

The objectives of this programme were:

1. To enhance the speed, accuracy and reproducibility of detection and sampling methods for pathogenic/allergenic microorganisms and biological material in environmental media that impact human health, with particular interest in cutting edge and novel techniques. For bioaerosols, detection methods may include improved molecular methods and sequencing techniques and/or address the problem of counting non-viable organisms.
2. To demonstrate the use of the enhanced techniques for process studies in freshwater and coastal waters and for bioaerosols.

Summary of EMHH programme outputs*

1. Optimisation of sampling methods to enhance the accuracy and reproducibility of detection (relates to Objective 1)
 - a. Endotoxin sampling from air^{1,2,4}.
 - b. Recovery of RNA/DNA from air^{1,2,4}.
 - c. Recovery of enteric viruses from environmental samples^{1,2,4}.
2. New microbiological and immunological method development (relates to Objective 1)
 - a. Co-culture methodology for understanding cell response to airborne endotoxin exposure^{1,2,4}.
 - b. Rapid detection methods for airborne pathogens^{1,2,4}.
 - c. Novel methods for detection of viral pathogens and indicator viruses in water and sediment samples^{1,2,4}.
3. Modelling and source tracking (relates to Objective 2)
 - a. New AMR source tracking targets identified^{1,4}.
 - b. Catchment scale methods for understand land use drivers for AMR in rivers^{1,4}.
 - c. Modelling enhancements for simulating transport of virus from sewage works and bioaerosol from waste and agricultural facilities^{1,4}.
4. Big data and omics (relates to Objective 2)
 - a. Viromics analysis of municipal wastewater for community health status monitoring^{1,4}.
 - b. Metagenomics identified significant levels of antibiotic resistance in river samples^{1,4}.
5. Commercially exploitable new science (relates to Objective 1)
 - a. Knowledge gained to enable a low cost bioaerosol sensor to be built in the future⁵.

*Output categories: ¹policy & regulation, ²private sector, ³public services, ⁴quality of life & public health, ⁵UK economy.