30 June 2021 (Wednesday)

7.00pm-8.30pm (SGT) (GMT +8)
Session 5.5 – Water Quality in Distribution Systems and Buildings

Session Chair(s): Regina Sommer, Medical University of Vienna (Austria)

WSPs for Distribution and Plumbing Systems

D. Cunliffe. SA Health (Australia)
Presenter is an invited speaker. No executive summary is available

Estimating the Burden of Waterborne Infectious Disease in the United States

V. Hill, S. A. Collier, L. Deng, K. M. Benedic, K. E. Fullerto, J. S. Yoder, M. J. Beach. Centers for Disease Control and Prevention (CDC) (United States)

The routine treatment of drinking water is one of the greatest US public health achievements of the twentieth century and provides a safe, reliable water supply. The reliable provision of safe water has led to water use in complex and diverse ways (e.g. heating and cooling systems in large buildings, agriculture and food production, medical treatment). This paper discusses CDC's efforts to estimate the waterborne disease burden and associated direct healthcare costs of 17 selected diseases in the United States using disease surveillance and health insurance billing data. This study found that over 7 million illnesses, including 600,000 emergency department visits, 120,000 hospital stays and 7,000 deaths, are due to waterborne disease every year in the United States and result in $3.2 billion dollars in healthcare costs. Hospitalizations and deaths were predominantly caused by biofilm-associated pathogens found in plumbing (non-tuberculous mycobacteria, Pseudomonas, Legionella) costing US$2.6 billion annually.

Online Flow Cytometric Fingerprinting For Microbial Water Quality Management In A Full-scale Drinking Water Tower.

J. Favere, B. Buysschaert, N. Boon, B. De Gusseme. Ghent University (Belgium)

Biological instability caused by microbial regrowth during drinking water distribution may result in a variety of problems. In order to anticipate to events of biological instability, more frequent measuring is necessary and relevant parameters for operational control need to be developed. In this research, online flow cytometry was used to measure biological stability of a full-scale water tower during normal and disturbed flow regime. Based on cytometric fingerprints, the Bray-Curtis (BC) dissimilarity was calculated and a threshold for event detection was set. Drastic microbial water quality changes were reflected in the BC dissimilarity in the studied water tower. The BC dissimilarity is therefore proposed as indicator for microbial water quality changes. When used in an online setup, it can be included as straightforward parameter during full-scale operation of drinking water distribution and combined with the cell concentration, it can provide an early-warning for biological instability.

Risk Exposure During Showering & Water-saving Showers

H. Niculita-Hirzel, C. Jackson, S. Goecke, G. Suarez, L. Amgwerd. Center for Primary Care and Public Health, Unisanté (Switzerland)

Eco-friendly showers aim to lower energy and water consumption by generating smaller water droplets than traditional systems. To evaluate the risk for the users to inhale the water droplets emitted and, with them, Legionella, we modelled the behaviour of water droplets aerosolized by such shower systems and confronted the model to reality in a real-size shower stall. The model revealed how the shower system's characteristics - geometry, pressure, flow rate and spray coverage - affected the droplets' distribution and density. The experimental count of inhalable droplets confirmed the difference between the spray patterns -- continuous flow, biphasic continuous flow and spray atomization - and let us identified the technical features that make the shower heads using the spray atomization technology secure for the users. When developing eco-friendly shower systems, the technical characteristics retained have to reduce water and energy consumption without increasing the risk of exposure for the users.