

TITLE: DETECTION OF ANTIMICROBIAL RESISTANCE IN RAW SEWAGE FROM TWO DIFFERENT HOSPITALS FROM BUENOS AIRES, ARGENTINA

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Untreated wastewater discharge into the environment is one of the main causes of contamination. The use of antibiotics in veterinary practice and clinical medicine contributes to the selection of multidrug resistant bacteria. Hospital effluents contain a mixture of organic matter, antibiotics, antiseptics, detergents, solvents, human excreta and secretions and different types of pathogens. The objective of this study was to evaluate the diversity of β -lactamase producers and the potential spread of waterborne resistance genes in hospital effluents from Buenos Aires, Argentina. To carry out this work, samples of residual fluids from an acute care and a pediatric hospital were used. Prevalence of resistant Gram-negative bacilli to β -lactam antibiotics was determined by the agar dilution method. Dilutions of the samples were inoculated in Agar Violet Red Bile medium with and without ceftriaxone, ceftazidime, imipenem, meropenem and colistin and the percentage of resistant bacteria was calculated. Antibiotic susceptibility testing and phenotypic detection of extended spectrum β -lactamases (ESBL) and carbapenemases for selected Gram negative bacteria was performed by the disk diffusion method according to CLSI. Bacterial identification by conventional methods and MALDI-TOF/MS was performed. PCR was used for screening CTX-M, IMP, VIM, SPM, NDM, PER-2, GES, CMY, KPC and OXA-48 β -lactamase-encoding genes (*bla*); MCR-1, MCR-2 and MCR-3 phosphoethanolamine-transferase genes. Class 1 integrase-encoding gene *int1* was also searched, representing a potential spread mechanism for resistance genes. Acute care hospital residual fluid samples showed higher prevalence of carbapenem resistance (90%) followed by ceftriaxone (50%). In contrast, 50% prevalence of 3rd generation cephalosporins was observed for the pediatric hospital and no carbapenem resistance was detected. ESBL phenotype was detected in both hospitals. Among isolated bacteria, an extended spectrum TEM β -lactamase *Alcaligenes faecalis* producer was identified from the acute care hospital residual fluids. *Escherichia coli* ESBL producer was identified in both hospitals. The occurrence of genes encoding for resistance to last-choice antimicrobials, in potentially relevant MDR pathogens in raw sewage may contribute to the spread of bacterial resistance. Our results highlight the need to focus on the One Health concept, generating the need to establish effective policies to reduce this growing public health problem.