



Public Health  
England

# Update - STEC testing of food samples in PHE

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- Routine sprouted seeds and their irrigation waters (no further positives in 2016 and 2017;  $n = > 120$ ); one isolate from curry leaves obtained (so far survey of 50 curry/banana/paan leaf samples).
- Port Health Authorities (raw meat shipments) - no further positives in 2016 and 2017 ( $n = > 40$ )
- O55, O157 PT34 and other outbreaks
- Raw milk for drinking survey/investigations

# STEC testing in relation to incidents

Year	Food type	Evidence for association	STEC Type	Samples tested	Reference
2017	raw cows drinking milk	Epi. Strain isolated, WGS	O157 and non-O157	Raw milks (several lots) O157 isolated and one unrelated O113:H4 isolated	-
2016	Mixed leaves suspected	Epi	O157 PT34	230 food, water and environmental samples; no O157 detected; – unrelated (O128) STEC isolated from salad	Largest outbreak of STEC O157 since 2011. Strong evidence that infection was linked to the consumption of mixed salad leaves available to consumers in a short time period ~ 9 days. Specific leaf and origin remains unclear .
2014-2016	No firm evidence for any source	...	O55	> 100 waters/ environmental swabs/ socks. O55 isolated from bathroom of patient; unrelated O146 isolated from zoo)	Eurosurveillance, 22, Issue 36, 2017; > 40 cases
2014	Raw drinking milk	Epi, strain isolated from cows WGS	O157, PT 21/28, stx 2	> 30 samples tested; STEC O157 genes detected in milk sample but not isolated: Ct <sub>stx</sub> 33.1;	Butcher et al., 2016



# Dairies approved for the sale of Raw Drinking Milk<sup>1</sup>



<sup>1</sup> > 200 Premises listed on FSA website



# Raw milk for drinking survey<sup>1</sup>

**Number of samples (n = 902) with microbiological results (borderline, unsatisfactory and potentially injurious categories) for individual test parameters**

Interpretation	Test Parameter	Criterion	No. (%) of samples
<b>Satisfactory</b> (while legally compliant if shelf life < 5 days these are considered of public health concern)	Listeria monocytogenes	Detected; <100/ml	66 (7.3)
	Listeria species (not monocytogenes)	Detected; <100/ml	44 (4.9)
<b>Borderline</b>	Coagulase positive staphylococci	20 - <10 <sup>4</sup> /ml	202 (22.4)
<b>Unsatisfactory</b>	Aerobic Colony Count	>20,000/ml	174 (19.3)
	Coliforms	>100/ml	164 (18.2)
<b>Unsatisfactory; potentially injurious to health</b>	Coagulase positive staphylococci	≥10 <sup>4</sup> /ml	3 (0.3)
	Listeria monocytogenes	>100/ml	2 (0.2)
	Salmonella	Detected	8 (0.9)
	Campylobacter	Detected	3 (0.3)
	<b>STEC</b>	<b>Detected</b>	<b>13 (1.4)</b>

<sup>1</sup> Willis et al. (JAM) in press



## STEC positives from 2 premises

*E. coli* O2 (stx2a) and O22 (stx2c and stx2d) isolated from 9 samples from the same farm A, taken on three occasions in a single month.

*E. coli* O171:H2 (stx2c and stx2b), *E. coli* O109:H16 (stx2a) and *E. coli* O157:H7 (PT8) detected in four samples from farm B taken on three separate occasions over a two-month period.

### Presence of pathogens in milk from farm B visited weekly for eight weeks between October and December

	No. samples	No. samples in which Salmonella detected	No. samples in which STEC detected	No. of samples in which ACC and/or coliform results were unsatisfactory
Week 1	6	2	0	0
Week 2	4	0	1	0
Week 3	4	1	0	0
Week 4	4	0	0	0
Week 5	4	1	1	0
Week 6	4	0	2	0
Week 7	11	1	0	0
Week 8	4	0	0	0



## Food Standards Agency protocol following detection of a pathogen in raw milk

- Sale of RDM suspended
- Remedial action taken
- 3 sets of 4 samples from the bulk tanks are collected at least 1 week apart
- All must give satisfactory results before RDM sale can recommence



# Food Safety and Hygiene England Regulation, 2014

5. The raw milk must meet the following standards:

Plate count at 30°C (cfu per ml)	$\leq 20,000$
Coliforms (cfu per ml)	$< 100$

6. In the case where farm premises are being used for the sale of raw cows' milk intended for direct human consumption pursuant to sub-paragraph (a) of paragraph 3, the Agency shall carry out such sampling, analysis and examination of the milk as it considers necessary to ensure that it meets the standards specified in paragraph 5.

7. In any case where the Agency carries out sampling, analysis and examination of raw cows' milk in accordance with paragraph 6, there shall be due to the Agency from the occupier of the production holding who is selling the milk a fee of £63, which is payable by the occupier to the Agency on demand.



## Timeline example from raw milk incident

- Day 1 – O157 cases linked by WGS/Health Protection Team. Outbreak Control Team (OCT) meeting. Farm voluntarily stops selling raw milk for drinking. Farm agrees to alert customers (signs by shop/café) to discard any milk they may have kept (frozen...?)
- Day 2 second OCT meeting to verify actions (raw milk samples received)
- Day 3 Raw milks found presumptive pos for O157 STEC; 4<sup>th</sup> case; OCT advises against young school children visit to farm
- Day 5 Presumptive positive from raw milks confirmed; concern about pasteurised milk production
- Day 8 Isolates from 3 raw milk samples sent for WGS. Animals samples.
- Day 9 OCT and 3 additional probable cases found (hospitalised HUS – some exposure after raw milk sale ceased as farm residents continued drinking it)
- Day 16 WGS of raw milk isolates confirmed within 5 SNPs (from case strains (STEC serogroup O157 phage type 21/28, eae and Stx2a, 4.4.4.590.3896.4108.xxxx)
- Day 17 OCT discuss press release



## STEC positive milk samples (3)

ACC count 2980 cfu /mL and Coliforms 2 cfu /mL

ACC count 6200 cfu /mL and Coliforms 16 cfu /mL

ACC count 6000 cfu /mL and (Coliforms not done)

*i.e.* compliant



# Difficult to ensure milking hygiene is adequate every day all year round?





# New surveillance data for STEC O157 in cattle (not dairy) in Scotland (2015-2016) England & Wales (E&W)

- Herd prevalence 0.23 (0.17-0.33) for Scotland (n = 110) and 0.21 (0.16-0.28) for E&W (n = 160).
- Majority of isolates vtx2 alone; vtx1 detected but only together with vtx2
- Dairy cattle?



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