

Hospitals & Healthcare Facilities - Chlorine Dioxide



Hospitals & Healthcare - Hospital-acquired Legionnaires' disease usually originates in hospital water systems. The causative organism, Legionella bacteria not only persists in hot water tanks, it is often found in the biofilm throughout the entire water system. Conditions within water systems that promote Legionella colonization include water temperature, system configuration and age of the hot water tank; and plumbing materials.

An estimated 10 to 15 thousand people contract Legionnaires' disease in the USA each year; 5 to 15% of these cases prove to be fatal. An additional unknown number are infected with Legionella bacterium and have mild symptoms or no illness at all. Additionally, Legionellosis is frequently misdiagnosed as common pneumonia.

Legionnaires' disease

The occurrence of Legionnaires' disease, and subsequent fatality rates, caused by nosocomial Legionellosis are much higher in hospitals and healthcare facilities than are observed elsewhere. In many parts of the world there is strong legislation to ensure that this entirely avoidable disease is prevented from coming into contact with high-risk members of the population.

In the USA the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) recommends a Risk Minimization Plan for all healthcare facilities "to reduce the potential for organizational-acquired illness including managing pathogenic biological agents in cooling towers, domestic hot water, and other aerosolizing water systems. The UK's Health and Safety Executive (HSE) also produce excellent guidance on the control and management of Legionella risks in their Approved Code of Practice & Guidance document "Legionnaires' disease: The control of legionella in water systems", L8. Additionally, the UK's Department of Health also produce their own Health Technical Memorandum 04-01 (HTM 04-01) which deals specifically with the control of Legionella in healthcare facilities.

The risk of hospital-acquired Legionnaires' disease can be minimized by control measures directed at the water distribution system. These include superheat-and-flush, copper/silver ionization, ultraviolet light, instantaneous heating systems, and hyper-chlorination. Each of these disinfection methods is effective in the short-term, but long-term efficacy is difficult due to limitations associated with each method.

Water hygiene

Because of its biocidal characteristics, chlorine dioxide (ClO_2) is ideal for maintaining good standards of water hygiene. Chlorine dioxide has consistently been shown to be the best molecule for eradicating the causative organism of Legionnaires' disease. In the UK, the Building Services Research and Information Association (BSRIA) has recommended chlorine dioxide as the best available technology for control of Legionella in hot and cold water systems.

Chlorine dioxide generated using tablets is effective in both short-term and long-term applications. It eliminates pathogens on initial application and then leaves a residual of chlorine dioxide to prevent re-infection. In addition to Legionella and other bacteria, chlorine dioxide also destroys biofilms so regrowth is significantly impeded. Chlorine dioxide is safe for plastic piping and exhibits no objectionable corrosive attack on copper piping.

Disinfection Of Healthcare Equipment

Endoscope disinfection using chlorine dioxide in an automated washer-disinfector.

Isomoto H, Urata M, Kawazoe K, Matsuda J, Nishi Y, Wada A, Ohnita K, Hirakata Y, Matsuo N, Inoue K, Hirayama T, Kamihira S, Kohno S.

Source: Department of Endoscopy, Nagasaki University School of Medicine, Sakamoto, Nagasaki, Japan. hajimei2002@yahoo.co.jp

Abstract:

Although 2% glutaraldehyde is often the first-line agent for endoscopic disinfection, its adverse reactions are common among staff and it is less effective against certain mycobacteria and spore-bearing bacteria.

Chlorine dioxide is a possible alternative and an automated washer-disinfector fitted with this agent is currently available. This study was conducted to evaluate the effectiveness of chlorine dioxide in endoscopic disinfection after upper gastrointestinal examination. In vitro microbicidal properties of chlorine dioxide solutions were examined at high (600 ppm) and low (30 ppm) concentrations against various microbes including *Pseudomonas aeruginosa*, *Helicobacter pylori*, *Mycobacterium avium-intracellulare* and *Bacillus subtilis* in the presence or absence of bovine serum albumin (BSA). Immediately following endoscopic procedures and after application to the automated reprocessor incorporating chlorine dioxide at 30 ppm for 5 min, endoscopic contamination with infectious agents, blood, *H. pylori* urea gene DNA and HCV-RNA was assessed by cultivation, sensitive test tape, polymerase chain reaction (PCR) and reverse transcriptase-PCR analysis, respectively.

Chlorine dioxide at 30 ppm has equivalent microbicidal activity against most microbes and faster antimicrobial effects on *M. avium-intracellulare* and *B. subtilis* compared with 2% glutaraldehyde.

Endoscopic contamination with microbes, blood and bacterial DNA was eliminated after application of the automated reprocessor/chlorine dioxide system. Thus, chlorine dioxide is a potential alternative to glutaraldehyde.

The use of automated reproprocessors with compatibility to chlorine dioxide, coupled with thorough pre-cleaning, can offer effective, faster and less problematic endoscopic disinfection.

(US National Library of Medicine - National Institutes of Health)

Technical support and advice

Globalex work closely with a diverse range of organizations from across the healthcare sector; intelligently combining advanced treatment technologies with practical solutions to resolve complex issues. If you have a project you would like to discuss with us, or require technical support and assistance; or if you simply have a question about one of our chlorine dioxide technologies please contact one of our specialist advisors