INTRODUCTION

Cryptosporidium causes diarrhoeal disease (cryptosporidiosis) with some 6000 confirmed cases in the UK each year.

Cryptosporidiosis can be contracted directly through contact with an infected person or animal and a faecal oral route or via consuming contaminated food and/or water. Most outbreaks of Cryptosporidiosis are however associated with recreational water exposure, in particular swimming pools, including leisure pools.

The Cryptosporidium oocysts are resistant to routine chemical disinfection in swimming pools and present challenges to swimming pool management.

Cryptosporidium is not tested for routinely in pools; it's difficult and expensive to test for, and not all laboratories are accredited to carry out the tests and there are no quantitative standards, or data are available for the UK.

Testing in outbreaks requires very careful consideration, including the interpretation of results taken some time after a potential water contamination incident.

Primary Aim:

- Undertake a longitudinal sample survey, over 10 weeks during summer and autumn 2017, to estimate the background occurrence and concentration of Cryptosporidium in six UK leisure pools.

Secondary Aims:

- to inform guidance for pool operators
- to provide data for quantitative microbial risk assessment
- improve sampling capacity, capability and interpretation for public health investigations

METHODS

Pool Water Samples

Pool water sample volumes through the IDEXX Filtamax xpress® were 60 to 999 L, median 493 L. Samples were taken over 8 to 24 hours.

IDEXX Filtamax xpress® filters can block even when water is not satisfactory.

Oocysts were detected in 12/59 (20%) samples, counts ranged from 0 to 0.116 oocysts/L. 8/12 (66%) detections were in August when bathers loads were highest.

Filter Backwash Water

Filter backwash water was sampled from 3 pools. Oocysts were detected in 2/29 (7%) samples, from 2 pools; counts were 1 and 4 oocysts/L. Detects coincided with oocyst counts in pool waters.

RESULTS

Testing for Routine Indicators

Colony counts of total coliforms, Escherichia coli, and Pseudomonas aeruginosa in 59/60 samples were all zero (1 sample invalid having been sent to the wrong laboratory).

Aerobic colony counts @ 37°C for 24 h in 57 samples were:

- Satisfactory (<10 cfu/ml) 41 (72%) samples
- Concerning (10-100 cfu/ml) 4 (7%) samples
- Unsatisfactory (>100 cfu/ml) 12 (21%) sample

3 samples were invalid (1 sent to wrong lab; 2 arrived >24 h after sampling)

ACC failures and Cryptosporidium detections were NOT related

Poolside sampling for routine indicators

Testing for chemical parameters, poolside

Laboratory culture (Lats Scientific)

Poolside sampling for bacterial indicators and chemical parameters was undertaken on site at the poolside, including pH, chlorine levels and turbidity.

CONCLUSIONS

The risk of detection of Cryptosporidium occurred when bath loads were highest. Pool water management is therefore critical at these times.

Cryptosporidium detections and ACC failures were not linked in the project. Nevertheless, sampling for indicators organisms can continue to give surety and verification of general water management.

Small numbers of Cryptosporidium oocysts detected in swimming pools can be successfully managed by adhering to PWTAG standards; this also includes ensuring pool water chemistry is monitored and pool plant and equipment is maintained.

Access to sampling paraphernalia including liaison with accredited laboratories, and developing an evidence base for environmental Cryptosporidium is essential to securing effective response to incidents.

Improved sampling capacity, capability and interpretation for public health investigations is required.

ACKNOWLEDGEMENTS

This project was carried out with the support of collaboration within public health, testing laboratories, recreational water providers and with significant support and input from the Pool Water Treatment Advisory Group.

The project was limited in terms of the study time, the number of participating pools and the configuration of the pools, but targeted the pool type and spanned the season most relevant to pool-related incidents.

The results serve to inform on actions that can be considered in response to a public health incident and in response to any positive results. From any sampling carried out for Cryptosporidium and/or indicator organisms.

These data should be supplemented for quantitative microbial risk assessment is required to further develop responses. This requires collaborators and funding to collect better behaviour data for UK and undertake analysis.

REFERENCES