Dairy foods involved with few disease outbreaks

Our track record has improved greatly, but we can’t let our guard down. Avoid drinking raw milk.

by Kathryn J. Boor and Ruth N. Zadoks

The Johne’s/Crohn’s question . . .

The ability of current pasteurization conditions to kill Mycobacterium avium subsp. paratuber-
culosus (MAP), the bacterium that causes Johne’s in cattle, is uncertain. MAP has been associated with — but not proven to cause — Crohn’s dis-
ease in humans. Live Mycobacteria have been isolated from pasteurized retail milk in England. Further, current pasteurization conditions will not ensure the complete destruction of some tox-
inus, such as the enterotoxins that may be pro-
duced by Staphylococcus aureus, present in tank
milk on many farms.

On April 12, 2002, the FDA alerted health care professionals about an emerging pathogen, En-
terobacter sakazakii. E. sakazakii can cause sep-
sepsis, meningitis, or necrotizing enterocolitis in new-
borns, and particularly in premature infants, or
others with weakened immune systems.

The FDA has not reported the organism in
E. sakazakii infections among healthy full-term infants in home
settings; nor have illnesses been associated with
liquid infant formulas. But emergence of newly
recognized agents such as E. sakazakii highlights the fact there is a great deal more to be learned about microbes that may be associated with dairy products and other animal-based foods.

Dairy foods appear to be responsible for a rel-
atively small proportion of U.S. foodborne illness
outbreaks. See table.

Most outbreaks were associated with consump-
tion of raw milk products or products contami-
nated by raw milk. Human disease also can result
from close contact with cattle. These outbreaks il-
lustrate the possibility of microbiological hazards
in unpasteurized milk, as well as the need to de-
velop effective interventions to control pathogens
in the farm. Several outbreaks (including some of
those associated with raw milk product con-
sumption) were associated with post-processing
contamination.

The low number of milkborne disease outbreaks is directly credited to application of regulations in the PMO. To illustrate, the 2001 revision of the
PMO states that 25 percent of all disease out-
breaks due to contaminated food and water were
a consequence of consumption of milk products in
1997. Currently, consumption of contaminated
dairy foods is associated with less than 1 percent
of reported outbreaks. This reduction primarily is
possible due to near universal implementation of
pasteurization for fluid milk products in the U.S.
It also reflects the improved health status of our
dairy herds.

What you can do . . .

Here are some main points to reduce risks of
dairy-borne disease:

• To control the spread of dangerous microbes, segregate animals with diarrhea or obvious ill-
ness, including clinical mastitis.

• Use good udder prep practices such as hair removal, washing, drying, and prepping. Keep the milking units clean during use.

• Presence of hair, dirt, and foreign objects on your in-line filters means that you have unwanted bacteria in your milk as well. Be sure to change filters every milking and keep milking equipment sanitized between milkings.

• Replace gaskets and rubber parts, including
inflations, regularly, before they show visible wear. Bacteria can grow in microscopic cracks.

• Be certain to wash hands before eating and
drinking, especially if you’ve been in the barn.
Make sure that children wash hands after visit-
ing the barn or after working with cattle, and
keep them away from sick pens.

• Pasteurize milk, or buy store milk.

Despite the clear link that has been established
between raw milk consumption and foodborne
illnesses, some consumers, including many milk
producers, continue to drink raw milk. Drinking
raw milk is risky behavior that can lead to seri-
ous illness. People are free to make choices, but
they should avoid consuming raw milk or do so
based on informed consent.

M ORE than a century ago, anecdotal obser-
vations that linked milk consumption with
certain diseases spurred scientists and
physicians around the world to investigate milk’s role in foodborne diseases. The Public Health Ser-
vice in 1925, reported that unpasteurized milk was
associated with many serious diseases, in-
cluding diphtheria, typhoid, tuberculosis, and
brucellosis.

The PHS reports provided evidence that control
of milkborne diseases would require sanitation measures all along the food system. The early re-
ports also highlighted need for research to deter-
mine the effectiveness of food processing. This tech-
nical research led to development of specific pas-
teurization strategies. Currently, the public health objective of pasteurization, defined in the 2001 “Grade A Pasteurized Milk Ordinance” (PMO), is to eliminate all nonspore-forming pathogens com-
monly associated with milk.

The PMO serves as the basis for state and local laws regulating milk producers, processors, distri-
butors, and retailers. It is recognized by pub-
lic health agencies and the dairy industry as the
national standard.

In the 1930s and ‘40s, Mycobacterium tubercu-
losis was considered to be the most heat-resis-
tant pathogen associated with milk. There was
extensive research to determine the heat treat-
ment required. In the 1940s and 50s, a signifi-
cant number of Q-fever cases were attributed to
milk. Coxiella burnetii, the causative agent of Q-
fever, was found to be more heat resistant than M. tuberculosis. Thus, there was new research to
define new processing conditions. In 1956, our
current minimum pasteurization temperature and tem-
perature combinations (161°F for 15 seconds or
145°F for 30 minutes) were established.

Some microbes that may be present in raw milk can survive pasteurization. Spore-forming bac-
teria, including those of the Bacillus and Clostrid-
ium genera, are among the heat resistant. Bacil-
lus species can cause milk spoilage, some also can also cause
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Recognized pathogens associated with milk include:

- Brucella abortus
- Salmonella typhi
- Campylobacter jejuni
- Staphylococcus aureus
- Escherichia coli
- Yersinia enterocolitica
- Listeria monocytogenes
- Mycobacterium tuberculosis
- Cryptosporidium parvum

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Outbreaks of foodborne disease associated with dairy products

<table>
<thead>
<tr>
<th>Year</th>
<th>Product and/or source</th>
<th>Organism</th>
<th>Illnesses</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>1985</td>
<td>Mexican-style white cheese, environment</td>
<td>Listeria monocytogenes</td>
<td>145</td>
<td>CA</td>
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<tr>
<td>1995</td>
<td>Mexican-style soft cheese, regularly imported, raw milk suspected</td>
<td>Brucella melitensis</td>
<td>9</td>
<td>TX</td>
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<tr>
<td>1995</td>
<td>Pasteurized 2% milk: postpasteurization contamination</td>
<td>Salmonella Typhimurium</td>
<td>16,000 confirmed; 160,000-plus cases estimated</td>
<td>IL</td>
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<tr>
<td>1992</td>
<td>Imported Irish soft unpasteurized cows' milk cheese</td>
<td>Salmonella Dublin</td>
<td>42</td>
<td>UK</td>
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<tr>
<td>1994</td>
<td>Pasteurized soft cheese cross-contaminated in plant</td>
<td>Salmonella Berta</td>
<td>82</td>
<td>Ont., Can.</td>
</tr>
<tr>
<td>1994</td>
<td>Chocolate milk, poor equipment and sanitation</td>
<td>Listeria monocytogenes</td>
<td>45</td>
<td>E</td>
</tr>
<tr>
<td>1994</td>
<td>Ice cream premix trailers that previously carried unpasteurized raw milk</td>
<td>Salmonella Enteritidis</td>
<td>224,000 (estimate)</td>
<td>MN</td>
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<tr>
<td>1996</td>
<td>Formula dried milk for infants</td>
<td>Salmonella Anatum</td>
<td>19</td>
<td>France, UK</td>
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<tr>
<td>1997</td>
<td>Mexican-style soft cheese (raw milk)</td>
<td>Salmonella Typhimurium DT104</td>
<td>54</td>
<td>WA</td>
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<tr>
<td>1997</td>
<td>Raw milk, contaminated by cows</td>
<td>E. coli O157:H7</td>
<td>6</td>
<td>OR</td>
</tr>
<tr>
<td>1998</td>
<td>Fresh cheese curds, unpasteurized</td>
<td>E. coli O157:H7</td>
<td>55</td>
<td>WI</td>
</tr>
<tr>
<td>2000</td>
<td>Low-fat milk and powdered skim milk; milk past code date</td>
<td>Staphylococcal enterotoxin A, produced by S. aureus</td>
<td>14,700</td>
<td>Japan</td>
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<tr>
<td>2000</td>
<td>Bottled pasteurized milk, possibly post-pasteurization contamination</td>
<td>Yersinia enterocolitica</td>
<td>10</td>
<td>VT, NH</td>
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<tr>
<td>2000</td>
<td>Morbier cheese (unpasteurized)</td>
<td>Salmonella Typhimurium</td>
<td>113</td>
<td>France</td>
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<tr>
<td>2002</td>
<td>Raw milk obtained through cow-lease program</td>
<td>Campylobacter jejuni</td>
<td>5</td>
<td>WI</td>
</tr>
<tr>
<td>2002</td>
<td>Visit to dairy farm with E. coli infected cows and calves</td>
<td>Salmonella Enteritidis</td>
<td>315</td>
<td>PA</td>
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