

# Enhanced laboratory-based surveillance of STEC O157

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**Research for man and environment**

# Enhanced surveillance STEC O157

## Microbiological laboratories (since 1999)

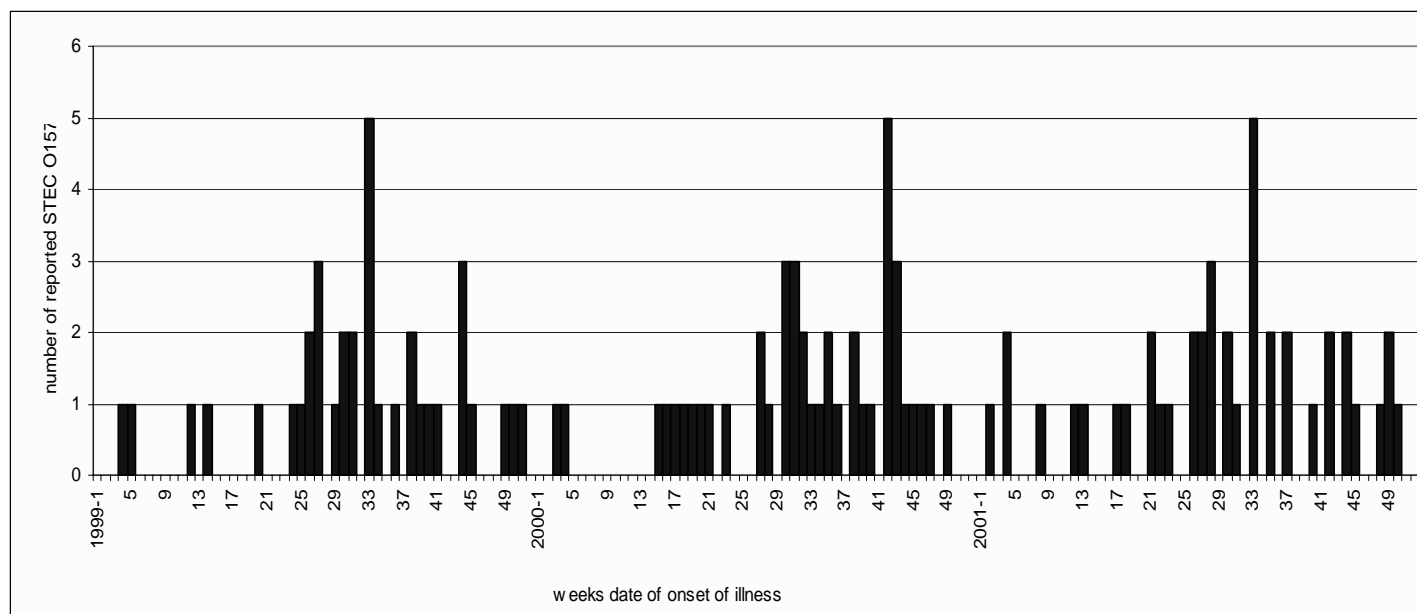
- report positive results to public health service
- send isolate to National Institute for typing  
PCR: *stx*-genes (*stx1/stx2*), *eae*-gene, enterohemolysin gene, pulsed-field gel electrophoresis (*Xba1*)
- questionnaire 02/2000: test criteria, diagnostic methods used, participation surveillance

## Public Health Services (since 1 April 1999)

- administer questionnaire reported patients

# Trends STEC O157, 1999-2001

- 1999:36, 2000:43 , 2001:41 → **stable incidence**
- 45% cases July-October (*figure*)
- 48% male, all ages affected (peak 0-4, dip 30-39)
- 2 cases (1.7%) died (boy 4 year, woman 85 year)



# Public Health questionnaires, 1999-June 2001

Questionnaire available for 82 (91%) cases

- 85% bloody diarrhea, 83% cramps, 41% fever
- at least 12 diagnosed with HUS (15%)
- 38% hospitalized (median 8 days, range 2-42)
- 17% report secondary cases in household
- known risk factors reported by 43 (52%) cases:
  - consumption raw / undercooked beef (12%)
  - consumption raw milk (1%)
  - contact farm animals / manure (21%)
  - contact symptomatic persons (18%)



# What are the important risk factors in the Netherlands?

## No controls in surveillance system

**Proxy:** 574 controls in general practice-based study gastroenteritis, '96-'99 *Emerg Infect Dis* 2001;7:82-91

- 7% contact farm animals / manure (versus 21%)
- 11% contact symptomatic persons (versus 18%)
- 9% consumed raw / undercooked beef (versus 12%)



→ **indication for role of animal / manure contact (and person-to-person**

# Contact with farm animals / manure important risk factor ?

Since summer 2000: report farm animal  
contact

→sample animals / environment

→PFGE of isolated STEC, compare with  
case

## Four investigations indistinguishable isolates

- 08/'00: boy 1,5 yr infected by goats petting z
- 07/'01: boy 1,5 yr infected at dairy farm  
grandfather
- 07/'01: boy 10 mth infected at municipal deer park
- 08/'01: girl 3 yr infected by goat/deer petting zoo  
campground



# Typing STEC O157 isolates, 1999-June 2001

**For 83 (89%) cases isolate available for typing:**

- Dominant O157: H7,*stx2* (48%), H-,*stx1*,*stx2* (24%)
- All *eae*-gene, *ehly*-gene positive, sorbitol-negative
- Distribution of types similar for HUS and non-HUS
- Less *stx1* strains (mainly combined *stx2*) among
  - cases urination disorder (18%) vs. remainder (46%),  $p=0.03$
  - hospitalized patients (30%) vs. remainder (42%), n.s.
  - cases aged 0-9 (23%) vs cases aged >39 (54%), n.s.

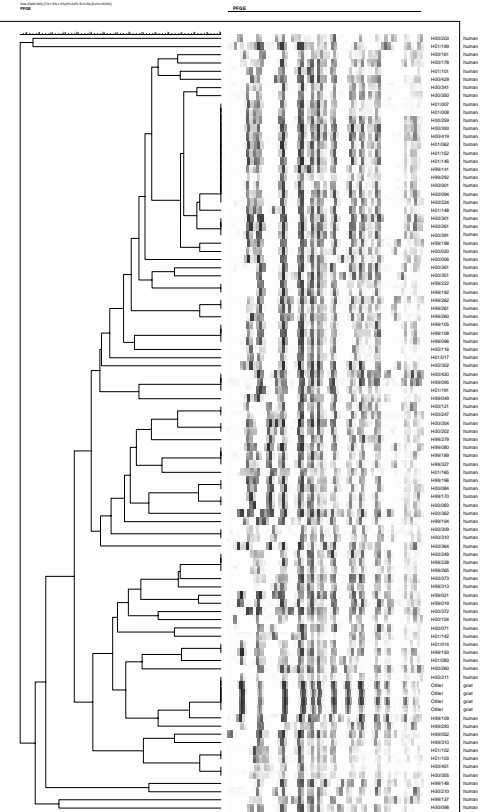
# Cluster analysis STEC O157, PFGE

Among 83 isolates

→ 15 clusters  $\geq 95\%$  identical fragments

- 5 with (partially) known relationship between cases (household contacts)
- 13 with (partially) unknown relationship (12 geographically far apart, *but 7 interval dates of onset < 28 days*)

→ second interview (often months later), no identification of common source is likely, but unknown, clusters





# Main results laboratory questionnaire

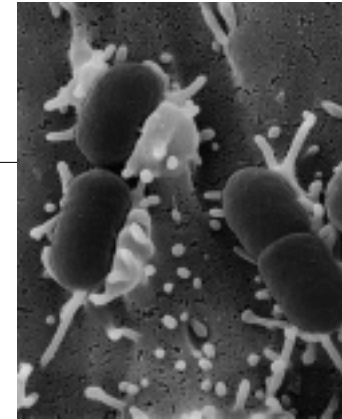
**Response laboratories: 62 (97%)**

**95% (59) tested for STEC O157**

- 8% tested all fecal samples
- 92% selective: bloody diarrhea (48), HUS / HC (32), age (6)
- detection: 88% culture (CT-)SMAC, 10% CHROMagar
- selective enrichment, immunomagnetic separation: not used
- 83% participated in enhanced surveillance

**6% also tested other STEC (only selective)**

# Conclusion



- Laboratory-confirmed 0.25/100,000 py,
  - (still) limited public health problem
- However, underestimated because:
  - minority of cases consult GP (estimate about 5-22%)
  - GP cases not always requested to collect stool (%?)
  - laboratories do not test routinely (only 8% of labs)
  - not most sensitive tests used
  - 85% of cases reported by laboratories to RIVM, PHS
- Serious illness (about 40% hospitalized, >15% HUS, 2% died) and outbreak potential
- Risk factors not well known (except for contact with farm animals / manure)
- Expansion to other STEC types not feasible yet