

Outbreak of *E. coli* O157:H7  
gastroenteritis associated with  
unpasteurized gouda cheese:  
Edmonton, Alberta

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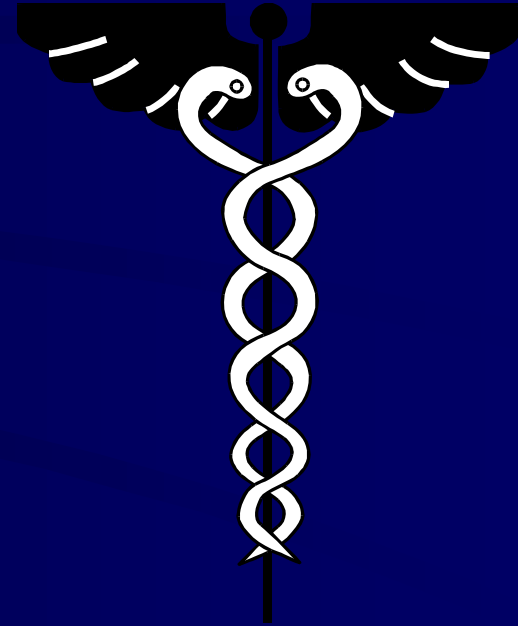
AICF Conference

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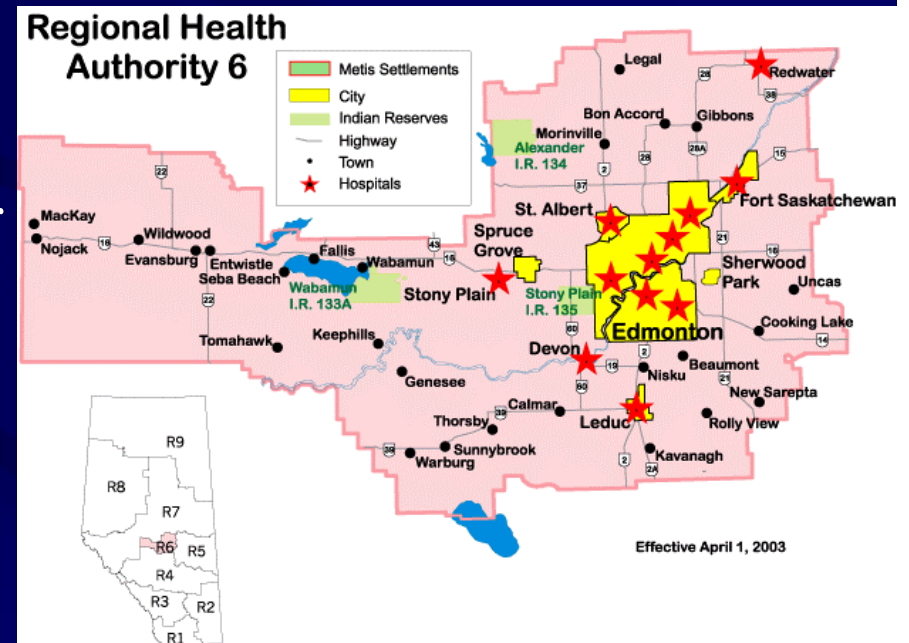
# Presentation outline

- The outbreak
  - surveillance system
  - investigative methods
  - results
- Implications
  - current food safety legislation, unpasteurized cheese
- Conclusions



# Outbreak setting

- Capital Health region (2002)
  - metro Edmonton, Alberta
  - population 840,000
  - E. coli O157:H7 incidence
    - average approx. 50 cases/year



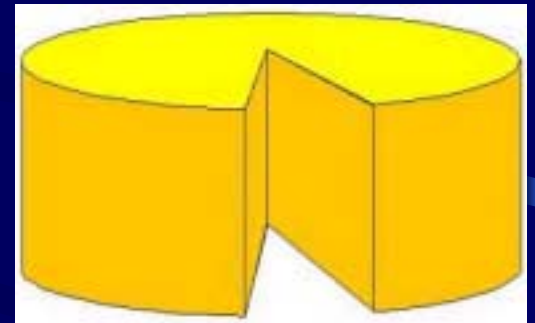
# Surveillance/ outbreak identification

- Notifiable disease surveillance
  - “Enterics Specialist”
- Contacts all lab-confirmed cases by telephone within 48 hours
  - Administers standard questionnaire
- Outbreaks referred to epidemiologist



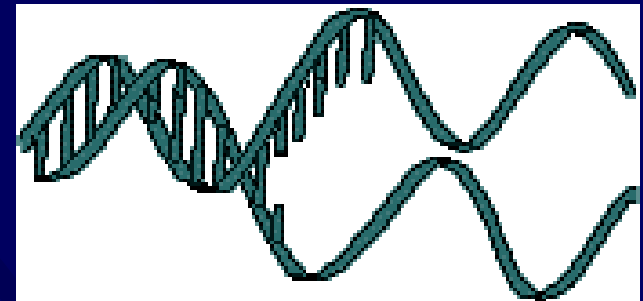
# Surveillance/ outbreak identification

- December, 2002
  - *E. coli* O157:H7 (EHEC) cluster
  - 7 confirmed cases, 1-2 expected
- 3 cases
  - attended same local farmers' market
  - consumed cheese from same market vendor
    - free sample or purchased block
- outbreak investigation initiated



# Investigation-- Identification of additional cases

- All EHEC isolates: PFGE profiling
  - Provincial Laboratory of Public Health
  - within 48 hours
- 3/7 December 2002 cases--same profile
  - ate the same cheese
- others with same PFGE, new EHEC cases
  - cheese, farmers' markets?

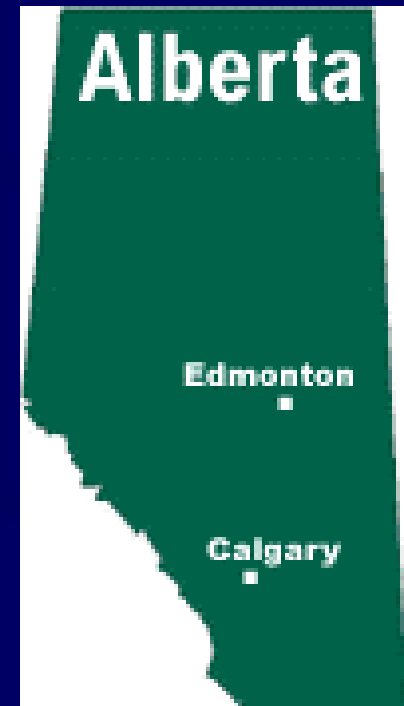


# Initial Public Health Interventions

- Implicated cheese producer
  - distribution lists sought
  - cheese samples collected
  - voluntarily ceased distribution
- Communication
  - provincial & federal health, food safety agencies
  - retailers of implicated cheese
  - public (media release)--extensive coverage

# Results--Implicated cheese producer

- Located on dairy farm 40 km from Edmonton
- produces unpasteurized gouda cheese
  - several varieties
- distributed to
  - 3 local farmers' markets
  - specialty stores
    - Edmonton, Calgary
  - restaurants
    - Edmonton, Calgary, Jasper





(courtesy Larry Trottier, CFIA)

# Investigation--Implicated cheese plant

- regulator:
  - Alberta Agriculture, Food and Rural Development
  - “hold” on cheese-making equipment, cheese in stock
  - CFIA recall
- plant inspection: review of
  - manufacturing procedures, routine sampling results
- collected environmental samples
  - raw milk, well water, cheese plant swabs, cow feces

# Results--

## Case series data

- 13 cases with outbreak PFGE profile
  - 12 reported consumption of implicated cheese
- demographics
  - 12 cases from metro Edmonton, 1 Sask.
  - Age: 22 months-77 years, 34.5/26 (mean/median)
  - 77% female

# Results--

## Clinical presentation

- Onset dates 2002 Oct. 26 - 2003 Feb. 1
- 10 cases (77%) reported bloody diarrhea
  - 5 cases (42%) hospitalized
- 2 cases: hemolytic uremic syndrome
  - 22 month-old, 4 year-old
  - required 2 transfusions
- all cases survived

**HUS**

## Results--

### Exposure to implicated cheese

- Incubation period 2-7 days
  - most cases--multiple exposures
- site of exposure (n=12)
  - free sample at farmers' market only (4, 33%)
    - low infectious dose?
  - consumed at home (8, 67%)
    - purchased at farmers' market (5, 42%)
    - purchased directly from farm (1, 8%)
    - received as gift (2, 17%)

# Results--

## Environmental samples

- Cheese samples
  - 26 samples collected: farm, retailers, homes
  - 2 positive for *E. coli* O157:H7
    - one in original sealed package
    - 104 days after production
  - PFGE profiling
    - same as “outbreak profile”
- Environmental swabs, raw milk, well water
  - negative for *E. coli* O157:H7

# Results--

## Compliance with CFIA Regs?

- Food and Drugs Act
  - hard unpasteurized cheese:
  - minimum 60-day aging
  - microbiological criteria
    - CFIA: <500 *E. coli*/g, <1000 *S. aureus*/g
    - AAFRD: <100 *E. coli*/g



# Results--

## Compliance with CFIA Regs?

- microbiological quality
  - all samples in compliance
  - one sample contained 40 *E. coli*/g
    - from same lot as +ve O157:H7 sample
- Recordkeeping, sanitation:
  - improvement needed



# Results--

## Disposition of cheese

- Source of contamination not found
- Could not trace outbreak to lot(s)
- remaining cheese in stock (\$80K)
  - destroyed (landfill)
- Cheese-making business discontinued

# Implications ...

- *E. coli* O157:H7 survival, cheese: >60 days!
  - this outbreak: 104 days post-production
  - other studies: 158 days (cheddar)
- Canadian studies
  - *E. coli* O157:H7 in raw milk
- complied with regulated microbiological criteria
  - low-level fecal contamination

# Conclusions ...

- Success ... surveillance works!
  - outbreak identified
  - source identified, removed
  - collaboration of food safety partners

# Conclusions ...

- Prevention of future similar outbreaks
  - part of the process!
  - Adequacy of current regulations, unpasteurized hard cheese
    - contamination after complying with regs
    - ready-to-eat product
    - serious pathogen
  - review required?

Questions?

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