Healthcare Outbreaks Associated With Dental Unit Water Systems: Strong Scientific Evidence of Minimal Risk

TO THE EDITOR—In their accurate review regarding healthcare outbreaks associated with waterborne pathogens, occurred between 1997 and 2015, Kanamori and colleagues [1] did not report episodes associated with dental unit water (DUW) systems, thus overcoming the uncertainty of the previous review [2].

Although the authors warned that immunocompromised patients may be at infection risk, I contend that such a risk is unlikely. Indeed, the number of persons exposed to DUW contaminated with waterborne pathogens during the 1997–2015 period is incredibly high. According to the Centers for Disease Control and Prevention [3], two-thirds of persons in the United States have dental visits annually. Assuming that this frequency is the same in North America, Europe, Japan, South Korea, and Australia, highly developed countries with similar high-quality infectious disease surveillance systems, almost 1 billion persons have dental visits annually in these countries. A pan-European study found that 3.8% DUW samples were positive for Pseudomonas aeruginosa, 4.2% for legionella, 36.4% for mycobacteria, and 1.3% for Candida [4]. Thus, roughly 40% individuals who have dental visits in industrialized countries are exposed to DUW contaminated with waterborne pathogens, corresponding to 7.2 billion exposures in the 1997–2015 period. Conservatively assuming that there is 1 immunocompromised patient for every 100,000 immunocompetent patients, several thousand immunocompromised patients have had dental visits at risk dental offices. Even so, no outbreaks or clusters have ever been reported.

Single cases occurring between 1997 and 2015 are inconclusive. One supposedly confirmed case of Legionnaires’ disease (LD) associated with DUW has been reported [5]. The association is no longer clear, however, because it was recently reported that the patient was probably already affected with LD the day of the dental visit [6]. In another reported case, LD was diagnosed in a receptionist who worked in a dental practice located in a healthcare facility. Legionella pneumophila serogroup 1 isolated from this patient matched with the isolates detected in hot-tap water samples from the healthcare facility. However, legionella were undetected in DUW [7].

In a third case, a patient developed keratitis, and Acanthamoeba was isolated from her ocular secretions. She reported that a DUW splash hit her eye during a visit, but the protozoan was undetected in the DUW [8]. In a fourth report, a dental patient with cystic fibrosis transiently harbored P. aeruginosa, which was genotypically identical to P. aeruginosa detected in DUW [9].

Given this review showing the lack of any reported outbreak, the high number of exposures occurring during the last 18 years, the reliability of the surveillance systems in highly developed countries, and the inconsistency of the episodes of waterborne infections associated with DUW and reported before 1997 [2], there is strong scientific evidence of minimal risk of waterborne pathogen infections in dental healthcare settings. Such an important conclusion does not imply that waterborne infection control measures (eg, recommendations from the Centers for Disease Control and Prevention [10]) are unnecessary, but it does imply that these measures are based on the precautionary principle [11] and that most lawsuits against dentists regarding such infections are unjustified if dental healthcare workers routinely apply suggested infection prevention strategies [1].

Note
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