The epidemiology of VTEC O157: Findings from 9 years of cattle studies

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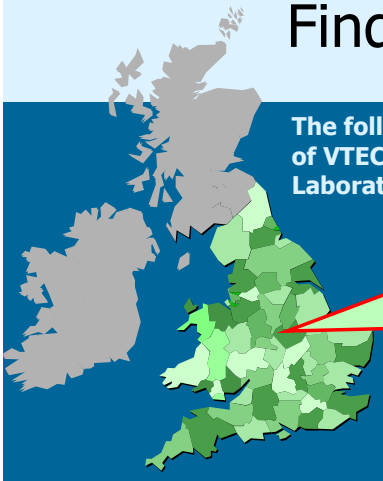
Veterinary Laboratories Agency



The following summary describes the main findings from a structured surveys into the epidemiology of VTEC O157 on cattle farms in England and Wales. The studies were carried out by the Veterinary Laboratories Agency between 1998 & 2007.

PREVALENCE

38.7% of farms [28.1-50.4]
4.2% of animals [2.0-6.4]

10.3% of animals on positive farms {range: 1.1-50.4}

RISK FACTORS FOR INDIVIDUAL ANIMALS

Cross-sectional study:
(Prevalence study)
90 farms
Rectal sampling

&

Longitudinal study:
11 months follow-up on 9 farms:
1209 animals aged 6-24 month,
Rectal sampling

- VTEC in water troughs
- Dirty animals
- Age: 3-18 months
- Fed milk
- Persistent excretor in enclosure
- Silage

Legend: Protective | RISK

FARM/GROUP RISK FACTORS

Cross-sectional study
255 farms, pat sampling, young-stock

&

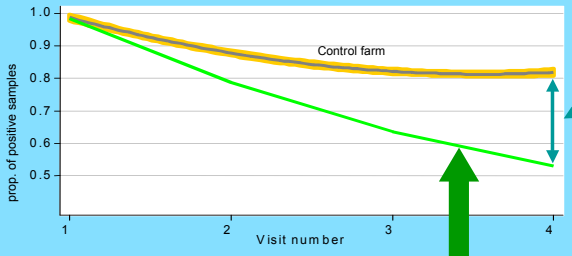
Longitudinal study
30 farms, 7 months follow-up, pat/group sampling, young animals

- Length of Time in study - awareness
- Presence of poultry
- Access to springs
- Assess bedding daily

- Campylo-bacter positive
- Wet bedding
- Large groups (>10)
- Fed straw

EFFECT OF INTERVENTIONS

Randomised controlled trial, 57 farms, 4.5 months, 30 control farms;
2 packages of management changes;
Analyses: GEE model, intention-to-treat adjusted for compliance



Risk ratio: 0.14
[$CI_{95\%}$ 0.02-0.84]
p=0.032

Interventions

- **Keeping bedding VERY dry**
- **No introduction of new animals into groups**

→ Strong effect

- No buying in of animals
- No direct contact with other cattle

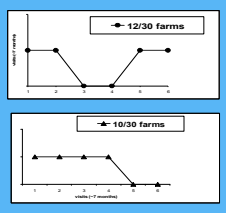
→ Medium effect

- **No shared water sources**
- **Clean animals**
- **Boot-dip**
- **Overcoats**

→ No measurable effect

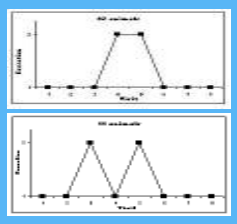
SHEDDING PATTERNS

over ~7 months
Groups of young-stock



3/30 were persistently positive

over ~11 months
Individual animals
(1209)



Longest persistent shedding animal: 98 days (of 335)

BEEF FARM TRANSMISSION MODEL

- In simulations over a four year period, in around 90% of cases, infection from the introduction of one infected animal dies out quickly.
- If infection persists until winter housing it can spread quickly among the calves, which increases the likelihood of spread to the finishing herd.
- Summer turn out decreases prevalence of infection.
- keeping a closed herd or increasing the cleaning of pens reduces within-herd prevalence of infection.

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