Produce Related Foodborne Infections: Review of the Centers for Disease Control Foodborne Outbreak Surveillance

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Public health burden of foodborne disease

- Each year an estimated 76 million cases (1999 estimate)
  - 1 in four Americans gets a foodborne illness each year
  - 1 in 1000 Americans is hospitalized each year
  - $6.5 billion in medical and other costs

- Prevention depends on efforts from farm to table to reduce contamination of food

- Increasingly recognize a problem in fresh produce

Foodborne pathogens and their reservoirs

- Infection with a variety of different pathogens
- Each pathogen has a characteristic reservoir
  - Some have a human reservoir: *Shigella*, hepatitis A, Norwalk virus
  - Some have an animal reservoir: *Salmonella*, *Campylobacter*, *E. coli* O157:H7, *Listeria*, *Vibrio*, *Yersinia*, *Toxoplasma*
- Transmitted by several different pathways
  - Foods, water, contact with animals, contact with humans

CDC

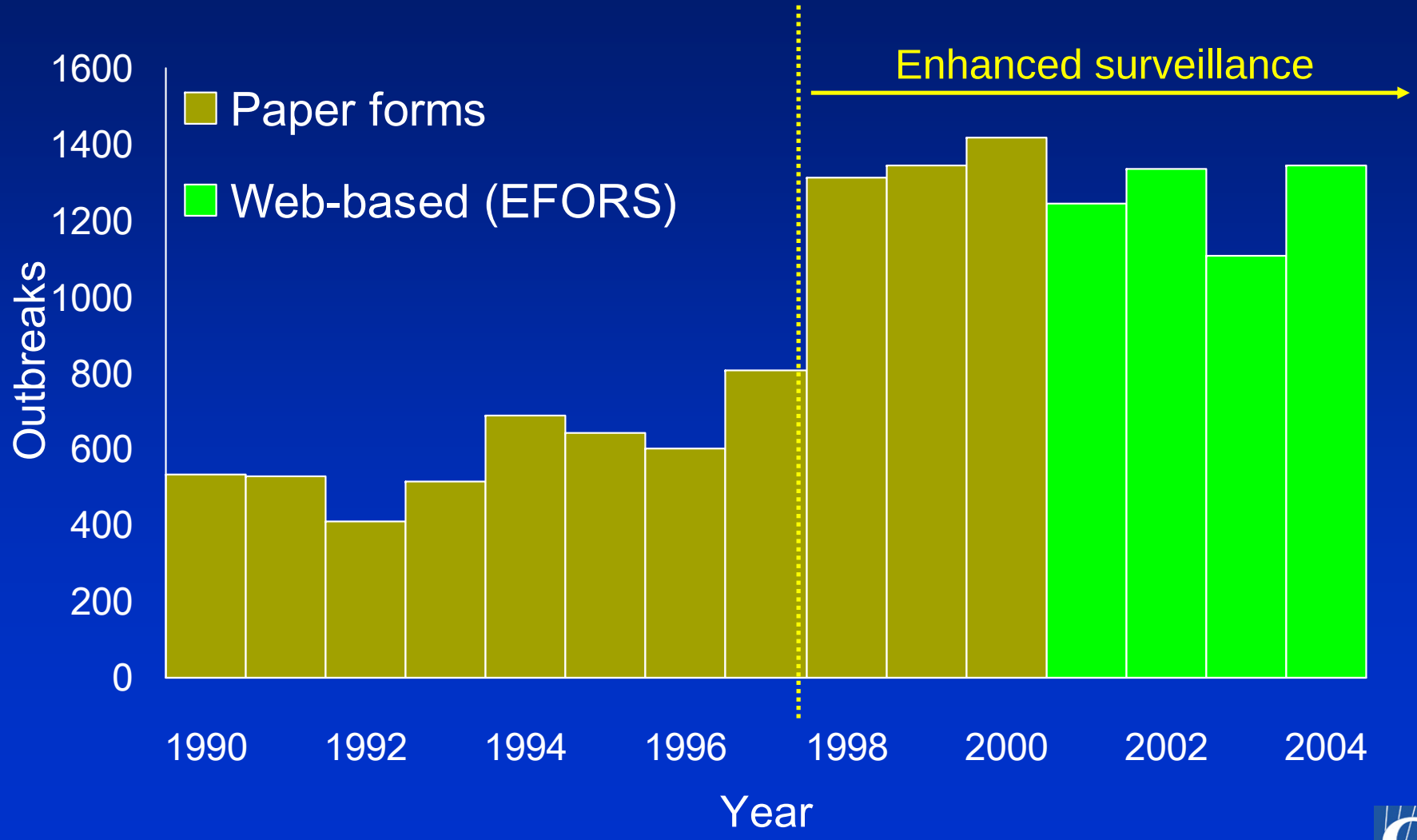
Foodborne outbreak surveillance

- 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 - 2004[1]



[1] By states to the Foodborne Disease Outbreak Surveillance System

Foodborne outbreaks related to fresh 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

*Sivapalasingham, JFP, 2004

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%

Foodborne outbreaks related to fresh produce, 1973-1997: Food vehicles implicated in 190 outbreaks

- Generic or multiple: 105 outbreaks
- One specific vehicle: 85 outbreaks
  - Lettuce 25
  - Melon 13
  - Seed sprouts 11
  - Apple or orange juice 11
  - Berry 9
  - Tomato 3
  - Green onion 3
  - Carrot 2
  - Other 8

88% of outbreaks with one specific vehicle

CDC

Foodborne outbreaks related to fresh produce, 1973-1997: Etiologies identified in 103 (54%) of 190 outbreaks

- **Bacterial 62:**
  - *Salmonella* 30
  - *E. coli* O157 13
  - Shigella 10
  - Campylobacter 4
  - Other 5
- **Viral 21**
  - Hepatitis A 12
  - Norovirus 9
- **Parasite 16**
  - Cyclospora 8
  - Other 8
- **Chemicals 4**

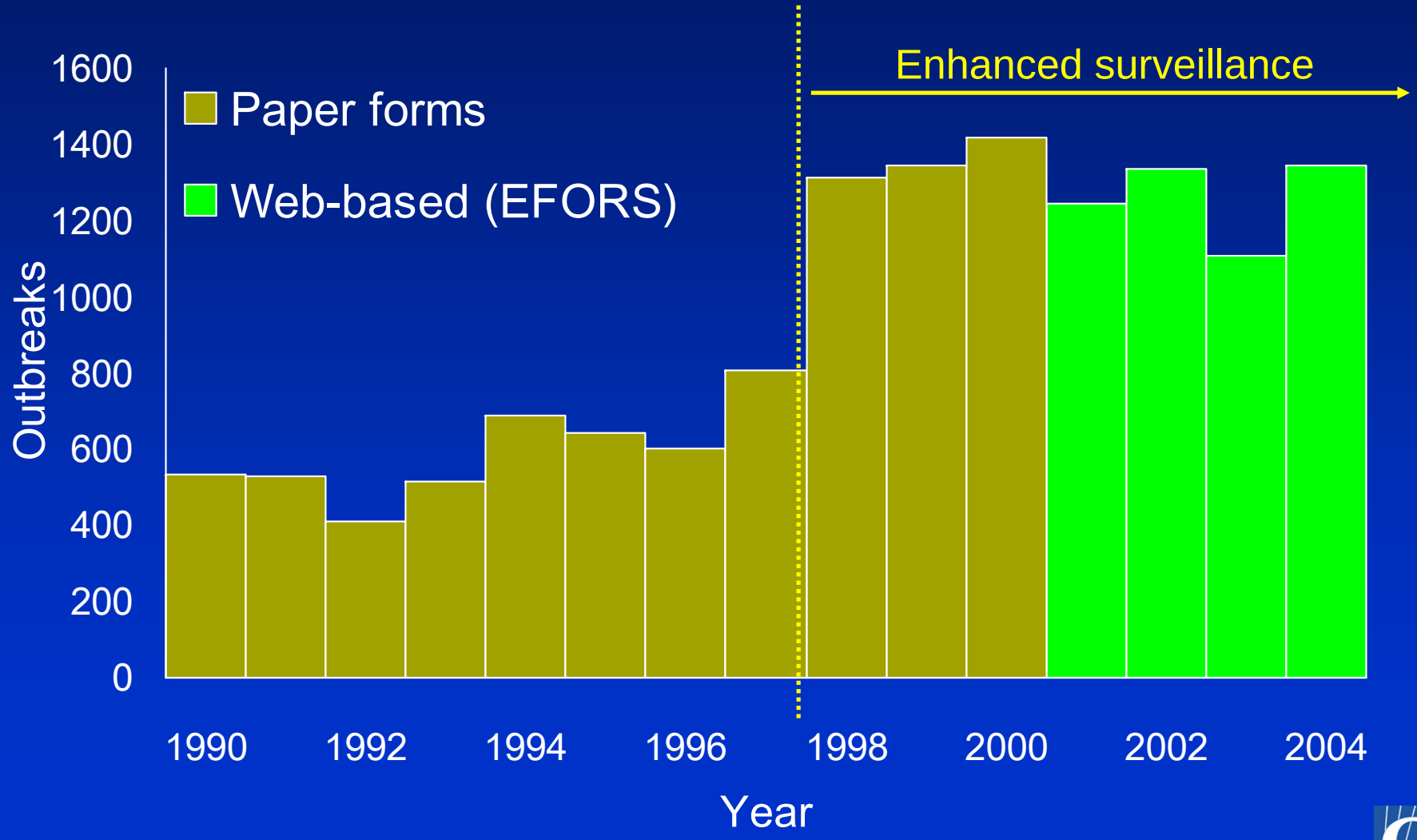
Pathogens with animal reservoir
= 48 outbreaks

Pathogens with human reservoir
= 34 outbreaks

Pathogens or agents with uncertain reservoir
= 21 outbreaks

CDC

Foodborne-disease outbreaks reported to CDC, 1990 - 2004[1]



[1] By states to the Foodborne Disease Outbreak Surveillance System

Foodborne outbreaks related to produce, reported to CDC, 1998-2004*

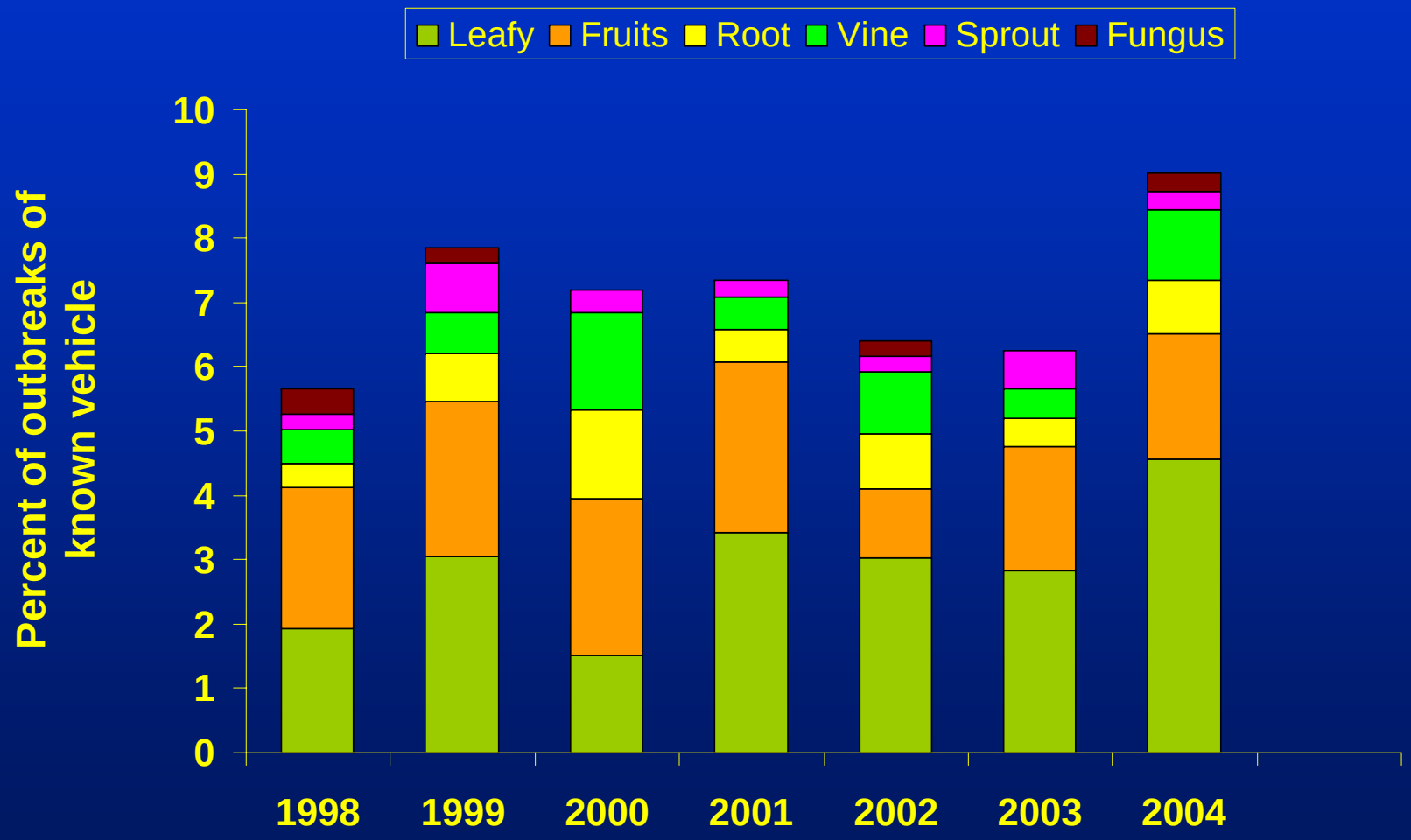
- **Produce defined as food items that are classified as either fruit or vegetables**

- **1998-2004**
  - 384 outbreaks linked to produce items (28 multistate outbreaks)
  - 15,856 Illnesses
  - 716 Hospitalizations
  - 15 Deaths

- **7% of all outbreaks of determined source**
- **14% of those outbreak-associated cases**

*eFORS, preliminary analysis and subject to change

Proportion of Foodborne Outbreaks Related to Produce, by Major Produce Category, 1998-2004*



*eFORS, preliminary analysis and subject to change

Foodborne outbreaks related to produce, 1998-2004*: Food vehicles implicated in 384 outbreaks

- Generic or mixed: 216 outbreaks
- One specific food: 168 outbreaks
  - Lettuce: 29
  - Sprouts: 20
  - Tomatoes : 11
  - Melons 11
  - Juice 8
  - Berries 7
  - Green onions: 4
  - Other produce items: 78

*eFORS, preliminary analysis and subject to change

CDC

Foodborne outbreaks related to produce 1998-2004*: Reported etiologies in 190 (49%) of 384 outbreaks

- **Bacterial: 97**
  - *Salmonella* 53
  - *E. coli* O157 19
  - *Shigella* 6
  - *Campylobacter* 6
  - Other 13

→ Pathogens with animal and human reservoirs

- **Viral: 81**
  - Calicivirus/Norovirus 73
  - Hepatitis A 8

→ Increased availability of Norovirus diagnostic testing

- **Parasitic: 6**
  - Cyclospora 5
  - Other 1

- **Chemical: 6**

*eFORS, preliminary analysis and subject to change

CDC

Conclusions

- A greater proportion of the burden than in the past
- 14% of outbreak- associated cases
- Both larger outbreaks, and a larger number of outbreaks
- Variety of fruits and vegetables (lettuce, melons, tomatoes, sprouts)
- Spectrum of pathogens reflects contamination with human and with animal feces
- Contamination and amplification can occur from farm to table

Thank-You

"THE FINDINGS AND CONCLUSIONS IN THIS PRESENTATION HAVE NOT BEEN FORMALLY DISSEMINATED BY CDC AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY."