UK Health Security Agency

Cryptosporidium Cases in England and Wales; Overview of the increase – Aug-Oct 2023

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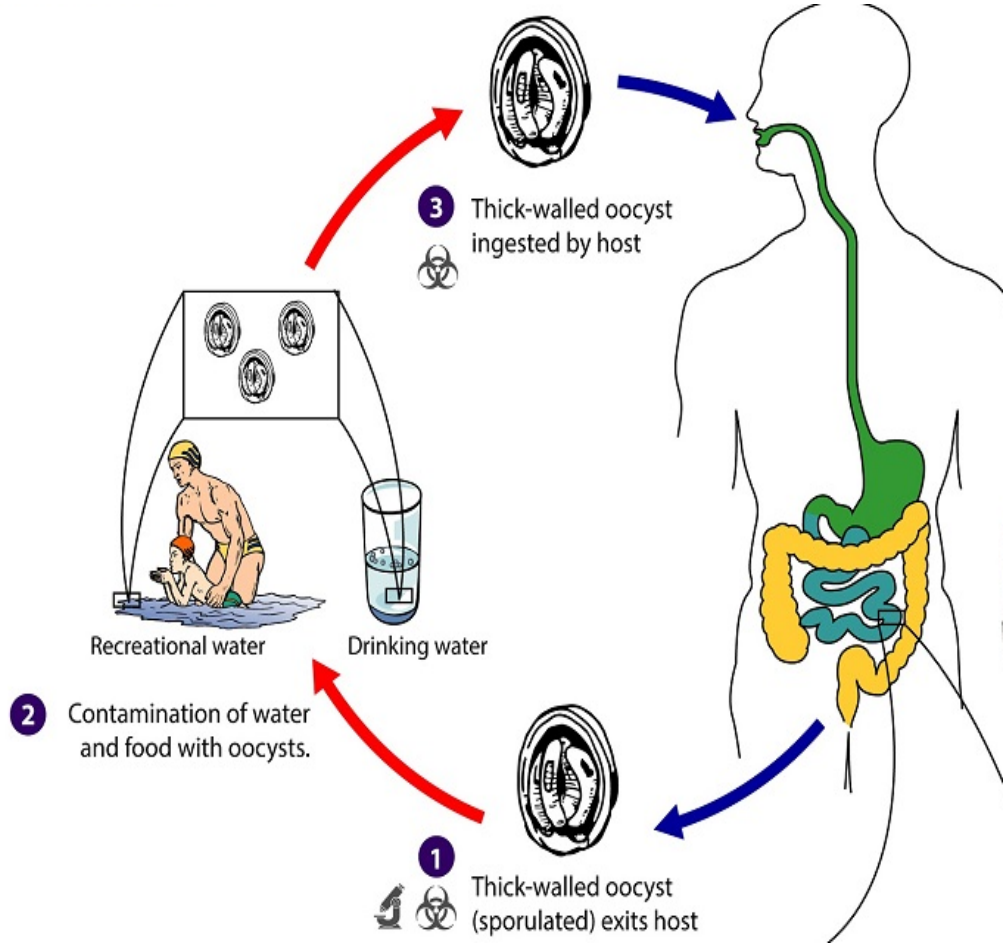
What is Cryptosporidium; overview

- Protozoan parasite: single celled animal, packaged in an oocyst
- Oocysts are ~5 µm in diameter

- Life cycle occurs in the gut:
- No multiplication in environment
- When swallowed it multiplies in the gut, causing diarrhoea

- Millions of oocysts are shed in faeces
- Oocysts are robust and resistant

- Ingesting ONE oocyst could cause illness



What is Cryptosporidium; overview

- High potential for spread from infected hosts
- May be shed in faeces after acute symptoms have stopped, presenting a transmission risk
- Multiple sources
- Multiple transmission routes

- Oocysts survive …….. resistant to chlorine disinfection
- Multi-barrier approach: protection from contamination and treatment to remove it

https://www.gov.uk/guidance/cryptosporidium-public-advice

Cryptosporidium; exposures and risks

- Contaminated drinking water
- Contaminated food or beverages
- Travel to countries with less developed sanitation systems
- Use of recreational water venues – in particular where there are water management issues
- Contact with livestock eg cattle and sheep in particular young ruminants
- Changing nappies or toileting young children
- Contact with another person with diarrhoea, especially a child
- Exposures in child care settings and other institutions
- Have close personal contact with cases

Cryptosporidium – exposures, includes …..

- Waterborne exposures
- Recreational water
- Untreated water
- Potable/drinking water
- Livestock
- Unpasteurized milk
- Unpasteurized apple cider
- Fresh produce
- Child care settings
- Person to person cases

Cryptosporidium Outbreaks though the Season England and Wales 2009 – 2017

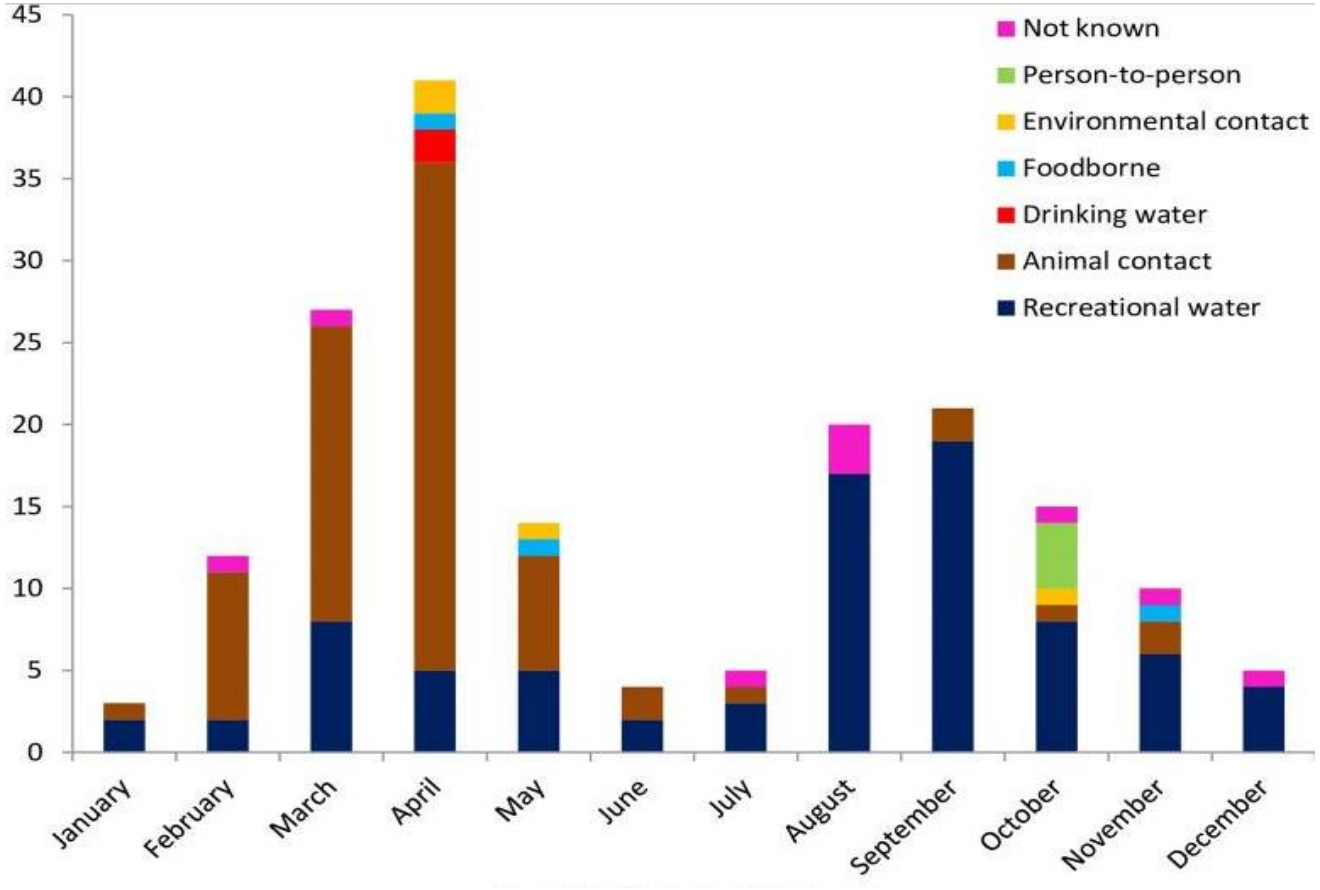
- Majority of illness in the UK is caused by

Cryptosporidium hominis and ***Cryptosporidium parvum***

- National and international outbreaks can occur

- **Most cases are linked to a particular setting**

- Travel outside the UK is significant



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6417012/

Cryptosporidium in England and Wales; 2022

- Positive samples are referred to the Cryptosporidium Reference Laboratory; Swansea
- In 2022 some 2,913 were referred and 2,698 were successfully genotyped

63% (n=1,694) were ***C.parvum***

34% (n= 919) were ***C.hominis***

Among genotyped specimens 16% (n=440) of those genotyped reported international travel, 65% of which were ***C.hominis***

Cryptosporidium; Occasionally there are non-hominis/parvum incidents, Summer 2008

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Page last updated at 16:32 GMT, Wednesday, 5 November 2008

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Water firm criticised over scare

Anglian Water has been criticised by a watchdog after a contaminated supply led to 250,000 people in having to boil their tap water in Northamptonshire.

The source of the outbreak was located at Pitsford Reservoir

In June this year, a rabbit got into a wash water tank, leading to the bug cryptosporidium infecting the firm's treatment works in Pitsford.

A warning was immediately issued to customers in Northampton and Daventry.

The Drinking Water Inspectorate said the water scare was caused by a failure of "basic water supply hygiene".

Cryptosporidium is a microscopic parasite can cause severe stomach upsets, especially in young or elderly people.

'Robust monitoring'

The Anglian Water oversight allowed a small rabbit to get into a wash water tank, contaminating the distribution system with a strain of the cryptosporidium parasite which infects the animals.

Deputy chief inspector Marcus Rink said : "My inspector is critical of this failure of basic water supply hygiene arrangements.

"However his assessment rightly highlights how it was Anglian Water's own robust monitoring procedures which raised the alarm and secured a quick and effective multi-agency response."

The announcement led to school closures and a shortage of bottled water in supermarkets across the area.

BBC Northamptonshire
Sport, travel, weather, things to do and more

SEE ALSO
- Q&A: Cryptosporidium
  30 Nov 05 | Wales
- Six fall ill after water infected
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- Ban on drinking tap water lifted
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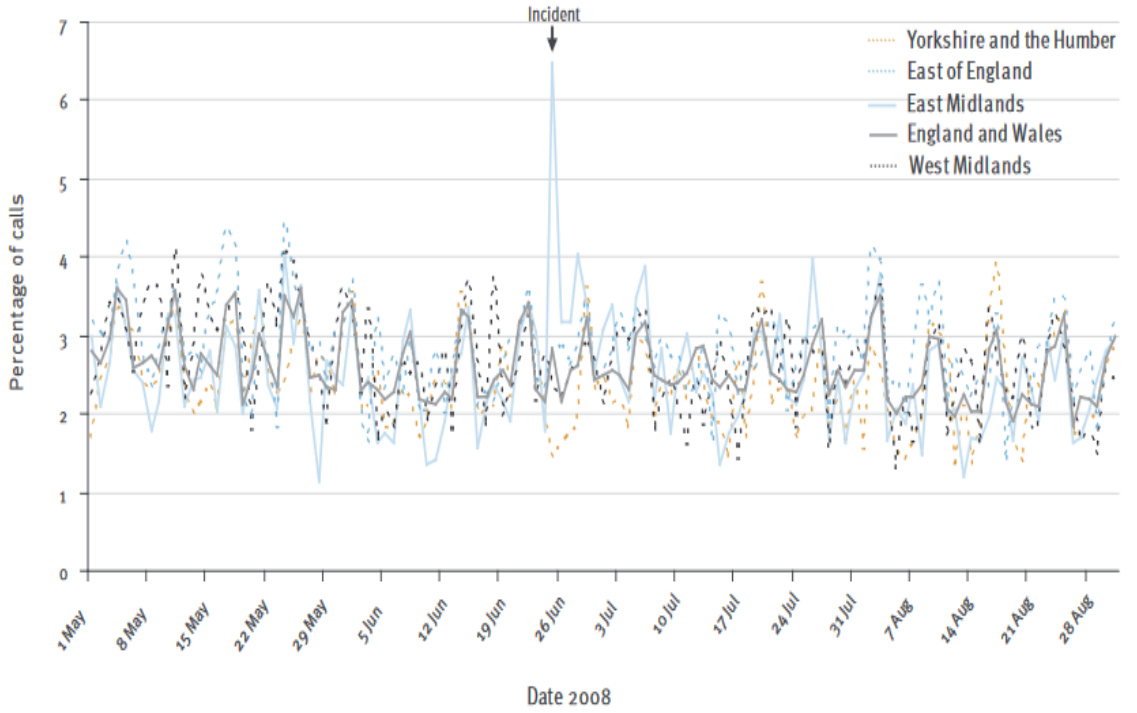
- Work to clean contaminated water
  28 Jun 08 | Northamptonshire
- Source of water bug is discovered
  27 Jun 08 | Northamptonshire
- Scientists test for sickness bug
  25 Jun 08 | Northamptonshire

RELATED INTERNET LINKS
- Anglian Water
- Northamptonshire County Council
- Cryptosporidium
- Health protection Agency

The BBC is not responsible for the content of external internet sites

FIGURE 1

Daily NHS Direct calls for diarrhoea in the East Midlands, compared with other regions, United Kingdom, 1 May – 31 August 2008



https://pdfs.semanticscholar.org/dc58/a1024cc142912855c4feb36b7a3d5ccf70cc.pdf

Cryptosporidium; Occasional v.large incidents, spring 1993

- Outbreak of acute watery diarrhoea in residents of Milwaukee
- Noted increase in turbidity in treated water in the city's southern water treatment plant – at which point the water treatment plant was shut down
- **Estimated that 403,000 cases of diarrhoea**
- **Confirmed in over 600 cases**
- Crypto entered the water system and were inadequately treated
- Possible sources were cattle, slaughterhouses and human sewage
- Rivers swelled by spring rains may have added to the issues
- Water treatment review, including reviewing coagulant and backwashing procedure and more robust monitoring of turbidity

https://pdfs.semanticscholar.org/dc58/a1024cc142912855c4feb36b7a3d5ccf70cc.pdf

Cryptosporidium and Water Treatment

Pathogen	Chlorine survival* 1mg/L, pH7.5, 25°C
E. coli O157	< 1 min
Cryptosporidium	10.6 days

*Source http://www.cdc.gov/healthywater/swimming/pools/chlorine-disinfection-timetable.html

Filtration;

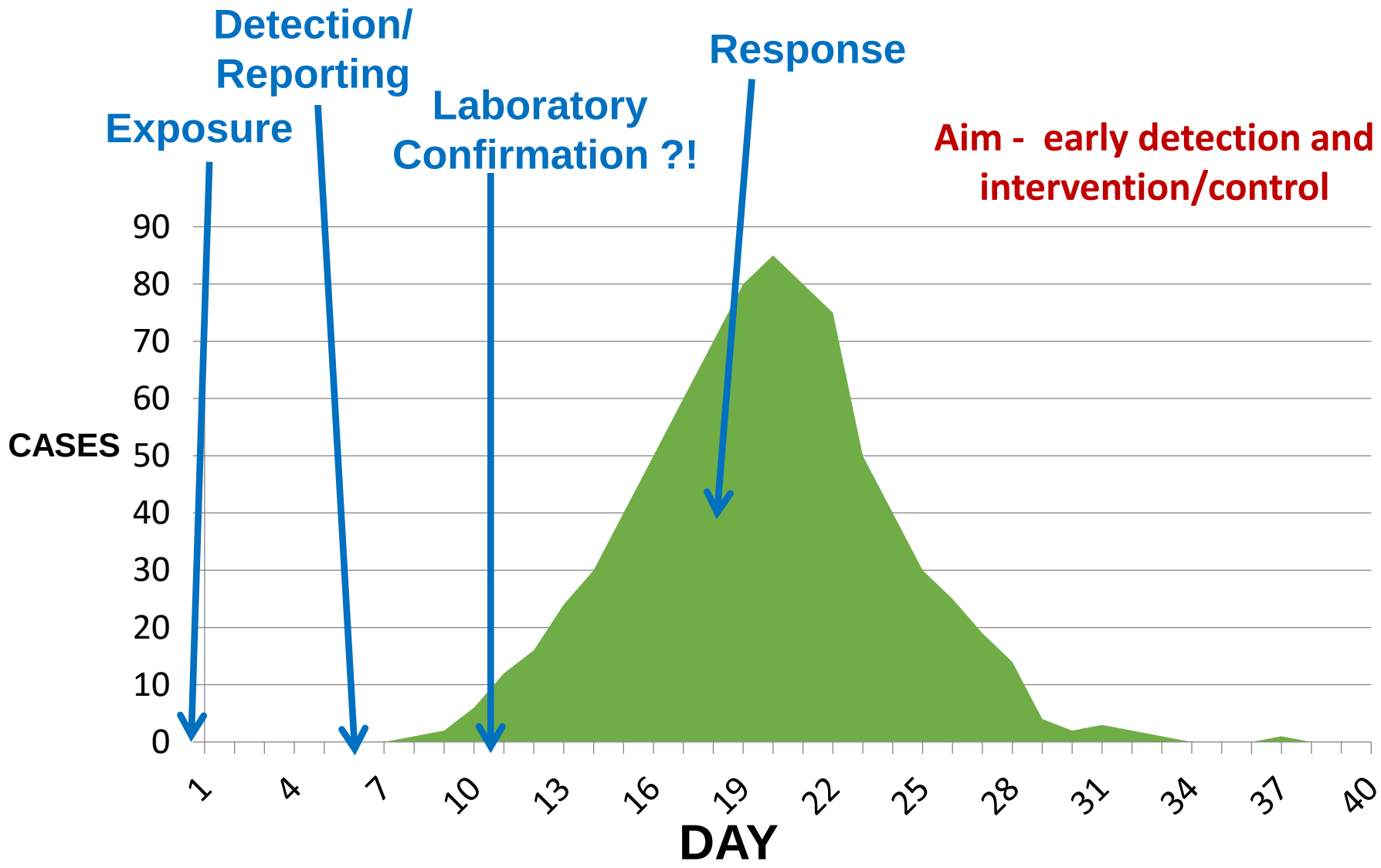
Designed to provide a physically clean, clear and safe environment, not specifically to remove Cryptosporidium

Most effective at rates <25$m^3/m^2/h$ (low or medium rate) with continuous coagulation

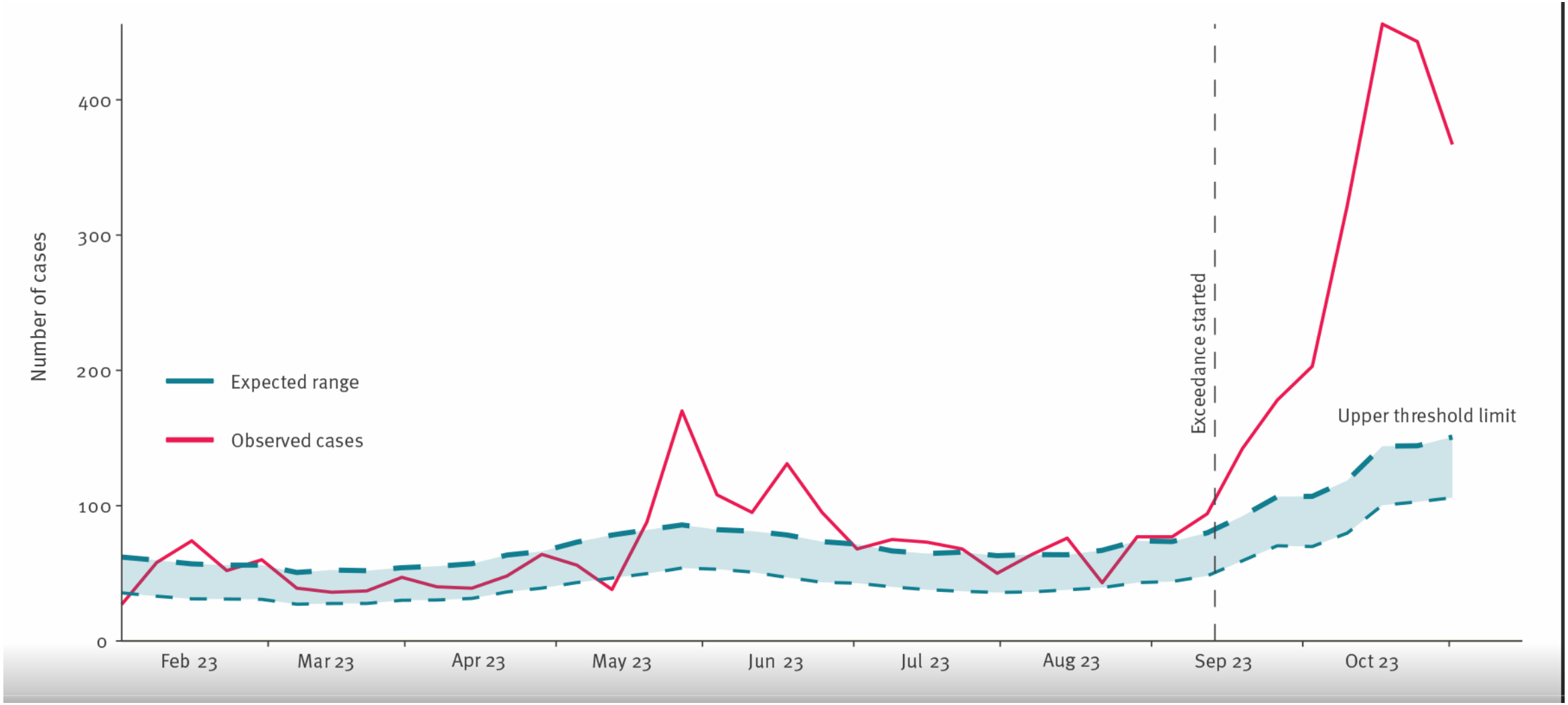
Cryptosporidium and Water Treatment; Filtration

Plant rooms can be large or small but …. '*Purity can be maintained by continuous purification, a combination of efficient filtration and accurately controlled chlorination' 1929*

Swimming and Recreational Water Pools; Investigating Outbreaks - Detection and Response



Cryptosporidium Notifications; England and Wales by Week of Specimen, 2023



Cryptosporidium Notifications; England and Wales by Week of Specimen 2023

- Increase and geographical spread across the regions and UK nations makes a single local exposure unlikely
- Local variation in surveillance and exposure questionnaires

- Standardised electronic questionnaire deployed ; asking about
  - foreign travel,
  - food and water exposures and
  - interactions with animals

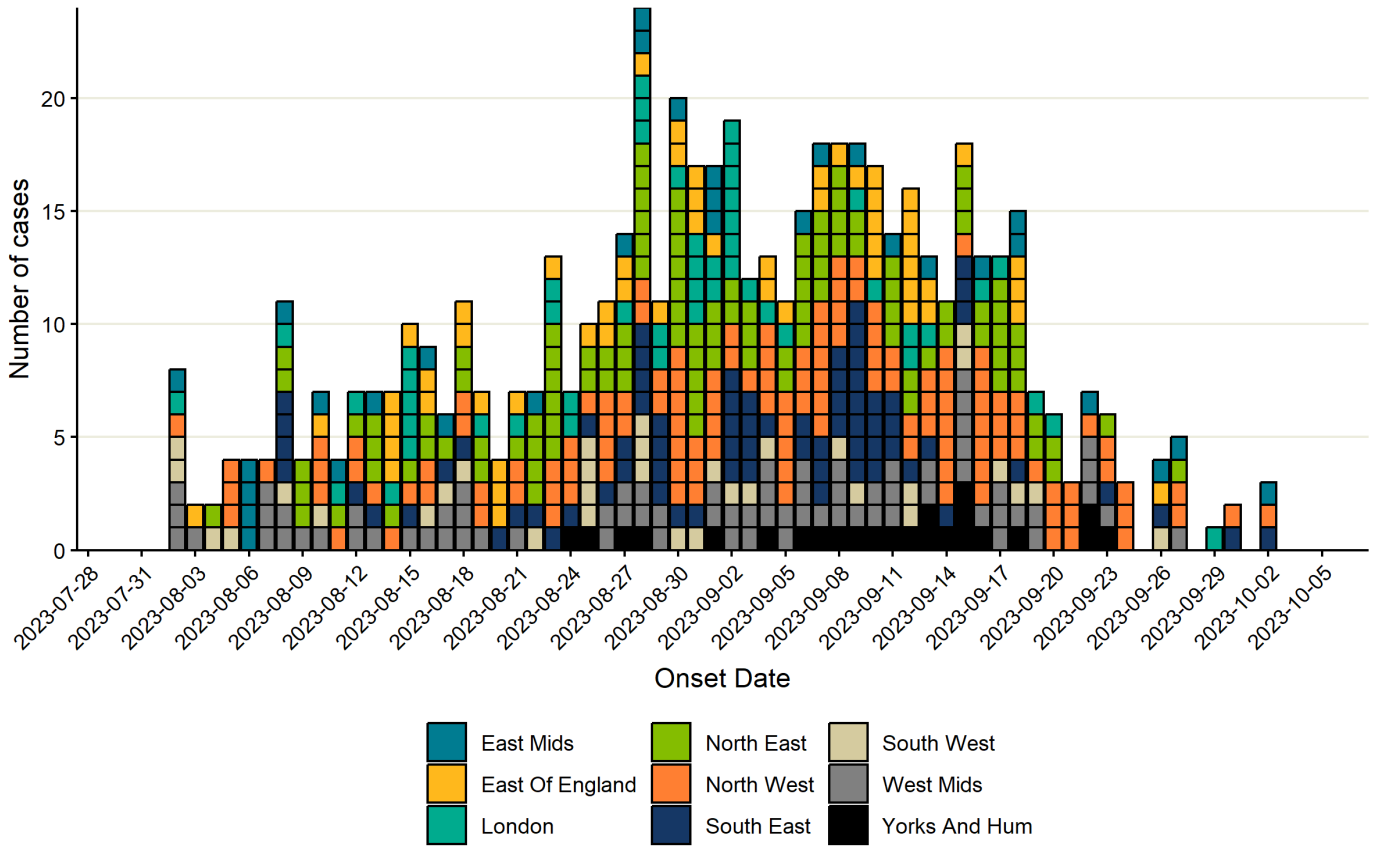
- In Wales a standardised questionnaire was in place before the exceedance

Cryptosporidium Increase in England and Wales 2023

Characteristic	N = 577[1]
East Mids	31 (5.4%)
East Of England	55 (9.5%)
London	49 (8.5%)
North East	109 (19%)
North West	129 (22%)
South East	73 (13%)
South West	33 (5.7%)
West Mids	74 (13%)
Yorks And Hum	24 (4.2%)

[1]n (%)

Cases with onset date from 1st August 2023



Some 2,411 cases (2,032 England, 163 Wales 127 Scotland and 89 NI)

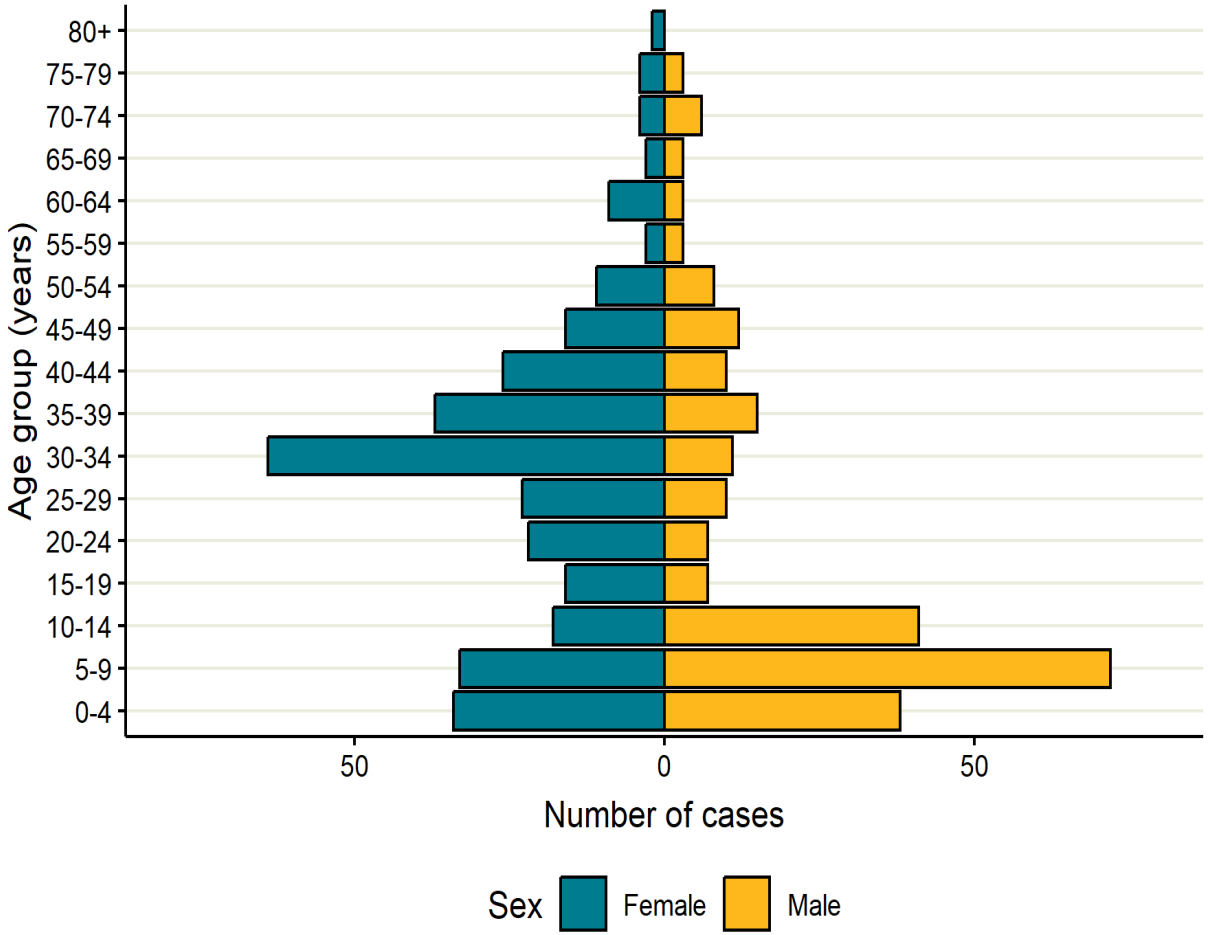
https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2023.28.43.2300538#html_fulltext

https://www.foodsafetynews.com/2023/10/rise-in-travel-related-cryptosporidium-cases-prompts-warning/

Cryptosporidium Increase in England and Wales 2023

Age (years)	**Overall**, N = 577[1]	**female**, N = 328[1]	**male**, N = 249[1]
0-4	72 (13%)	34 (10%)	38 (15%)
5-9	105 (18%)	33 (10%)	72 (29%)
10-14	59 (10%)	18 (5.5%)	41 (16%)
15-19	23 (4.0%)	16 (4.9%)	7 (2.8%)
20-29	62 (11%)	45 (14%)	17 (6.8%)
30-39	127 (22%)	101 (31%)	26 (10%)
40-59	89 (16%)	56 (17%)	33 (13%)
60-79	18 (3.1%)	12 (3.7%)	6 (2.4%)
80+	19 (3.3%)	10 (3.1%)	9 (3.6%)

[1]n (%)



Cases with onset date from 1st August 2023

Cryptosporidium Notified Cases weeks 33-39, 2023

Characteristics	England	Wales	Scotland	Northern Ireland
Local laboratory				
All *Cryptosporidium* species	2,032	163	127	89
Exceedance threshold first reached	Week 33	Week 35	Week 39	NA
Reference laboratory[b]				
C. parvum	431		10	0
C. hominis	929		25	0
Other *Cryptosporidium* species	19		0	0
Not typable	32		0	0
Not yet processed	784		92	89

Cryptosporidium Increase in England and Wales 2023

- In England; 2 October, 406 standardised exposure questionnaires completed for individuals reporting a symptom onset date of 1 August or later, with species data available for 235 (58%).
- Comparable questionnaire data from Wales are available for an additional 71 cases reporting symptom onset from 14 August (ISO Week 33).

- Foreign travel was reported by 250 (54%) of 463 Cryptosporidium spp. cases and by 139 (65%) of 213 C. hominis cases.

- Of the 394 cryptosporidiosis cases resident in England who provided information on travel, 215 (55%) reported foreign travel in the 14 days preceding their illness, of which 96 (45%) noted travel to Spain (Spanish mainland and/or the Balearic Islands).

Cryptosporidium Increase in England and Wales 2023

Cautious review of available data;

- Looking at comparative data - possible exceedance associated with greater exposure to swimming in the 14 days before onset ???
- Swimming in pools / water parks has not identified particular settings that could explain the exceedance

- 2 Local (UK) recreational settings have been associated with cases.
- These settings have been investigated with the LA Environmental Health Teams, HP-Teams/UKHSA and the operators

- Liaison with National Travel Health Network Centre (NaTHNaC) to ensure travel advice available.
- Linking with European Centre for Disease Prevention and Control (ECDC)

Cryptosporidium Increase in England and Wales 2023; Summary to date ……

- Recreational water exposure most likely
- But no single recreational water exposure has been identified – so far

- Food cannot be ruled out – at this stage (and/or food irrigation water)

- Spain and the Mediterranean countries are of interest in the investigation and the cases
- Investigations in other countries in progress

- 56% of the 224 cases reported illness lasting >10 days - illustrating the burden of disease
- Transmission within households and secondary cases associated with recreational water exposure and child care settings/schools etc can occur

UK Health Security Agency

Thanks

The authors of the Eurosurveillance Rapid Communication Volume 28, Issue 43 26 October 2023

Environmental Health in Local Authorities, UKHSA Health Protection Teams & Field Services colleagues, PH-Wales including the England and Wales Cryptosporidium Reference Laboratory, (Swansea)