In the Clyde, UK co-selection antibiotic resistance occurs in microorganisms, promoted by stress from potentially toxic element (PTE) presence, and impacts bacteria that could possibly be human pathogens. Higher concentrations of PTE in the environment correlates to higher MIC to the PTE, and ultimately to higher antibiotic resistance levels.

HYPOTHESIS

Recent evidence indicate that numbers of antibiotic resistant bacteria within contaminated landscapes are significantly higher than that of uncontaminated land. The legacy of pollution and the inability to remove pollution by-products such as heavy metals can cause co-selection for antibiotic resistant genes within bacterial species.

Three sites with different pollution levels were chosen to compare the levels of antibiotic/heavy metal resistance genes: Clydebank, Dumbarton West and Cardross.

Using sediment cores, we were able to get a historical representation of pollution and resistant bacteria levels from the past to the present.

CONCLUSIONS

- From the results obtained it is clear that gram-negative bacteria isolated from an area with an extensive industrial pollution history show higher minimum inhibitory concentrations and minimum bactericidal concentrations to a range of both PTEs and antibiotics.

- In general, genes for resistance mechanisms were shown to be highest within 0-10cm soils. However when examining data from deeper cores, isolated bacteria still harbour resistance traits to both PTEs and antibiotics.

- Through a combination of qPCR, high throughput gene array qPCR technology and susceptibility assay data, it is clear co-selection of PTEs and antibiotic resistance does occur, and this impacts bacteria that are potential human pathogens.