

# **Outbreaks of *E.coli* O157 Infections Associated with Lettuce and Other Leafy Greens**

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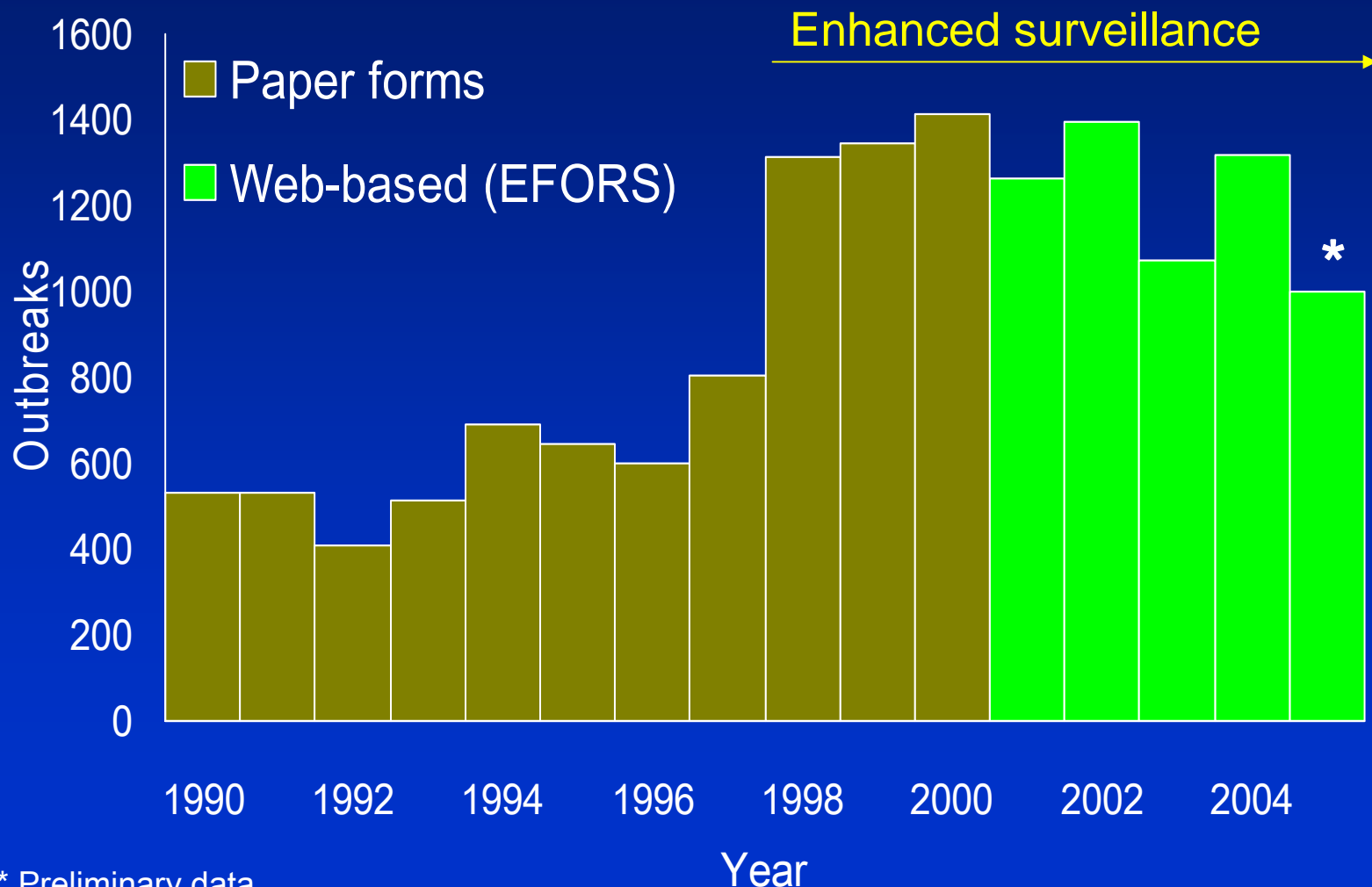
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# Foodborne outbreak surveillance

- Most outbreaks detected, investigated and controlled by local and state health departments
- CDC collects reports of outbreaks investigated
  - Reporting is voluntary and incomplete
  - Definition of an outbreak:
    - 2 or more cases of a similar illness resulting from the ingestion of a common food
  - Data collected: No of cases, implicated food, etiology
  - Received reports of 400-600/year before 1998

# Foodborne-disease outbreaks reported to CDC, 1990 – 2005<sup>1</sup>

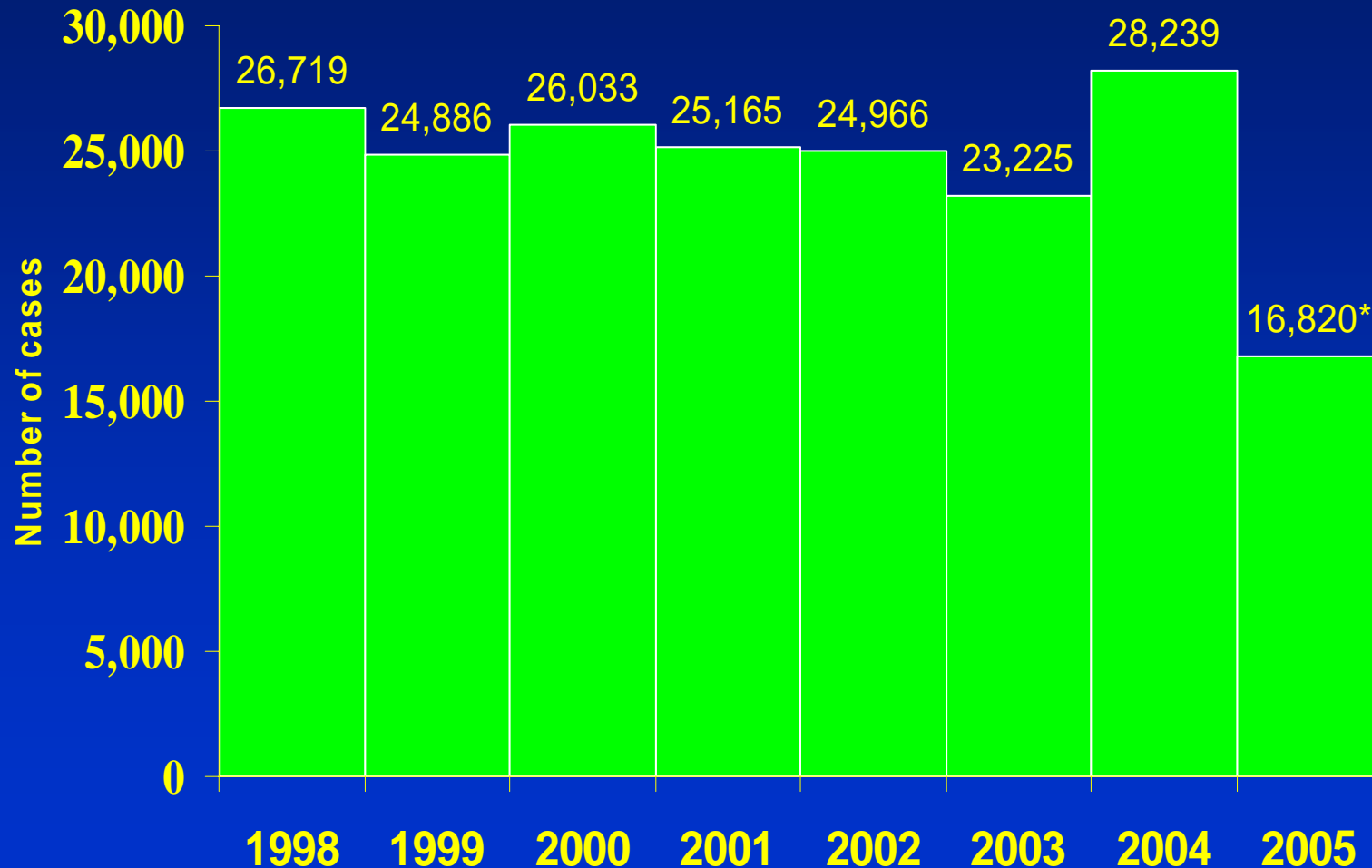


\* Preliminary data

<sup>1</sup> By states to the Foodborne Disease Outbreak Surveillance System



# Cases in Foodborne Disease Outbreaks, eFORS 1998-2005\*

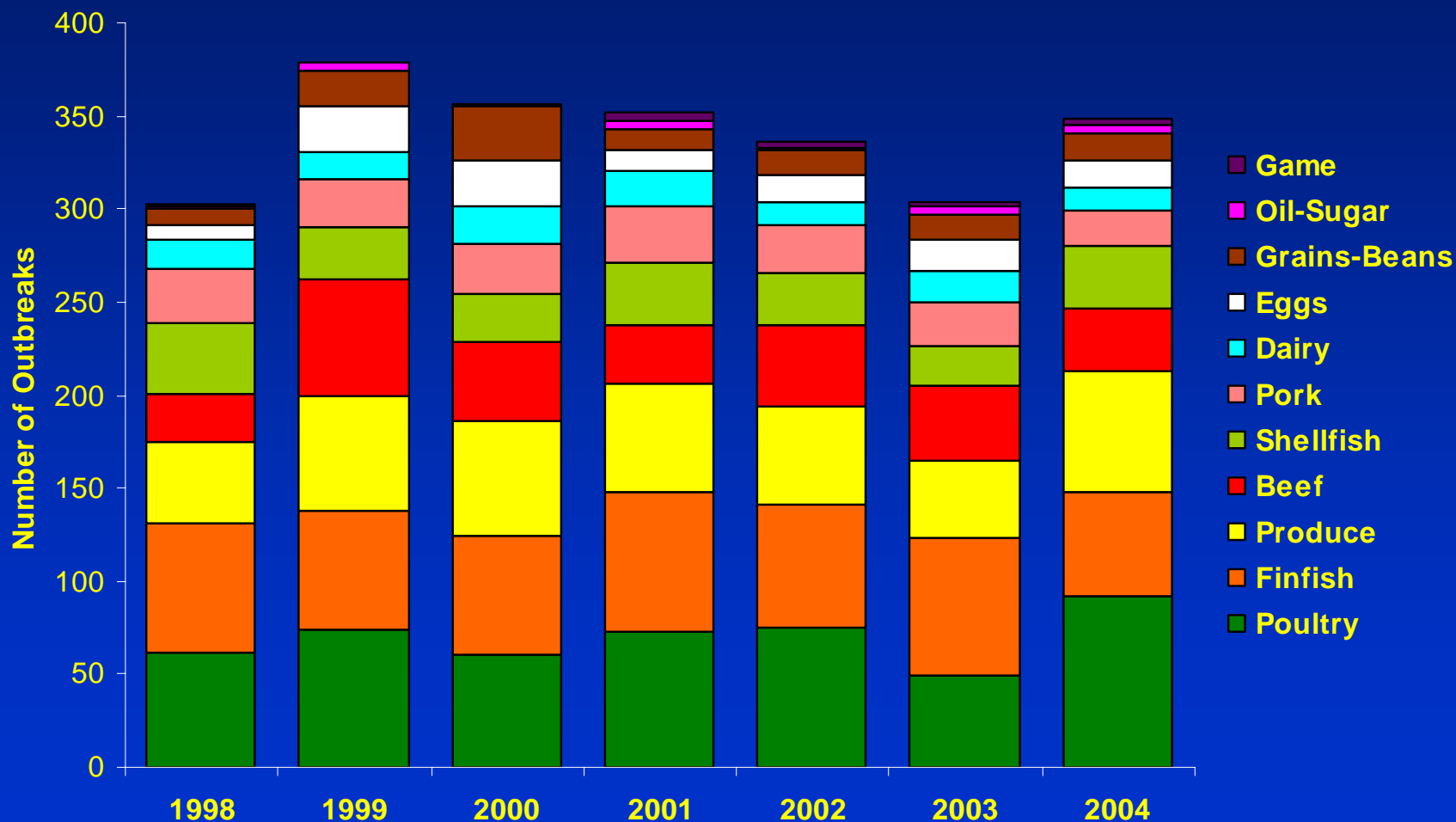


\* Preliminary data, not all states have completed reporting; data subject to change.

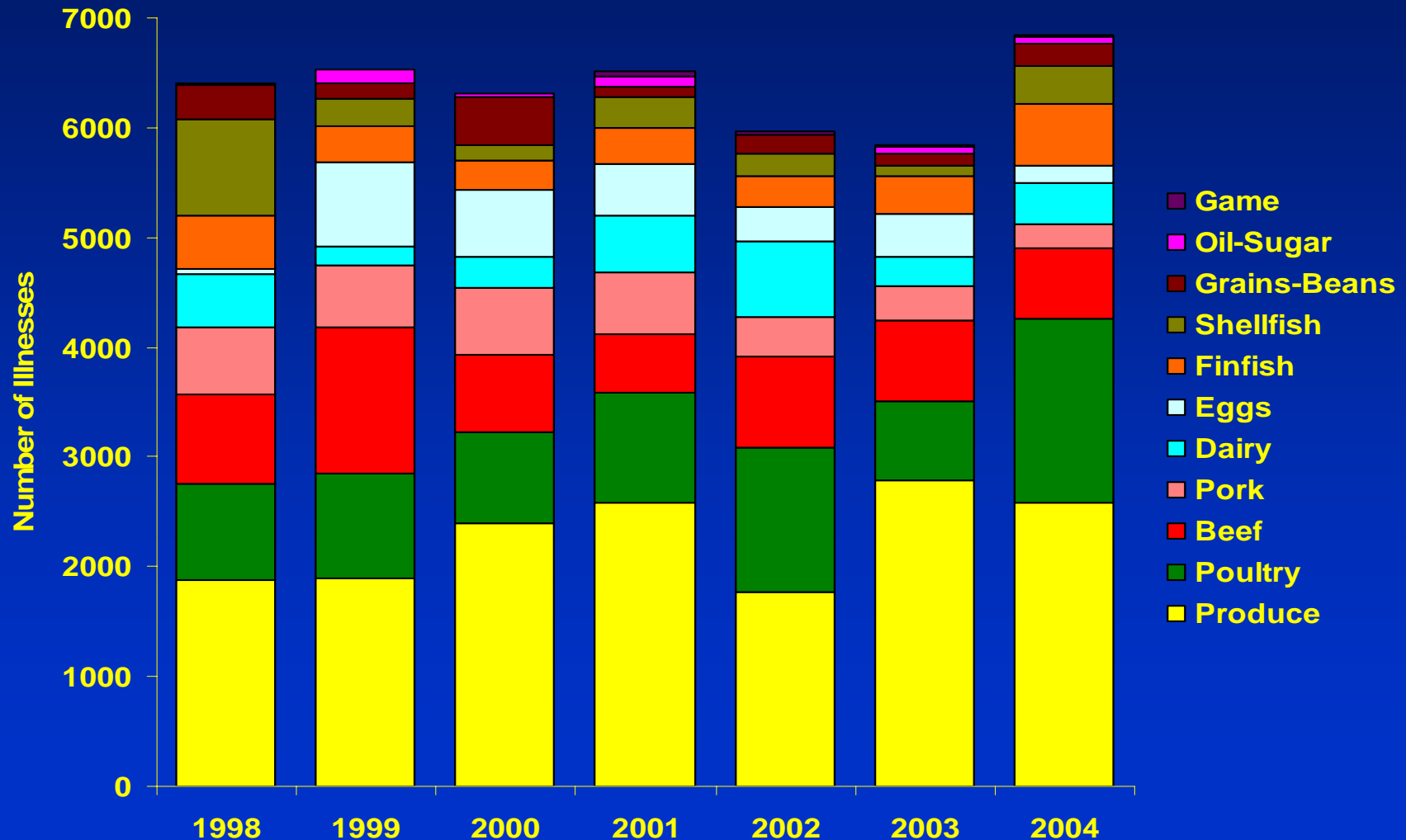
# Example of Simple and Complex Outbreaks

Outbreak #	Simple or Complex	Commodity	Implicated Food	Contaminated Ingredient
1	<b>Simple</b>	Beef	hamburger	beef
2	<b>Complex</b>	Beef	hamburger	Unknown
2	<b>Complex</b>	Vegetable/Leafy	hamburger	Unknown
3	<b>Simple</b>	Vegetable	hamburger	lettuce

# Number of Simple Food Outbreaks by Major Commodity Grouping, 1998-2004



# Number of Simple Food Illnesses by Major Commodity Grouping, 1998-2004



# Foodborne outbreaks related to produce, 1973-1997

- Fresh produce defined as: uncooked produce items, or “salad” without eggs, cheeses, seafood or meat
- 1973-1997
  - 190 foodborne outbreak linked to fresh produce
  - 16,058 illnesses
  - 598 hospitalizations
  - 8 deaths
- 3.2 % of all outbreaks of determined source
- 6.2 % of those outbreak-associated cases

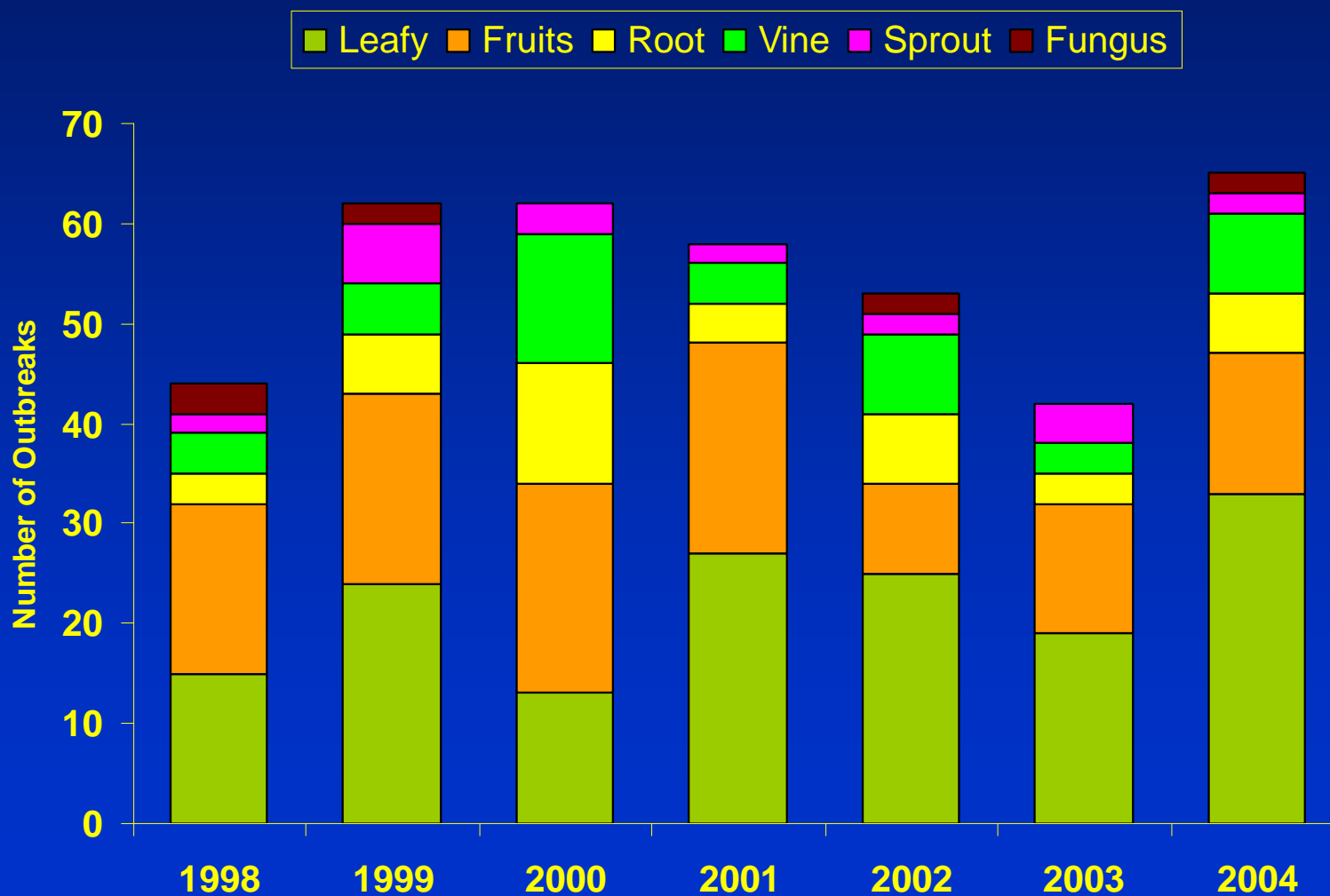
# Foodborne outbreaks related to produce, 1998-2005

- Produce defined as food items that are classified as either fruit or vegetables
- 1998-2005
  - 411 Outbreaks linked to produce items
  - 16, 555 Illnesses
  - 724 Hospitalizations
  - 15 Deaths
- 7 % of all outbreaks of determined source
- 14% of those outbreak-associated cases

# Foodborne outbreaks related to fresh produce, 1973-1997: Trends in burden

	1970's	1990's
Number of outbreaks/yr	2	16
Median cases/outbreak	21	43
% of OB of known vehicle	0.7%	6%
% of outbreak associated cases	0.6%	12%

# Number of Simple Produce Food Outbreaks by Major Grouping, 1998-2004



# Foodborne outbreaks related to lettuce/leafy green, 1998-2005: Spectrum of pathogens identified in 79 outbreaks

## ➤ Bacterial 35:

- *E. coli* O157 20
- *Salmonella* 7
- *Campylobacter* 3
- *Shigella* 3
- *C. Perfringens* 1
- *S. aureus* 1

➔ Norovirus increasingly identified as etiology of foodborne outbreaks

➔ O157 the second most common pathogen identified

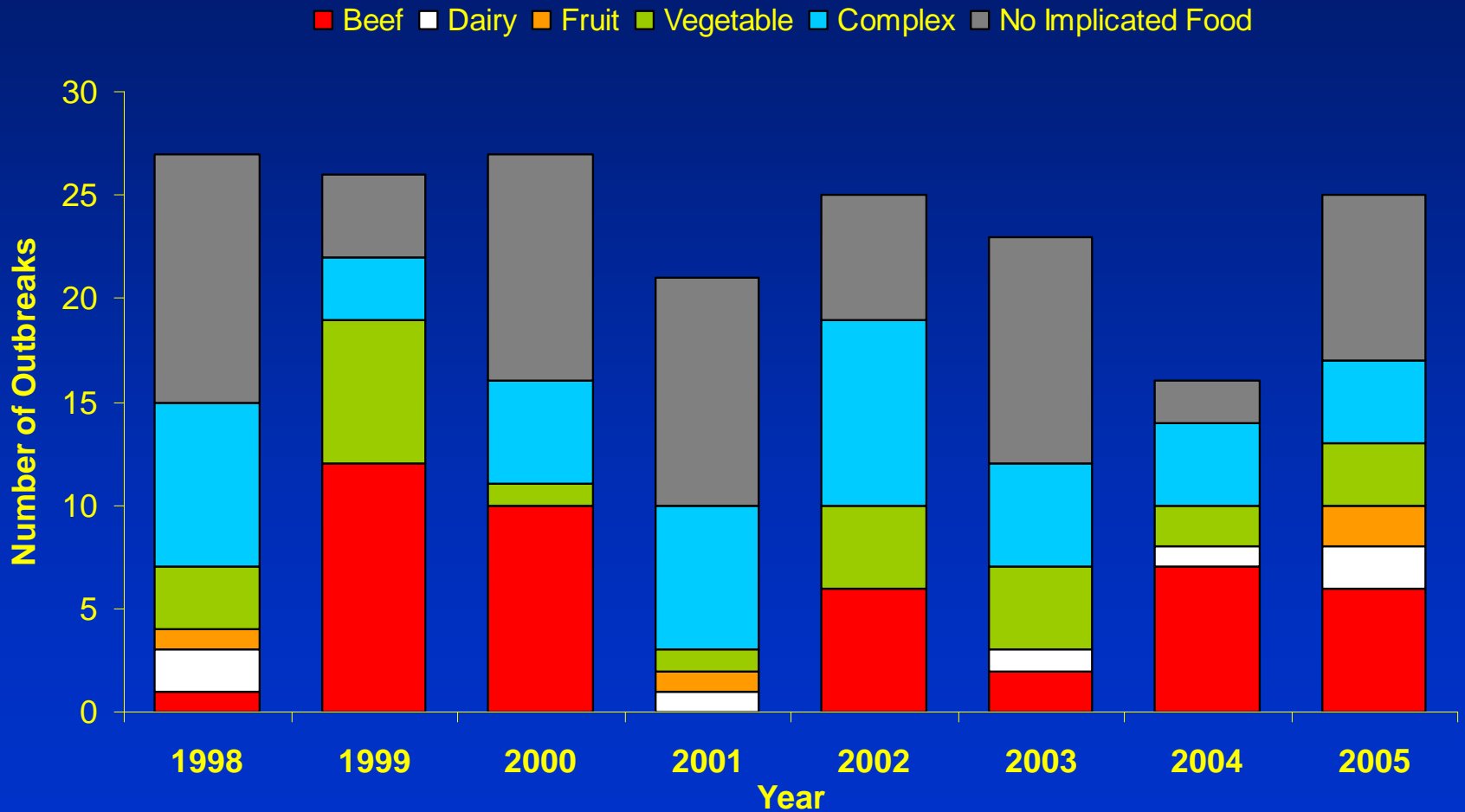
## ➤ Viral 42

- Norovirus 38
- Hepatitis A 4

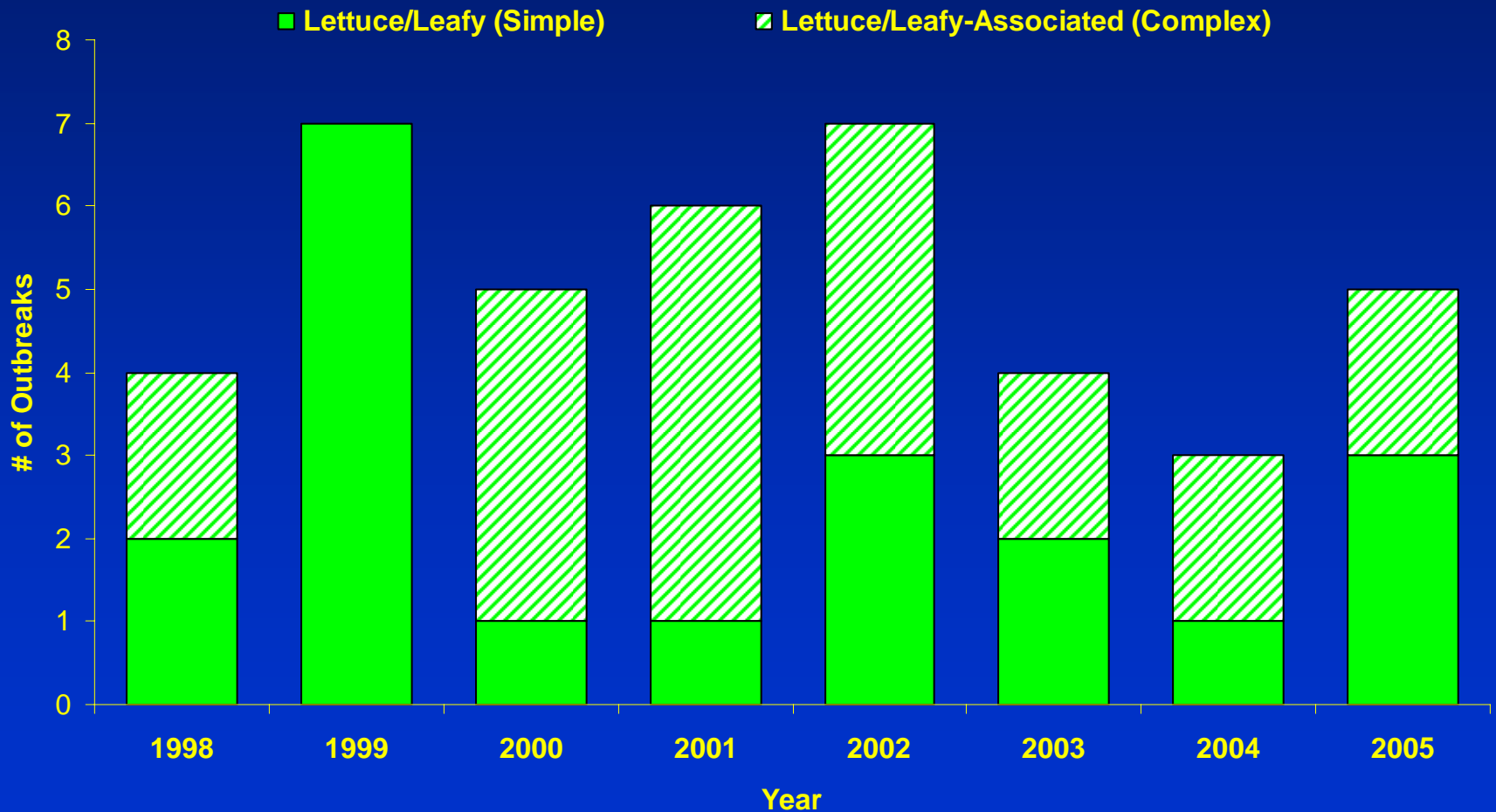
## ➤ Parasite 2

- *Cyclospora* 2

# Number of Foodborne *E.coli* O157 Outbreaks by Food Commodity, 1998-2005



# Number of Lettuce/Leafy Green and Lettuce/Leafy- Associated *E.coli* O157 Outbreaks, 1998-2005\*



# Summary of Lettuce/Leafy Green-Associated *E. coli* O157 outbreaks

- Twenty-six lettuce/leafy green-associated *E. coli* outbreaks 1995-2005
  - 751 ill
  - 94 hospitalized
  - 2 HUS
  - 1 death
- Lettuce second most common food vehicle in *E. coli* O157 outbreaks

# Lettuce/Leafy Green associated *E. coli* O157 Outbreak Scenarios

## Scenario 1: WA, 2002 , 55 illnesses

Case isolate PFGE pattern indistinguishable from cases in another area also linked to romaine lettuce

Contamination most likely occurred pre-point of preparation

## Scenario 2: CA, 2003, 51 illnesses

Multiple patrons from restaurant A consumed contaminated lettuce .

Point of contamination?

Highlights need for ability model point of contamination, current limitation to data.

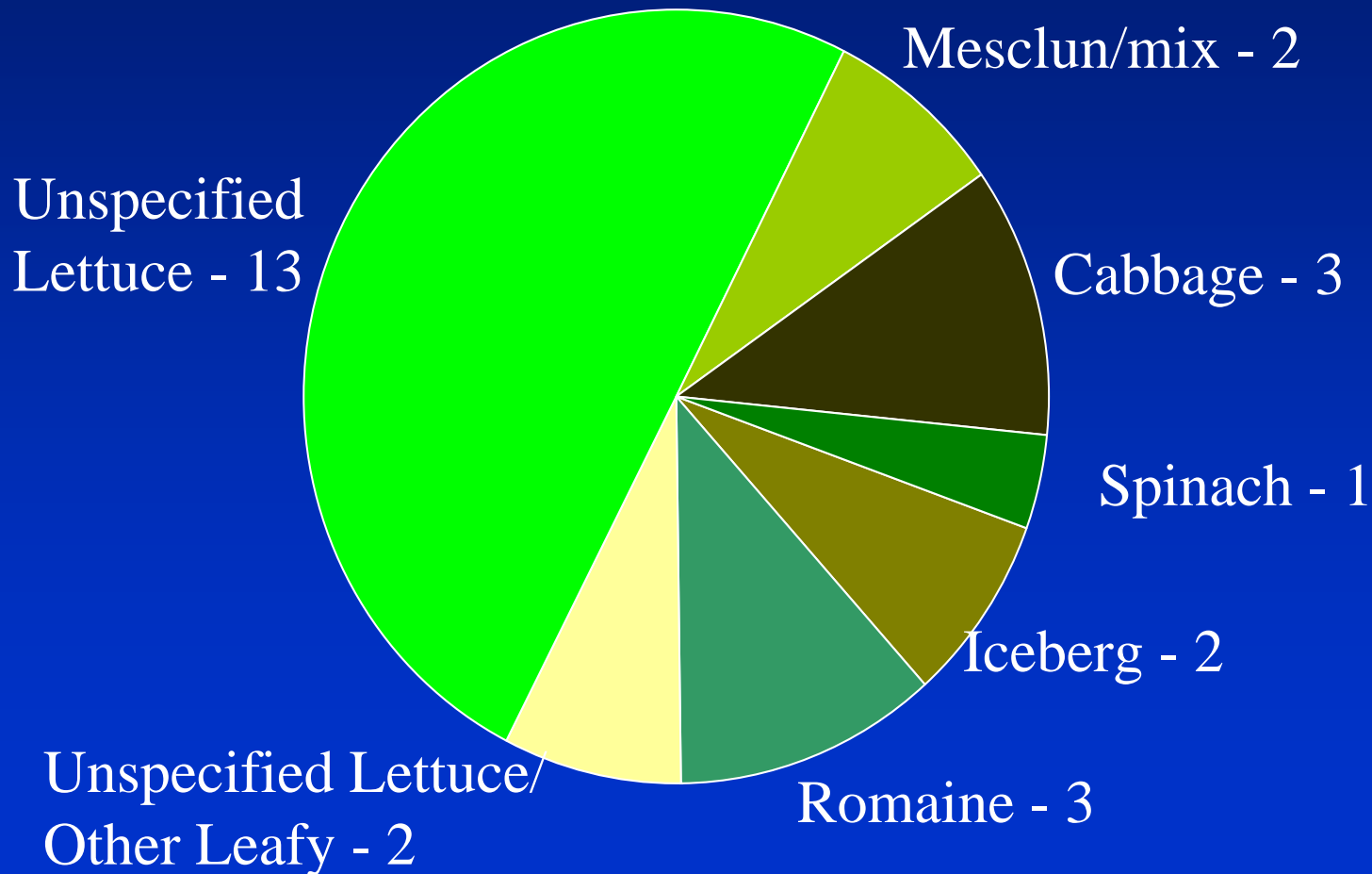
# List of Types of Lettuce/Leafy Green Implicated in Simple\* Foodborne *E.coli* O157 Outbreaks, 1995-2005

Type of Lettuce/Leafy Green	# of OBs	Illnesses
cabbage	3	188
iceberg lettuce	2	9
lettuce, unspecified	13	392
lettuce, unspecified; parsley	2	6
mesclun mix	2	68
romaine lettuce	3	72
spinach	1	16

\* where lettuce/leafy green was the only commodity implicated in the outbreak

# Types of Lettuce/Leafy Green Associated with *E. coli* O157 Outbreaks, 1995-2005\*

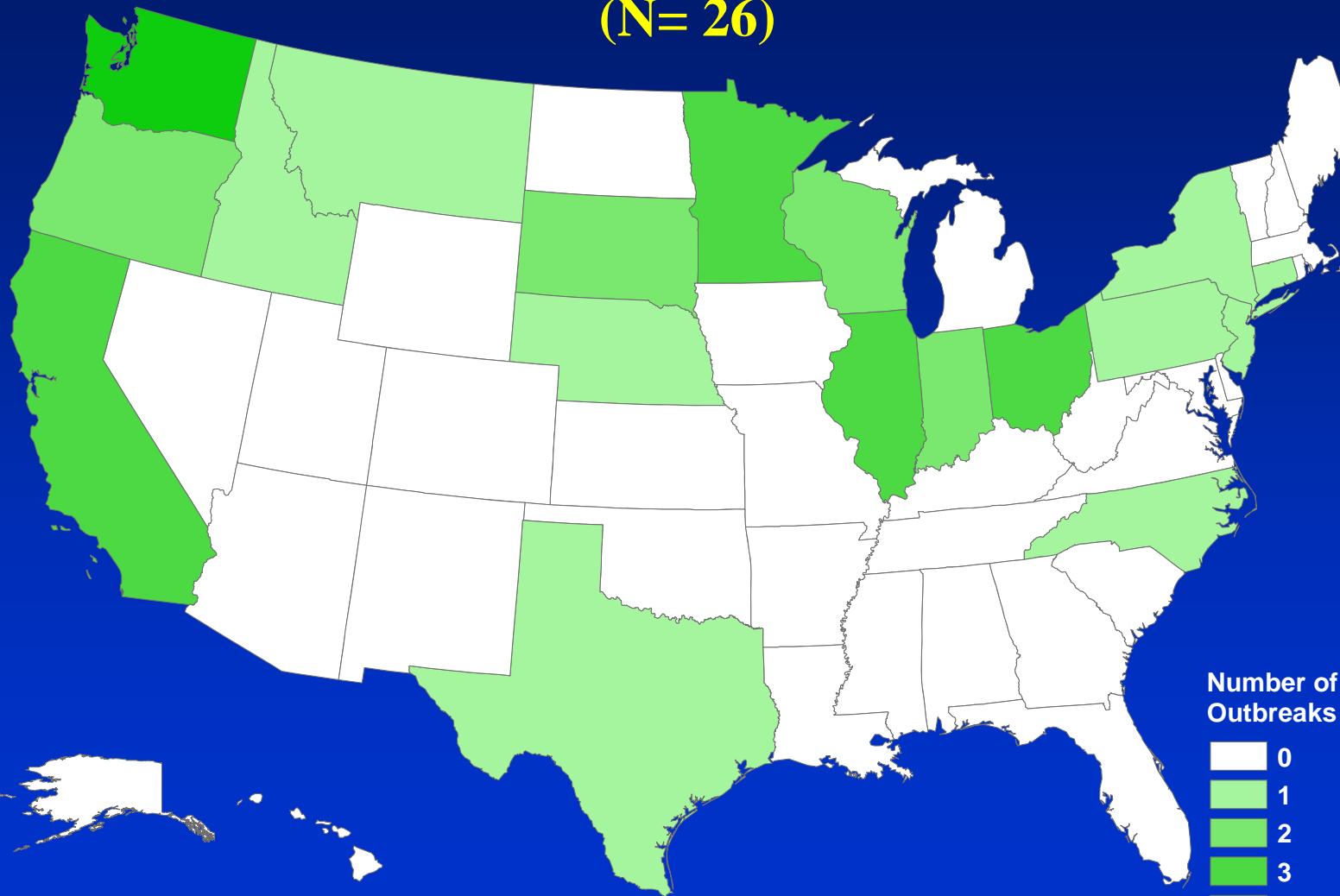
(n=26)



\*eFORS, 2005 data preliminary

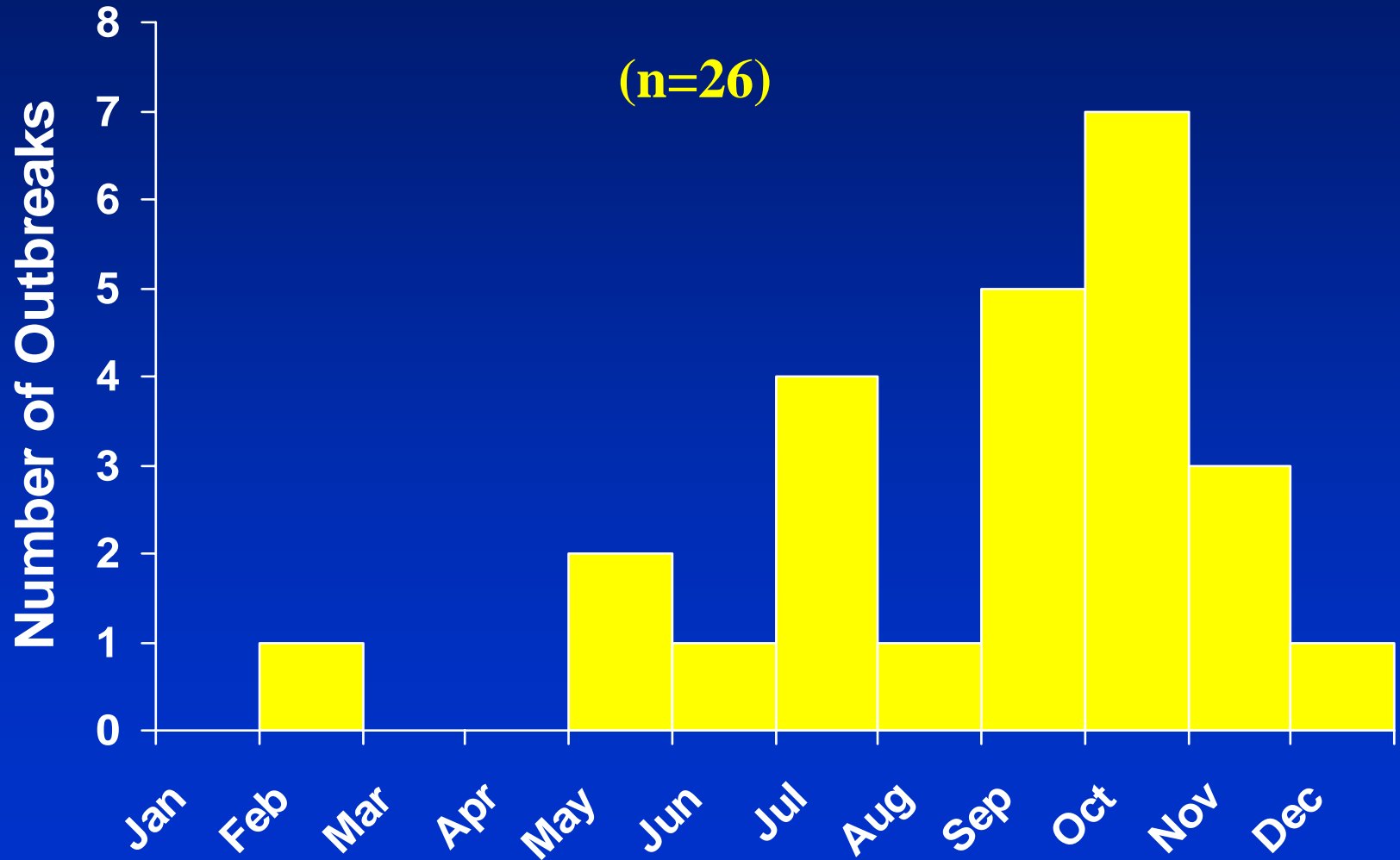
# Outbreaks of Lettuce Associated *E. coli* O157 by State, 1995-2005

(N= 26)



Includes 4 multi-state outbreaks

# Number of Lettuce Associated *E. coli* O157 outbreaks by Month, United States, 1995-2005\*



\*eFORS, 2005 data preliminary

# Place where food eaten in lettuce/leafy green –associated *E. coli* O157 outbreaks, 1995-2005

Place food eaten (n= 20)	Number of outbreaks
Restaurant	17
Nursing home	2
Private Home*	2
Camp	1
School*	1
Unknown	4

\*2 outbreaks reported more than one location of consumption

# Conclusions

- Lettuce most commonly identified food vehicle in produce-associated foodborne disease outbreaks
- Norovirus most common pathogen in lettuce associated outbreaks
- *E. coli* O157 most common bacterial etiology of outbreaks associated with lettuce
- Prevention of lettuce associated outbreaks requires efforts from farm to table

# Acknowledgements

**State and local health department outbreak investigators  
and eFORS reporters**

**Staff of the Enteric Disease Epidemiology Branch**

*"THE FINDINGS AND CONCLUSIONS IN THIS PRESENTATION HAVE NOT BEEN  
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# Thank-You



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