Outbreaks Due to Unpasteurized Dairy Products in the United States

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
Pasteurization and Public Health

- Late 1800s — Developed by Louis Pasteur
  - Originally intended to prevent wine spoilage
- Early 1900s — Introduced to eliminate milkborne pathogens
- 1948 — First statewide requirement (Michigan)
- 1987 — FDA bans interstate sale of unpasteurized dairy products
Current State of Regulations

- Interstate sale prohibited by FDA
- Intrastate sale regulated by states
- 25 states permitted sale during 1993–2006
- Challenges to regulations
  - Attempts to circumvent rules
  - Attempts to seek legislative nullification
Policy Analysis

- Do restrictions on state raw milk sales reduce raw milk outbreaks?
- 87% of raw milk outbreaks during 1973–1992 in states that permitted intrastate sale
- CDC expanded analysis for 1993–2006
Policy Analysis Methods

- Outbreak summary data reported to CDC
  - Foodborne Outbreak Reporting System
  - All outbreaks that implicated milk or cheese
- Conducted descriptive analysis of outbreak data
- Surveyed states to determine legal status
- Calculated incidence of outbreaks in states
- Compared incidence by states’ legal status
Outbreaks

123 Dairy Product Outbreaks
2,837 Cases
232 Hospitalizations
3 Deaths

74 Unpasteurized
1,600 Cases
202 Hospitalizations
2 Deaths

48 Pasteurized
1,223 Cases
30 Hospitalizations
1 Death
Etiologies — Unpasteurized

- Campylobacter, 41 (55%)
- Salmonella, 16 (22%)
- STEC, 10 (14%)
- Brucella, 3 (4%)
- Listeria, 3 (4%)
- Shigella, 2 (3%)
Shigella, 1, 3%
Listeria, 1, 3%
Salmonella, 6, 20%
Norovirus, 13, 44%
Campylobacter, 3, 10%
Staphylococcus aureus, 3, 10%
Clostridium perfringens, 2, 7%
Bacillus cereus, 1, 3%
Reports by Year

Enhanced Surveillance Implemented
Seasonal Distribution

Outbreaks

Months

1 2 3 4 5 6 7 8 9 10 11 12

- Brucella spp.
- Listeria monocytogenes
- Shigella spp.
- Salmonella enterica
- STEC
- Norovirus
- Other/Unknown
- Campylobacter spp.
- Toxic

Bar chart showing the seasonal distribution of various outbreaks for each month.
States’ Legal Status

- Responses received from all 50 states
- Seven (14%) changed status during period
  - Three legalized sales
  - Three prohibited sales
  - One prohibited sales and then relegalized
- 21 (49%) of remaining states permitted sales
Legal Status — 1993

1993

 Permit Sale of UDP
 Prohibit Sale of UDP
Legal Status — 1999

Permit Sale of UDP
Prohibit Sale of UDP

Sum of Annual Population of U.S. during 1993–2006 = 3.9 Billion Person-Years

Sale Permitted
2.2 Billion Person-Years
56 Outbreaks
1045 Cases

Sale Prohibited
1.7 Billion Person-Years
15 Outbreaks
414 Cases

Sale Permitted
56 / 2.2B = 2.54*
1045 / 2.2B = 47.45*

Sale Prohibited
15 / 1.7B = 0.88*
414 / 1.7B = 24.18*

Incidence Density Ratios
Outbreaks: 2.54 / 0.88 = 2.90 (95% CI = 1.67–5.20)
Cases: 47.45 / 24.18 = 1.96 (95% CI = 1.70–2.14)

* per 100 million person-years
Conclusions

- Unpasteurized product consumption continues to cause illness and outbreaks.
- Outbreaks are associated with inadequate regulations restricting unpasteurized products.
- Unpasteurized product outbreaks are more common and cause more severe illness than pasteurized product outbreaks.
Limitations

- Outbreak surveillance data limited
  - Outbreaks likely underreported
  - Some outbreaks have limited information
- Data not adjusted for prevalence of unpasteurized product consumption
Recommendations

- Further restrict/prohibit distribution of unpasteurized dairy products
- Educate consumers about health risks of consuming unpasteurized products
  - Local, state, and federal public health partners
  - Clinicians
  - Consumer and advocacy groups
• CDC. Campylobacteriosis Associated with Raw Milk Consumption – Pennsylvania. MMWR Morb Mortal Wkly Rep 32;337-8,344.
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Questions?

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