



Contribution ID: 432

Type: Oral presentation

Harmonized One Health surveillance of antimicrobial resistance and heavy metal tolerance in Baltic Sea surface waters and wild birds

Wednesday, October 7, 2026 10:15 AM (15 minutes)

Abstract. Antimicrobial resistance (AMR) and heavy metal tolerance in aquatic and wildlife-associated bacteria are interconnected One Health challenges, yet harmonized cross-border data remain scarce.

BALTIC-AMR addresses this gap through standardized longitudinal surveillance across Germany, Sweden, Estonia, and Poland, integrating surface-water and wild-bird sampling with culture-based isolation, phenotyping, genomics, and residue analysis. From 04/24–09/25, 1,346 isolates were recovered from water and wild birds, mainly comprising priority *Enterobacterales* and selected *Pseudomonadales*. Putative ESBL and arsenic tolerant phenotypes predominated, while carbapenem resistance was more frequent among water-derived isolates; zinc tolerance occurred rarely.

The same sampling framework also captured water-borne *Vibrio* spp. During the 2024 *Vibrio* season (06/24–10/24), 330 isolates were collected and sequenced to resolve phylogenetic diversity and screen for resistance and virulence determinants. Preliminary screening identified genes assigned to tetracycline and beta-lactam resistance classes, alongside efflux and lipid A modification markers. In parallel, residue analysis detected fluoroquinolone and tetracycline concentrations exceeding PNEC levels year-round in WWTP effluents.

Together, these data confirm environmental AMR occurrence and support phylogeny-aware One Health risk assessment in the Baltic Sea region.

Keywords

Antimicrobial resistance; heavy metal tolerance; Baltic Sea; environmental surveillance; surface water; wild birds; Enterobacterales; Pseudomonadales; Vibrio spp.

Registration ID

OHS26-119

Professional Status of the Speaker

PhD Student

Junior Scientist Status

Yes, I am a Junior Scientist.

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Session Classification: Session 10: AMR I

Track Classification: AMR