

Do State Raw Milk Sales Restrictions Reduce Raw Milk Outbreaks?: A Policy Analysis

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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

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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
 - ◆ Seeking legislative nullification

Policy Analysis

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

Policy Analysis Methods

- Obtain outbreak summary data reported to CDC
 - ◆ Foodborne Outbreak Reporting System
 - ◆ All outbreaks that implicated milk or cheese
- Descriptive analysis of outbreak data
- Survey states to determine legal status
- Calculate incidence of outbreaks in states
- Compare incidence by states' legal status

Outbreaks

122 Dairy Product Outbreaks

2,808 Cases

232 Hospitalizations

3 Deaths

73 Unpasteurized

1,571 Cases

202 Hospitalizations

2 Deaths

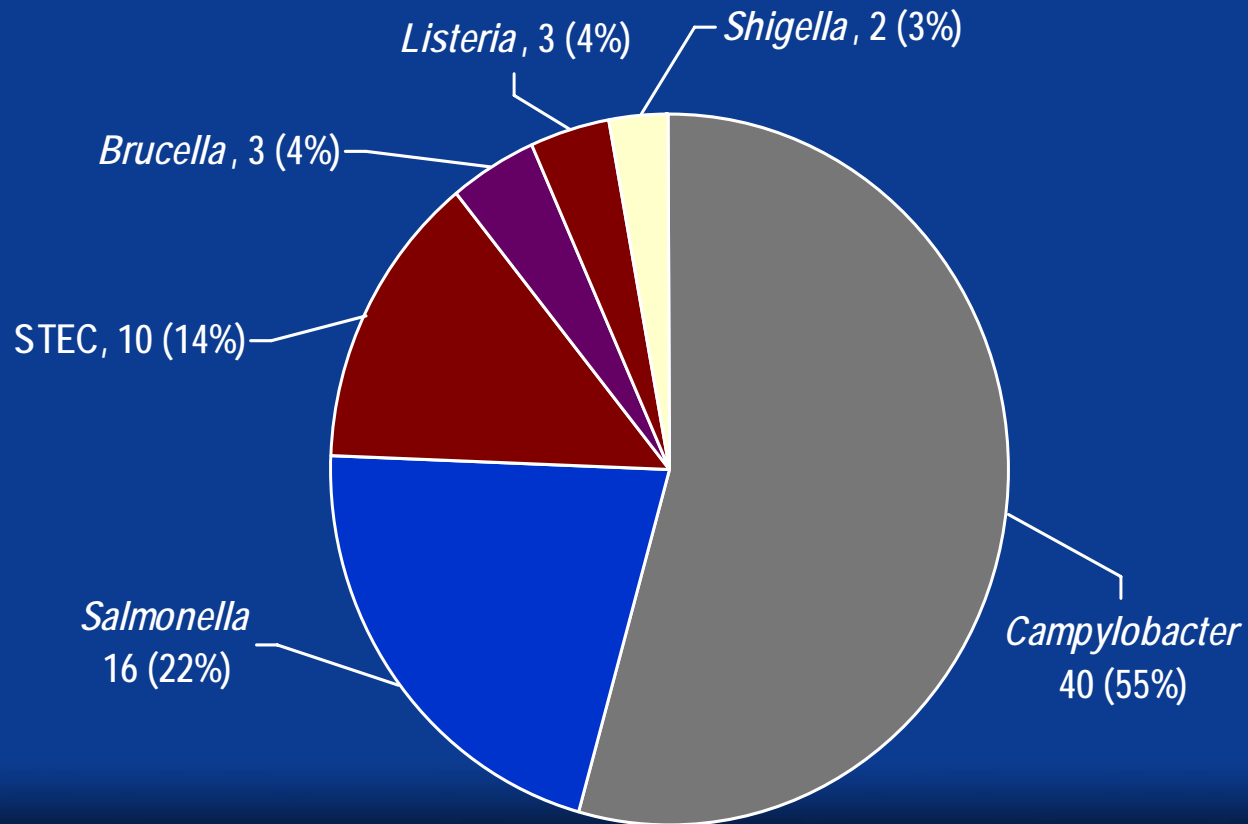
48 Pasteurized

1,223 Cases

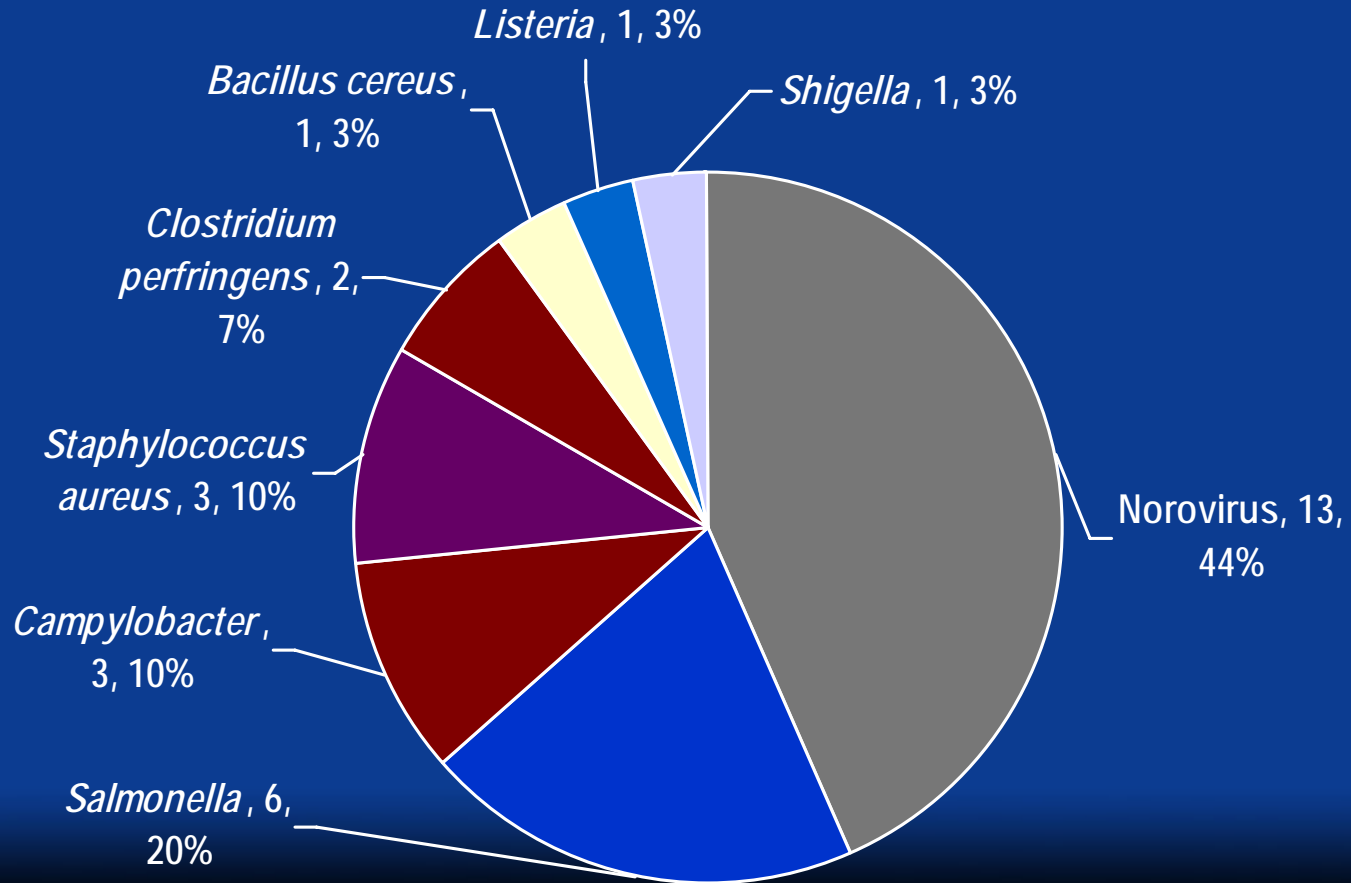
30 Hospitalizations

1 Death

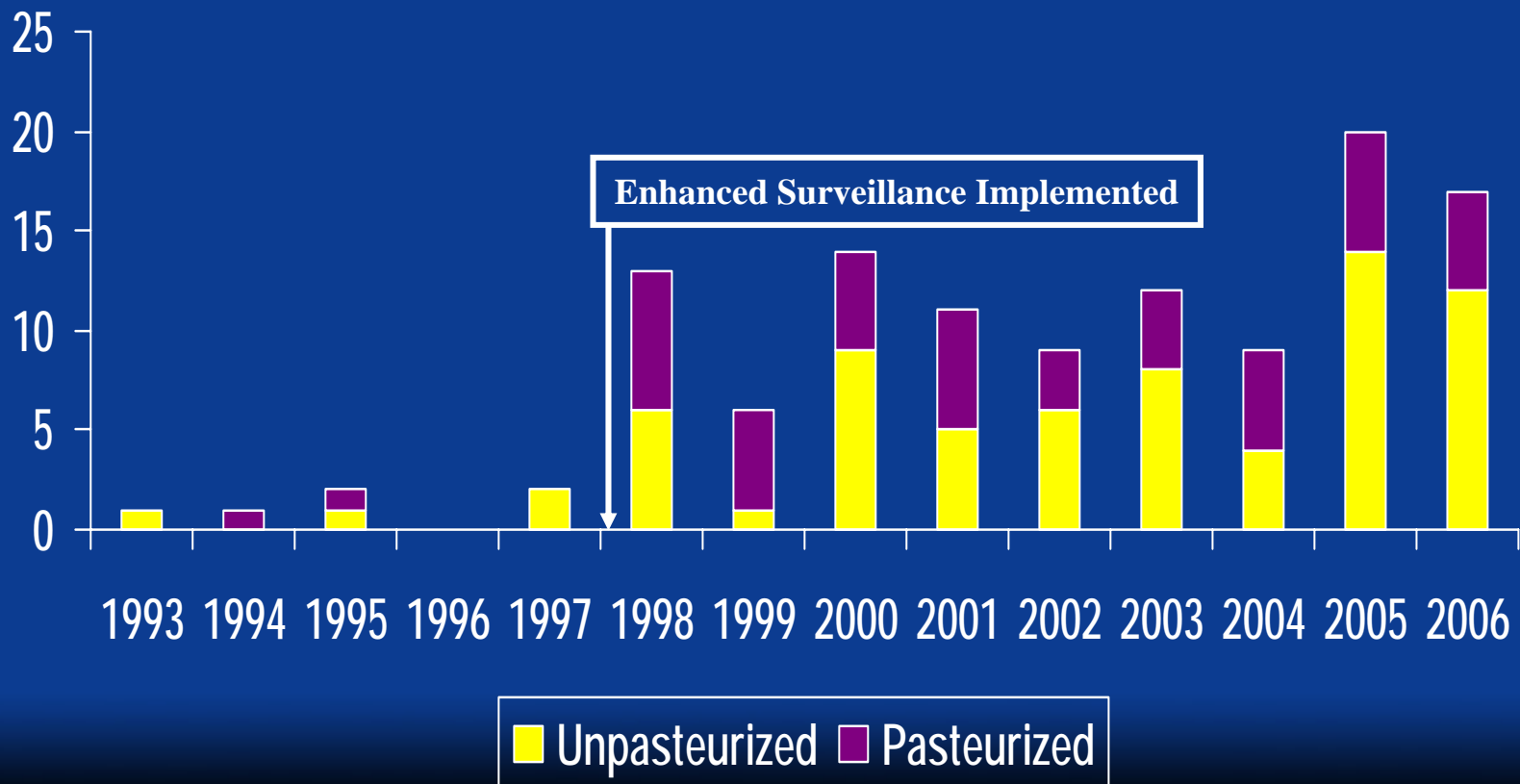
Etiologies — Unpasteurized



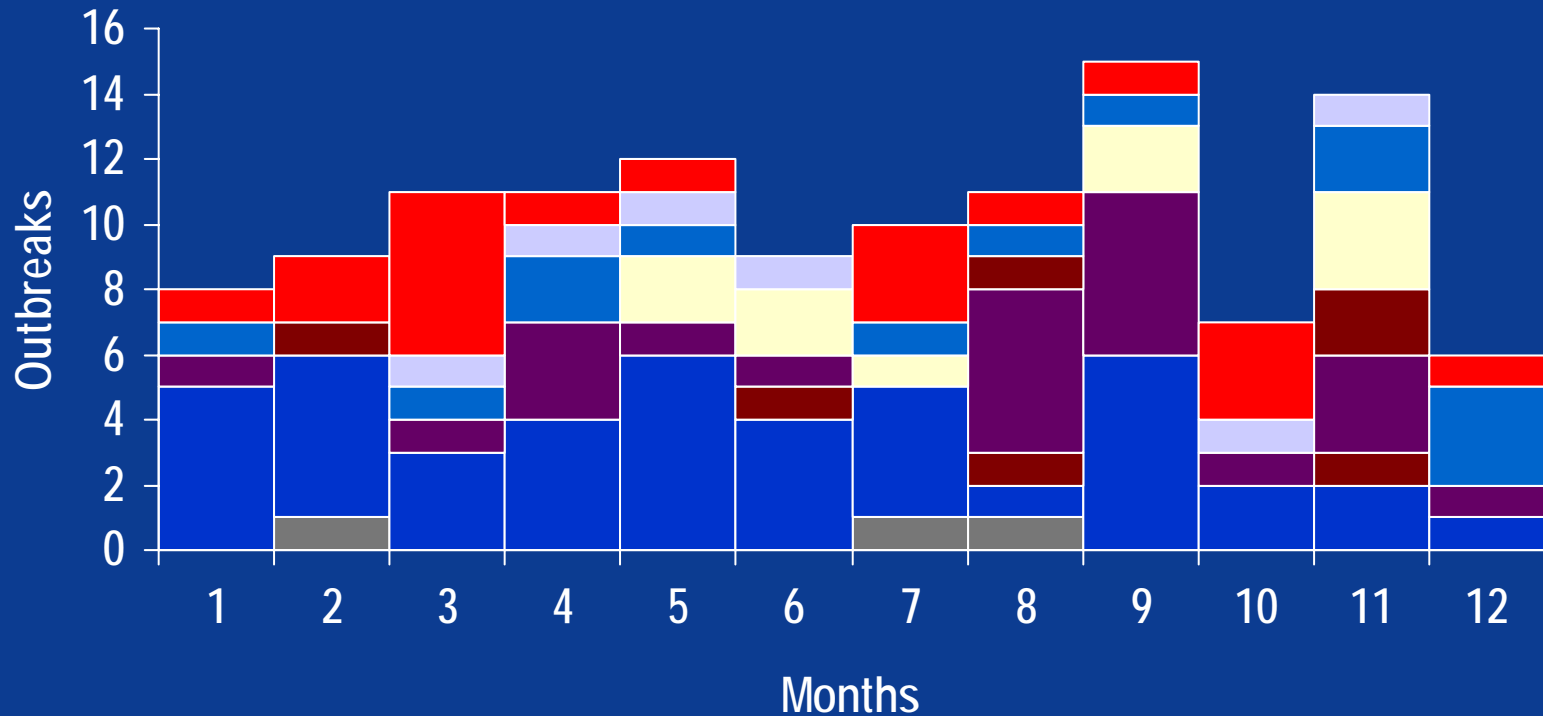
Etiologies — Pasteurized



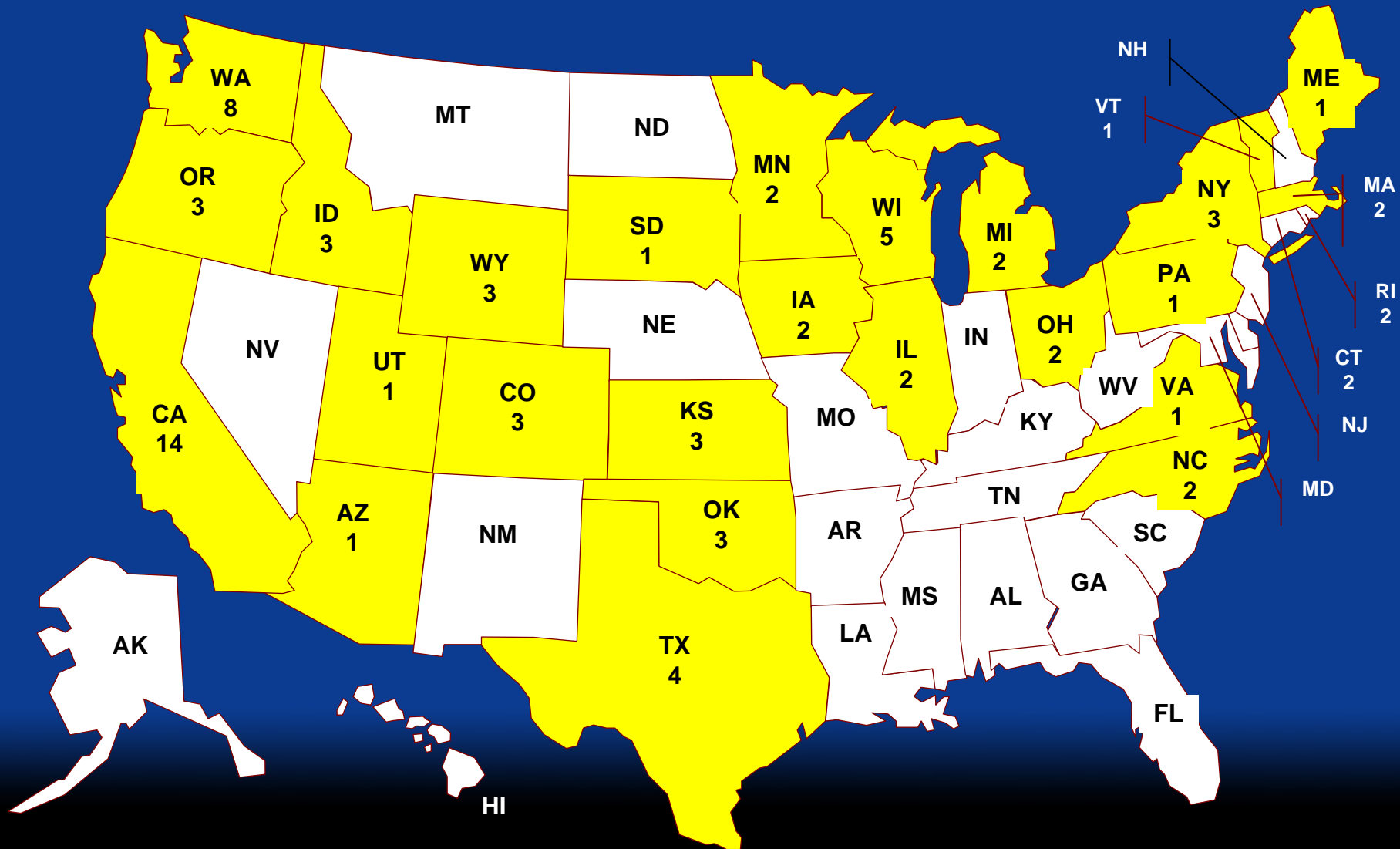
Reports by Year



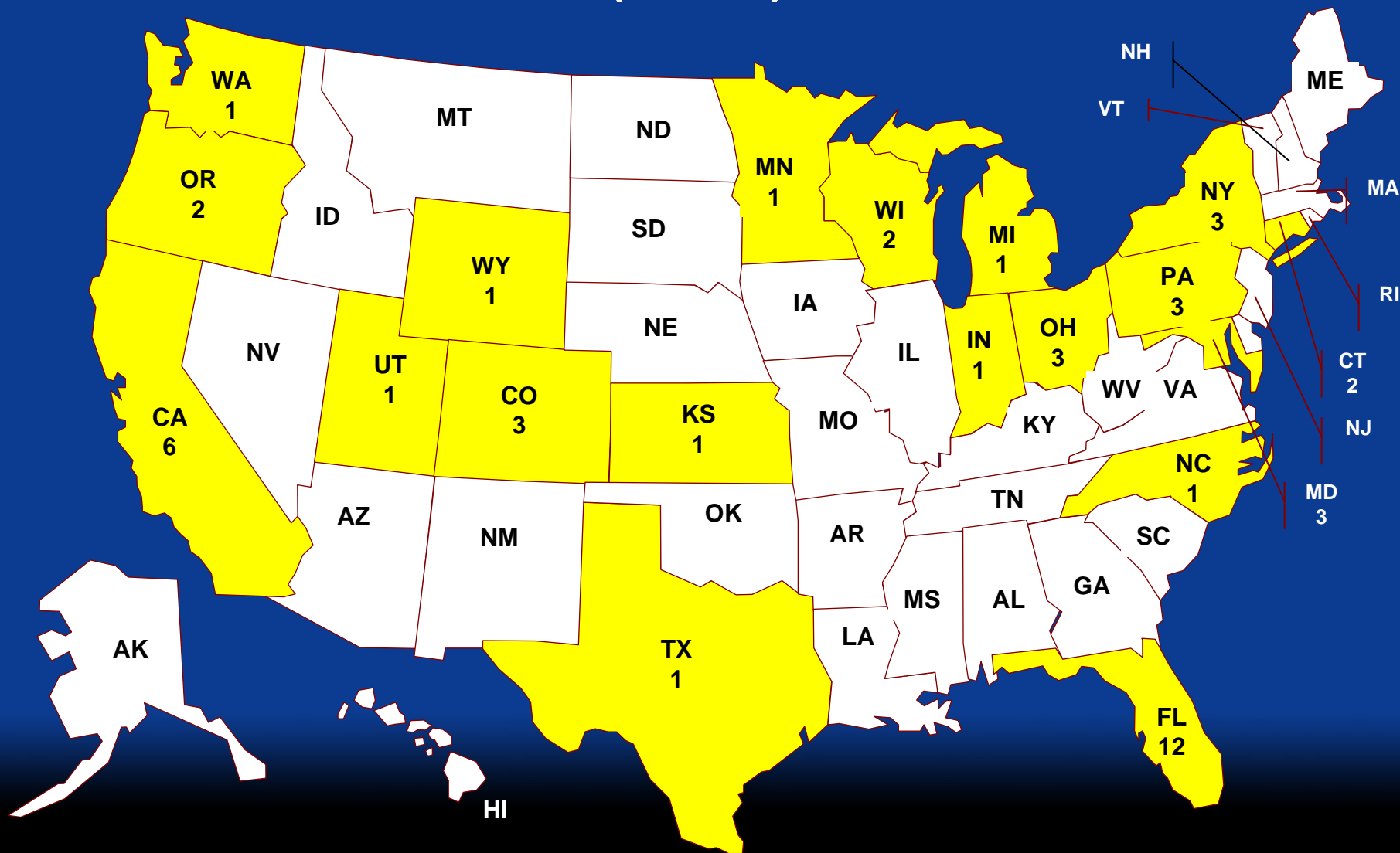
Seasonal Distribution



Unpasteurized product outbreaks, by state — 1993–2006 (N = 73)



Pasteurized product outbreaks, by state — 1993–2006 (N = 48)

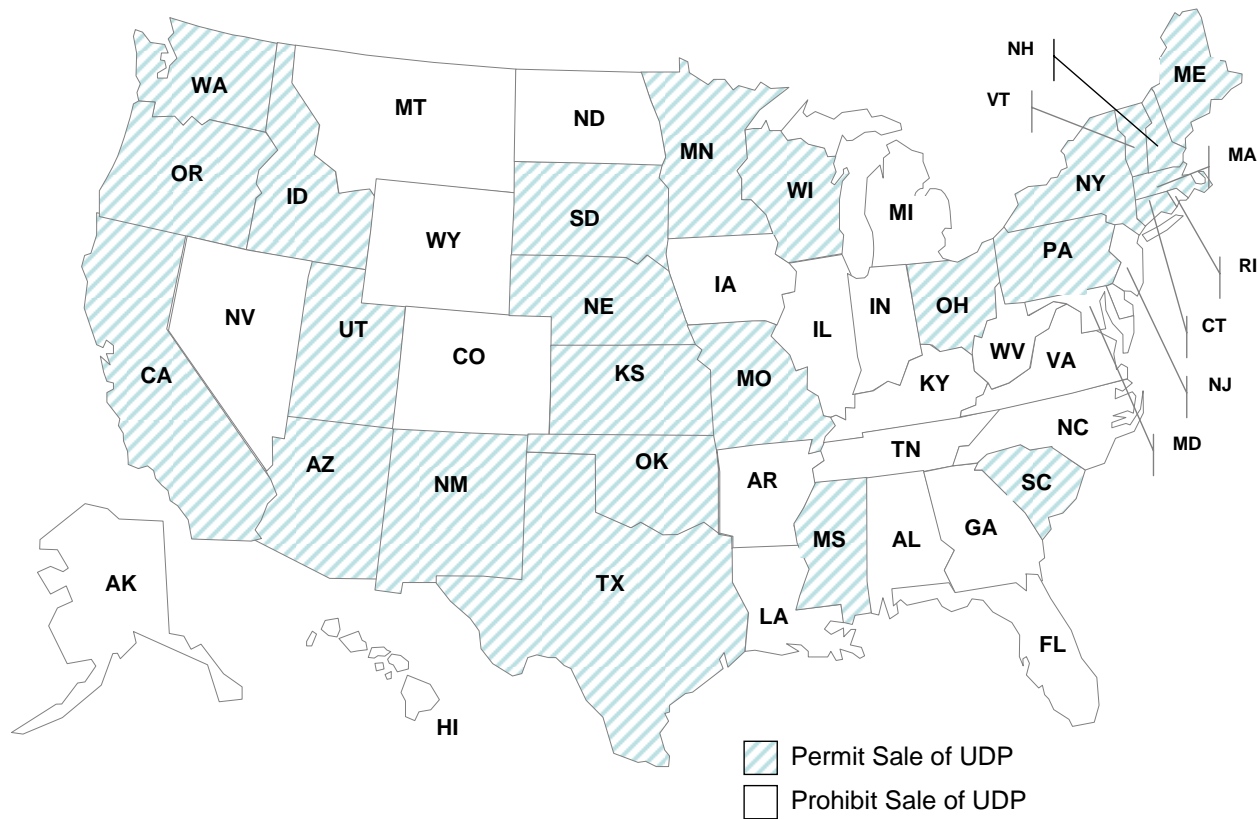


States' Legal Status

- 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

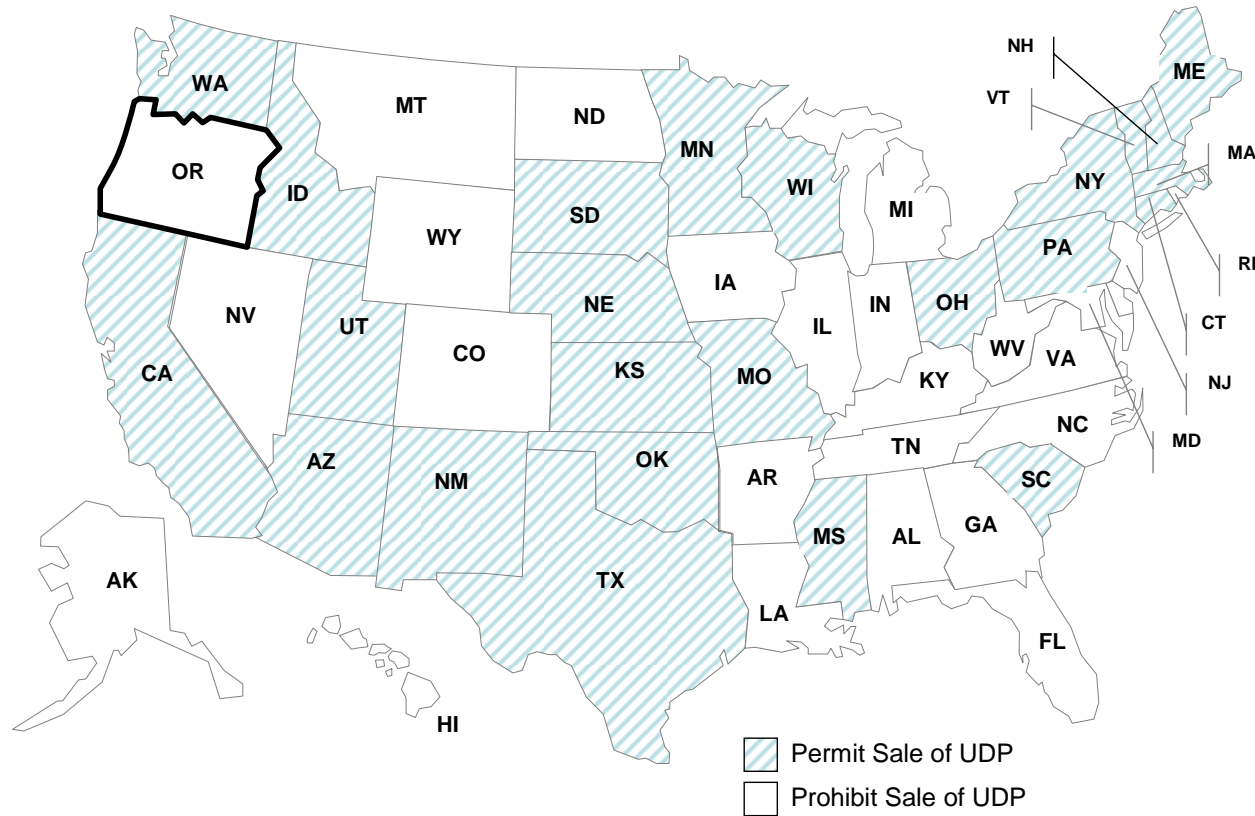
Legal Status — 1993

1993



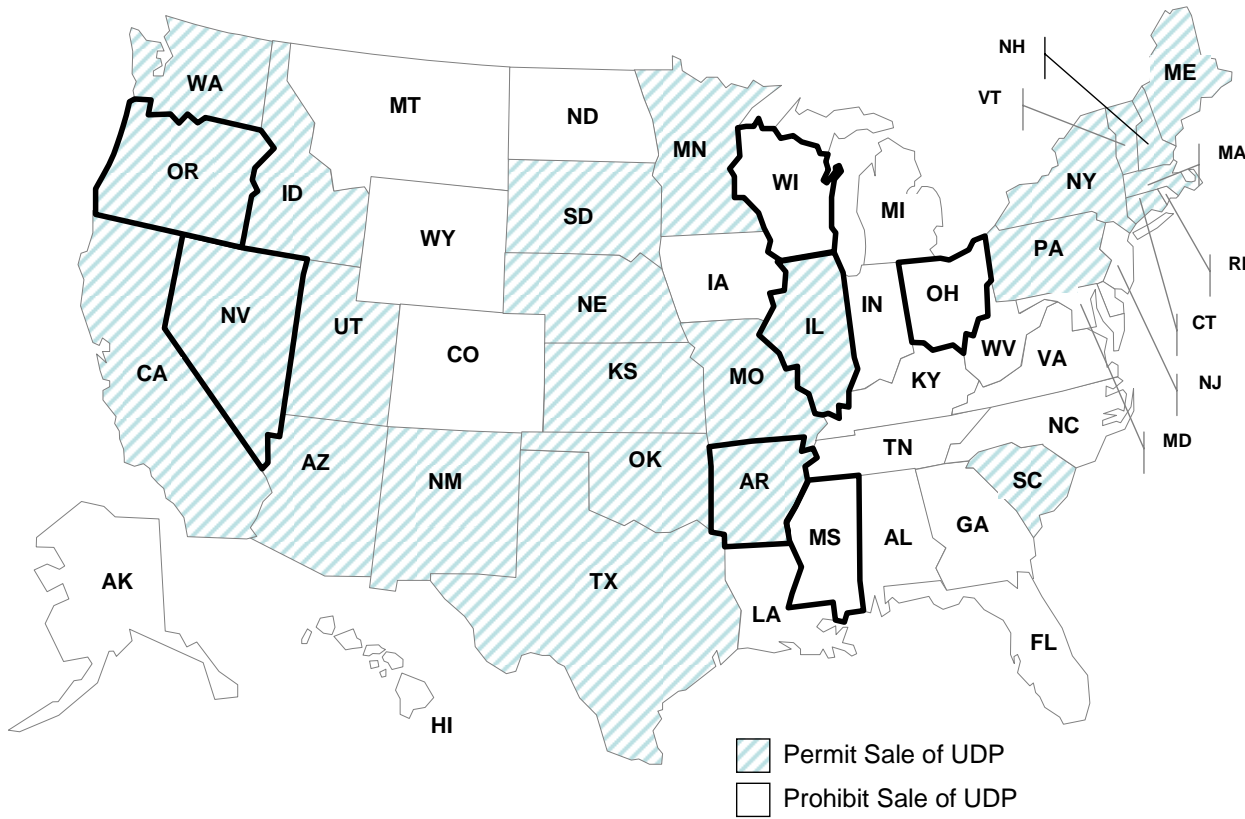
Legal Status — 1999

1999



Legal Status — 2006

2006



Unpasteurized Product Incidence (1993–2006)

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

Sale Permitted

2.2 Billion Person-Years

55 Outbreaks

1016 Cases

Sale Prohibited

1.7 Billion Person-Years

15 Outbreaks

414 Cases

Unpasteurized Product Incidence (1993–2006)

Sale Permitted

$$55 / 2.2\text{B} = 2.50^*$$

$$1016 / 2.2\text{B} = 46.14^*$$

Sale Prohibited

$$15 / 1.7\text{B} = 0.88^*$$

$$414 / 1.7\text{B} = 24.18^*$$

Incidence Density Ratios

$$\text{Outbreaks: } 2.50 / 0.88 = 2.85 \text{ (95\% CI = 1.67–5.20)}$$

$$\text{Cases: } 46.14 / 24.18 = 1.91 \text{ (95\% CI = 1.70–2.14)}$$

* per 100 million person-years

Conclusions

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