



Online Workshop on AMR Environmental Surveillance: Global Perspectives

organized by

Pune Knowledge Cluster, CSIR-National Chemical Laboratory and Ashoka University

1st and 2nd December 2025: 4:00 PM to 6:00 PM IST

Environmental surveillance is emerging as a critical frontier in the fight against antimicrobial resistance (AMR). Wastewater, surface water, soil, and solid waste streams act as reservoirs and conduits for resistant pathogens and resistance genes, often reflecting hidden transmission pathways that clinical systems fail to capture. By integrating environmental data with clinical and public-health insights, countries can detect emerging threats earlier, understand community-level burdens, and tailor interventions with far greater precision. As cities grow, pollution intensifies, and climate stresses reshape ecosystems, environmental surveillance offers a powerful, data-driven lens to anticipate AMR risks and strengthen global resilience.

In India, the One Health approach is driving a new wave of environmental AMR surveillance efforts. Recognizing that resistant pathogens move seamlessly across humans, animals, food systems, and the environment, national and state programs are beginning to integrate wastewater testing, agricultural run-off monitoring, and surveillance in animal-health settings. These initiatives—spanning health departments, veterinary institutions, pollution control boards, and research bodies—are helping build a more connected picture of AMR emergence and spread. While still evolving, India's One Health ecosystem is steadily laying the foundations for coordinated data, shared protocols, and actionable insights that can inform both public-health response and environmental stewardship.

The Pune Knowledge Cluster in collaboration with Ashoka University and CSIR-National Chemical Laboratory is enabling an ecosystem to promote the development and validation of frameworks for AMR environmental surveillance. This workshop (over 2 days) is being organized as part of our outreach efforts to create awareness for R&D initiatives that are ongoing globally in the AMR surveillance space, share best practices and encourage strategic partnerships.

Target Audience:

- Researchers
- Public Health & Community Medicine Experts
- Government Representatives
- Start-ups
- Policy Makers



Day 1: 1st December 2025

Agenda

Date and Time	Session
4:00 PM – 4:10 PM IST	Opening Remarks and Context Setting
4:10 PM – 4:30 PM IST	Dr. Laasya Samhita, Assistant Professor of Biology, Ashoka University, Sonipat, India
4:30 PM – 4:50 PM IST	Dr. Dhammika Leshan Wannigama, Assistant Prof., Department of Infectious Diseases and Infection Control, Yamagata Prefectural Central Hospital, Japan
4:50 PM – 5:10 PM IST	Dr. Frank M. Aarestrup, Professor, Head of Research Group DTU National Food Institute, Denmark
5:10 PM – 5:30 PM IST	Dr. Mahesh Dharne, Senior Principal Scientist, CSIR-National Chemical Laboratory, Pune, India
5:30 PM – 6:00 PM IST	Open Forum for Q & A

Day 2: 2nd December 2025

Agenda

Date and Time	Session
4:00 PM – 4:10 PM IST	Opening Remarks and Context Setting
4:10 PM – 4:30 PM IST	Dr. Amishi Panwar, Senior Project Associate, Bristol University, UK
4:30 PM – 4:50 PM IST	Dr. Francis Hassard, Senior Lecturer in Public Health Microbiology, Cranfield Water Science Institute, UK
4:50 PM – 5:10 PM IST	Ms. Megan Diamond, Senior Technical Advisor, The World Health Organization Dr. Barbara Ghiglione, Bacterial Resistance Lab at Microbiology Department, School of Pharmacy and Biochemistry, CONCET, University of Buenos Aires, Argentina
5:10 PM – 5:30 PM IST	Dr. Shraddha Karve, Assistant Professor of Research, Koita Centre for Digital Health, Ashoka University, Sonipat, India
5:30 PM – 6:00 PM IST	Open Forum for Q & A

Overview



The Pune Knowledge Cluster organized a workshop focused on antimicrobial resistance surveillance, bringing together stakeholders through collaboration with the International Pathogen Surveillance Network. Researchers presented studies on antibiotic pollution in Himachal Pradesh, environmental organism challenges in European water systems, and wastewater surveillance initiatives, with discussions centered on genomic approaches and practical applications. The two-day conference highlighted the importance of environmental surveillance, community engagement, and global collaboration in addressing antimicrobial resistance, with participants calling for continued support and collaboration within the AMR surveillance community.

Speaker-wise summary:

Dr. Laasya Samhita, Assistant Professor of Biology, Ashoka University, Sonipat, India

Dr. Samhita presented findings from their two-year study on AMR in wastewater across the Delhi NCR region. The research, which involves 20 locations, aims to understand the interplay between environmental and clinical AMR. Key results include the discovery of high sulfa drug resistance near a fishing pond, stable antibiotic resistance gene profiles, and the presence of clinically relevant pathogens like *Pseudomonas* and *E.coli* in wastewater. Challenges faced include variable DNA quality in wastewater samples and differences in antibiotic susceptibility testing methods between regions. The project, which involves collaboration with Dr. Karve and Dr. Dharne, seeks to correlate AMR patterns in the environment with those in clinics using genomics and DNA barcoding.

Dr. Dhammika Leshan Wannigama, Assistant Prof., Department of Infectious Diseases and Infection Control, Yamagata Prefectural Central Hospital, Japan

Dr. Wannigama discussed the importance of participatory infectious disease wastewater surveillance, particularly for low- and middle-income countries facing health inequalities and threats from antibiotic resistance (AMR). He explained how wastewater surveillance can provide early detection of pathogens and AMR, offering a more comprehensive view of health disparities across different community settings. Through studies in Thailand and Japan, Dr. Wannigama demonstrated how wastewater analysis reveals varying levels of antibiotic resistance and transmission dynamics in urban versus rural areas, highlighting the need for targeted public health interventions. He emphasized that while wastewater surveillance presents challenges regarding infrastructure and result interpretation, it remains a valuable tool for addressing health inequalities and informing infection control measures.

Dr. Frank M. Aarestrup, Professor, Head of Research Group DTU National Food Institute, Denmark

Dr. Aarestrup presented research on global surveillance of antimicrobial resistance using sewage-based monitoring. He highlighted that 50-80% of resistome publications may be flawed due to incorrect database usage, and presented findings from three studies analyzing samples from over 100 countries. The research showed that resistance gene abundances and diversity differ significantly between global regions, with Europe, Oceania, and North America forming one group and the rest of the world another. Surprisingly, the study found that medical doctor density correlated better with resistance occurrence than antimicrobial consumption, leading to policy implications about the importance of hygiene and health education in controlling resistance. He discussed the analysis of mobile resistant genes in sewage systems, noting their connection to multiple taxa and the potential to identify faecal contributions using network analysis. He highlighted the lack of correlation between



antibiotic usage patterns and resistance loads, suggesting that hygiene and microbial loads may play a significant role. Dr. Aarestrup also presented findings on the reanalysis of sewage data, including the detection of a *Vibrio cholera* strain, and emphasized the potential of wastewater surveillance for various applications, such as detecting gastrointestinal pathogens.

Dr. Mahesh Dharne, Senior Principal Scientist, CSIR-National Chemical Laboratory, Pune, India

Dr. Dharne presented on wastewater surveillance for AMR in western India, discussing their work with the Rockefeller Foundation-funded APSI consortium in four cities, including Pune. He shared data on antibiotic resistance genes in wastewater, including seasonal variations and correlations with hospital data, while highlighting challenges in translating wastewater surveillance into policy. The discussion concluded with agreement on the need for a "Bio Village" pilot study to better understand community AMR patterns, with participants emphasizing the importance of making data public and accessible while addressing economic considerations for implementation.

Dr. Amishi Panwar, Senior Project Associate, Bristol University, UK

Dr. Amishi presented a study on antibiotic pollution and its impact on environmental antimicrobial resistance (AMR) in Himachal Pradesh, with a focus on the pharmaceutical hubs of Kangra and Baddi. The project, conducted between 2019 and 2024, explored social and cultural drivers of AMR, examining treatment-seeking practices, waste disposal, and environmental contamination. Key findings included improper disposal of antibiotics, weak environmental regulations, and challenges in explaining AMR to local populations. The study highlighted the interconnected nature of antibiotic exposure pathways and emphasized the need for improved waste management practices and more robust regulatory frameworks.

Dr. Francis Hassard, Senior Lecturer in Public Health Microbiology, Cranfield Water Science Institute, UK Francis

Dr. Hassard presented research on *Serratia fonticola*, an environmental organism causing challenges in European drinking water treatment systems. The study found that, although the organism itself does not exhibit significant intrinsic chlorine resistance, its ability to form biofilms and become immobilized within flocs significantly enhances its resistance to disinfection. The research identified a distinctive 168-kilobase plasmid containing multiple beta-lactamase resistance genes, which appears to enable the organism's persistence within the treatment infrastructure. The findings led to practical recommendations for water treatment facilities, including optimizing filtration performance, implementing systematic backwashing protocols, and increasing chlorine doses where necessary to maintain public health safety.

Ms. Megan Diamond, Senior Technical Advisor, The World Health Organization

Ms. Diamon presented an overview of the WHO IPSN Community of Practice for Wastewater Surveillance, highlighting its mission to advance environmental surveillance through global awareness, coordination, and collaboration. She explained the community's three main activities:



monthly anchor meetings, member-driven sessions, and time-bound projects. Ms. Diamond also introduced two ongoing projects: developing a training repository and a costing tool for wastewater surveillance. She also presented an overview of the WHO Collaboratory Platform, highlighting its role as a centralized hub for the IPSN community of practice, where members can access resources, post updates, and connect with experts working on AMR and wastewater surveillance. She emphasized the community's global reach, with over 50 experts from 25 countries, and noted that 71% of the focus is on AMR in wastewater. She introduced new resources, including a genomics costing tool, guidance on genomic data sharing, and a summary on AMR and WES feasibility, while encouraging collaboration and direct engagement with resource creators.

Dr. Barbara Ghiglione, Bacterial Resistance Lab at Microbiology Department, School of Pharmacy and Biochemistry, CONCET, University of Buenos Aires, Argentina

Dr. Ghiglione presented on a wastewater surveillance pilot project for antimicrobial resistance (AMR) in hospitals in Agua City. The project, which began in 2024, sampled hospital wastewater and wastewater treatment plants to detect bacteria and potential AMR markers. Preliminary results showed clustering by sampling site and identified shared clusters between hospitals and wastewater treatment plants, suggesting cross-transmission. After joining the COP West initiative, the team refined their project and received valuable expert feedback, leading to an expanded project in the paediatric hospital starting December. The team plans to sample more wastewater points, perform surface swabbing, and integrate with hospital staff.

Dr. Shraddha Karve, Assistant Professor of Research, Koita Centre for Digital Health, Ashoka University, Sonipat, India

The meeting focused on antimicrobial resistance (AMR) surveillance, particularly environmental surveillance using genomic approaches. Dr. Karve presented on genomic surveillance of clinical isolates in Indian tertiary healthcare centers, highlighting challenges in data availability and the need for more sequencing data from different regions. The discussion emphasized the importance of wastewater surveillance for detecting AMR genes and the need to correlate clinical and environmental data. Participants discussed the challenges of translating AMR research into practical applications, including community engagement and education. The conversation ended with a call for collaboration and support within the global community of practice working on AMR surveillance.