

Changes to Populations Might Aid the Spread Antibiotic Resistance in the Environment

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Abstract : Resistance to antibiotics has become a threat to public health. As a result of their misuse and overuse, bacteria have become resistant to many common antibiotics. Beta lactam (β -lactam) antibiotics are one of the most significant classes of antimicrobials in providing therapeutic benefits for the treatment of bacterial infections in both human and veterinary medicine, for approximately 60% of all antibiotics are used. In particular, some Enterobacteriaceae produce Extend Spectrum Beta Lactamases (ESBLs) that enable them to some break down multi-groups of antibiotics. CTX-M enzymes have rapidly become the most important ESBLs, with increases in mainly CTX-M 15 in many countries during the last decade. Global travel by intercontinental medical 'tourists', migrant employees and overseas students could theoretically be a risk factor for spreading antibiotic resistance genes in different parts of the world. Bangor city, North Wales, is subject to sudden demographic changes due to a large proportion (>25%) of the population being students, most of which arrive over a space of days. This makes it a suitable location to study the impacts of large demographic change on the presence of ESBLs. The aim of this study is to monitor the presence of ESBLs in *Escherichia coli* and faecal coliform bacteria isolated from Bangor wastewater treatment plant, before, during and after the arrival week of students to Bangor University. Over a five-week period, water samples were collected twice a week, from the influent, primary sedimentation tank, aeration tank and the final effluent. Isolation and counts for *Escherichia coli* and other faecal coliforms were done on selective agar (primary UTI agar). ESBL presence will be confirmed by phenotypic and genotypic methods. Sampling at all points of the tertiary treatment stages will indicate the effectiveness of wastewater treatment in reducing the spread of ESBLs genes. The study will yield valuable information to help tackle a problem which many regard to be the one of the biggest threats to modern-day society.

Keywords : extended spectrum β -lactamase, enterobacteriaceae, international travel, wastewater treatment plant

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