocomial waterborne infections can also be successfully avoided via the continual physical disinfection of sink drains (SISSOKO et al. 2004 und 2005).
A technical solution to the problem

The BIOREC disinfection system disinfects sink drains under washbasins, showers, baths, birthing tubs and floor drains in a continuous, fully automatic manner, enabling the simultaneous use of the aforementioned equipment.

This continuous automatic disinfection process prevents the dissemination of pathogens from the drains via aerosol formation when water is run or when the basin’s contents are emptied in an ultra-reliable manner: (KRAMER et al. 2005; SISSOKO et al. 2005).

The BIORC Medical hygiene siphon operates according to the following disinfection principles:

- continuous physical disinfection (thermal and UV)
- electromechanical cleansing of the siphon’s inner wall
- antibacterial coating of the siphon’s inner wall.

The ongoing clinical tests carried out on the BIOREC medical hygiene siphon since 1999, which have so far involved over 8,000 patients, attest to the device’s ability to prevent patient colonisation and nosocomial infections in a highly efficient manner.

Please click on the following link www.biorec.de for detailed test reports.
Selected results of clinical tests

Eliminating the emission of infectious bioaerosols from sink drains (siphons) with the BIOREC system

1. “The formation of biofilm was prevented via the siphon's continuous thermal disinfection in conjunction with low frequency vibration, successfully eliminating the siphon as a source of infection.”

B. Sissoko, R. Sütterlin, M. Blaschke, S. Stefaniak, G. Daeschlein and A. Kramer

Emission of Bacteria from sink drains

Hygiene und Medizin, (Hygiene and Medicine), 30th anniversary year, 2005, issue 4, pp. 72-76

2. “Bacteria colonizing oncologic patients were found in the sinks and in aerosols around the basin of the patient room. Continuous thermo-disinfection in combination with low frequency vibration of the siphon prevented biofilm formation and eliminated siphons as bacterial reservoir.”

Translation:

“Die selben Bakterien, die (während der Untersuchungen) auf onkologischen Patienten befanden, traten sowohl in den Geruchsverschlüssen als auch in den Aerosolen aus dem Waschbecken auf, welches sich im Krankenzimmer befindet. Die kontinuierliche Thermo-Desinfektion, ergänzt durch eine Niederfrequenz-Vibrationsreinigung, verhindert die Biofilmbildung und schaltet damit den Geruchsverschluss als Bakterienreservoir aus.”

Axel Kramer, Georg Daeschlein and U. Weber, Greifswald, Institute of Hygiene and Environmental Medicine, University Hospital

Experiences with water safety plan in a university hospital over one year including prevention of bacterial emission from sink drains

18th DOSCH symposium: “Sterilisation – disinfection – cleaning” Hospital hygiene and nosocomial infections, Goldegg, Austria, 2005
3. “We conclude sinks and corresponding emissions play a relevant role in the context of nosocomial spread of gram-negative rods not only for pseudomonas aeruginosa. For prevention of aerogenic spread of nosocomial pathogens by sinks the continuous thermo disinfection combined with ultrasonic (BIOREC) is an effective technique.”

Translation:

„Wir schliessen (aus den dargestellten Ergebnissen), dass Geruchsverschlüsse eine wichtige Rolle bei der nosokomialen Verbreitung nicht nur von Pseudomonas aeruginosa, sondern gramnegativer Stäbchenbakterien insgesamt spielen. Die kontinuierliche Thermo-Desinfektion in Kombination mit einer Behandlung der Geruchsverschlüsse mit einer Schwingungsreinigung ist eine geeignete Methode, die Verbreitung nosokomialer Pathogene über die Luft zu verhindern."

A. Kramer, G. Daeschlein, C. Niesytto, B. Sissoko, R. Sütterlin, M. Blaschke and C. Fusch

Contamination of sinks and emission of nosocomial gramnegative pathogens in a NICU - outing of a reservoir as risk factor for nosocomial colonization and infection.

Umweltmed. Forsch. Prax. (Environmental medicine, research and practice) 10 (5), 2005

Reducing nosocomial patient colonisation and nosocomial infections

1. “Both pathogen statistics and the record of nosocomial infections have demonstrated a significant reduction in patient colonisation and the occurrence of nosocomial infections since the test devices' installation.”

B. Sissoko, P. Sütterlin, Martina Blaschke, J. Flicker and A. Schluttig

Infektionsreservoire Geruchsverschluss: Prävention nosokomialer Infektionen
Sink drains as a source of pathogens and infections: Prevention of nosocomial infections

Lecture given at the 12th GHU conference (Association of Hygiene and Environmental Medicine) and the 8th ISEM conference (International Society of Environmental Medicine) on 3rd -5th October 2004 in Halle/Saale, Germany

Please click on the following link www.biorec.de for a complete overview of all results to date. We will be happy to send you copies of the individual publications, either electronically or by post. Please use our contact form to request this service.
The BIOREC fully automatic medical hygiene siphon consists of the disinfection device itself (in the centre of the image) and the control unit (next to it on the right-hand side).

The disinfection device operates on a low voltage of 24 V for safety reasons. The devices are calibrated for a disinfection temperature of 93°C during manufacture. Device delivery includes installation and start-up by our service representatives.

For a detailed technical description of our devices and an instruction manual, please click on the following link [www.biorec.de](http://www.biorec.de).
Here, the CE-certified disinfection system (no. 102843C) BIOREC medical hygiene siphon is located in the floor unit beneath the washbasin, sink or baby bath, and is designed to be as discreet as possible. The BIOREC system is installed in such a way that nursing staff can continue to use available space as far as possible.
The BIOREC medical hygiene siphon’s compact, modular design means that it can be integrated within even the most complex spatial situations – in this case, behind the units of a washer-disinfector.

Special constructions are also available for sink drains connected to bathing tubs, shower trays and floor drains.

**Costs and efficiency**

The **total costs (investment costs plus operating costs)** of the „BIOREC medical hygiene siphon“ are

**less than 1,50 € for one device per day.**

An efficiency calculation you can find on [www.biorec.de](http://www.biorec.de).
1. Determining and evaluating the sources of infectious aerosols on wards

2. Planning measures for outbreak intervention and decontamination
   - scheduling
   - costs
   - microbiological monitoring
3. „find & kill“ – sanitary disinfection for outbreak intervention and complete decontamination

Deep level disinfection for all clinical sanitary components such as washbasins, sinks, shower trays, toilet bowls and floor drains.
4. Disinfection device delivery and assembly

- BIOREC medical hygiene siphon
- UV – disinfection units
- Complete delivery and assembly of the BIOREC medical hygiene wash station
your reliable partner for
disinfection devices and services
for the
prevention of infectious aerosols
in clinical sanitary risk areas