

Florida Food and Waterborne Diseases: Ten Years of Data, 1994-2003

Multi-state Food Safety and Quality Update Inservice Training
National Trends in Food Safety and Quality
IFAS/University of Florida
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Bureau of Community Environmental Health



The Bureau of Community Environmental Health investigates food and waterborne disease outbreaks with



Epi Teams:

- ✓ 1 Statewide Coordinator
- ✓ 9 Regional Food and Waterborne Disease Epidemiologists
- ✓ 67 County Health Departments:
Environmental Health + Nursing + Epidemiology

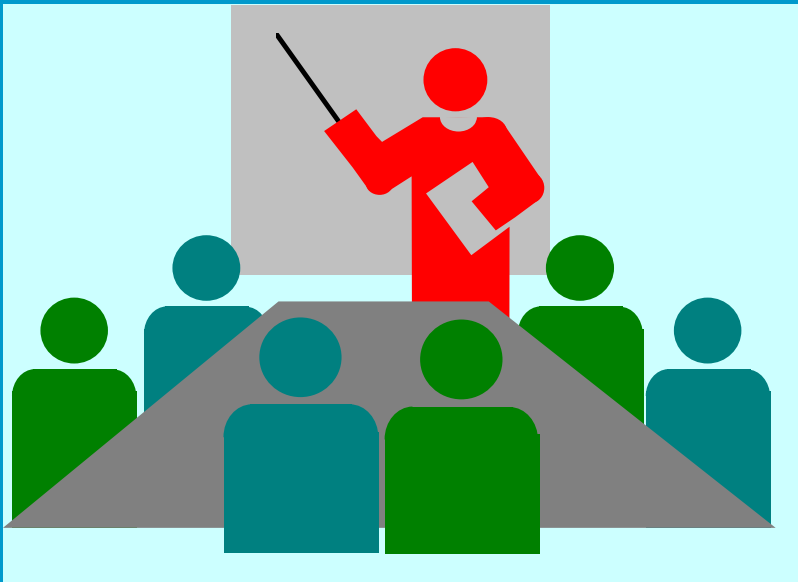


Regional Environmental Epidemiologists

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- Dean Bodager (407) 245-0468
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- Kathleen Ward (904) 798-4455
- Janet Wammes (772) 467-4124
- Karen La Fleur (954) 467-4841
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Regional Food and Waterborne Disease Functions



- ✓ Surveillance
- ✓ Provide investigation assistance on request of county health departments
- ✓ Training: develop and provide training to county health departments as needed

Florida Background Data



- 👉 Florida population: est. 17M
- 👉 Florida tourist visitors: est. 74.5M
- 👉 Licensed restaurants and caterers: approx. 41,000
- 👉 Licensed grocery stores, food processors and delis: approx. 47,000
- 👉 Licensed institutions with food service: approx. 13,000

Estimated Cases and Deaths Annually in the U.S.



Cases Deaths

Mead et al. 76 M 5,000

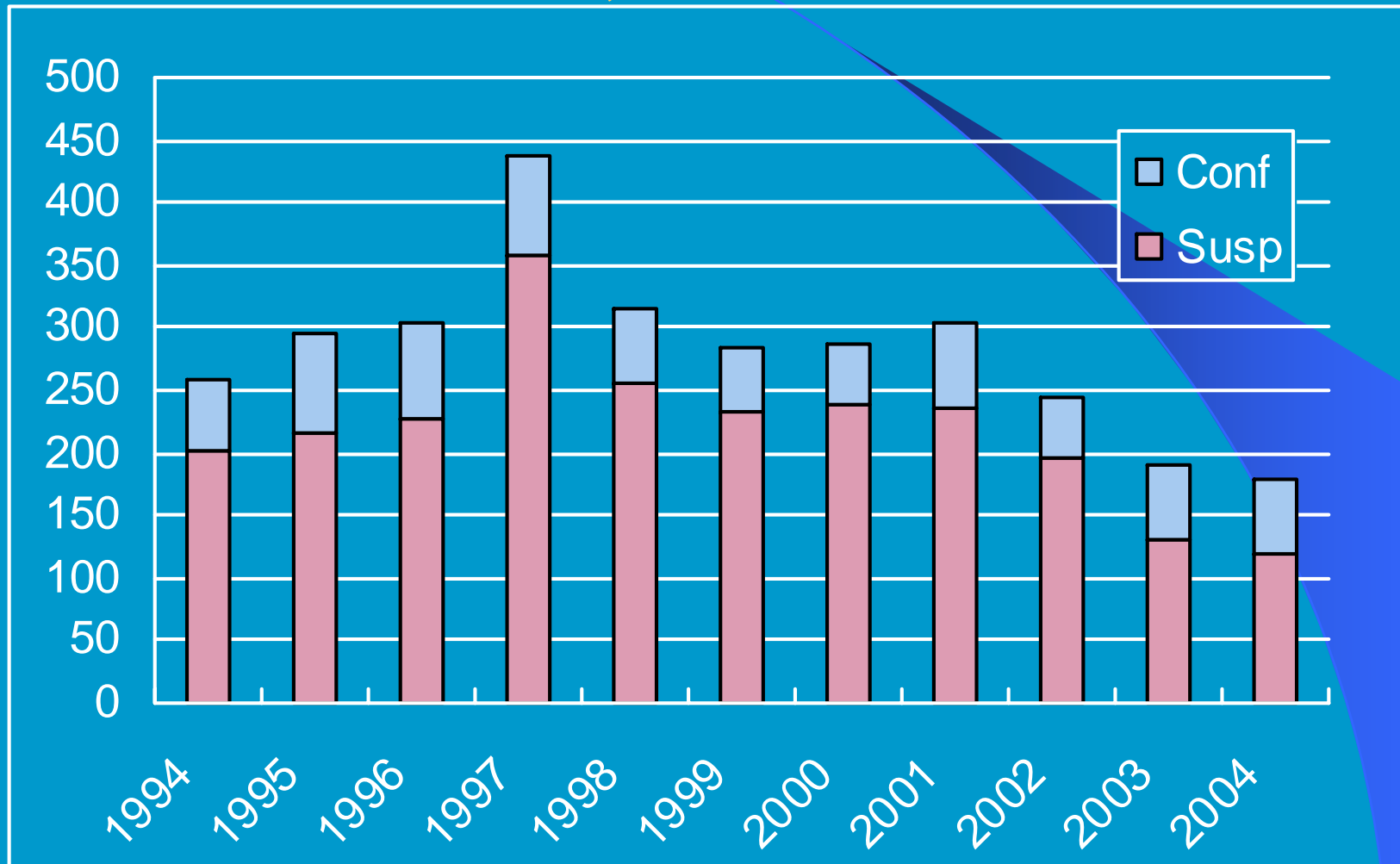
Reported Food and Waterborne Illnesses in Florida

Current surveillance and reporting system begins in 1994

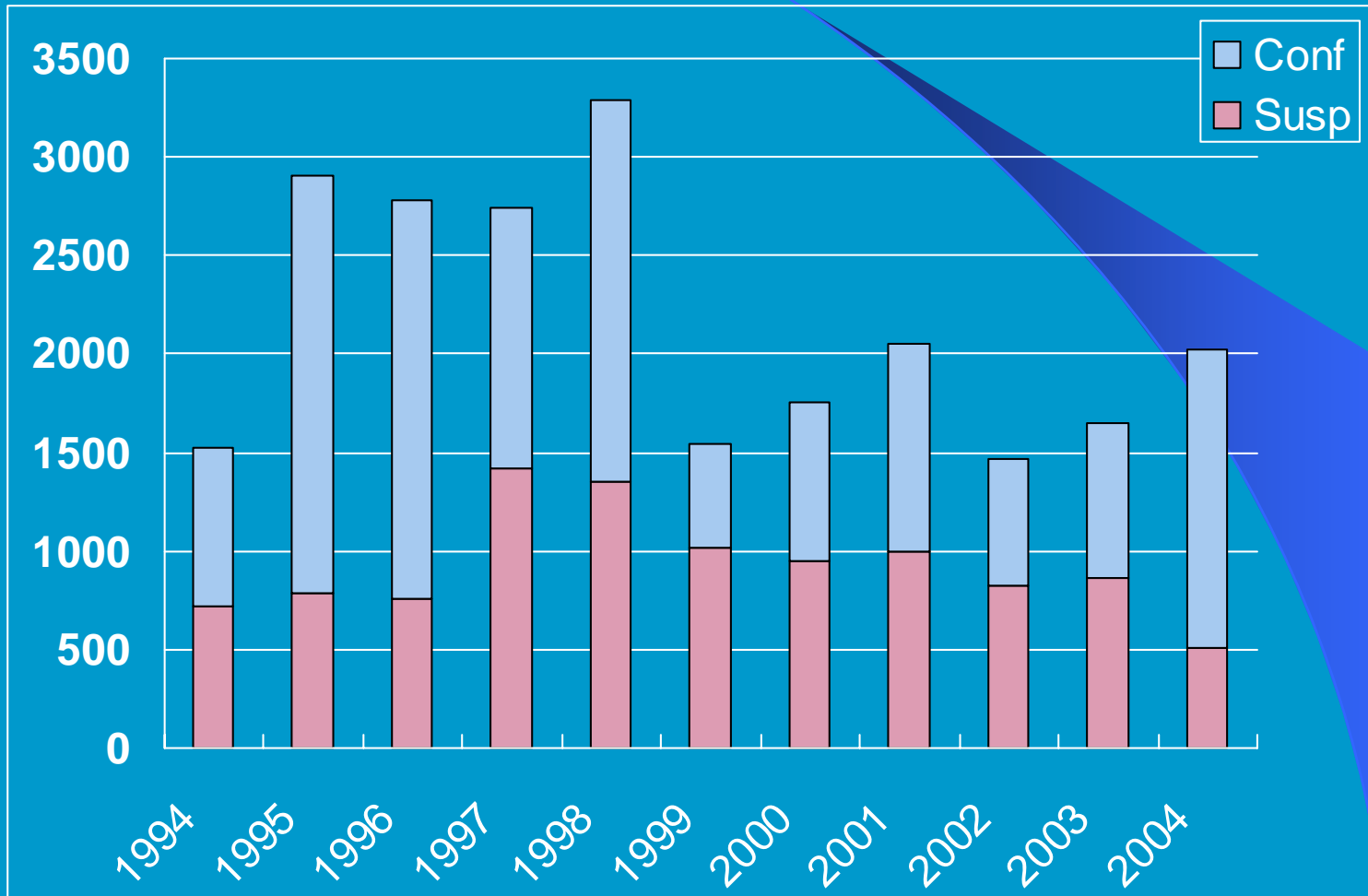


Year	# Outbreaks	# Cases
1994	258	1526
1995	295	2908
1996	305	2777
1997	439	2744
1998	315	3290
1999	286	1544
2000	288	1757
2001	303	2052
2002	243	1469
2003	189	1654
2004	180	2026

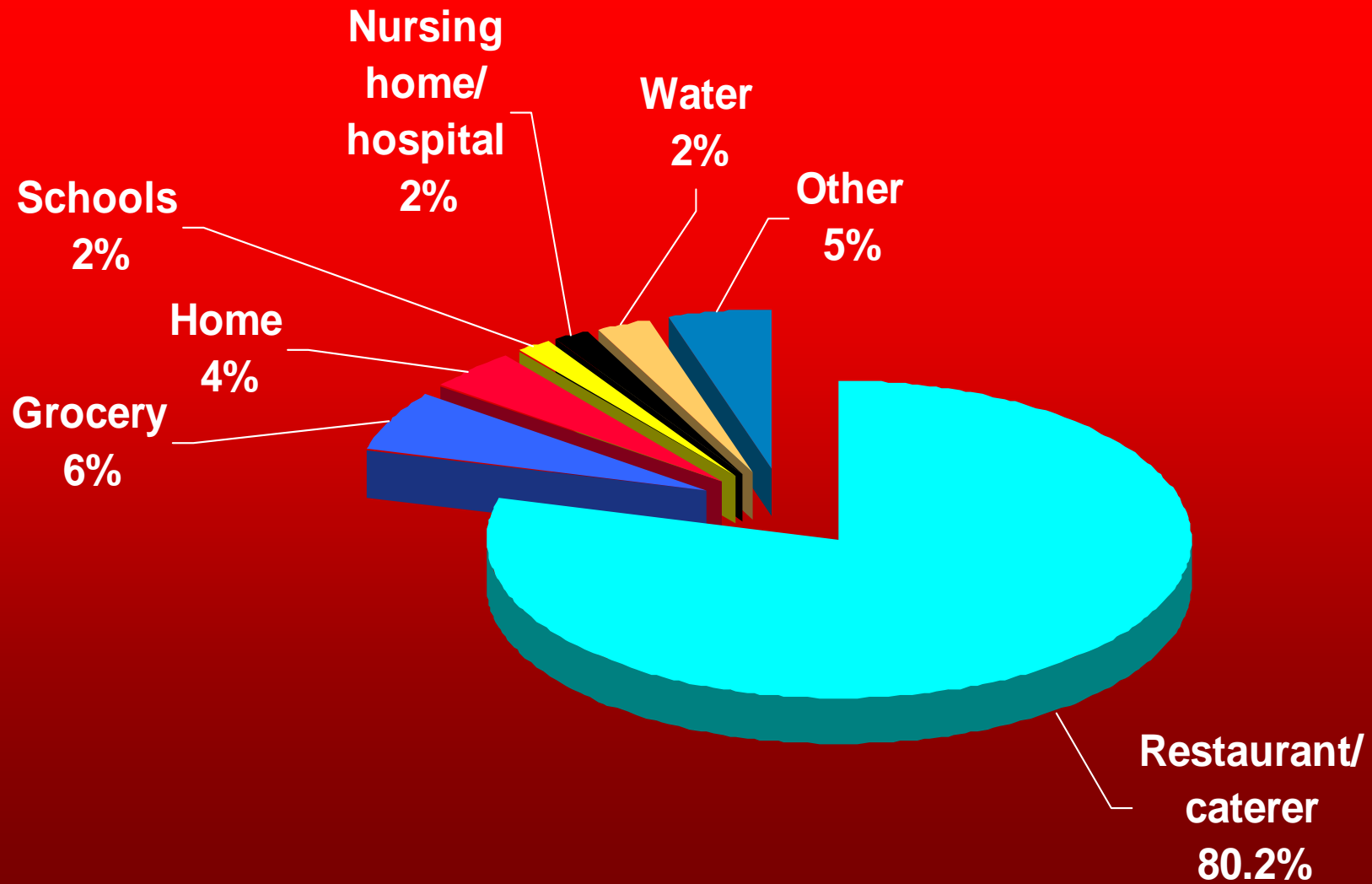
Number of Reported Outbreaks, Florida, 1994-2004



Number of Cases in Reported Outbreaks, Florida, 1994-2004

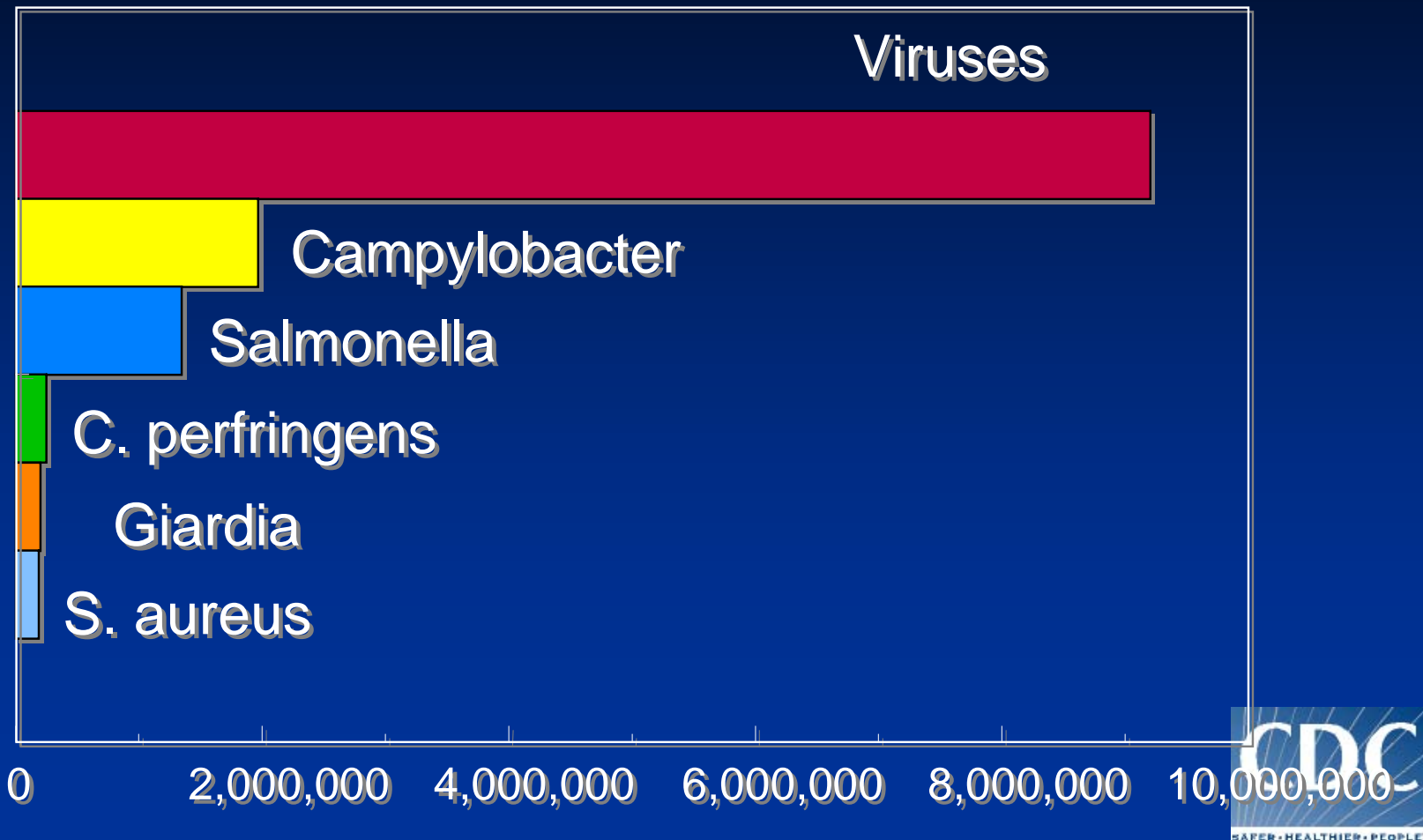


Sites of Foodborne Outbreaks, 1994-2003



Most common causes of foodborne illness

Mead et al, 1999



Larger outbreaks, Florida, 1993-2004

- 👉 337 outbreaks with more than 10 ill (222 confirmed, 115 suspected, 12% total outbreaks)
- 👉 13,737 cases – 63% of the total number of outbreak-related cases

👉 Of 337 Outbreaks:

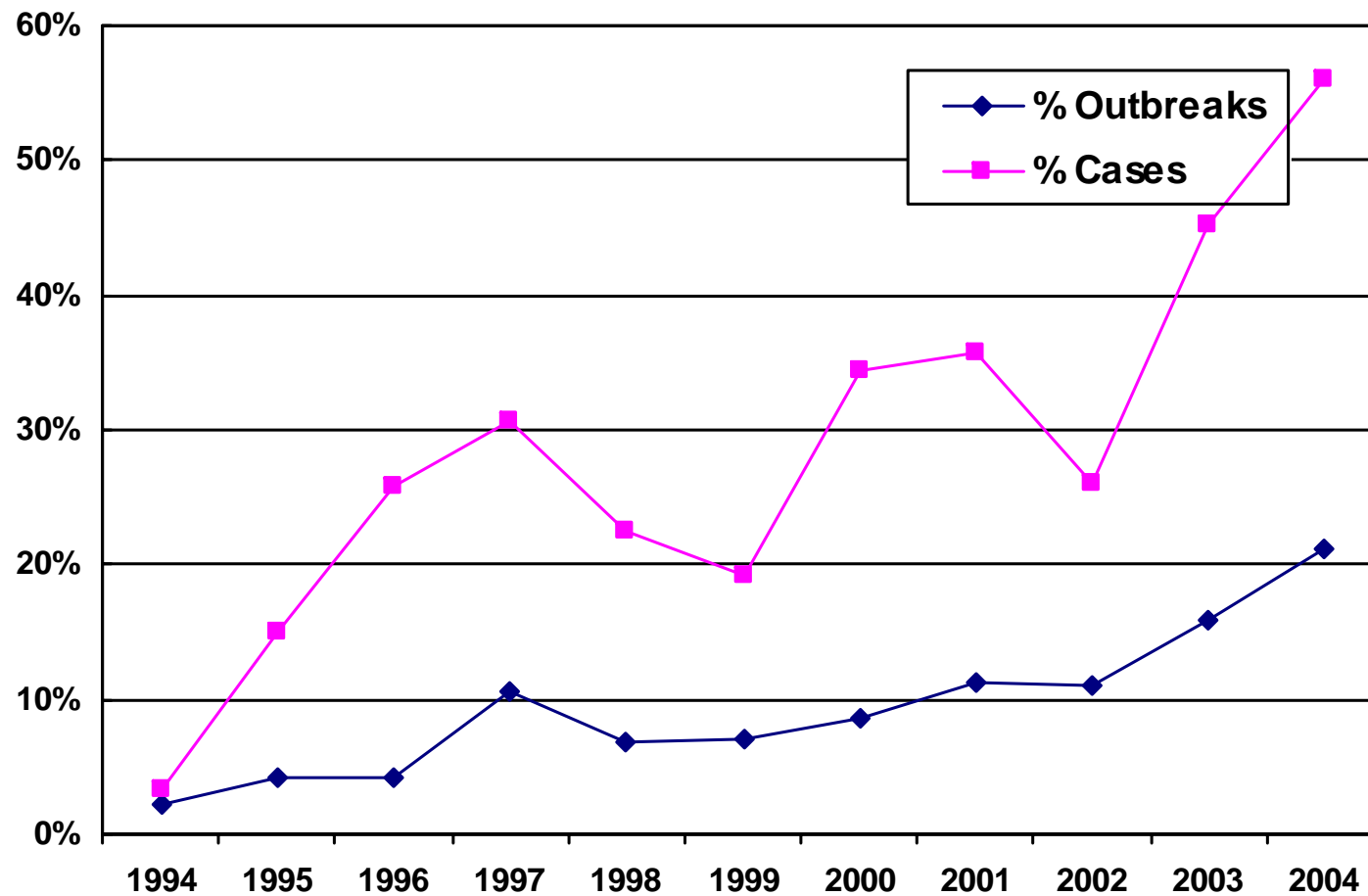
- ✓ 36% Norovirus
- ✓ 9% Salmonella
- ✓ 7% C. perfringens
- ✓ 21% unknown pathogens
- ✓ 1.8% hepatitis A

👉 Cases:

- ✓ 36% Norovirus
- ✓ 18% Salmonella
- ✓ 5% C. perfringens
- ✓ 21% Unknown
- ✓ 1% hepatitis A



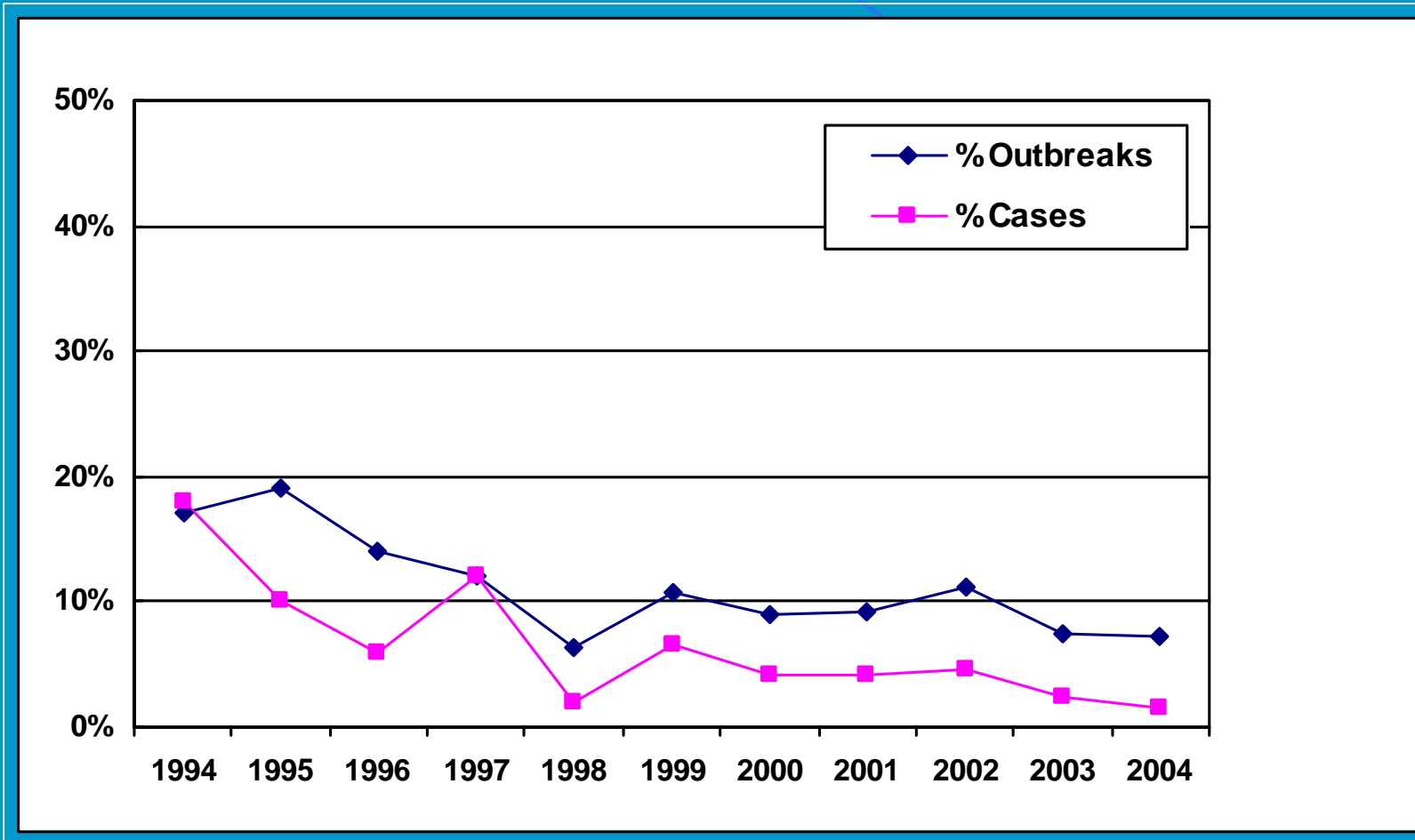
Trends in Reported Norovirus Outbreaks and Cases in Florida, 1994-2004



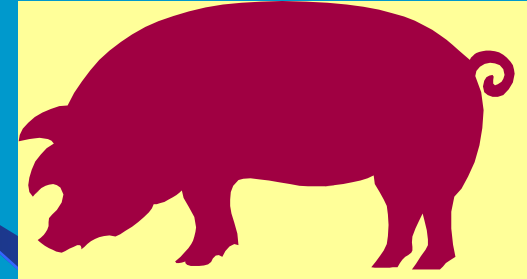
Norovirus Examples

- ☞ Several oyster associated outbreaks
 - ✓ Cause: overboard raw sewage
- ☞ Salads, garnishes and other undetermined foods
 - ✓ Cause: Poor personal hygiene (handwashing)
- ☞ Ice
 - ✓ Cause: Poor personal hygiene (handwashing)

Trends in Reported Staph Outbreaks and Cases in Florida, 1994-2004

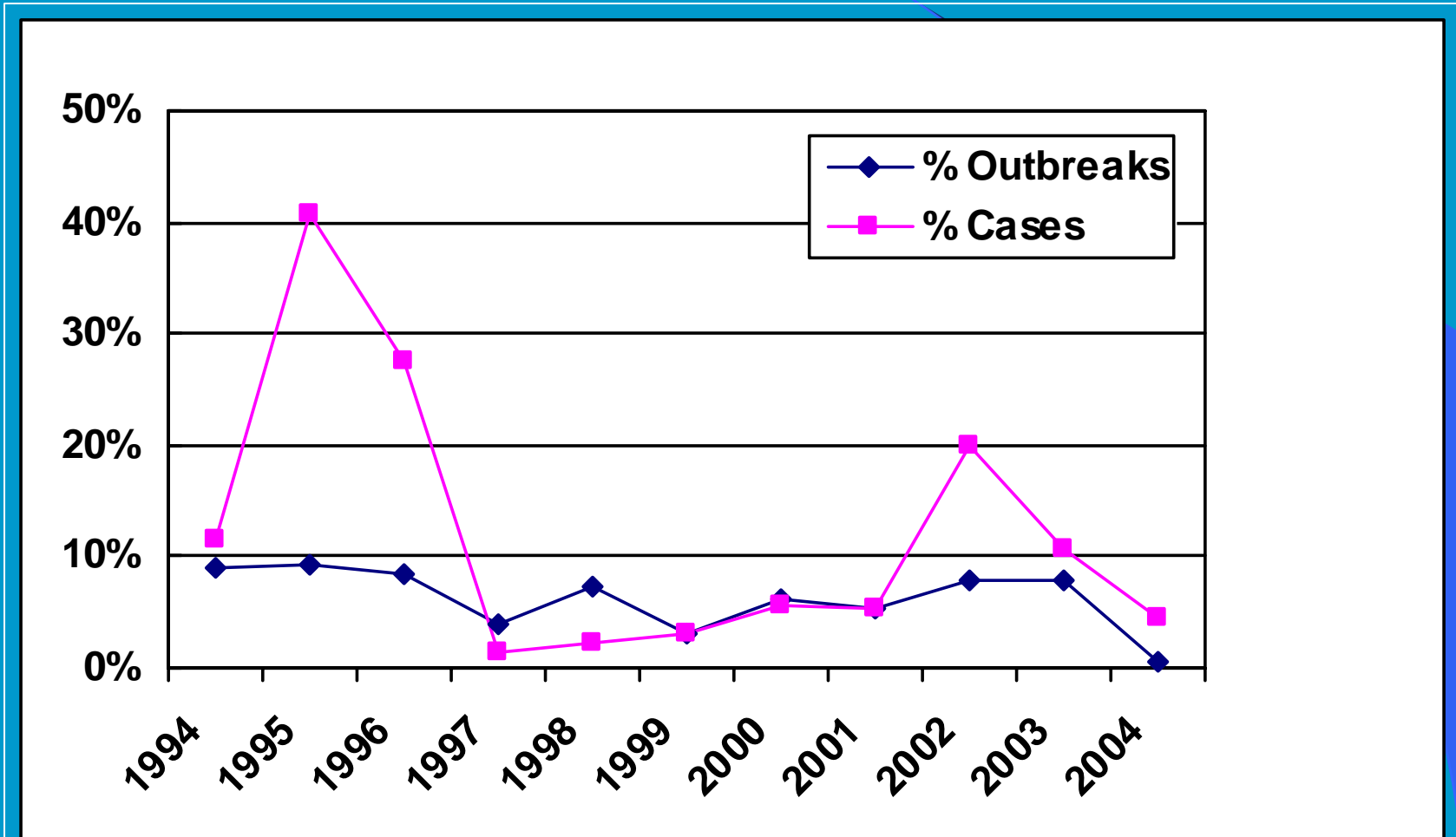


Staphylococcus aureus in Ham



- ◆ September 1997, St. John's County
- ◆ 18/125 persons at retirement party
- ◆ 7 sought medical treatment, 2 hospitalized
- ◆ Implicated food: pre-cooked ham
- ◆ Ham baked, handled, sliced hot
- ◆ 16 lbs. stored together in one small container
- ◆ Ham frequently implicated in Staph outbreaks:
 - ✓ Pre-cooked ham has higher salt content
 - ✓ Staph organisms are more salt tolerant
 - ✓ Staph organisms can thrive when non-pathogenic competitors cannot

Trends in Reported Salmonella Outbreaks and Cases in Florida, 1994-2004



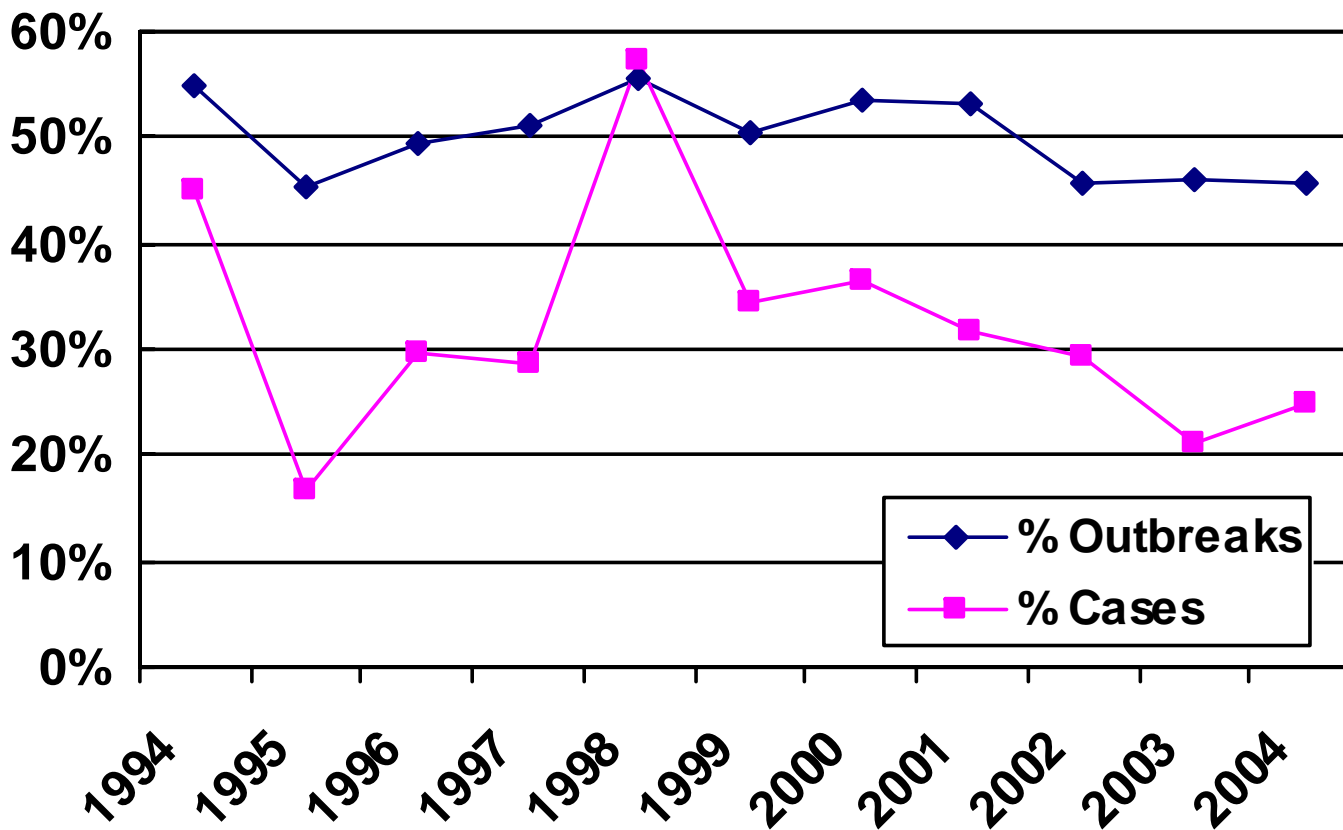
Salmonella at a Deli/Barbecue

- ✦ Reports from hospital emergency room
- ✦ All had common exposure of particular restaurant
- ✦ 83 ill - 11 hospitalized
- ✦ Critical violations at restaurant
- ✦ Cases - including 4 employees - tested positive for Salmonella heidelberg
- ✦ Leftover food tested positive for Salmonella heidelberg
- ✦ Establishment closed until workers received negative test
- ✦ Epidemiologic evidence points strongly to macaroni and cheese as leading suspect vehicle

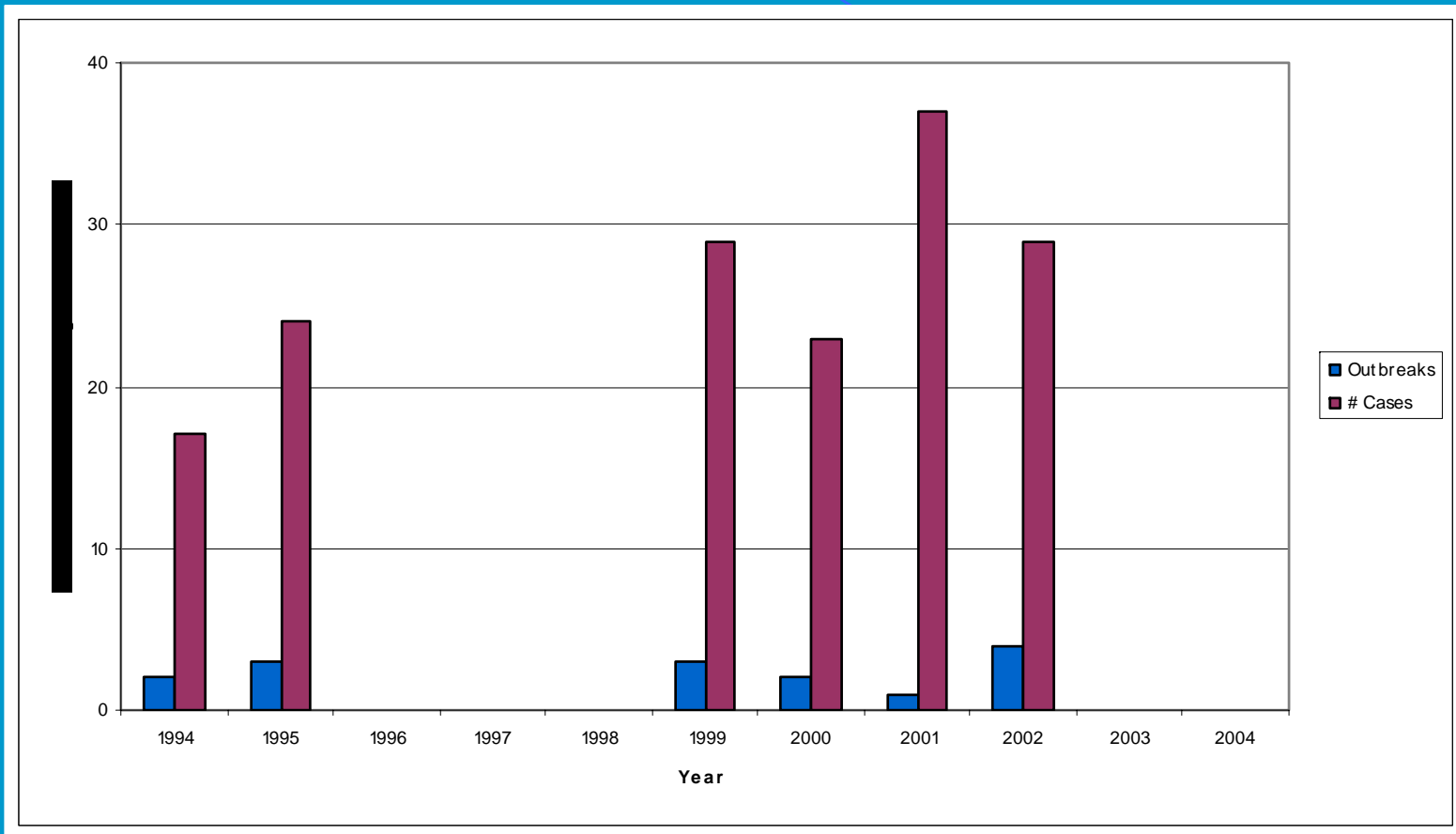
Results: Final Report

- ◆ 83 people ill, 11 hospitalized
- ◆ Lab results:
 - ✓ *Salmonella heidelberg* in stools
 - ✓ *Salmonella heidelberg* in leftover food
- ◆ Vehicle of transmission: macaroni and cheese
- ◆ Environmental investigation:
 - ✓ handwash sink not in working order
 - ✓ no soap and paper towels available
 - ✓ possible cross-contamination of macaroni and cheese with raw chicken

Trends in Reported Outbreaks and Cases with Unknown Pathogens in Florida, 1994-2004



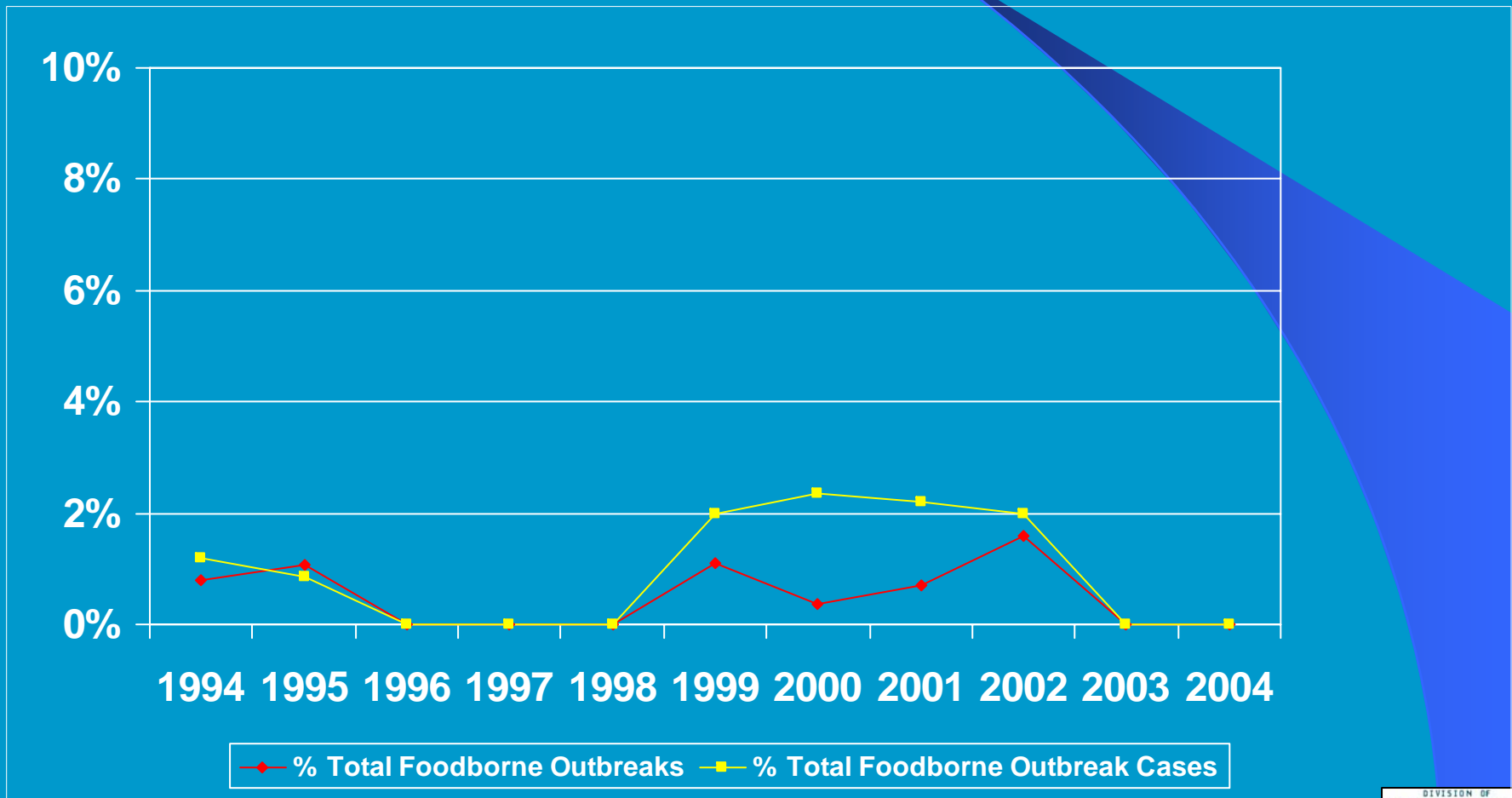
Number of Foodborne Hepatitis A Outbreaks and Outbreak Related Cases Reported in Florida, 1994-2004



Total # Outbreaks: 15

Total # Cases: 159

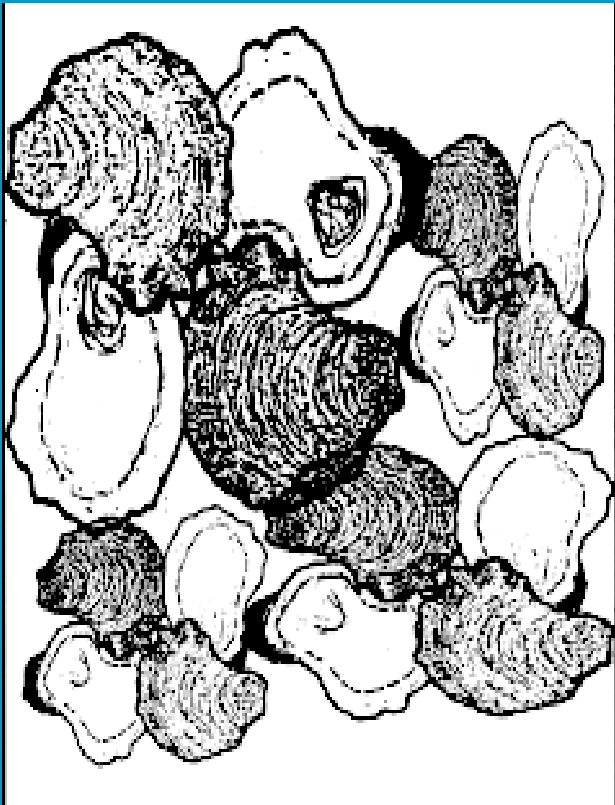
Foodborne Hepatitis A Outbreaks in Florida: % Total Outbreaks and Outbreak-related Cases 1994-2004



Food Worker Hepatitis A in Florida, 1994-2004



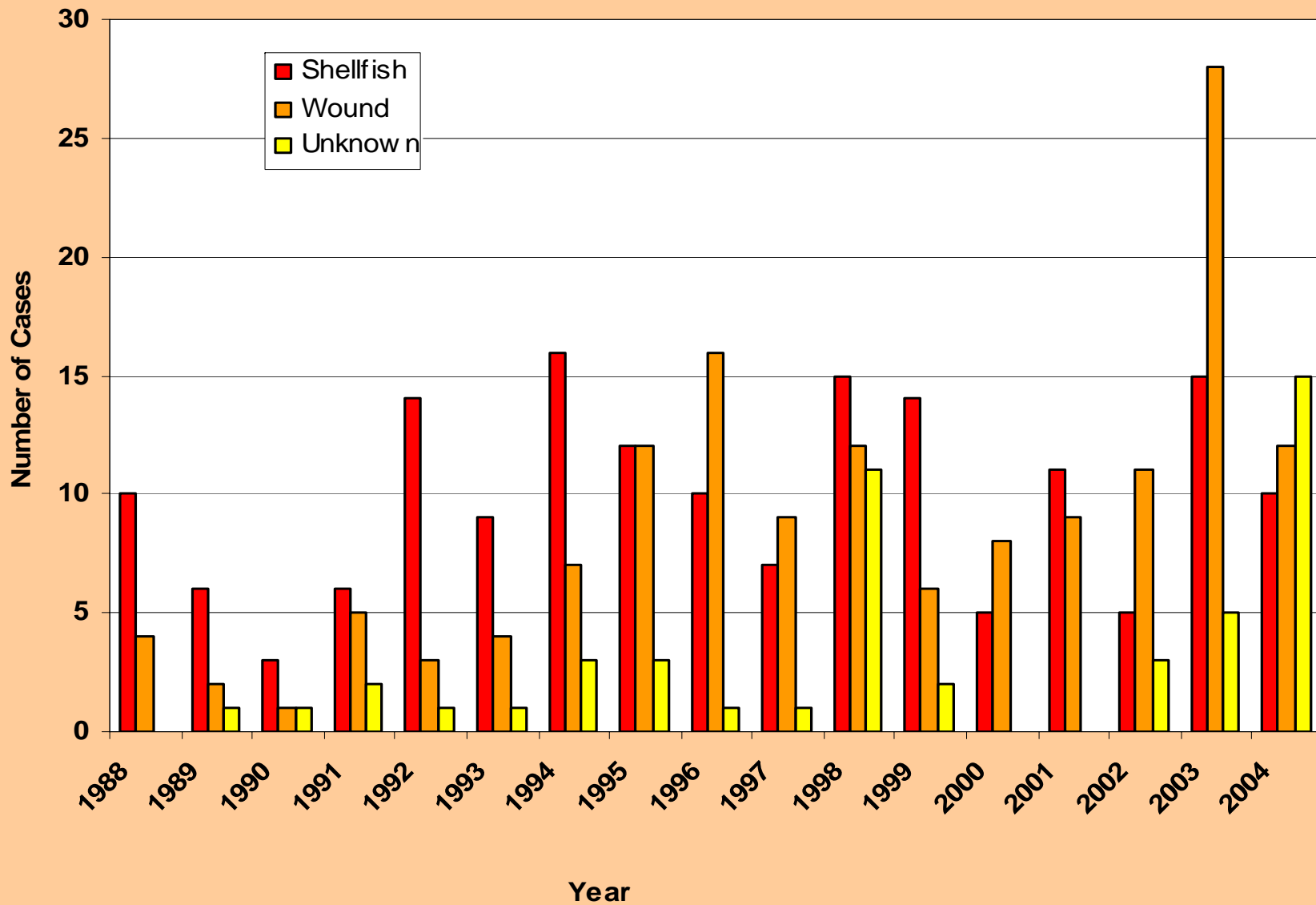
Vibrio vulnificus, Florida, 2004



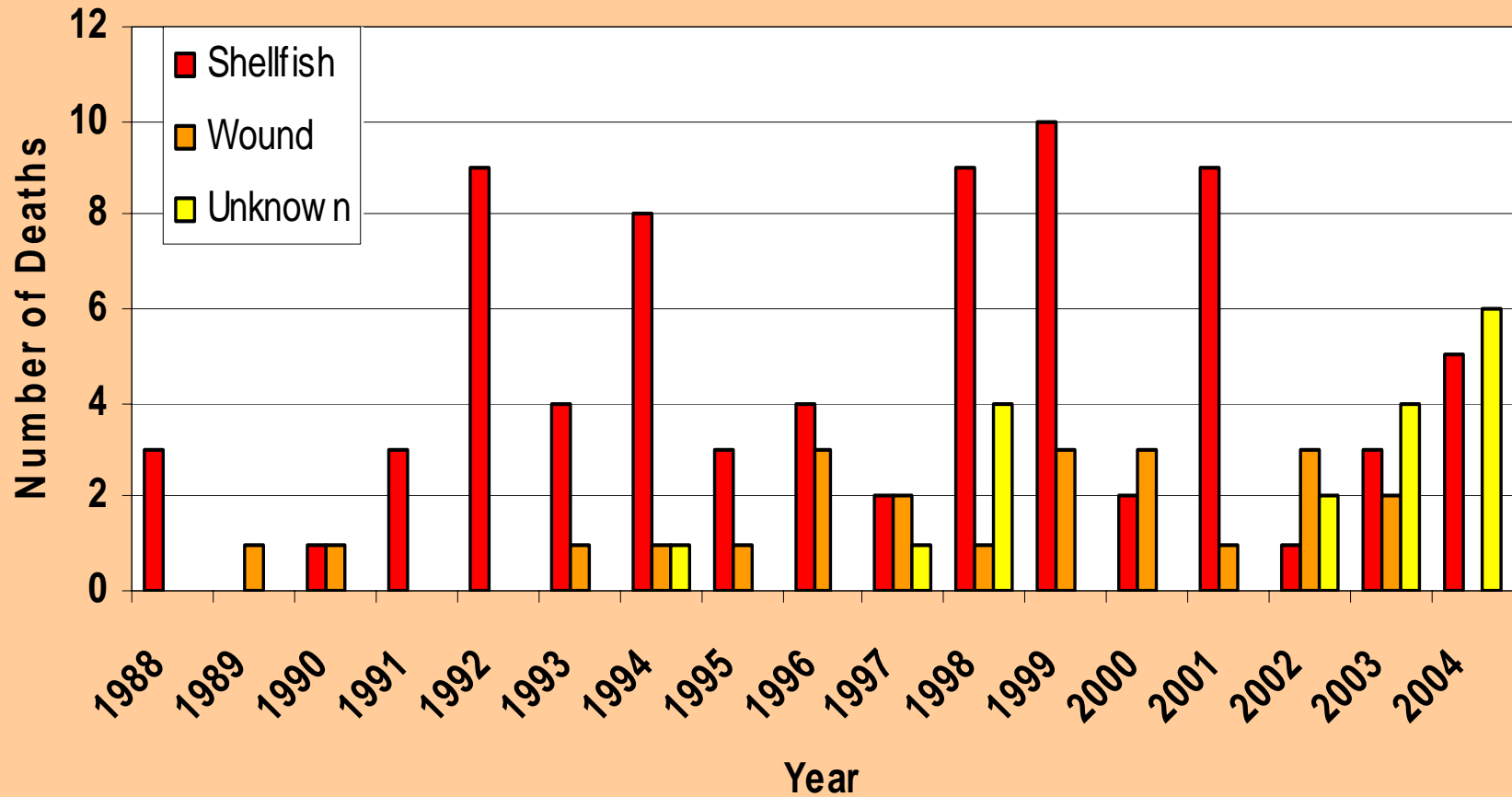
Exposure	# Cases (deaths)
Wound	12 (0 deaths)
Oyster	10 (5 deaths)
Unknown	15 (6 deaths)
Total	37 (11 deaths)

2003: 28 wound (2 deaths), 14 oysters (3 deaths), 6 unknown exposure (4 deaths): Total 48 (9 deaths)

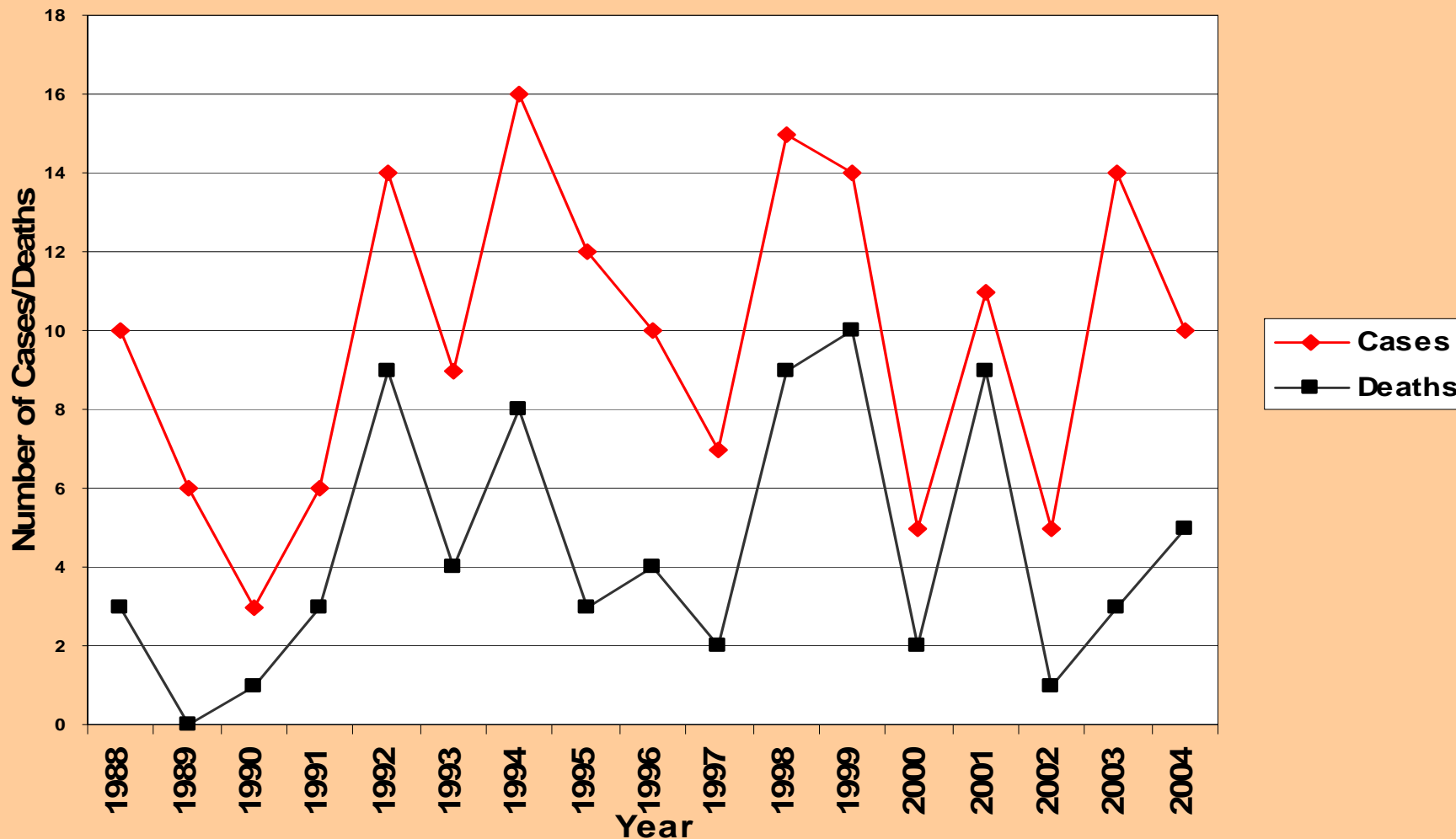
Number of *V. vulnificus* Cases Reported in Florida, 1988-2004



Number of *V. vulnificus* Deaths Reported in Florida, 1988-2004



Vibrio vulnificus Cases and Deaths Associated With Oyster Consumption, Florida, 1988-2004



Total Shellfish Cases, 1988-2004: 167 Total Deaths: 76 (46%)



Contributing Factors in Foodborne Outbreaks, Florida, 2000-2003

	% Outbreaks	% Cases
Contamination Factor		
Bare hand contact	25%	24%
Inadequate cleaning	14%	14%
Proliferation Factor		
Inadequate cold holding	41%	32%
Food at room temp.	20%	17%
Survival Factor		
Other	44%	46%
Insufficient time/temp. reheat	26%	32%
Method of Cooking		
Cook/serve	25%	17%
Multiple items	12%	14%

Unusual Outbreaks: Emerging Pathogens and Vehicles

- 👉 Salmonella Hartford in fresh-squeezed orange juice
- 👉 Salmonella Typhi in frozen imported mamey
- 👉 Cyclospora in fresh red imported raspberries
- 👉 Cyclospora in baby spring green lettuce
- 👉 Norovirus and ice
- 👉 Saxitoxin in puffer fish
- 👉 Botulism in home made garlic in oil

Basic Steps in a Foodborne Outbreak Investigation: “The Ideal”

1. Receive and act on notification of illness
2. Prepare for the investigation
3. Take steps to verify the diagnosis
4. Develop a case definition
5. Make epidemiologic associations
6. Expand the investigation
7. Investigate the place where the foods were mishandled
8. Analyze data
9. Submit report
10. Use investigative data for prevention

Important Things to Remember in an Outbreak Investigation:

✦ Who's in charge here ?

Always designate a lead person

✦ Communications

It is very important to keep all the players informed - cuts down on confusion

✦ Team work

Even though there is a lead person, this is a team effort

✦ Dissemination of results

A preventive and educational measure

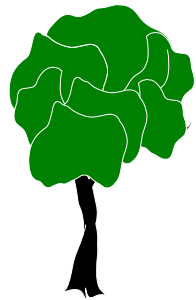
Salmonella and Fresh-Squeezed OJ

- ✦ Character breakfasts at a theme park
- ✦ Etiologic agents responsible:
 - ✦ Salmonella hartford and gaminara
- ✦ Orange juice consumed by 97% cases
 - ✦ Waffles consumed by 54% cases
- ✦ E. coli and Samonella gaminara isolated in orange juice @ 2 months after outbreak
- ✦ Ongoing transmission from within the processing plant &/or insufficient sanitization of juice oranges
- ✦ Original source of Salmonella unknown
 - ✓ Chicken manure?
 - ✓ Frogs?
- ✦ Salmonella can survive up to 27 days in orange juice with a pH of 3.0-3.1 @ 5° C.

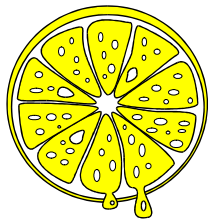


CHART 1

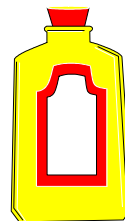
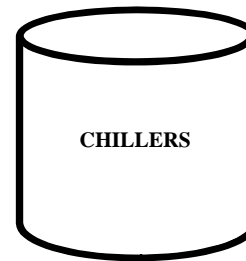
UNPASTEURIZED ORANGE JUICE PRODUCTION



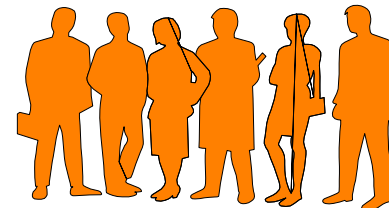
Added August 4, 1995



Squeezed



Packaging

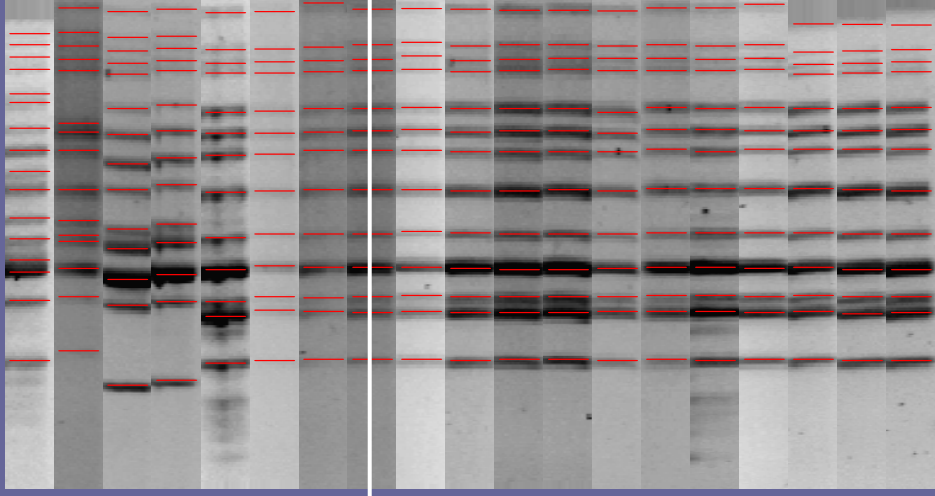


Consumption

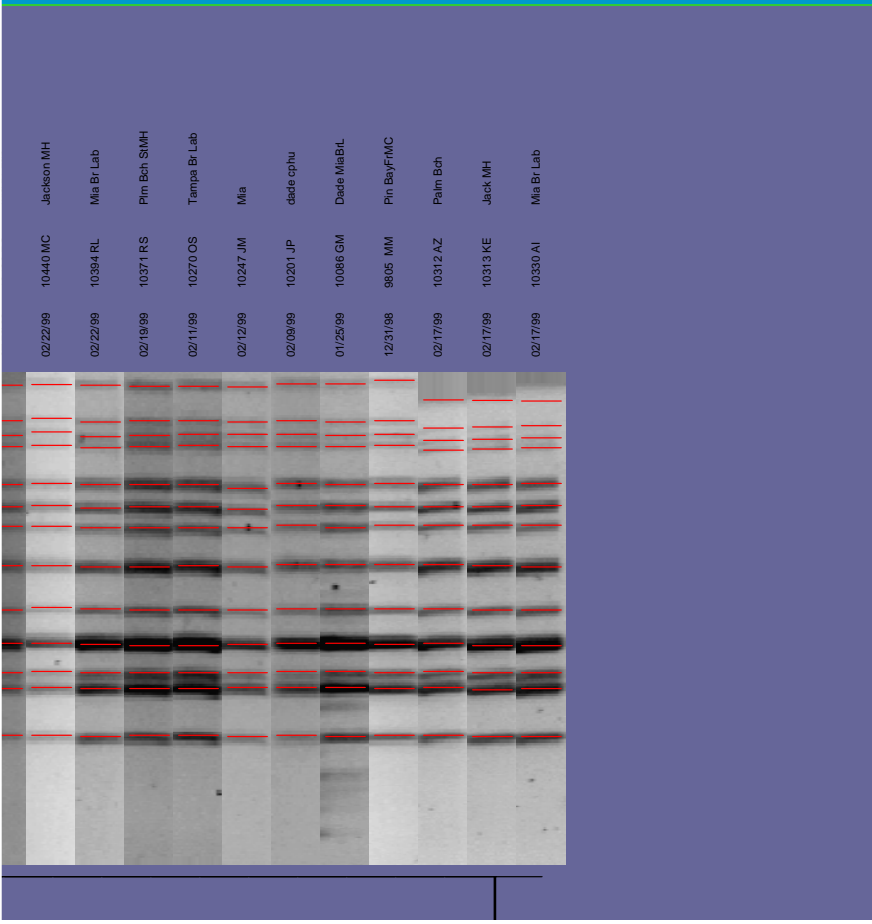
Typhoid Fever: Miami-Dade County, 1999

What do the cases have in common?

- 👉 Hispanic
- 👉 Living in or visiting areas with other Hispanics
- 👉 Common dietary preferences



06/01/99 11486 JS Mia Br Lab
 04/20/99 11048 AG Brow CPHU
 04/15/99 11010 JK Broward MH
 04/15/99 11011 MSK Broward MH
 04/07/99 10910 CC Dade cphu
 03/02/99 10599 AR Mia Br Lab
 02/26/99 10439 JS Brow Mem RH
 02/22/99 10440 MC Jackson MH
 02/22/99 10394 RL Mia Br Lab
 02/19/99 10371 RS Pin Bch SMH
 02/11/99 10270 OS Tampa Br Lab
 02/12/99 10247 JM Mia
 02/09/99 10201 JP dade cphu
 01/25/99 10096 GM Dade MaBrL
 12/31/98 9805 MM Pin BayFMC
 02/17/99 10312 AZ Palm Bch
 02/17/99 10313 KE Jack MH
 02/17/99 10330 AI Mia Br Lab



Typhoid Fever, Miami-Dade County, 1999



- Outbreak of 16 cases
- Of 15 isolates tested, PFGE pattern identical
- Cases linked epidemiologically to frozen, imported mamey

National efforts

- 👉 Feb. 20 - FDA issues national warning
- 👉 CDC notified states with large Hispanic communities - no other associated cases found
- 👉 Laboratory
 - ✓ large amounts of fecal coliforms in unopened packages of two brands
 - ✓ no *Salmonella* Typhi identified
- 👉 FDA announces voluntary recall of the two brands on March 8, 1999
- 👉 PFGE pattern put on PulseNet - no matches found

Cyclospora 1997 - Leon County

- 👉 Reported April 15, 1997
- 👉 Implicated meals eaten the week of March 16, 1997
- 👉 Symptoms: weeks of fatigue, 1 day - 3 weeks of diarrhea, nausea, vomiting, bloating
- 👉 Duration: several days to several weeks; intermittent
- 👉 27 laboratory confirmed cases
- 👉 Team comprised of DBPR, DACS, FDA, CDC, Department of Health personnel

Cyclospora 1997 (cont.)

- 👉 At least 2 restaurants served contaminated greens, both had ill patrons
- 👉 Contaminated foods were the spring greens (also called baby greens or mesclun)
- 👉 Trace-back led to a Miami distributor (greens from Lima, Peru) and to a CA distributor (greens from Arizona)
- 👉 Cases of cyclosporiasis aboard a cruise ship which receives greens from same distributor in Miami



Emerging Vehicle for Saxitoxin Poisoning: Florida Puffer Fish



Southern Puffer, *Sphoeroides nephelus*

Saxitoxin in Puffer Fish, Florida 2002 -2004

- 👉 Cases: 2002 -16 (FL), 3 (NJ), 2 (VA), 2003-2, 2004-4
- 👉 Saxitoxin not found in FL puffer fish before, normally causes paralytic shellfish poisoning from shellfish consumption. PSP extremely uncommon in FL.
- 👉 Tests of puffer fish, shellfish and other fish from the same harvest areas are ongoing.
- 👉 Harvesting of pufferfish banned in Florida in 5 counties

Saxitoxin vs Tetrodotoxin

Saxitoxin

- ➡ Rapid symptoms: ½ - 2 hrs.
- ➡ Tingling, burning, numbness, drowsiness, incoherent speech, respiratory paralysis
- ➡ Mussels, clams, cockles, scallops, and now Southern puffer fish
- ➡ **Cleaning the fish does NOT remove the toxin**

Tetrodotoxin

- ➡ “fugu” poisoning
- ➡ Rapid symptoms: 20 min. – 3 hrs.
- ➡ Numbness of lips and tongue, >paresthesia in face and extremities, lightness, floating, headache, epigastric pain, nausea, diarrhea vomiting. Followed by >paralysis, respiratory distress, death.
- ➡ Japanese pufferfish

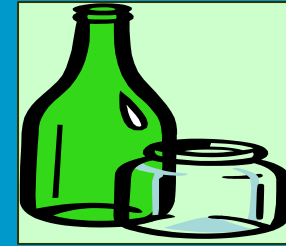


Botulism from Home-Prepared Garlic in Oil, Sarasota County, 1999

- 👉 Mother and daughter, ages 79 & 52 were admitted to hospital with neurological symptoms suggestive of botulism.
- 👉 Symptoms included: nausea, abdominal pain, vomiting, blurred/double vision, difficulty in swallowing, speaking, and breathing, muscle weakness, dizziness, tightness in chest, drooping of the upper eyelid and paralysis.
- 👉 Onset of illness: 13 hours
- 👉 Daughter's husband age 52 became symptomatic 2 days later.
- 👉 Common food: home bottled garlic infused oil.
- 👉 CDC's lab results: garlic cloves and the 2 women tested positive for type-A botulism.
- 👉 Neighbor prepared the garlic infused oil for presents. There was no acidification step and the product was not stored refrigerated.



Botulism, cont.



- ➔ Specific garlic cloves contaminated with *Clostridium Botulinum* type A
- ➔ Treatment temperatures inadequate to destroy spores formed by the organism or its toxin
- ➔ Product pH 6.4 inadequate to prevent growth
- ➔ Storage temperatures did not prohibit growth of bacteria and the formation of toxin
- ➔ Even after opening the jar, olive oil maintained an anaerobic environment for the garlic



What do we DO with these data?

Prevention

- ✓ High risk groups – e.g. *Vibrio vulnificus*
- ✓ Food workers and owner/operators
- ✓ Interested community groups

Training

- ✓ County health department staff
- ✓ Professional associations
- ✓ Universities

Preparedness

- ✓ Baseline data
- ✓ Practice for response to intentional and natural disaster events

Important Issues We Face:

1. **Sick food handlers continuing to handle food.**
2. **Insufficient food production and storage standards on imported foods.**
3. **Ongoing struggle to promote proper handwashing techniques and frequent handwashing.**

References

- 👉 Florida annual reports:
<http://www9.myflorida.com/environment/hsee/foodsurveillanace/>
- 👉 Paul Mead article:
<http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm>
- 👉 FDA BadBug Book:
<http://vm.cfsan.fda.gov/~mow/intro.html>
- 👉 CDC Health Topics A-Z: <http://www.cdc.gov/health/>
- 👉 CDC Foodborne Disease site:
<http://www.cdc.gov/foodborneoutbreaks/>
- 👉 CDC norovirus on cruise ships:
<http://iccl.org/pressroom/vsp-icclR.pdf>
- 👉 CDC Vessel Sanitation Program website:
<http://www.vsp@cdc.gov>

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Salmonella at a Deli/Barbecue

- ✦ Reports from hospital emergency room
- ✦ All had common exposure of particular restaurant
- ✦ 83 ill - 11 hospitalized
- ✦ Critical violations at restaurant
- ✦ Cases - including 4 employees - tested positive for Salmonella heidelberg
- ✦ Leftover food tested positive for Salmonella heidelberg
- ✦ Establishment closed until workers received negative test
- ✦ Epidemiologic evidence points strongly to macaroni and cheese as leading suspect vehicle

Labor Day Salmonella Outbreak

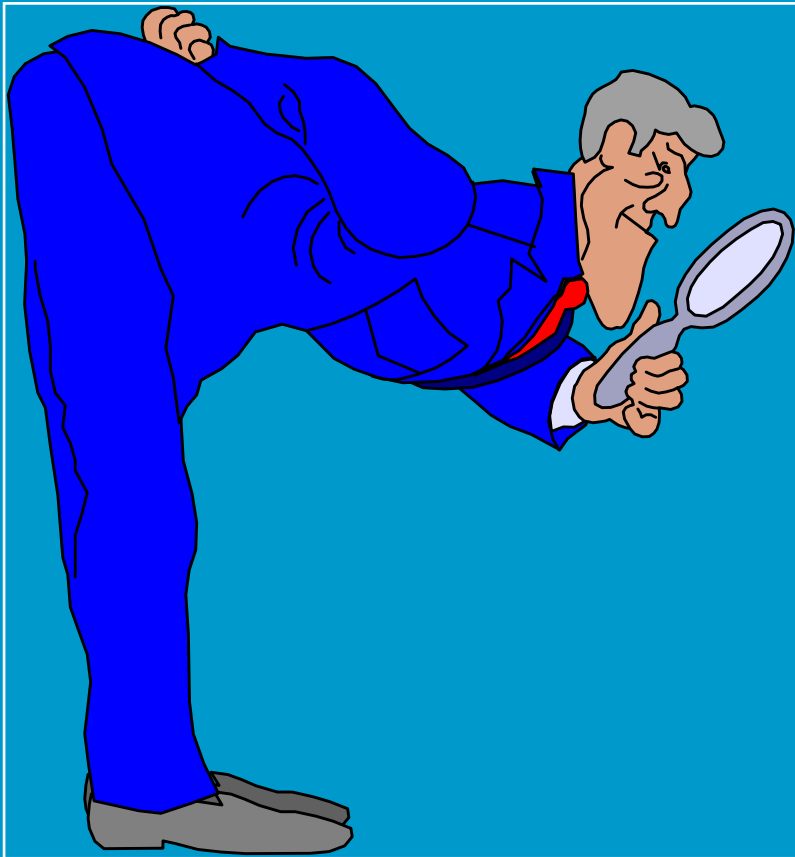
- ✦ Investigation steps: “the ideal”
- ✦ Chronology
 - Interviewing sick and well people
 - Environmental field investigation
 - Dealing with the media
 - Analysis
- ✦ Coordination and Communication

Initial Notification of Illness: The first day

- ◆ Call at 2am, September 1
- ◆ Hospital emergency rooms 2am - 5am
- ◆ Notification of appropriate agencies and outbreak investigation staff
- ◆ Development of questionnaire
- ◆ Interviews by phone & in hospitals (9am - 9pm)
- ◆ First visit to the restaurant
- ◆ Media inquiries



The Second Day: More of the First



- ◆ Interviews of food handlers
 - food consumption questionnaires
 - stool samples
 - what happened at the restaurant
- ◆ More interviews of sick and well people
- ◆ More media contacts
- ◆ Collection of leftover food
- ◆ Coordinating with various agencies involved
- ◆ Data entry

The third day

- ➔ Data entry of interview information
- ➔ Documenting and collating lab results of stools
- ➔ Lab confirmations and serotyping by state labs
- ➔ More phone calls
- ➔ Initial data analysis
- ➔ Food handler education



The rest of the investigation



- ⌚ Waiting for lab results
- ⌚ Communicating with agencies and people involved
- ⌚ More phone calls
- ⌚ Media contacts
- ⌚ More data analysis

Results: Final Report

- ◆ 83 people ill, 11 hospitalized
- ◆ Lab results:
 - ✓ *Salmonella heidelberg* in stools
 - ✓ *Salmonella heidelberg* in leftover food
- ◆ Vehicle of transmission: macaroni and cheese
- ◆ Environmental investigation:
 - ✓ handwash sink not in working order
 - ✓ no soap and paper towels available
 - ✓ possible cross-contamination of macaroni and cheese with raw chicken

Recommendations

- ➡ All utensils should be meticulously cleaned and sanitized after each use
- ➡ Precautions must be taken to prevent uncooked foods from coming in contact with cooked foods
- ➡ Hands must be properly washed prior to handling any food
- ➡ Proper supervision and education on sanitary techniques and personal hygiene should be an ongoing effort
- ➡ Foods should be kept at correct temperatures and properly stored



Entities involved in this investigation...

☞ Department of Health:

- ✓ Bureau of Environmental Epidemiology
- ✓ Leon County Health Department
- ✓ Office of Laboratory Services

☞ Department of Business and Professional Regulation

☞ TMRMC & TCH

- ✓ Emergency Room
- ✓ Laboratory

☞ Media

- ✓ Channels 27 & 6
- ✓ Tallahassee Democrat