

## BIOLOGICALLY PURE WATER

Benefit from Nephros Dual Stage Ultrafilters. Safe, simple and reliable water filtration removes waterborne bacteria, viruses, fungi, and cysts from tap water.

## REDUCE INFECTIONS FOR AT-RISK PATIENTS

According to the CDC, Pneumonia accounts for approximately 15% of all HAI's, and 27% and 24% of all infections acquired in ICU and coronary care units, respectively. For HAI-associated pneumonia, attributable mortality rates of 20%-33% have been reported.

## FOR HIGH RISK PATIENT AREAS

- ICU/NICU
- TRANSPLANT
- ONCOLOGY
- HEMATOLOGY
- BURN UNIT
- SURGICAL
- PEDIATRICS
- GERIATRICS

**Nephros Dual Stage Water Filters:** An important addition to water safety and health care facilities for the prevention of water-borne infections water borne infections.

## Background

A major cause of hospital acquired infections is water borne pathogens. Current methods to eliminate these pathogens involve complete chemical or heat disinfection of the entire hospital water system. Point of use filters serve as an effective alternative to these methods particularly in high risk hospital settings. Nephros Dual Stage Ultrafilters are designed to provide additional safety for water and immunocompromised patients.

## Situation

It is well documented that hospital water systems are a major source of nosocomial infections, since they serve as a reservoir for waterborne pathogens protected by biofilm. Legionella may be the best known, but many others including *Pseudomonas aeruginosa*, *Stenotrophomonas*, and mycobacteria are just as dangerous. Immuno-compromised patients are at a much greater risk of

infections and subsequently, mortality from these pathogens. These include transplant, HIV, elderly, oncology, ICU, burn, neonatal, and surgical patients.

To reduce the risk of infection there are basically three water treatment options: water restrictions, system disinfection, and point of use filtration. Water restrictions are effective, but can be costly and an inconvenience to the patient (no showering, only bottled water use, etc.). Disinfection by methods such as superheat and flush, copper silver ionization, or hyperchlorination are generally effective, however, they often do not completely eliminate the bacteria. Many hospital water systems have dead legs into which the disinfectant does not reach. Also no disinfection method eliminates the biofilm within the pipes that serves as a nutrient base for regrowth of bacteria. Point of use filters have shown to be effective in pilot studies at eliminating Legionella, but there are two issues with typical 0.2 µm sheet membrane filters: their small surface area leads to a rapid clogging and a short service life. Additionally, even if the water has few particulates, the service life is short because within two weeks trapped bacteria can actually grow through the membrane.



## ABOUT NEPHROS

Nephros is a commercial stage company that develops and sells high performance water purification products to the medical device and commercial markets. Nephros ultrafilters are used in hospitals and medical clinics for added protection in retaining bacteria (e.g., Legionella, Pseudomonas) and viruses from water, providing barriers that assist in improving infection control in showers, sinks, and ice machines.

Additionally, Nephros ultrafilters are used by dialysis centers for assisting in the added removal of endotoxins and other biological contaminants from the water and bicarbonate concentrate supplied to hemodialysis machines and patients.

For more information, please visit our website at: [www.nephros.com](http://www.nephros.com)



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*The Nephros DSU-H removes a broad range of bacteria, viruses, endotoxins, fungi and toxic substances.*

Pseudomonas aeruginosa	Haemophilus influenzae
Staphylococcus aureus	Rickettsia
Candida albicans	Bacillus anthracis
Mycobacterium tuberculosis	Vibrio cholerae
Bacillus atrophaceus	Corynebacterium diphtheriae
Geobacillus stearothermophilus	Ebola virus
Streptococcus pneumoniae	Rhinovirus
Escherichia coli	Clostridium Botulinum toxin
Salmonella	Ricin toxin
N. gonorrhoeae & N. meningitidis	Staphylococcal enterotoxin B
Hepatitis A,B,C	Giardia Lamblia
HIV	Fungi

The Nephros Dual Stage Ultrafilter (DSU-H) takes filtration to a new level of safety, reliability and protection in removing a broad range of bacteria, viral agents and toxic substances. The DSU-H is designed to effectively stop these substances based on our proprietary membrane characteristics.

The Nephros DSU-H offers a nominal pore size = 0.005 microns, generally over two orders of magnitude finer than competing devices, with a molecular weight cutoff of 15 kDaltons. Laboratory testing has demonstrated bacterial retention > 10<sup>10</sup> reduction (each stage) pseudomonas diminuta (ASTM F838-83), and endotoxin retention ≥ 10<sup>5</sup> reduction (each stage) with 1000-3000 EU/ml challenge).

## Results

DSU-H filters were installed on 20 shower outlets in a large metropolitan hospital. Water samples were taken pre- and post filter installation and also at the end of a 6 week filter change out cycle. Two cycles were done over 3 months. Samples were analyzed for

Legionella and total heterotrophic plate count (HPC) bacteria. Filters were assessed for flow capacity over the 6 weeks.

All filtered samples came up negative for both Legionella and HPC. Of the unfiltered samples 85% were positive for Legionella (range 1 to 20) and all for HPC (range 500 to 1000). Adequate flow rates were maintained over the 6 week use of the filters. As a result it is clear that the DSU-H filters can effectively eliminate waterborne pathogens at the point of use.

