Prepared, But Not Ready to Eat Foods

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Outlines

- Selected consumer trends
- Definitions
- Take home message

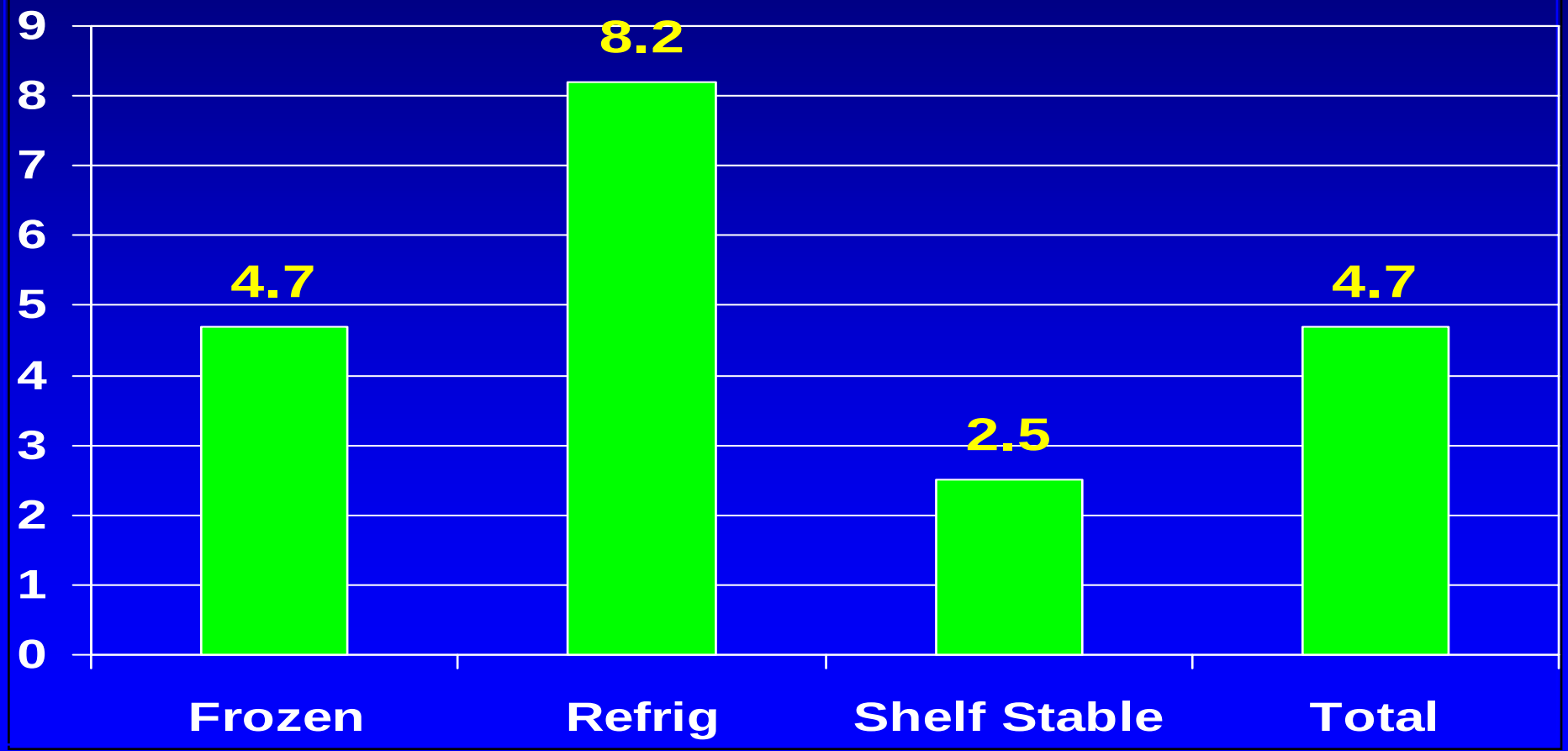
Selected Trends to That Impact Food Safety

- Changing Population
- Life Style
- Food Safety Knowledge/behavior

Consumer Demands

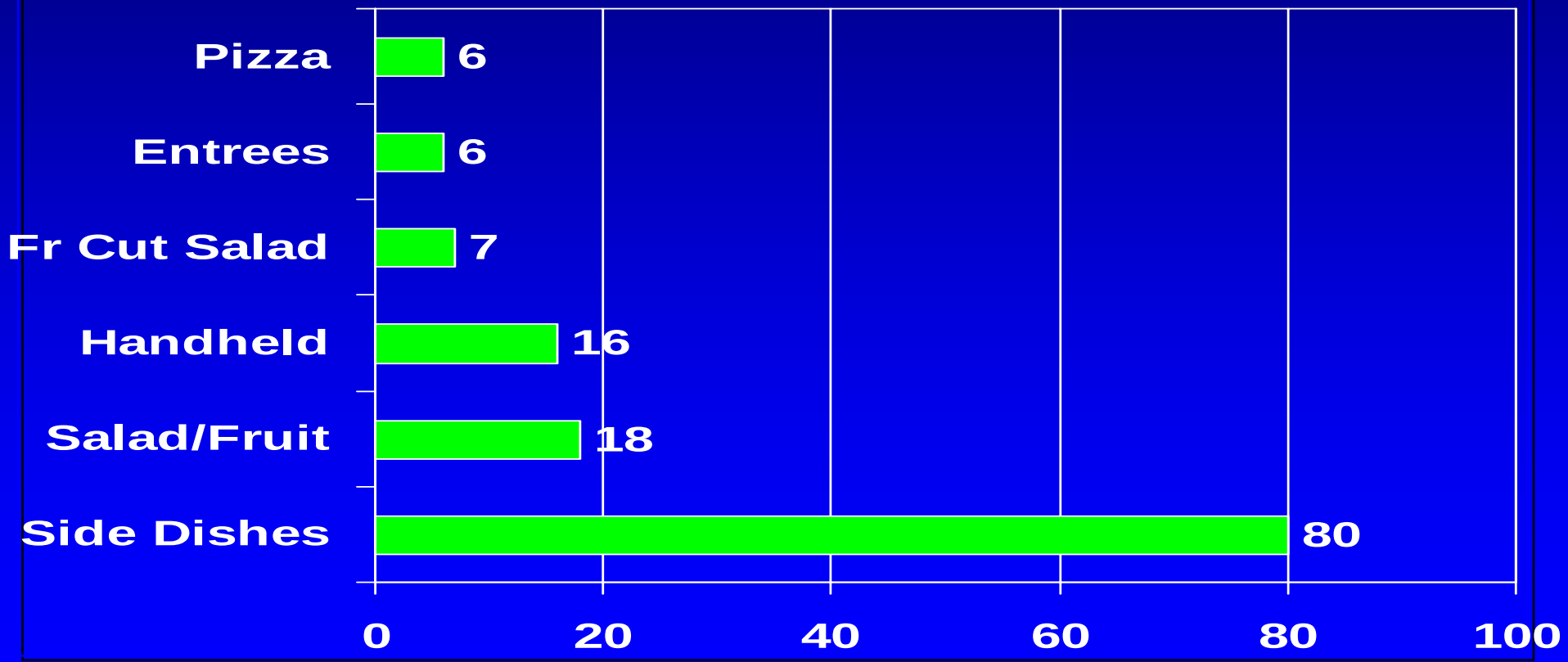
- Good taste – Like freshly prepared
- Greater convenience
- Ready in 15 minutes or less

Change in Sales vs Prior Year



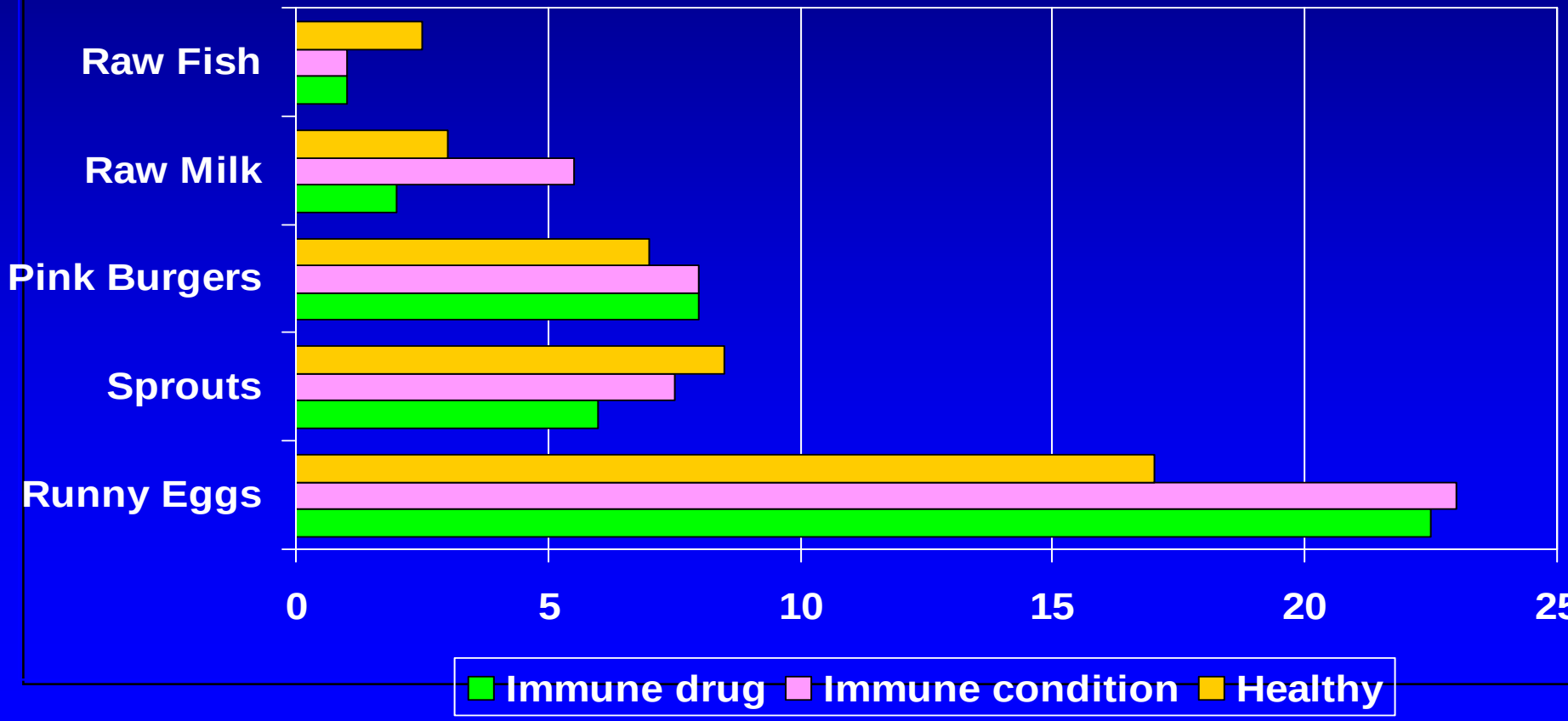
IRI Marketinsight Times and Trends Oct 05

Refrigerated Convenient Food Growth



IRI MarketInsight, Times & Trends 2005

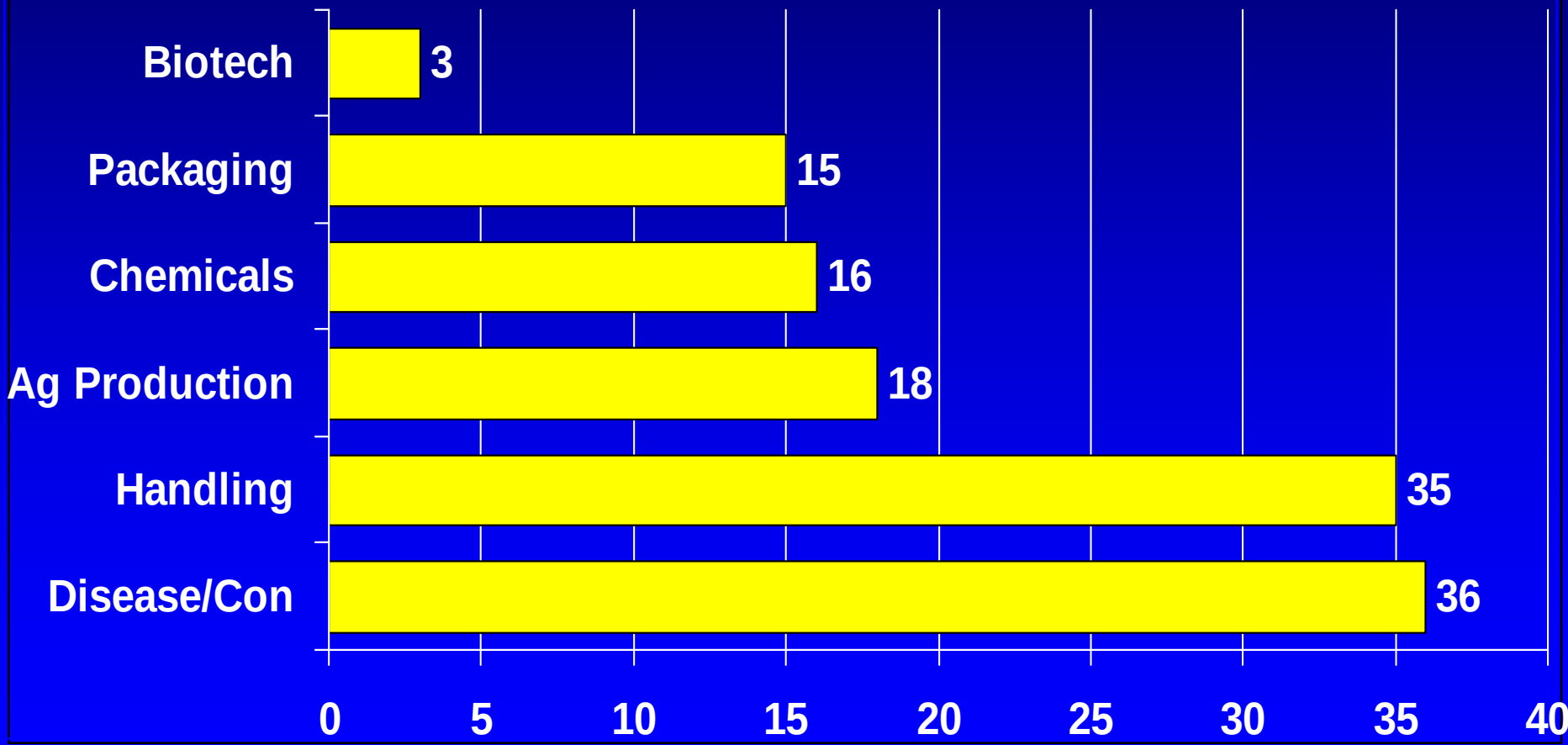
Eating Risky Foods by Immune Groups



ERS USDA, 20002

Perceptions: - Food Safety Concerns

Unaided Question



Cogent, Jan,2006

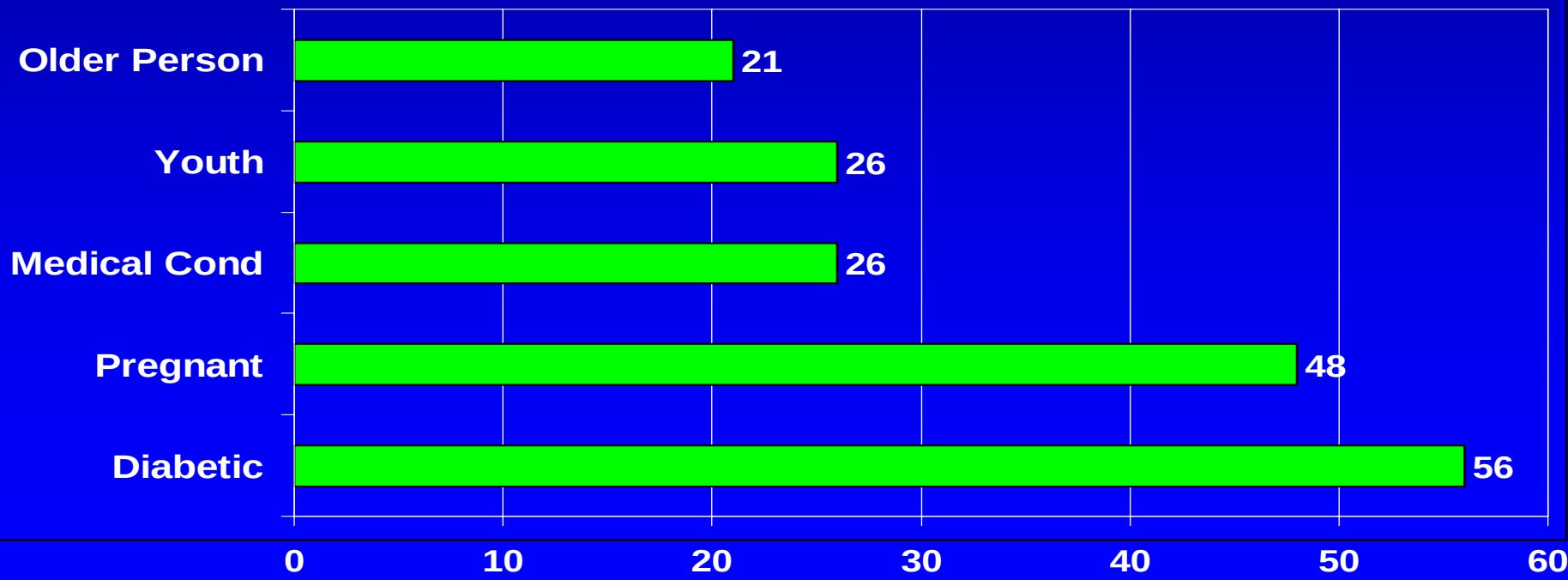
Increased Awareness of Some Pathogens

- Many are aware of *Salmonella* (93%) and *E. coli* (85%)
- More people are aware of *L. monocytogenes* in 2006 (44%) compared to 1993 (9%) and 1998 (14%)

Cates et al, 2006, PR/AHCCP Rule Evaluation Rpt, 2001

Don’t Know Who is at Highest Risk

Nationally –
Fewer than 6% can identify highest risk groups



Bruhn et al, 2007

Not Aware of Proper Storage

- **Proper Storage**
  - •16% thought it was acceptable to store cooked meat at room temp
  - •50% cool food to room temp before refrigerating
- **Recommended refrigerator temperature**
  - •Only 46% volunteers knew recommended temperature (2007)
  - •Nationwide – 40-56% do not know recommended temperature

Bruhn et al, 2007

Confused About Date Labeling

- Sometimes finding the date is a challenge
- Not clear about package dates
  - Manufacturer by
  - Sell by
  - Use by

Bruhn et al, 2007

Few Verify Proper Cooking

- 60% own a thermometer
- 4% - 6% use a thermometer on burgers
- Even after educational program, few seniors would use a thermometer

Medeiros et al, 2006, Anderson et al, 2004, FDA/FSIS, 2002

Challenges

- Disconnect between eating and illness
- Judging food safety messages validity
- Modeling of careless handling practices
- Recognize that there are new hazards
- Acknowledge that they are not invincible

Definitions

- Prepared, But Not Ready-to-Eat (PNRTE) Foods:
  - Convenience foods designed for microwave or conventional cooking
  - Significant portion of foods consumed in the US.

PNRTE

- Frozen, microwavable foods are increasingly being recognized as a vehicle for *Salmonella* outbreaks.
- Par-fried stuffed chicken products, chicken nuggets, and chicken strips have been implicated in *Salmonella* outbreaks (Williams, 2008).

Prepared, but Not Ready-to-Eat Foods & Salmonellosis

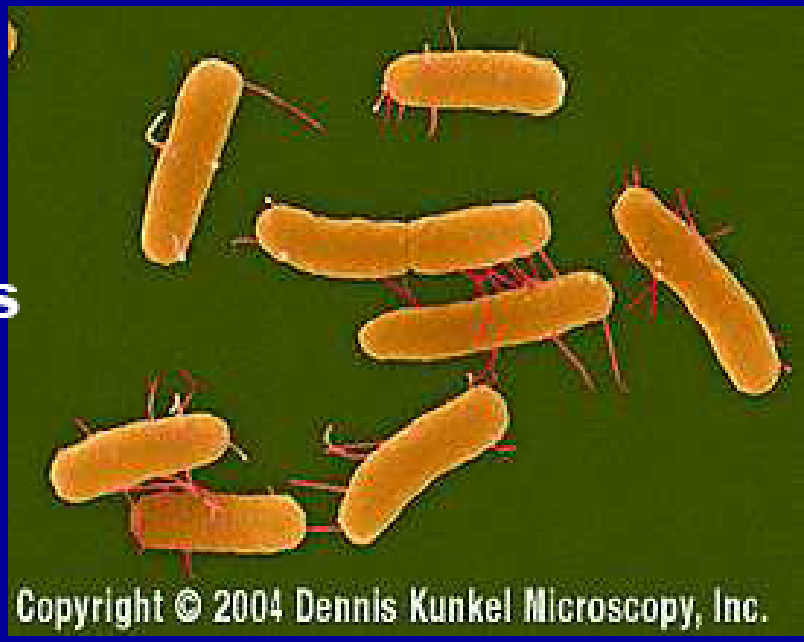
- Increasingly being recognized as vehicle for recent outbreaks
  - Canada & Australia: *S.* Heidelberg and *S.* Enteritidis infection associated with raw "flash-fried" or "par fried" breaded chicken nuggets and chicken strips
    - Investigators in Canada cultured *Salmonella* from 27% (25/92) samples of breaded nuggets & strips, and nugget/strip meat
  - Four separate outbreaks of salmonellosis in investigated by Minnesota Dept of Health (MDH) associated with raw, frozen, microwavable, breaded, pre-browned stuffed chicken products
    - 1998: *S.* Typhimurium – Brand A "chicken Kiev"
      - *Salmonella* isolated from Brand A products from patient home and purchased at retail
    - 2005: *S.* Heidelberg – Brand B "chicken Kiev"
      - *Salmonella* isolated from Brand B products purchased at retail
    - Press release by MDH, USDA-FSIS public health alert, manufacturer modified label to clarify this was a raw product
    - 2005-6: *S.* Enteritidis – Multiple Brands, multiple varieties but predominantly Brand A
      - *Salmonella* isolated from Brand A products from patient homes
    - 2006: *S.*Typhimurium - Brand B stuffed chicken products
      - *Salmonella* isolated from Brand B product from patient home

Prepared, but Not Ready-to-Eat Foods & Salmonellosis

- Common themes in outbreaks
  - Frozen, microwavable processed foods
  - Consumer confusion over the raw or cooked nature of products
    - Not clearly labeled as containing raw meat
    - Breaded and pre-browned leading to the perception that they are pre-cooked
  - Most consumers did not follow package cooking instructions
  - In Minnesota outbreaks, modification of labels, verification of cooking instructions by manufacturer, and notifications to alert the public that these products contain raw poultry implemented because of the first two outbreaks did not prevent the other outbreaks

Salmonella serotype I 4,[5],12:i:-

- Pronounced “four five twelve eye minus”
- Variant of *Salmonella* Typhimurium
  - Lacks expression of the second flagellar antigen
- Rarely recognized before the mid-1990s
  - Increasing incidence?
    - Many were reported as Typhimurium and Group B
  - More severe disease?
- Epidemiology is not well understood
- 6th most common *Salmonella* serotype
  - ~3% of reported *Salmonella* infections



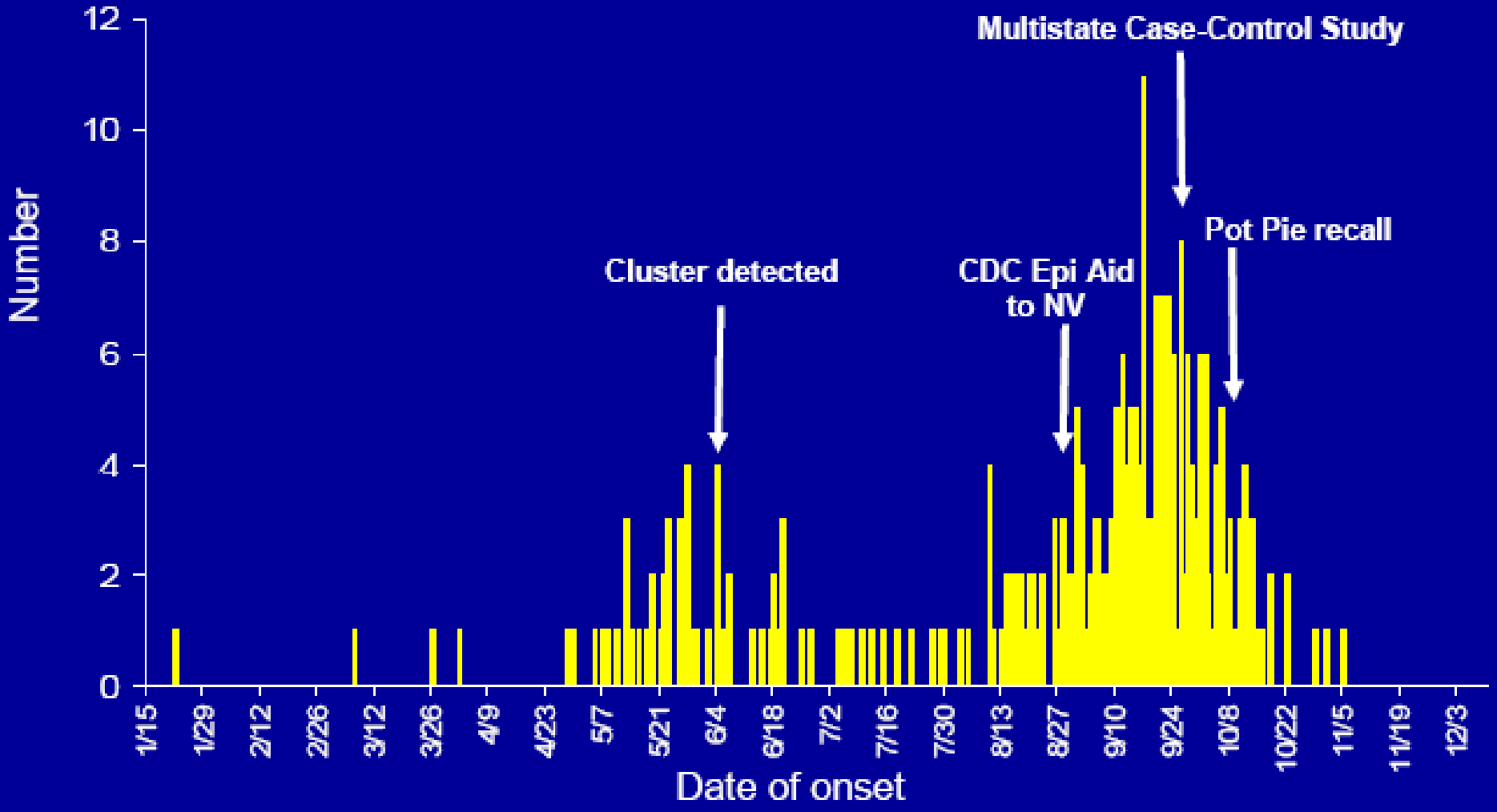
Salmonella I 4,[5],12:i:- Outbreak Detection & Investigation, 2007

- June – Cluster of *Salmonella* I 4,[5],12:i:- infections identified by PulseNet
- August – CDC invited to assist with the investigation of 3 cases in rural Nevada
  - Hypothesis generating questionnaire administered to cases in 10 States
- Oct. 3 – Multistate case-control study initiated using a structured questionnaire
  - Cases = outbreak strain of *Salmonella;* illness onset after July 31, 2007
  - Controls = geographic and aged matched
  - Exposures period = 1 week prior onset for cases and 1 week before interview for controls

Salmonella I 4,[5],12:i:- Outbreak Detection & Investigation, 2007 (continued)

- Oct. 4 – Minnesota Department of Health (MDH) reported 5 cases interviewed had consumed Brand A pot pies
  - Questions on pot pie consumption not part of case-control study
  - Pot pie questions asked as part of standardized foodborne illness protocol used by MDH
- Oct. 5 – Supplemental pot pie questions added to multistate case-control study
  - Structured questions listing a number of brands of pot pies (not just Brand A)
  - Questions on method of preparation of pot pies
- Oct. 9 – USDA FSIS posted consumer advisory
- Oct. 11 – Voluntary recall of Brand A pot pies

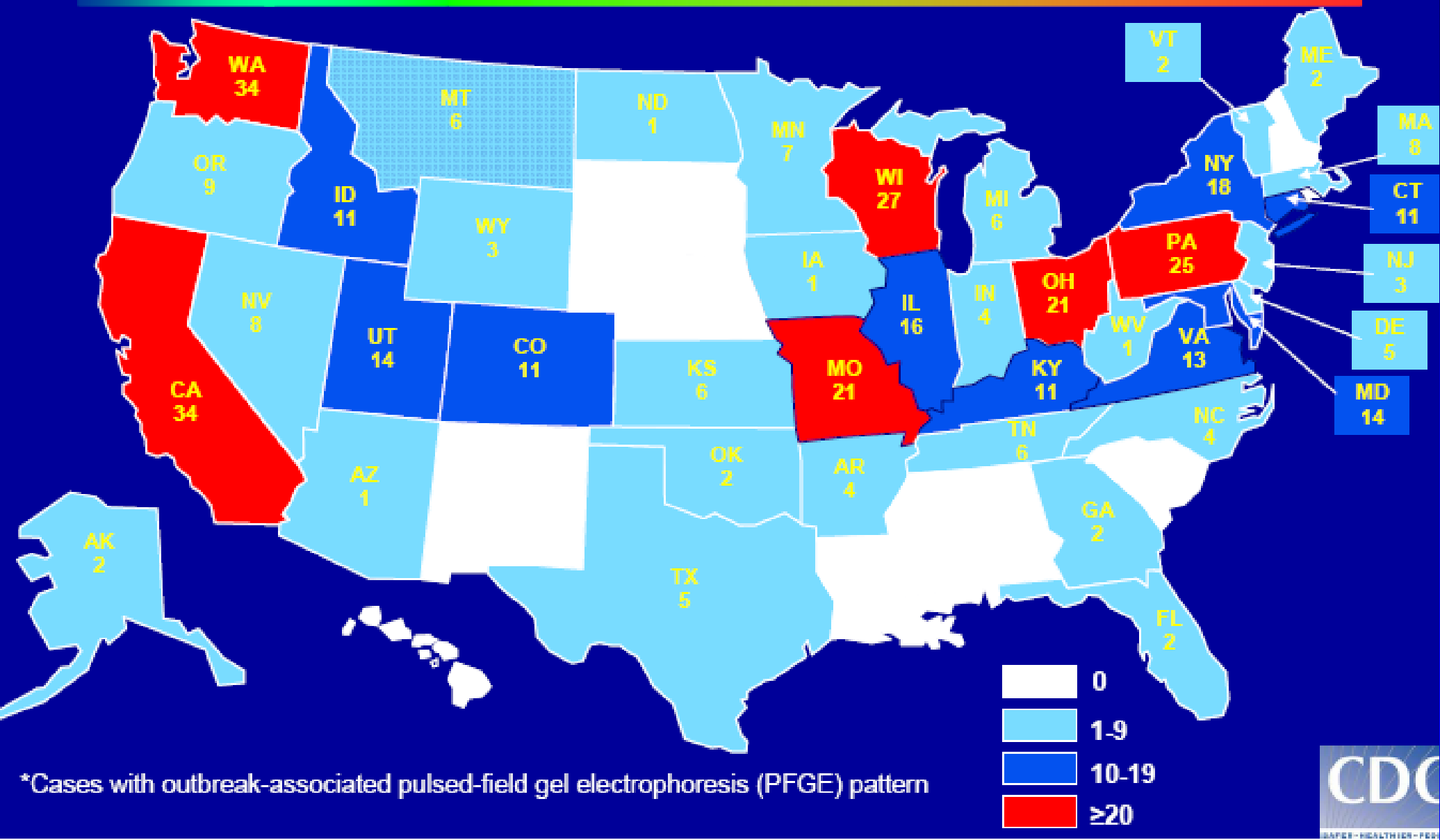
Outbreak of *Salmonella* I 4,[5],12:i:- Infections Associated with Consumption of Pot Pies, US, 2007 (n=282)*



*Cases with outbreak-associated pulsed-field gel electrophoresis patterns and for which date of symptom onset was available.

CDC

Outbreak of *Salmonella* I 4,[5],12:i:- Infections Associated with Consumption of Pot Pies, US, 2007 (n=381)*



*Cases with outbreak-associated pulsed-field gel electrophoresis (PFGE) pattern

Results of Investigation

- 381 cases identified in 2007
  - Median age: 19 years (range: 2 months – 97 years)
    - <5 years = 21%
    - 5-17 years = 26%
    - 18-59 years = 38%
    - >59 years = 14%
  - 50% female
  - Hospitalized (n=272): 31%
  - Reported Deaths = 2
- Case-control study:
  - 17 cases and 24 matched controls enrolled
    - 71% of cases ate Brand A pot pies compared with 0% of controls (matched odds ratio=23.6, 95% CI =3.8–inf)
    - None of the 67 other exposures evaluated were statistically associated with illness

Results of Investigation (continued)

- Brand of pot pie(s) consumed is known for 130 cases
  - 92% ate a Brand A brand
  - 2.3% ate Brand A or other brand produced in same facility
  - 4.6% ate Brand A and/or non-recalled brand
  - 1.5% ate a non-recalled brand
- Outbreak strain isolated from 11 unopened Brand A pot pies collected from case-patient homes (n=5) and stores (n=6)
  - All were turkey pot pies & had a production date of July 13 or 31, 2007
- Brand A pot pies made at single manufacturing facility
  - ~250 million pot pies recalled
  - Investigation of facility ongoing
  - Source of contamination not yet identified

FOR FOOD SAFETY AND QUALITY, FOLLOW THESE COOKING DIRECTIONS:

Microwave Oven

(fine print: Ovens vary; cooking time may need to be adjusted)

PLACE tray on microwave-safe plate; slit top crust

MICROWAVE on HIGH.

Med. OR High Wattage Microwave 4 mins

Low Wattage Microwave 6 mins

LET STAND 3 minutes.

CAREFULLY remove as PRODUCT WILL BE HOT

Conventional Oven

(fine print: Do not prepare in toaster oven)

PREHEAT oven to 400F.

Place tray on cookie sheet, slit top crust.

BAKE in oven 30 to 32 minutes.

CAREFULLY remove as PRODUCT will be hot.

Let Stand 5 minutes.

Brand A Pot Pie Consumption (n = 119)

- 75% cases cooked their pies in a microwave
  - Among cases who used a home microwave
    - Only 32% reporting knowing the wattage
  - Among cases who used a microwave outside the home
    - Only 12.5% reporting knowing the wattage
  - 19% reporting cooking >1 pie simultaneously
  - 37% did not let pies stand the full recommended time after microwaving

Conclusions - Outbreak of *Salmonella* I 4,[5],12:i:- infections, 2007

- Large outbreak associated with consumption of Brand A pot pies
  - Source of contamination at manufacturing facility not yet been identified
  - Microwave cooking instructions were confusing
    - Most consumers did not know wattage of their microwave and therefore could not follow cooking instructions
    - Confusion likely led to under cooking of this frozen not ready-to-eat product

Conclusions - Foodborne Outbreaks Associated with Prepared, But Not Ready-to-Eat Products

- Common themes
  - Frozen, microwavable processed foods
  - Consumer confusion over the raw or cooked nature of products
    - Not clearly labeled as containing raw meat
    - Breaded and pre-browned products leading to the perception that they are pre-cooked
  - Most consumers did not follow package cooking instructions
- Highlights the need for clear instructions on frozen processed foods that are not ready-to-eat
  - Foods should be clearly labeled and cooking instructions should address
    - Consumers lack of knowledge about the wattage of their microwave
    - How variability in output wattage of microwaves affects cooking times

Issues of PNRTE (FSIS)

- Variable microbial loads for different PNRTE products
- Controls for the NRTE operations focus on preventing growth but not in the preventing contamination or reducing levels.
- Consumer's confusion of PNRTE or NRTE and Ready-To-Eat products

Engeljohn, 2008

Issues of PNRTE (FSIS)

- **“Cooking instructions not validated for pathogens of public health concern.”**
- **“Reliance on consumer to adequately handle products, but the instructions are not accurate and the consumers can’t follow them.”**

Engeljohn, 2008

Take Home Message

- Read and follow instructions
- Getting to know your cooking equipments
- Old solutions to new problems: Use your thermometers!
- FSIS always recommend consumers to use a thermometer for safe cooking.

Acknowledgement

- Dr. Christine Bruhn (UC-Davis)
- Dr. Ian Williams, CDC
- Dr. Daniel Engeljohn, FSIS

Part of the materials for this presentation were taken from these individuals' presentations or from the IAFP Timely Topic Symposium on Prepared, But Not Ready-To-Eat Foods- What You Need to Know, 2008