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Drinking Raw Milk Is Risky Even for Dairy Families

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I drank raw milk as a child and likely most of you who are reading this article did the same. Is your family still drinking raw milk? This article reviews results from several studies that support my belief that it is time to give strong consideration to shifting to pasteurized milk.

Three bacterial species are primarily responsible for foodborne illnesses. Symptoms of foodborne illness can range anywhere from stomach cramps to kidney failure and death. Some people develop arthritis after a foodborne illness. Young children are especially vulnerable to infection with two bacteria that may be transmitted via raw milk - *Salmonella* and *E. coli* O157:H7 - so giving raw milk to children is particularly risky.

1) E. coli O157:H7 is a relatively new pathogen, which was first identified in 1982. It is carried by ruminant animals, requires only a very small number of live bacterial cells to cause an infection, and causes very serious illness, particularly for young children, elderly and persons with weakened immune systems. (Pathogen is the term used for microorganisms that cause illness.)

2) Salmonella bacteria are widespread in many types of animals as well as in water and soil. *Salmonella* infections cause nausea, vomiting, and cramps that usually last for 1-2 days, although the illness may be prolonged under some circumstances.

3) Campylobacter jejuni is often found in healthy cattle, chicken, wild birds and flies. An infection causes diarrhea, cramping, abdominal pain and fever. The illness generally lasts 7-10 days, but relapses are not uncommon. In about 1 out of 1000 *Campylobacter* infections, severe complications, including paralysis result.

The chances are about one in four that raw milk taken from bulk tanks is contaminated with bacteria that can cause foodborne illness.

More than 25% of milk samples collected from bulk tanks on 131 farms in Minnesota-South Dakota had one or more types of bacteria that can cause foodborne illness. The most common pathogenic bacteria were *Campylobacter* (9% of samples), followed by *Salmonella* (6% of samples).

In a study conducted in Tennessee, 2 of 268 milk samples (0.75%) contained *E. coli* O157:H7 bacteria cells.

Even if the contamination rate is low, there is a high probability that a dairy family using milk from the bulk tank will drink contaminated milk over a period of one or two

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Agroterrorism: What You Should Know About Foreign Animal Diseases

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Recently, an incredible amount of media attention has been given to weapons of mass destruction and biological crimes. Biowarfare, the use of biological agents against military personnel, was first documented in 1346 at the Siege of Caffa. The Tarters catapulted plague infected bodies over the walls of the city to infect its residents. With the development of terrorism, numerous bioterrorist incidents have occurred both in the United States and abroad. Bioterrorism is the use of biological agents against civilians. In both biowarfare and bioterrorism, the goal is to inflict human death or incapacity from disease. Agroterrorism is the use of biological agents against livestock or crops. The goal of the agroterrorist is not to inflict human casualties, but to inflict economic damage.

Animal agriculture in the United States is highly vulnerable to an intentional animal disease introduction. In 1991, it was established that the former Soviet Union had weaponized foot-and-mouth disease virus, anthrax, African swine fever, and other "high economic impact" agricultural pathogens. Many animal disease agents are so highly contagious that they do not need to be weaponized to be effective. These diseases could be spread by terrorists with little or no equipment and are hard or impossible to initially detect. The lag time between exposure to disease causing organisms and expression of disease would allow the perpetrator time to escape without detection.

Agriculture today is a global business. The ability to export animals and animal products is based on freedom from highly contagious diseases. Countries like the United States, Canada, and Australia have a marked advantage in world trade because they are relatively disease free. In 2000, U.S. exports of animals and animal products were approximately $5.7 billion. Exports would be drastically diminished if there were an outbreak of Foot and Mouth Disease or Classical Swine Fever (Hog Cholera) in the United States.

Animal disease outbreaks are reported internationally to the Office of International des Epizooties (OIE). The OIE was first established in 1924 to eradicate Rinderpest, the "cattle plague," after World War I. In 1995, the World Trade Organization designated OIE as the international agency responsible for animal agriculture disease reporting. Currently there are 162 member nations in the OIE, including the United States. OIE list A diseases includes agents causing animal diseases that are highly contagious, capable of rapidly spreading across international borders, and having the capacity to inflict catastrophic economic losses and social disruption. The complete OIE list A diseases include, foot-and-mouth disease (FMD), vesicular stomatitis, swine vesicular disease, rinderpest, peste des petits ruminants, contagious bovine pleuropneumonia, lumpy skin disease, Rift Valley fever, blue tongue, sheep and goat pox, African horse sickness, African swine fever, classical swine fever, highly pathogenic avian influenza, and Newcastle's disease. Any of these list A diseases are potential agents of agroterrorism. Foot-and-mouth disease, rinderpest, or contagious bovine pleuropneumonia are three diseases that could potentially be used for agroterror against the dairy industry in the U.S.

Foot-and-mouth disease is a highly contagious viral vesicular disease that affects primarily cloven hoofed domestic animals (cattle, pigs, sheep, goats, and water buffalo), cloven-hoofed wild animals, and several

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other animals that are not cloven-hoofed (hedgehogs, armadillos, nutrias, elephants, rats, and mice). The virus is a member of the genus *Aphthovirus* in the family Picornaviridae. FMD is the most contagious disease of animals and is the most feared disease of the livestock industry. Transmission occurs by direct and indirect contact with infected animals, aerosol spread, and feeding contaminated garbage. FMD is characterized by fever and vesicles (blisters) with subsequent erosions in the mouth, nostrils, muzzle, or teats. Clinical signs include drooling, lameness, decreased feed consumption, and severe drop in milk production. There are 7 serotypes of the virus (A, O, C, Asia 1, and Southern African Territories 1, 2, and 3) and over 60 subtypes. The importance of the subtypes is that a vaccine may have to be tailored to the subtype present in an area to be effective. Consequently, there is not a single vaccine that is effective for all strains of FMD virus. The disease is normally not fatal to adult animals, but will affect virtually every animal in the herd. Control of the disease depends on movement restrictions, slaughter of infected animals, carcass destruction, disinfection, and potentially vaccination.

Rinderpest, the "cattle plague," is a highly contagious viral disease of cattle, domestic buffalo, and some species of wildlife. Rinderpest virus is a member of the genus *Morbillivirus* and the family Paramyxoviridae. It is immunologically related to canine distemper virus, human measles virus, peste des petits ruminants virus, and marine mammal morbilliviruses. Rinderpest is an Asian disease brought to Europe and subsequently Africa during colonization. It has caused virtually millions of deaths of African wildlife. Clinical signs include fever, depression, oral erosions, salivation, congested mucous membranes, diarrhea, dehydration, with subsequent prostration and death. Morbidity and mortality are high in susceptible animals. Transmission is by direct and indirect (contaminated ground, water, equipment, clothing) contact with infected animals. Only one serologic strain of rinderpest virus exists, but field strains vary widely in virulence. There is an effective vaccine, and eradication of this disease in domestic animals is possible. Control measures include movement restrictions, slaughter, and vaccination.

Contagious Bovine Pleuropneumonia (CBPP) is a highly infectious acute, subacute, or chronic disease, primarily of cattle, affecting the lungs and occasionally the joints. It is caused by the mycoplasma organism *Mycoplasma mycoides mycoides.* It was eradicated in the United States in 1893 following control measures created by the Bureau of Animal Industries, the precursor to USDA's Animal and Plant Health Inspection Service. CBPP primarily affects animals in the genus Bos; both bovine and zebu cattle. In general, European breeds are more susceptible than indigenous African breeds. In zoos, the infection has been recorded in bison and yak. Transmission is by inhalation of infected droplets from an infected, coughing animal. Relatively close contact is required for transmission to occur, so confinement of animals increases the likelihood of transmission. Clinical signs include fever, depression, arthritis, and decreased feed consumption followed by coughing and evidence of thoracic pain. As the pneumonia progresses, the animals become increasingly dyspneic. The mortality rate ranges from 10 to 70 percent. Successful control of CBPP relies on removal of susceptible animals from any possible contact with CBPP infected animals. Testing, slaughter, and quarantine are the methods of choice during an outbreak.

Agroterrorism and incursions of foreign animal diseases into the U.S. is a real threat. OIE list A diseases are the most likely candidates for terrorism, because of their ability to spread quickly before they are detected. For more information on foreign animal diseases, the United States Animal Health Association (USAHA) has published *Foreign Animal Diseases "The Gray Book.* It is available on the USAHA web site: http://www.usaha.org . The livestock industry must maintain vigilance in the detection and prevention of foreign animal diseases if our international markets are to remain open.

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years. If we assume that a family removes a pitcher of raw milk from the bulk tank 300 times per year and that 1% of the time their bulk tank is positive for pathogenic bacteria such as *E. coli* O157:H7, it is almost certain that at least one of those pitchers will contain *Salmonella*, *E. coli* O157:H7 or other pathogenic bacteria.

For generations families on dairy farms have routinely drunk raw milk from their bulk tank without any concern. In comparison the rest of the U.S. population is rarely exposed to raw milk.

In a 1999 survey conducted by South Dakota State University, 60% of dairy producers in that region reported that they consumed raw milk. It is likely that a significant percentage of people who work on dairy farms also consume raw milk.

27% of the South Dakota dairy families who consumed raw milk had one or more species of harmful bacteria detected in their bulk tank milk.

The Centers for Disease Control and Prevention (CDC) surveyed 12,000 people, a sample of the entire US population, in 1998-99 and found that more than 3% of them had consumed raw or unpasteurized milk in the past week, including 2% of the children who were between 1 and 10 years old. These children (1-10 years of age) are at the highest-risk of contracting milk-borne illnesses.

Media reports emphasize outbreaks of meat associated foodborne illnesses but raw milk and raw milk cheeses are relatively common as a source of foodborne illnesses.

Between 1973 and 1992, there were 1,733 reported cases of illness that were linked to raw milk. It is likely that these reported cases represent only the 'tip of the iceberg' since about one of every twenty cases of foodborne illness is reported to health departments. Thus, the actual number of illnesses associated with raw milk during that 20 year period may be as high as 35,000.

Changes in the dairy industry that have encouraged herd expansion and congregation of cows from numerous sources have made drinking raw milk more risky than it used to be on smaller farms.

The larger the size of the dairy the greater the chance that at least one cow in the herd will be shedding bacteria that can cause illness.

A study in Tennessee found that about 2% of cull dairy cattle tested positive for *E. coli* O157:H7 and 2% tested positive for *Salmonella*. If you are milking 6 cows, it is unlikely that one of them will be positive for *Salmonella* or *E. coli* O157:H7. If you are milking 600 cows, about 24 of those cows are likely to test positive for one of the pathogens that may be shed in milk. Sometimes the milk from infected cows will be diluted in the bulk tank to a point that the raw milk will not cause an infection. However, there are bacteria such as *E. coli* O157:H7 that have a very low infectious dose (in other words, it takes only a few *E. coli* O157:H7 cells to result in an infection). For these bacteria, depending on dilution to prevent infection is a risky venture.

In a large dairy there is usually a greater importation rate of new cattle, which increases the risk of introducing new pathogens to the herd and into the milk.

Although I drank raw milk as a child, I strongly urge you to choose pasteurized milk for yourself and to serve your family and guests. Also, encourage those who work on the dairy to use pasteurized milk rather than raw milk. If you wish to pasteurize your own milk, heat the milk to 145°F and hold it at that temperature for 30 minutes or heat to 161°F for 15 seconds.

Western Dairy News *is published as a service to the people interested in the health and welfare of the western dairy industry. Archives of this publication may be found at http://animalscience-extension.tamu.edu/dairy/wdn/wdn.html*

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