

'To Chlorinate, or Not to Chlorinate'

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Introduction – Safe Drinking Water

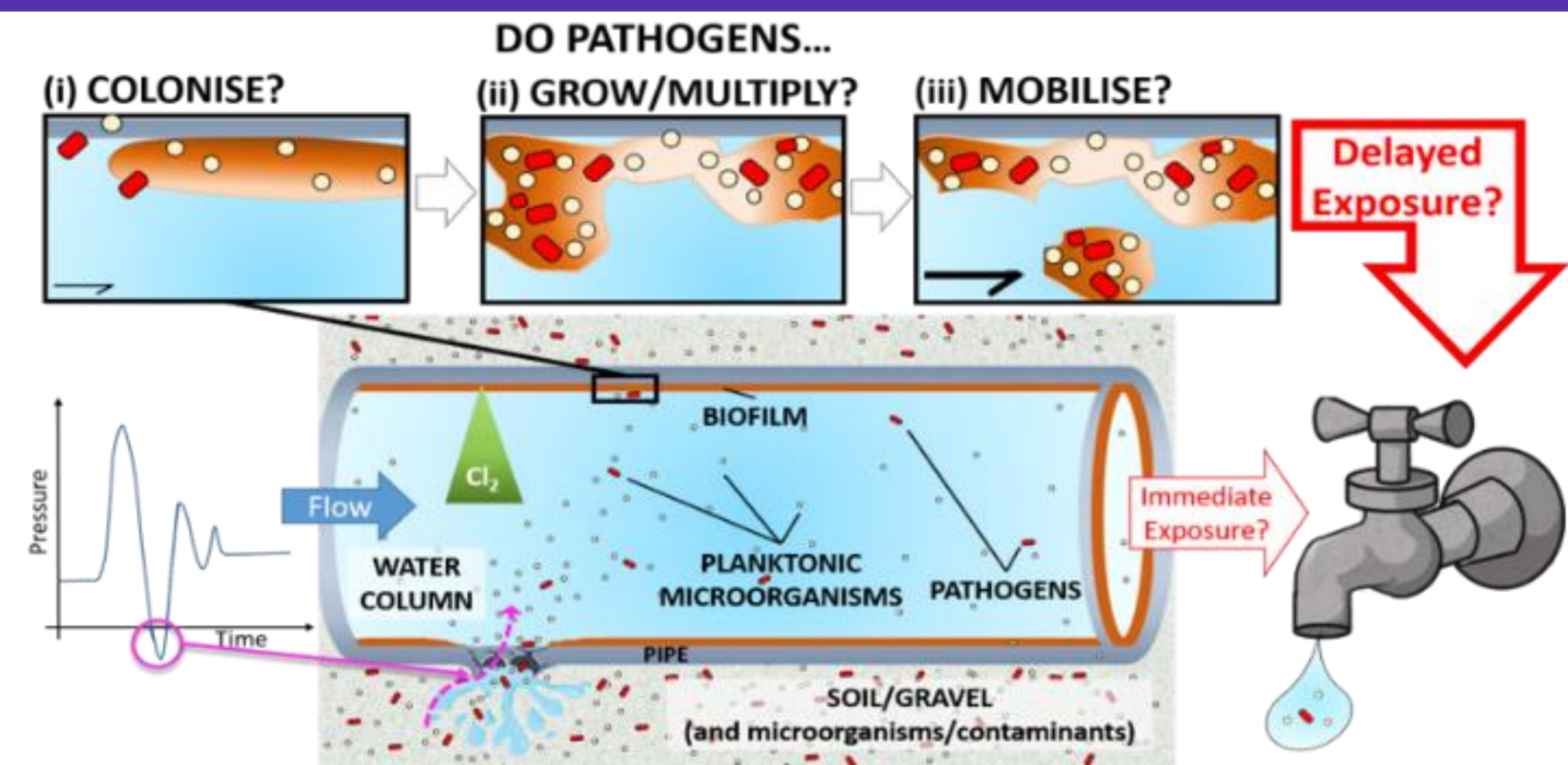
- Safe drinking water underpins society and is essential for **public health** and the **economy**.
- The UK water industry treats **13,877 million litres of water per day¹** and it is essential that the quality of drinking water does not deteriorate as water travels to customer homes.
- The global threat of **opportunistic pathogens**, microorganisms that may cause serious infection in immunocompromised individuals, is increasing.
- The role of biofilms, microorganisms attached to the internal surface of drinking water pipes, is largely unknown.



Photograph and scanning electron microscope image of drinking water biofilms.

UK drinking water utilities therefore need to research into the best strategies to manage pathogen risk in drinking water pipes

¹Environment Agency (2024). Water resources 2023-2024: analysis of the water industry's annual water resources performance.

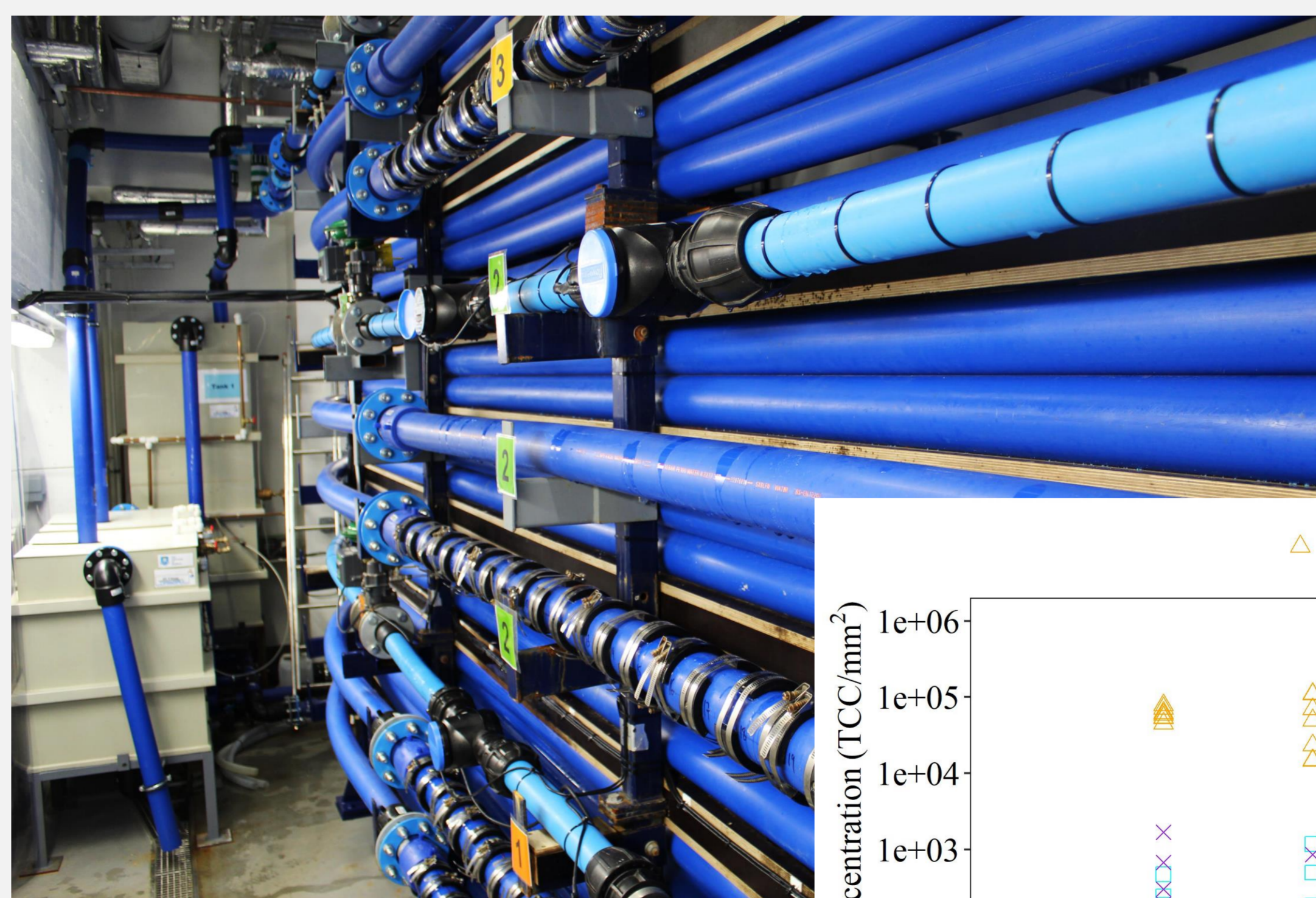


Research Aims

- The efficiency of **chlorine**, used to help to kill pathogens within UK drinking water pipes, was investigated.
- The impact of chlorine upon **microorganisms and pathogens residing within biofilms** was assessed to determine if pathogens can **survive longer** if they are able to colonise biofilms.

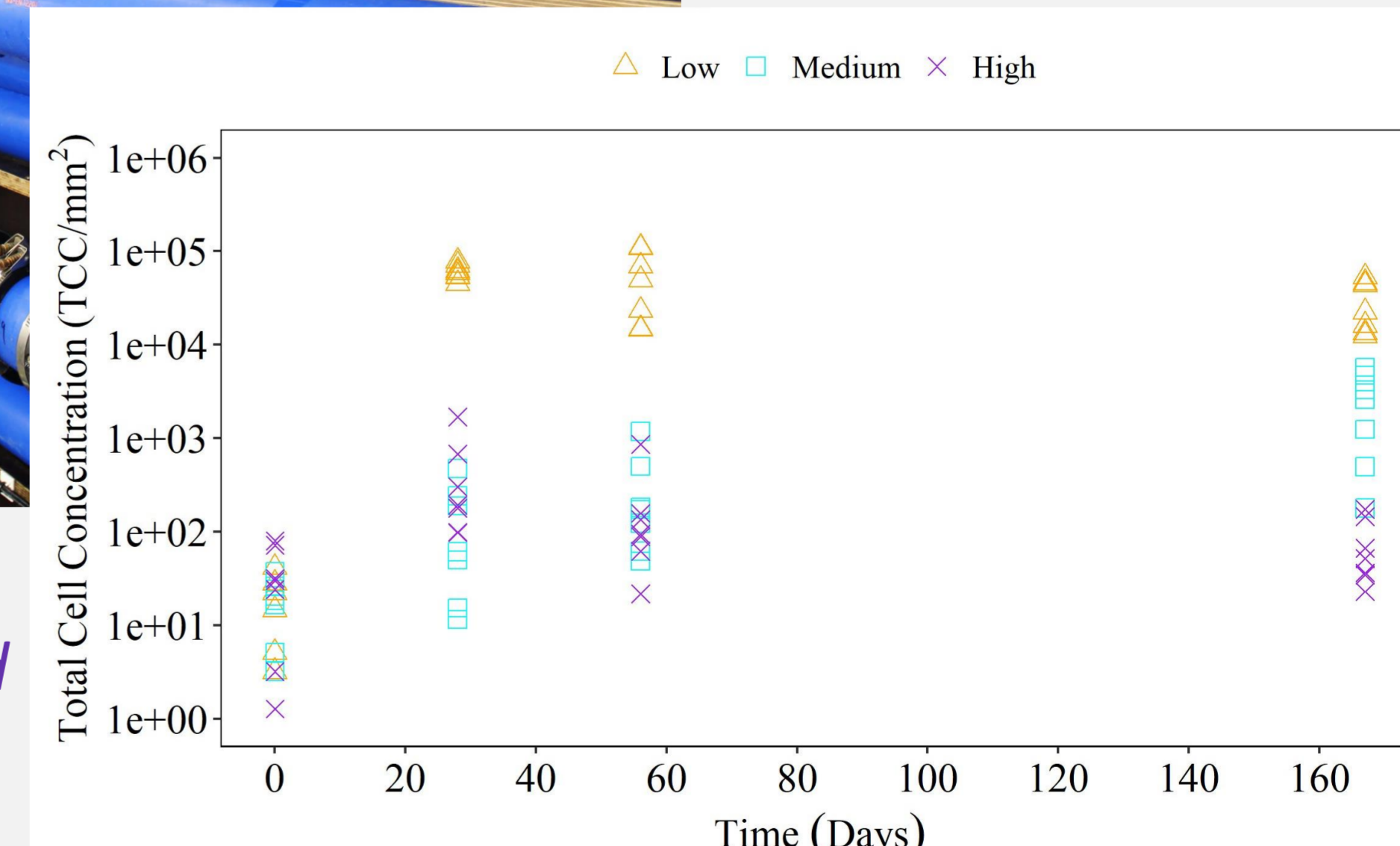
Results & Conclusions

- Biofilms were grown in drinking water under **low, medium and high chlorine concentrations**, before an **environmental contaminant** was introduced.
- Microorganism cell numbers were found to be highest within the low chlorine system.
- **Coliforms (pathogen indicator organisms)** were mobilised from the pipe wall into the drinking water in the **low chlorine system** when the flow rate of the drinking water was increased.
- This research will help ensure **safe drinking water** for all and protect public health **now and into the future**.



The internationally-unique drinking water pipe facility at The University of Sheffield

Biofilm microorganism cell counts from the low, med and high chlorine regimes over time.



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