Investigation of *Salmonella* Enteritidis in humans in BC

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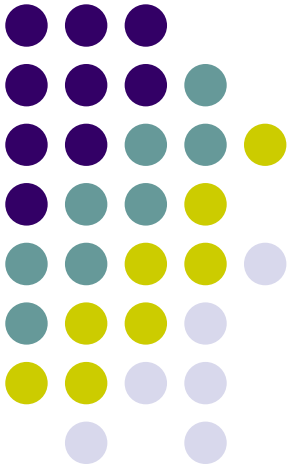

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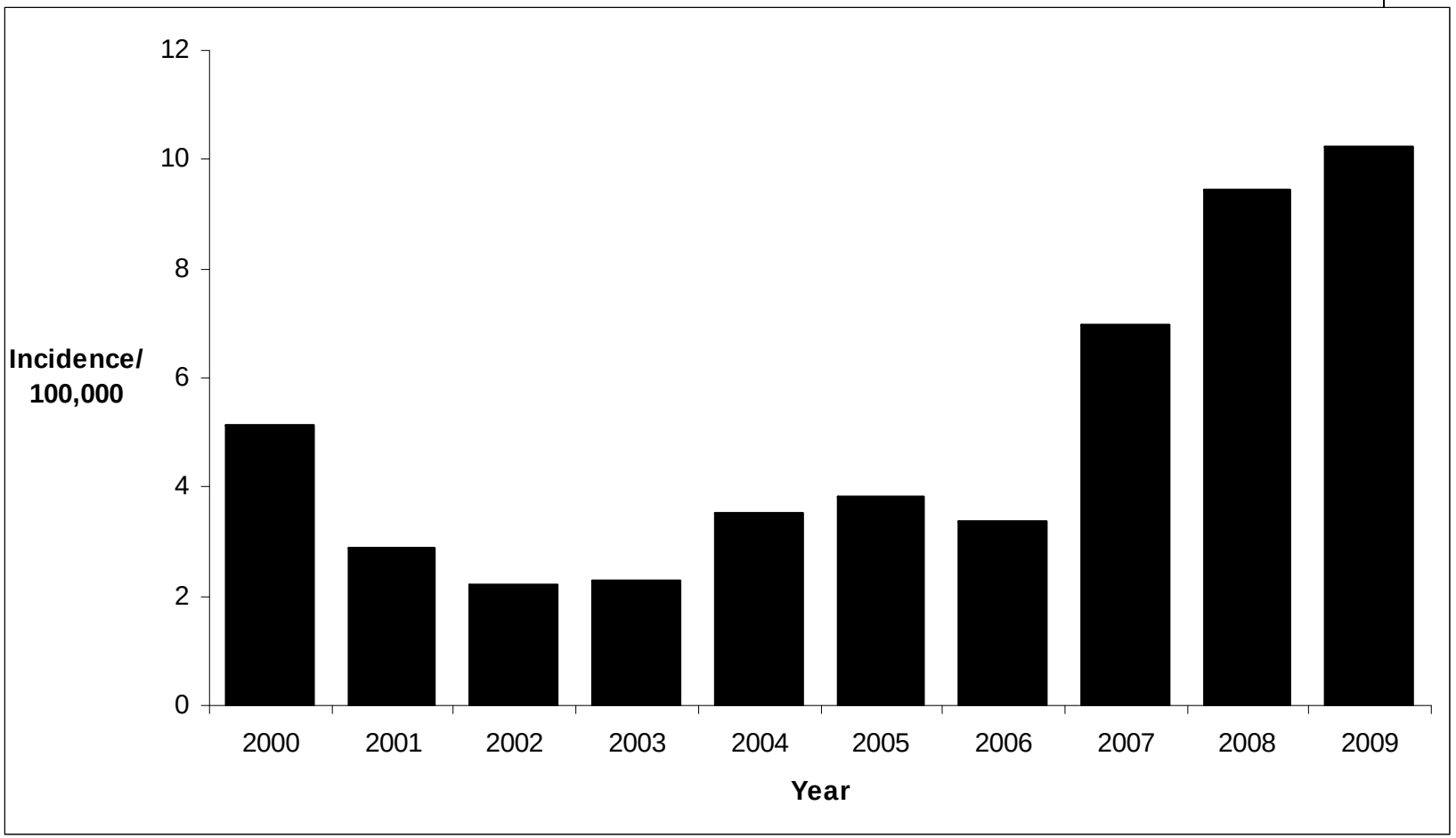
Outline

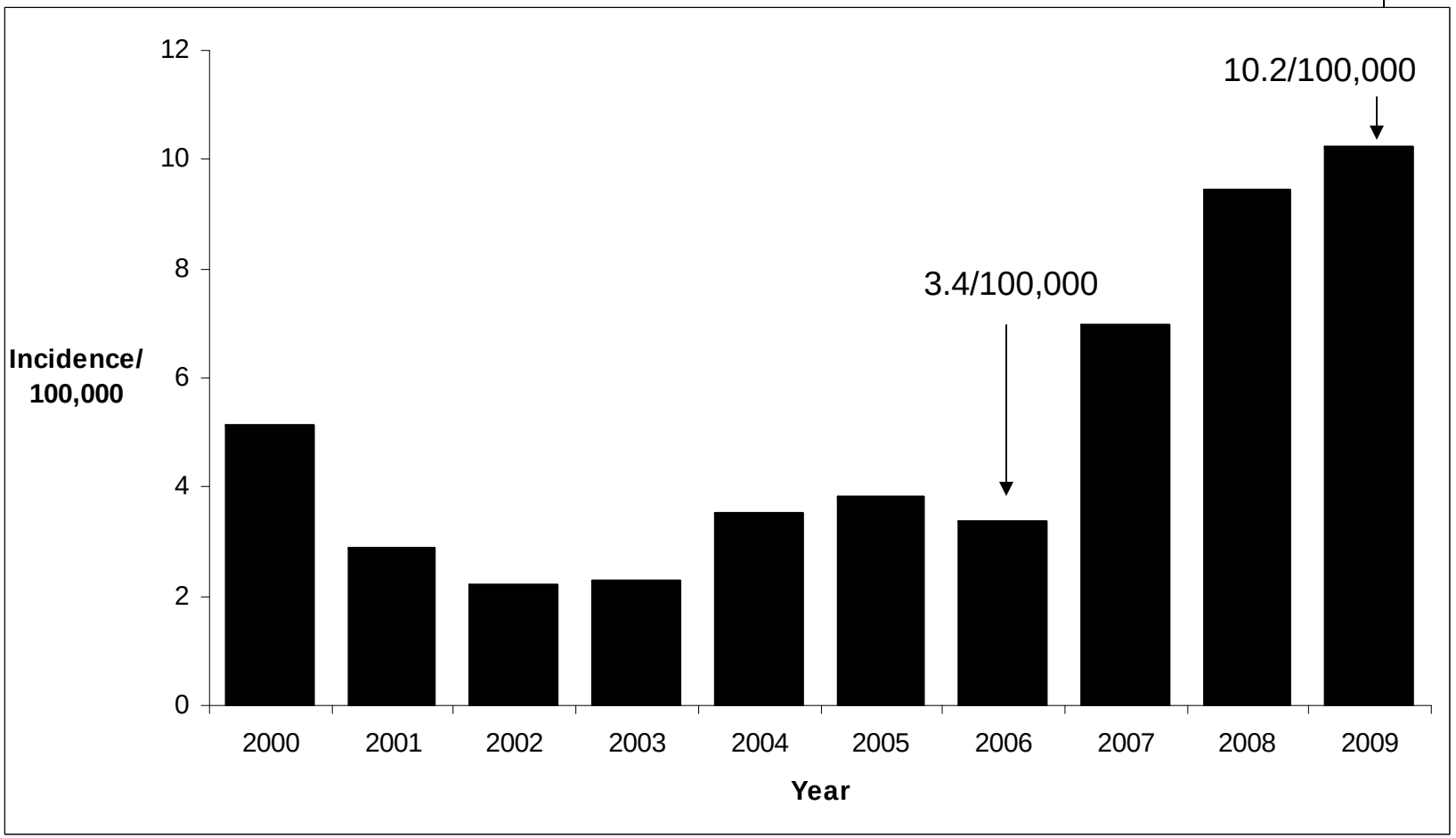
- Epidemiology of *Salmonella* Enteritidis (SE) in humans in BC
- Outbreak investigation in BC (2008-2010)
  - Epidemiological
  - Environmental
  - Collaboration with animal health colleagues
  - Actions taken
- Challenges

SE Incidence in BC, 2000-2009



Source: BCCDC labs

SE Incidence in BC, 2000-2009



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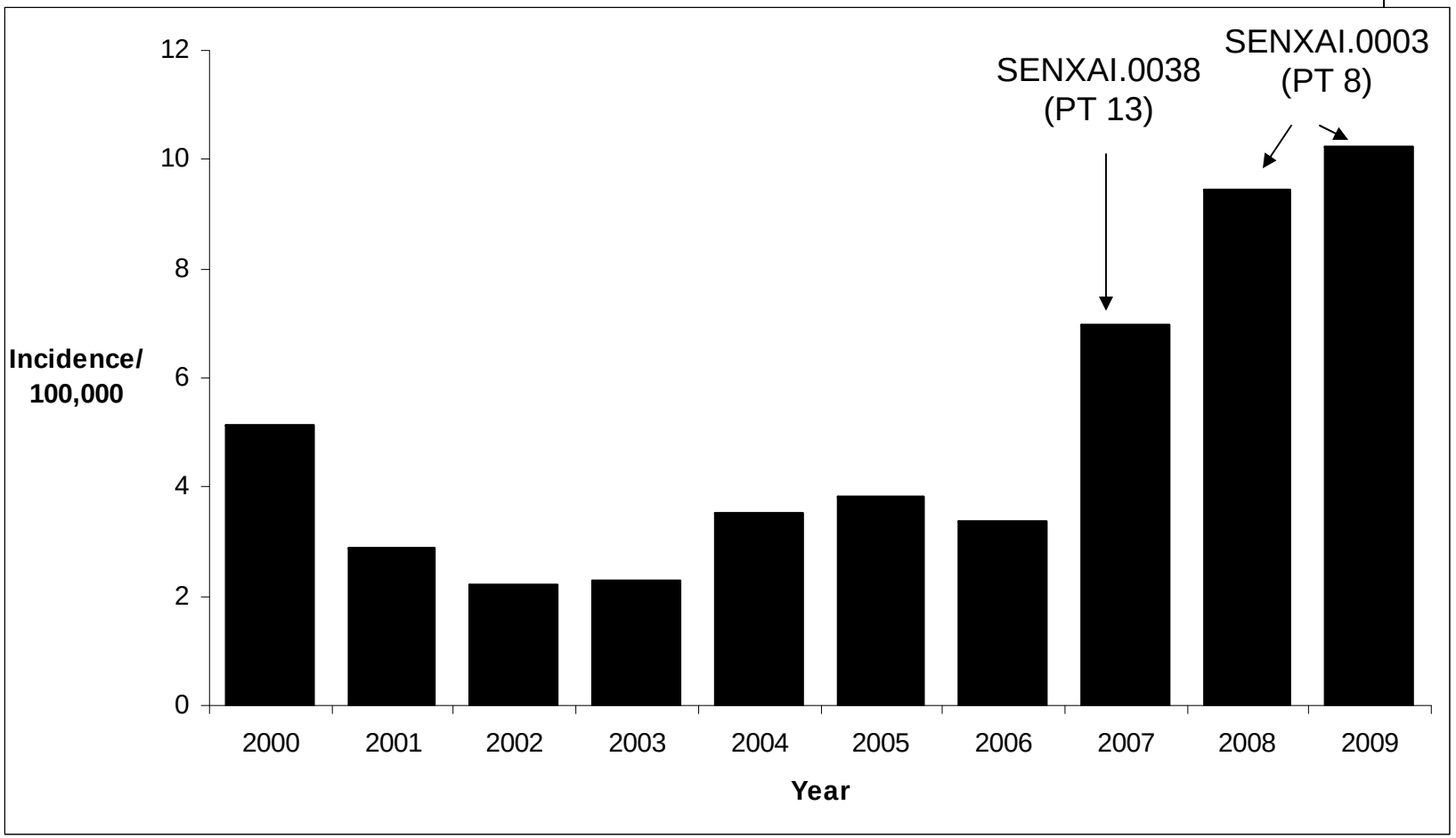
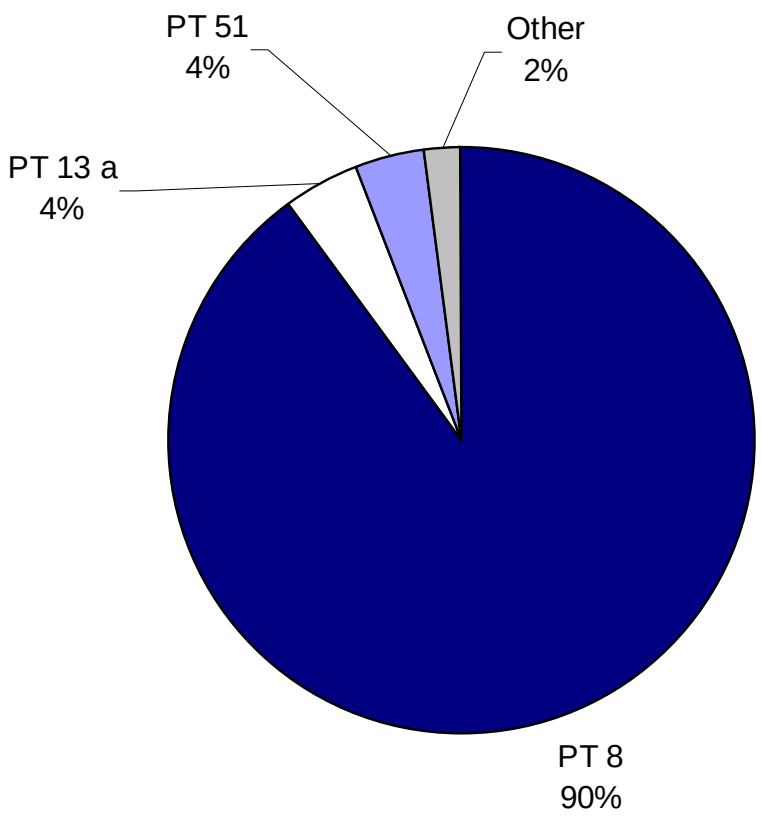
SE Incidence in BC, 2000-2009



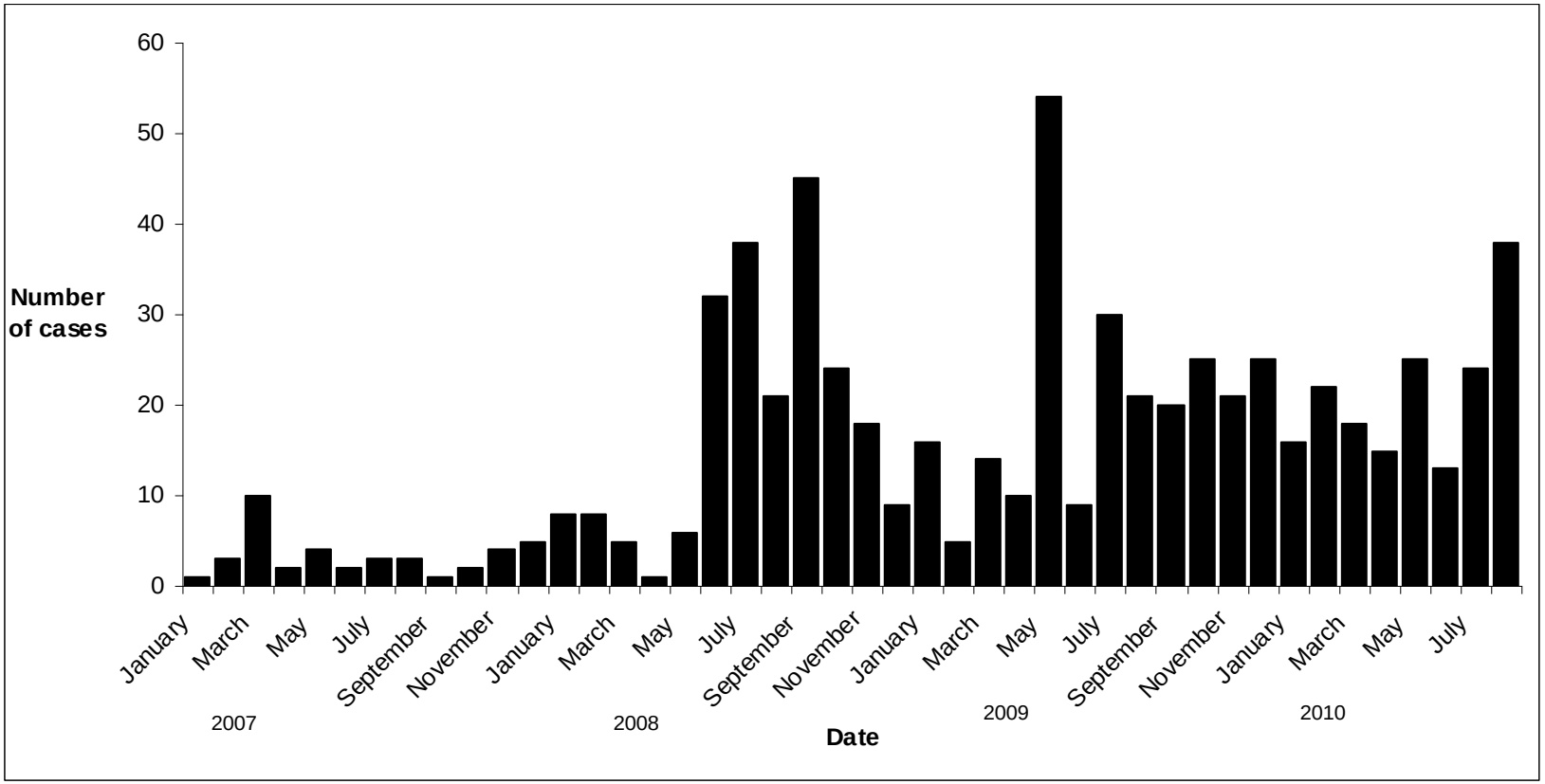
Source: BCCDC labs

Distribution of Phagetype within SENXAI.0003 (SE 3), BC



Source: BCCDC labs

SE 3 infections, BC, by reported week, January 2007- August 2010



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Source: BCCDC labs

Emergence of SE 3 in BC

- Restaurant cluster associated with raw egg mayo in June 2008
  - Raw egg mayo tested positive for SE 3
- Previous outbreaks
  - 2000: egg wash*
  - 2007: egg noodle factory
  - 2007: chicken omelette
- Animal data
  - BC Ministry of Agriculture
    - Strain identified in ill/dead chickens and CFIA broiler hatchery monitoring samples
  - CIPARS
    - PT 8 was a common strain identified from chicken sources between 2006 and 2008

*B Strauss, M Fyfe, K Higo, M Sisler, A Paccagnella, A Trinidad, K Louie, C Kurzac, B Zaharia. *Salmonella* Enteritidis Outbreak Linked to a Local Bakery, British Columbia, Canada. CCDR. April 1, 2005. Vol 31-07.

Investigation results- Epidemiological

Case interviews conducted with all cases of salmonellosis

Investigation results- Epidemiological

Retrospective case control study

92 cases matched by geography and age to controls

Investigation results- Environmental clusters

Investigation results- Environmental

- Traceback
  - Attempted for all clusters and sporadic cases where possible
  - No single common source was identified
  - Significant challenges identified during ungraded egg traceback
    - Lack of receipts, supplier information
  - Redistribution of eggs from farms
    - Regulatory issues

Investigation results-Animal data

- Registered broiler hatchery monitoring
  - Increase in SE between 2007 and 2009
  - PT 8 was the predominant strain reported
- Ill and dead chicken diagnostics
  - Increase in SE between 2007 and 2009
  - PT 8 was the predominant strain reported
- Registered table egg monitoring
  - Stable SE detection
  - No PT 8 detected as of August 1, 2010

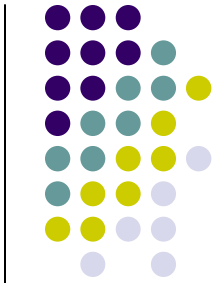
Investigation conclusions

- Significant burden of human illness
- Concurrent emergence of the same strain in humans and the poultry sector between 2008 and 2010
- Most likely source of illness is eggs
- Various brands, locations and sources identified
- Collaborative investigation and multiple sources of data required

Actions taken

- Public health
  - Annual media releases
  - Confiscation of eggs
    - 82 between 2007 and 2010
  - Progressive enforcement
- Animal health
  - Shared information with the supply managed poultry sector.
  - SE vaccination program and enhanced mitigation strategies in broiler breeder flocks (2009)
  - Initiated sampling for broiler hatcheries at farm level (Winter 2009)
  - BC Broiler Hatching Egg Commission recommended that hatching eggs not be sold at farmgate for consumption.
- Joint actions
  - Meetings between industry, animal and public health

Challenges and solutions- Investigations



- Lab methods for SE
  - Not always discriminatory
  - Different authorities using different testing methods

- Look for standard methods that improve differentiation and interpretation

Challenges-Investigations

- Identifying a common source is challenging
  - Eggs are commonly consumed (as is chicken)
  - Could not rely on only one method of investigation
  - Traceback had limited success
  - No single source identified
- Use of environmental clusters
- Required data from multiple sources

- Our experience in BC with SE 3
  - Are there differences in sources?
    - Based on regional practices/industries
    - Strain of SE
- Opportunity for national collaboration on human illness investigations

Challenges-Investigations

- Epidemiological and environmental investigation identified eggs; however SE 3 has not been identified in the table egg sector
  - Are broiler hatching eggs the only egg source?
  - Unable to identify association of human illness with chicken meat
  - Is the surveillance system able to detect SE 3 in table eggs?

- Will changes to industry monitoring of table eggs have an impact?
- Share data to target response

Challenges-Control

- Actions to date have not had an impact
  - Is it too early to assess?
  - Are the surveillance systems able to detect this change?
- Ongoing and effective monitoring for SE among all sectors

  - Are our actions not effective?
  - Other contributing factors?
    - Restaurants, Regulations, Imported products
- Consider what additional actions we can take

- Continue to take a multi-prong and multi-sectoral approach to control

What is causing illness in humans?

- Eggs
- Chicken
- Both

- How much does each contribute to human illness?
- How widespread is this in the industry? Food chain?
- How can we take effective collaborative actions?

Acknowledgements

- Vancouver Coastal Health Authority
- Fraser Health Authority
- Vancouver Island Health Authority
- Interior Health Authority
- Northern Health Authority
- BC Ministry of Agriculture
- BCCDC Public Health Microbiology and Reference Lab
- Canadian Food Inspection Agency
- Public Health Agency of Canada
- BC Centre for Disease Control

THANK YOU

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