

For hospitals with documented nosocomial legionellosis, particularly those with transplant patients, the copper-silver ionization system appears to be a cost-effective alternative to hyperchlorination and thermal disinfection for the control of nosocomial legionnaires' disease in healthcare facilities. Vigilance for cases of legionnaires' disease, routine environmental cultures for *Legionella*, and monitoring of ion levels should continue as part of the Infection Control Program to document efficacy or detect problems with the system. We perform *Legionella* environmental monitoring and copper-silver analysis every other month. If *Legionella* culture is performed in-house, the costs for supplies and media would be less than \$1,000 per year. Ion analysis should be performed by atomic absorption spectrophotometry. The copper test kit provided with the ionization system offers only a crude estimate of copper concentration and no information on silver levels. Monitoring for silver is important, because elevated silver ion concentrations can cause discoloration of the hot water due to precipitation of silver chloride. For our hospital, the cost for copper and silver analysis for 1 year was approximately \$2,000.

In summary, copper-silver ionization was more effective than superheat and flush in reducing *Legionella* colonization. If properly monitored, it does not affect water quality adversely and is comparable in cost to hyperchlorination. However, regular monitoring and maintenance of the system is required for optimal efficacy. Our data supports the opinions expressed by Goetz and Yu¹⁵; the apparent technical advance and efficacy of copper-silver ionization should be viewed with optimism, albeit restrained.

REFERENCES

1. Best M, Yu VL, Stout J, Goetz A, Muder RR, Taylor F. *Legionellaceae* in

the hospital water supply—epidemiological link with disease and evaluation of a method of control of nosocomial legionnaires' disease and Pittsburgh pneumonia. *Lancet* 1983;2:307-310.

2. Thurman RB, Gerba CP. The molecular mechanisms of copper and silver ion disinfection of bacteria and viruses. *CRC Critical Reviews in Environmental Control* 1989;18(4):295-314.
3. Liu Z, Stout JE, Tedesco L, Boldin M, Hwang C, Diven WF, et al. Controlled evaluation of copper-silver ionization in eradicating *Legionella pneumophila* from a hospital water distribution system. *J Infect Dis* 1994;169:919-922.
4. Lin YE, Vidic RD, Stout JE, Yu VL. Individual and combined effects of copper and silver ions on inactivation of *Legionella pneumophila*. *Water Research* 1996;30:1905-1913.
5. Stout JE, Joly J, Para M, Plouffe J, Ciesielski C, Blaser MJ, et al. Comparison of molecular methods for subtyping patients and epidemiologically-linked environmental isolates of *L. pneumophila*. *J Infect Dis* 1988;157:486-494.
6. Chang FY, Jacobs SL, Colodny SM, Stout JE, Yu VL. Nosocomial legionnaires' disease caused by *Legionella pneumophila* serogroup 5: laboratory and epidemiological infection. *J Infect Dis* 1996;174:1116-1119.
7. Vickers RM, Stout JE, Yu VL, Rihs JD. Manual of culture methodology for *Legionella*. *Semin Respir Infect* 1987;2:274-279.
8. Marrie TJ, Haldane D, Macdonald S. Control of endemic nosocomial legionnaires' disease by using sterile potable water for high risk patients. *Epidemiol Infect* 1991;107:591-605.
9. Hutchinson DN. Nosocomial legionellosis. *Reviews of Medical Microbiology* 1990;1:108-115.
10. Joseph CA, Watson JM, Harrison TG, Bartlett CLR. Nosocomial legionnaires' disease in England and Wales. *Epidemiol Infect* 1994;112:329-345.
11. Helms CM, Massanari M, Wenzel RP, Pfaller MA, Mayer NP, Hall N. Legionnaires' disease associated with a hospital water system: a five year progress report on continuous hyperchlorination. *JAMA* 1988;259:2423-2427.
12. Swan SH, Waller K, Hopkins B, Windham G, Fenster L, Schaefer C, et al. A prospective study of spontaneous abortion: relation to amount and source of drinking water consumed in early pregnancy. *Epidemiology* 1998;9:126-133.
13. Mietzner S, Schwillie RC, Farley A, Wald ER, Ge JH, States SJ, et al. Efficacy of thermal treatment and copper-silver ionization for controlling *Legionella pneumophila* in high volume hot water plumbing systems in hospitals. *Am J Infect Control* 1997;25:452-457.
14. Lin YE, Stout JE, Yu VL, Vidic RD. Disinfection of water distribution systems for *Legionella*. *Semin Respir Infect* 1998;13:147-149.
15. Goetz A, Yu VL. Copper-silver ionization: cautious optimism for *Legionella* disinfection and implications for environmental culturing. *Am J Infect Control* 1997;25:449-451.

Antimicrobial Threat Discussed

Gina Pugliese, RN, MS
Martin S. Favero, PhD

On September 9-10, 1998, more than 300 representatives of political, expert, consumer, and producer groups attended a meeting held in Copenhagen to discuss the worldwide threat of resistance. Professor Fernando Baquero of the Center of Microbiology in Madrid said that bacterial resistance may return us to the age before antibiotics.

It was noted that some European countries have a daily consumption of more than a ton of antibiotics for both human and animal treatment. Recent figures for methicillin-resistant *Staphylococcus aureus*, for example, indicate that resistance is developing rapidly both within and outside Europe. In 20

surveyed centers around the world, only four Nordic countries (Denmark, Finland, Norway, and Sweden) had MRSA resistance levels below 2%. It was between 5% and 20% in Germany, Lithuania, Colorado US, New Zealand, Australia, France, and the United Kingdom. In five centers (California US, Spain, Belgium, Kuwait, and South Africa), it was between 20% and 40%, and in four centers (Poland, New Jersey US, Malaysia, and Greece), it was over 40%.

Reasons for the low rates in Scandinavia are because of the efforts to insulate their country. All patients and hospital staff who have been hospitalized or worked outside Scandinavia are isolated on arrival at a Scandinavian hospital until it is confirmed that they are not colo-

nized with multidrug-resistant bacteria.

Conference attendees called for national and global plans to address the threat. Currently, WHO is trying to implement global coordination of efforts. The conclusions of the five workshops held at the conference are available on the conference web site at <http://www.microbial.threat.dk>.

The September 5, 1998, issue of the *British Medical Journal* contains a series of articles on antimicrobial resistance that were published in conjunction with the conference. The series of articles discusses the perceptions of the public's right for treatment, controversies in measures to reduce use, the need for education of the public and physicians, and international surveillance.