Epidemiology of Shiga toxin-producing *Escherichia coli* (STEC) Infections in Connecticut, February 2000 – January 2002

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Background

- Shiga toxin-producing *Escherichia coli* (STEC) are an important public health problem.
- *E. coli* O157 most widely recognized STEC in U.S.
- Less is known about spectrum of illness and epidemiology of non-O157 STEC.
- Studies in other countries suggest disease caused by non-O157 STEC may be as prevalent as disease caused by O157.
- Changes in laboratory practices provide new opportunity to evaluate role of non-O157 STEC in human disease.

Objectives

- Determine the frequency of non-O157 STEC compared to O157 STEC.
- Assess the spectrum of clinical illness associated with non-O157 STEC compared to O157.
- Assess differences in risk factors for non-O157 STEC and O157.

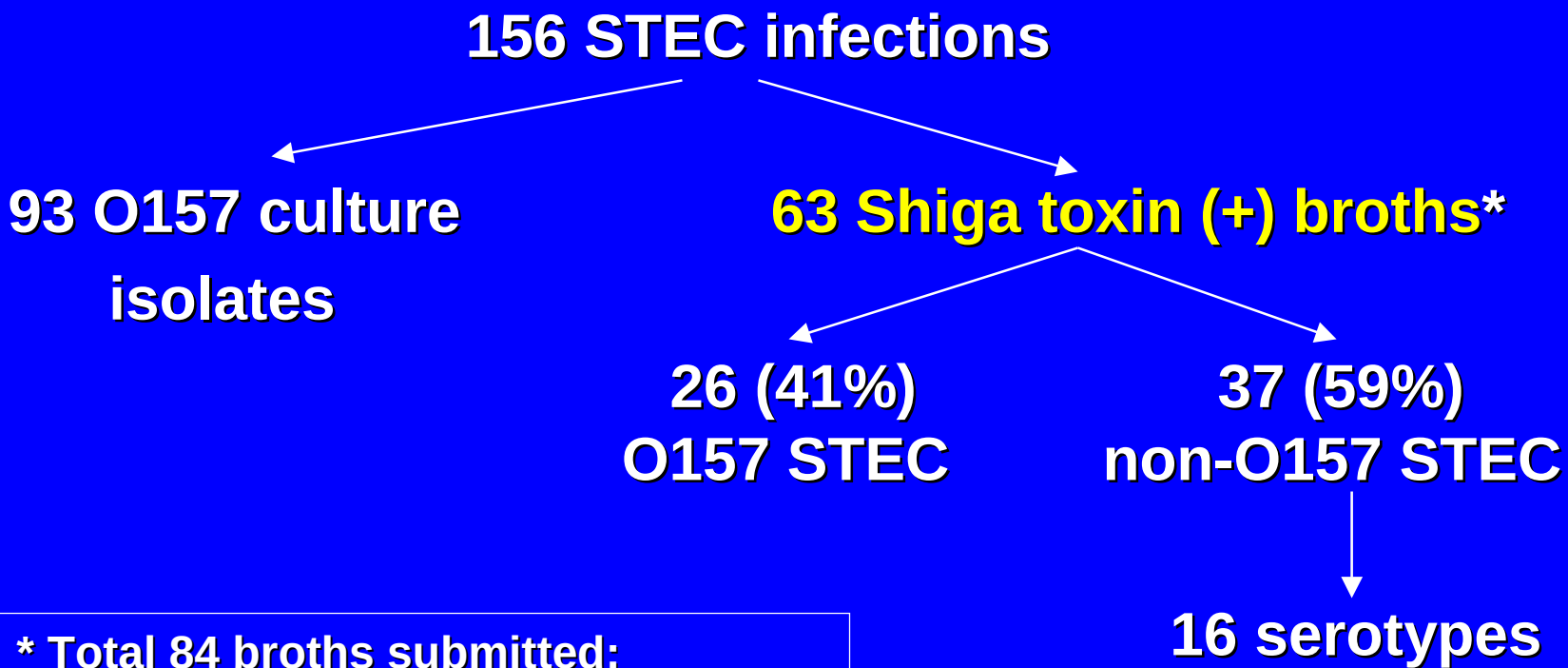
Methods – Laboratory Surveillance

- ST-related disease made reportable in 2000.
- Laboratories required to submit ST-positive broths to the State Laboratory.
- Broths plated on SMAC & CT-SMAC.
- Sorbitol-negative colonies tested for O157.
- If O157-negative, sorbitol-positive colonies & sweep of plate tested for ST.
- Non-O157 STEC isolates sent to CDC for serotyping.

Methods – Clinical and Epidemiology

- Relative frequency of non-O157 STEC was determined from subset of ST-positive specimens.
- Culture-confirmed STEC patients found between 2/1/00 and 1/31/02 interviewed.
  - symptoms, complications, and potential exposures
- Differences between case-patients with non-O157 and patients with O157 STEC were assessed.

Laboratory Surveillance



* Total 84 broths submitted:

17 (20%) “false positives”

67 (80%) confirmed ST-positive

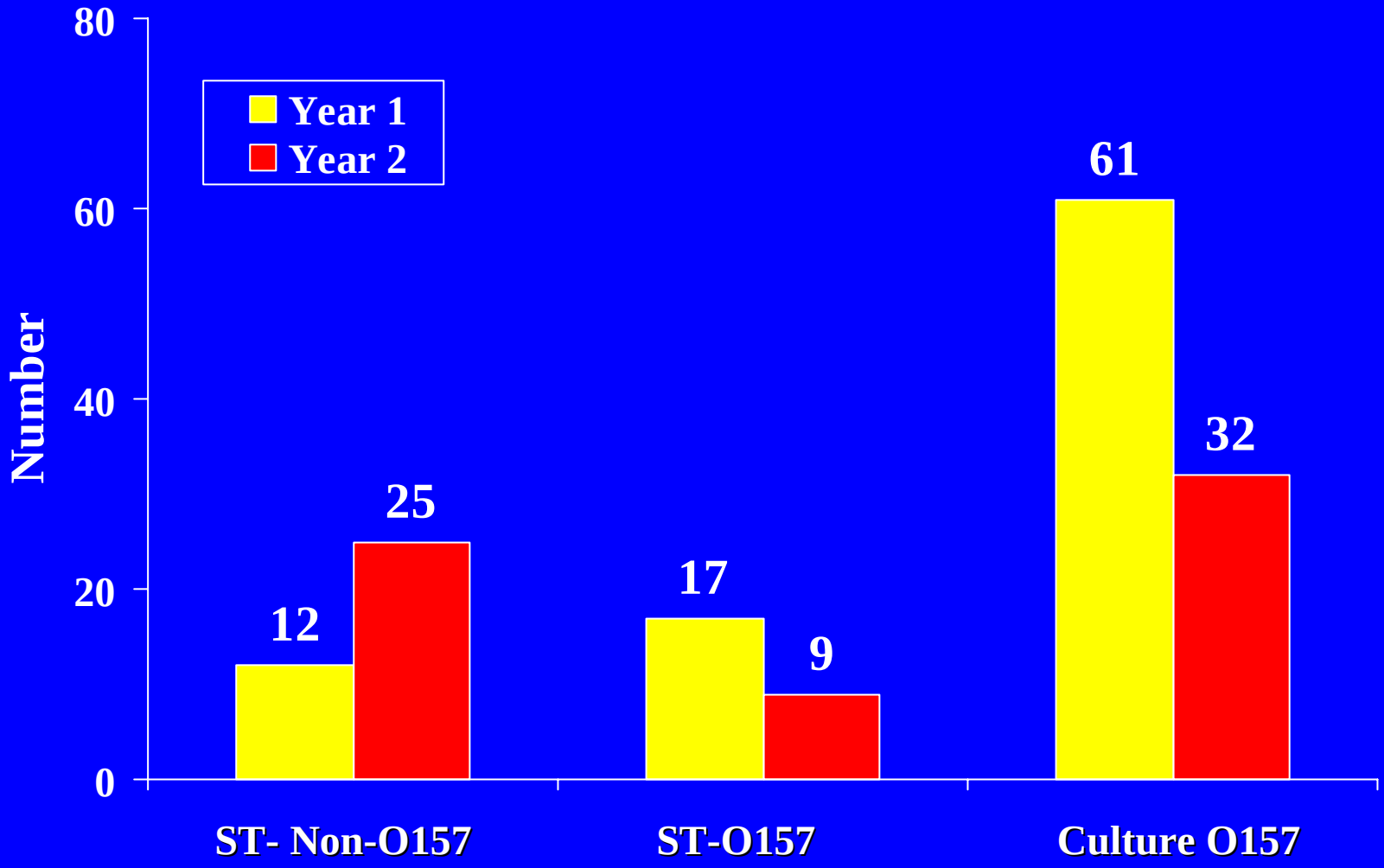
Among 67 confirmed ST-positive:

63 (94%) had *E. coli* isolated

Non-O157 STEC Serotypes Among 37 Isolates

Serotype	No. isolates	Serotype	No. isolates
O103:H2	11	O26:NM	1
O45:H2	7	O91:NM	1
O26:H11	3	O103:H11	1
O-undetermined:NM	3	O103:H25	1
O111:NM	2	O111:H8	1
O-undetermined:H25	1	O145:NM	1
O-rough:H11	1	O163:H19	1
O8:H14	1	O174:H21	1

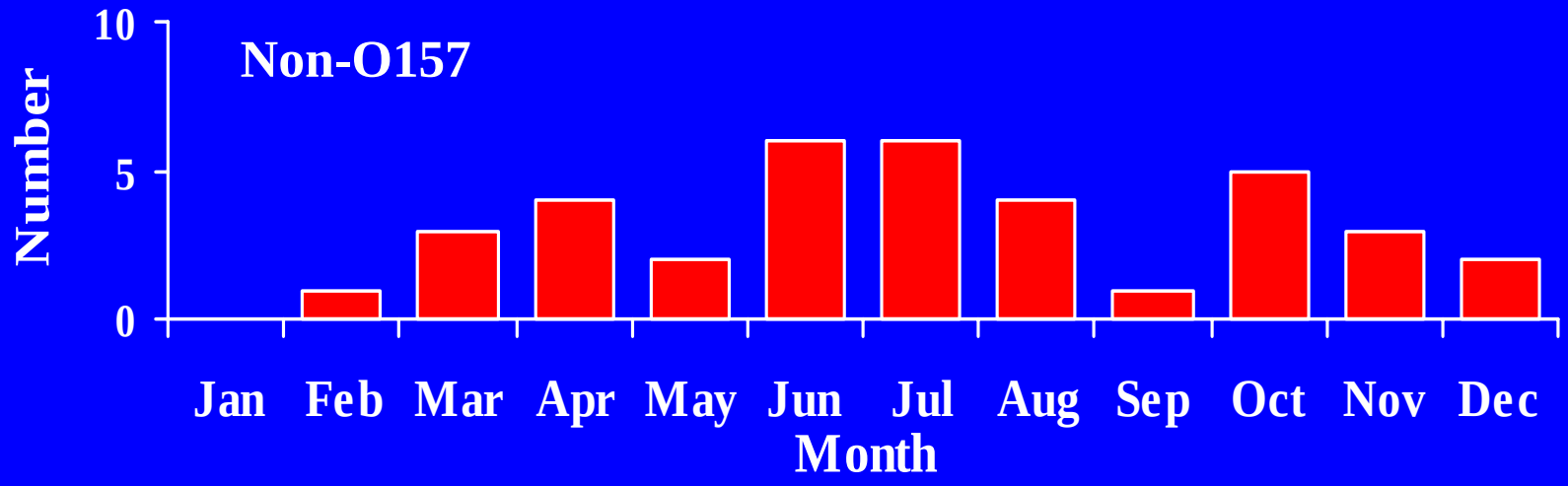
Number of STEC Infections by Year and by Method Identified

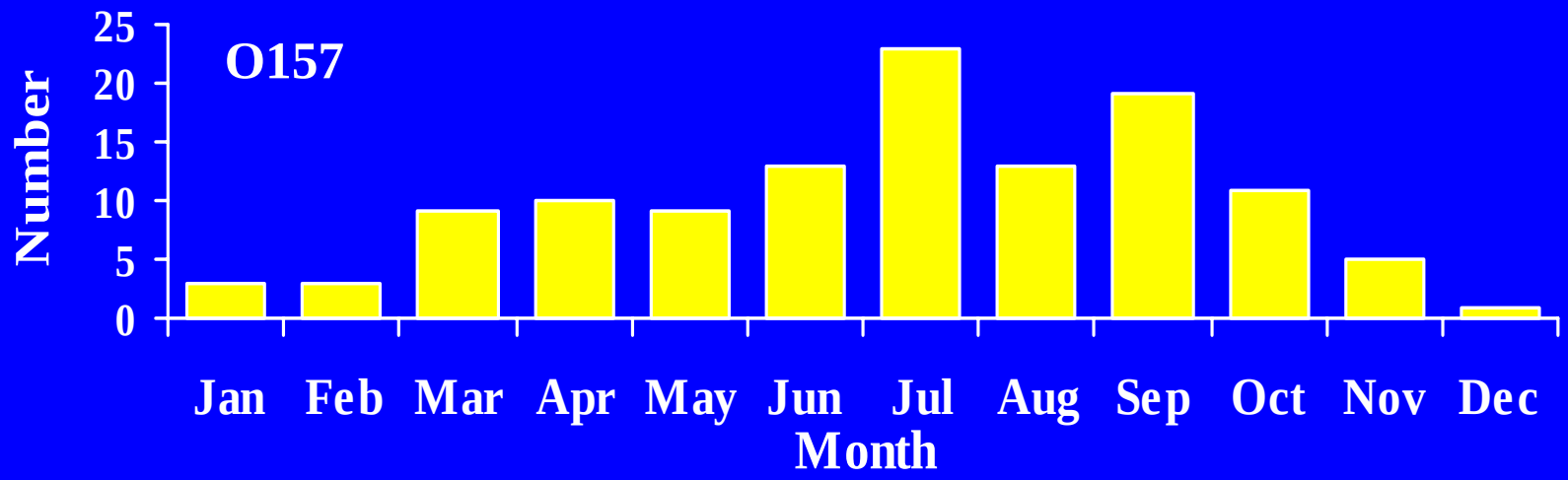


Symptoms and Complications by O157 Detection Method

Symptoms & Complications	Culture O157 (n=86)	ST-O157 (n=25)	*P*-value
Diarrhea	100%	100%	-
Bloody stool	89%	88%	NS
Nausea	57%	42%	NS
Vomiting	43%	44%	NS
Cramps	96%	96%	NS
Headache	32%	24%	NS
Fever	48%	48%	NS
Hospitalized	53%	28%	0.02
HUS/TTP	10%	4%	NS

STEC Infections by Month



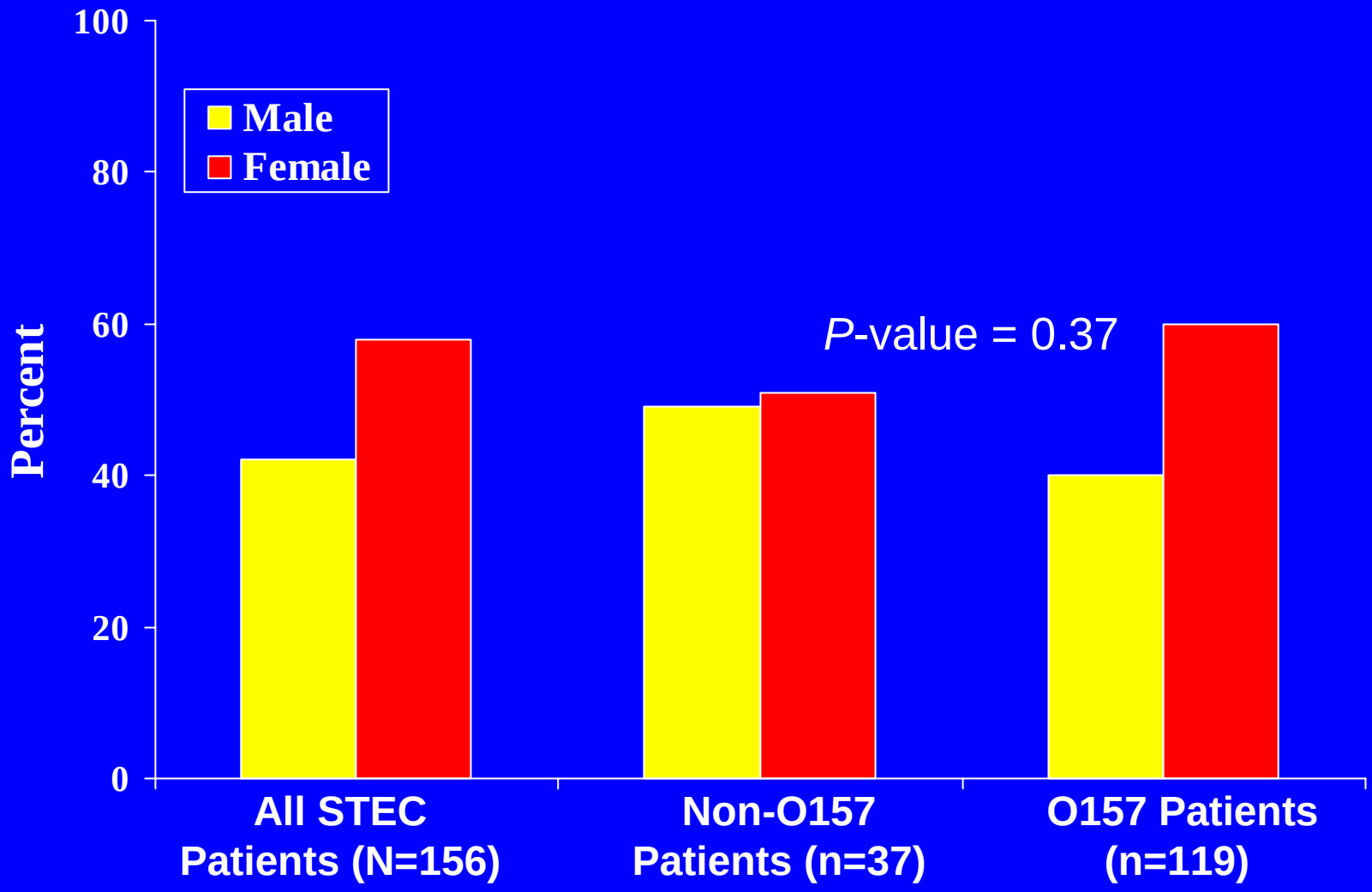


STEC Infections by Age Group

Age (years)	Non-O157 n=37	O157 n=119
< 10	27 %	33 %
10 – 19	30 %	28 %
20 – 39*	3 %	10 %
40 – 59	8 %	13 %
≥ 60^	3 %	16 %

* *P*-value = 0.001, ^ *P*-value = 0.05

STEC Infections by Sex



Symptoms and Complications by STEC Type

	Non-O157 (n=36)	O157 (n=111)	*P*-value
Symptoms			
Bloody stool	56%	89%	< 0.0001
Cramps	82%	96%	0.01
Diarrhea	94%	100%	0.06
Headache	47%	30%	0.07
Complications			
Hospitalized (All)	8%	48%	< 0.0001
Hospitalized (ST)	8%	28%	0.08

Food Exposures with Strongest Association with Non-O157 in Preceding 7 Days

Selected Exposures	Non-O157	All O157	OR	*P*-value
	% exposed	% exposed		
Bottled water	**86%**	**58%**	**4.6**	**0.005**
Peppers	34%	17%	2.6	0.03
Pineapple	21%	8%	2.8	0.07
Squash	9%	2%	5.1	0.09
Mesclun lettuce	10%	3%	3.7	0.13
Basil	15%	6%	2.9	0.14
Eggplant	6%	1%	6.7	0.14

Bottled Water by Age Group

	Non-O157	O157	OR	P-value
< 10	60% (3/5)	52% (14/13)	1.4	1.00
10 – 19	89% (8/9)	69% (20/29)	3.6	0.40
20 – 39	91% (10/11)	64% (7/11)	5.7	0.31
40 – 59	100% (3/3)	64% (9/14)	undef	0.51
≥ 60^	100% (1/1)	56% (5/9)	undef	0.40

Crude OR = 4.6

MH weighted OR = 3.73 (1.15, 12.08)

MLE estimate of OR = 3.62 (1.07, 15.91) p= 0.02