

## BIOLOGICALLY PURE WATER

Benefit from Nephros Dual Stage Ultra-filters. 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

## 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 microfilters have shown to be effective in pilot studies at eliminating Legionella, but there are two issues with typical 0.2  $\mu\text{m}$  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, INC.**

Nephros, Inc. headquartered in River Edge, New Jersey, is a medical device company developing and marketing products designed to improve the quality of life of patients and the general public.

Nephros has developed Mid-Dilution Hemodiafiltration, a unique fluid management system offering optimized removal of renal toxins. Aimed at improving the quality of life for End-Stage Renal Disease (ESRD) patients, it also addresses the critical financial and clinical needs of the care provider.

Nephros also markets a line of water filtration products, the Dual Stage Ultra-filter (DSU) that produces biologically safe water. The Company's patent-pending dual stage cold sterilization Ultra-filter has the capability to filter out bacteria, viruses, and parasites, and a range of other biotoxins.

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



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

The Nephros Dual Stage Ultrafilter (DSU) 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 is designed to effectively stop these substances based on our proprietary membrane characteristics as shown in this summary chart.

Pseudomonas aeruginosa	Haemophilus influenzae
Staphylococcus aureus	Rickettsia
Candida albicans	Bacillus anthracis
Mycobacterium tuberculosis	Vibrio cholerae
Bacillus atrophaeus	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 DSU offers a nominal pore size of 0.005 microns, generally over two orders of magnitude finer than other microfilter devices, with a molecular weight cutoff of 15 kDaltons. Laboratory testing has demonstrated bacterial retention  $> 10^{10}$  (each stage) of pseudomonas diminuta (ASTM F838-83), and endotoxin retention  $\geq 10^5$  (each stage) with a 1000-3000 EU/ml challenge.

**Results**

DSU filters were installed on 20 shower outlets and 5 sink outlets in two 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 filters can effectively eliminate waterborne pathogens at the point of use.

