Optimizing Affordable Testing Equipment for Nationwide Water Quality Surveys

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MOTIVATION

700 children under five die daily from diarrhoea linked to inadequate water, sanitation and hygiene (UNICEF, n.d).

Low-cost, lightweight, and reliable water quality testing equipment facilitates more widespread testing for *E.Coli* bacteria in at-risk household and community water.

The Joint Monitoring Programme (JMP)'s Second Generation Lightweight Affordable Manifold (2GLAM) was created to achieve this purpose; however, samples collected using this manifold are subject to "smearing" of *E.Coli* colonies, making quantification and therefore accurate risk assessment difficult.

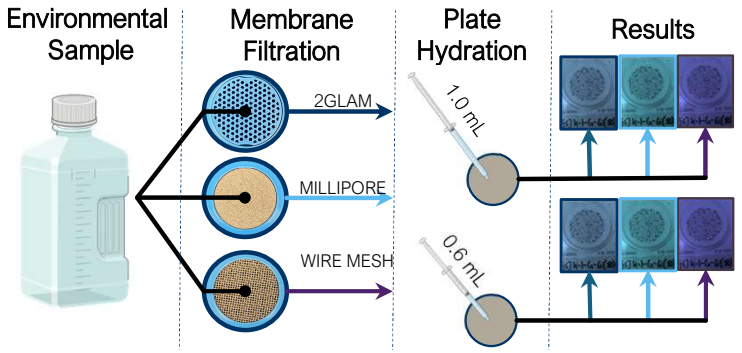
OBJECTIVES

Evaluate the effect of the following on colony "smearing"

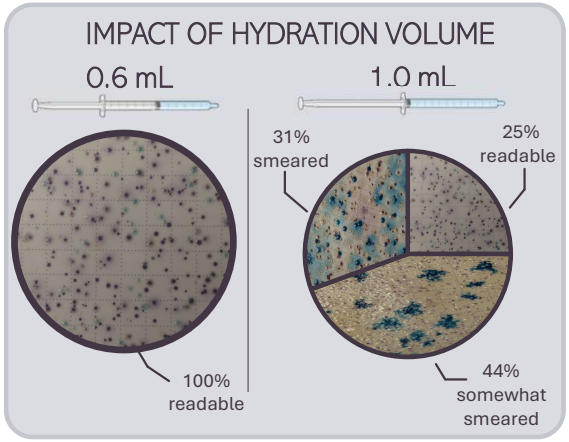
- Filtration disc (2GLAM, Millipore, Wire Mesh)
- Plate hydration volume (1 mL or 0.6 mL)

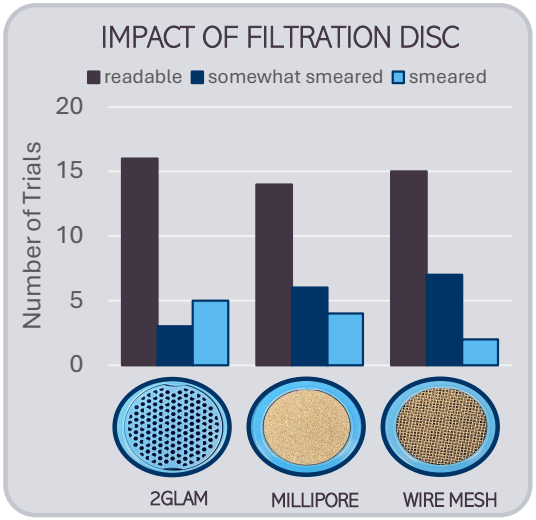
METHODS

Six environmental samples, collected from around Victoria, BC, were tested using the steps shown below.



RESULTS





DISCUSSION

- **Zero** of the thirty-six plates hydrated with 0.6 mL experienced "smearing", which further substantiates the use of a 0.6 mL hydration volume (Smart, et. al., 2024).
- **Both** the Millipore and the triple-layer wire mesh filtration discs appear to produce less "smeared" results; however, when combining "somewhat smeared" and "smeared" results the 2GLAM appears to perform better.
- **~40%** of the trials grew very tiny colonies, making quantification difficult

FUTURE STEPS

- **Analyse** the filtration disc comparison data and determine data significance
- **Determine** cause of small colonies, and repeat tests
- **Propose,** and test for, other potential influences on "smearing" (colony count, turbidity, etc.)

RECOMMENDATIONS

- **Implement** the reduced plate rehydration volume, changing from 1.0 mL to 0.6 mL for field tests

AKNOWLEDGEMENTS

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REFERENCES

Smart, C., et. al. (2024). *Research Brief: Optimization of Rehydration Volume for Compact Dry ECO Plates with Turbid Surface Water Samples*.

UNICEF. (n.d.). *Rapid Water Quality Testing.* Retrieved from UNICEF Office of Innovation: http://unicef.org/innovation/rapid-water-quality-testing