Public Health Service
DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention (CDC)

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To: State and Territorial Epidemiologists
State Public Health Veterinarians

The Ongoing Public Health Hazard of Consuming Raw Milk

The purpose of this letter is to provide state and territorial public health officials with information and resources on the risks of consuming raw milk and other unpasteurized dairy products. Please distribute this letter to those involved with raw milk issues in your state and territory, and to others who have an interest in this important public health issue.

The role of raw milk and other unpasteurized dairy products in the transmission of infectious diseases is well documented. Pasteurization is the process of heating milk to a high enough temperature for a long enough time to kill disease-causing bacteria. Raw milk was recognized as a source of severe infections over 100 years ago, and pasteurization of milk to prevent these infections is one of the public health triumphs of the 20th century. Human pathogens such as *Escherichia coli* O157, *Campylobacter jejuni*, and *Salmonella* can contaminate milk during the milking process because they are shed in the feces of healthy-looking dairy animals, including cows and goats. Infection with these pathogens can cause severe, long-term consequences, such as hemolytic uremic syndrome, which can result in kidney failure, and Guillain-Barré syndrome, which can result in paralysis. These infections are particularly serious in those who are very young, very old, or who have impaired immune systems. They can even be fatal.

Adherence to good hygienic practices during milking can reduce, but not eliminate, the risk of milk contamination. Pasteurization is the only way to ensure that fluid milk products do not contain harmful bacteria. In order to be pasteurized, milk is legally required to meet the Grade A standard for cleanliness. Routine pasteurization of milk began in the 1920s and became widespread in the United States by 1950 as a means to reduce contamination and resulting illness. This led to dramatic reductions in diseases previously associated with milk. Many public health experts consider pasteurization to be one of public health's most effective food safety interventions. Pasteurization is recommended for all animal milk consumed by humans by the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the American Academy of Pediatrics, the American Academy of Family Practitioners, the American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and many other medical and scientific organizations.

In 1987, the FDA prohibited the distribution of raw milk over state lines for direct sale to consumers. Despite the federal ban on sale of raw milk across state lines and broad use of

pasteurization by the dairy industry, human illness and outbreaks associated with consumption of unpasteurized products continue to occur. Raw milk is still available for sale in many states, and CDC data shows that the rate of raw milk-associated outbreaks is higher in states in which the sale of raw milk is legal than in states where sale of raw milk is illegal.

Among dairy product-associated outbreaks reported to CDC between 1973 and 2009 in which the investigators reported whether the product was pasteurized or raw, 82% were due to raw milk or cheese. From 1998 through 2009, 93 outbreaks due to consumption of raw milk or raw milk products were reported to CDC. These resulted in 1,837 illnesses, 195 hospitalizations, and 2 deaths. Most of these illnesses were caused by *Escherichia coli*, *Campylobacter*, or *Salmonella*. It is important to note that a substantial proportion of the raw milk-associated disease burden falls on children; among the 93 raw dairy product outbreaks from 1998 to 2009, 79% involved at least one person younger than 20 years old.

A study released by CDC in February 2012 examined the impact of laws preventing raw milk sales on the number of dairy outbreaks in the United States during 1993—2006. Three-quarters of the outbreaks reported occurred in states where the sale of raw milk was legal at the time. Experts also found that those sickened in raw milk outbreaks were 13 times more likely to be hospitalized than those who got ill from pasteurized milk during an outbreak. States that allow the legal sale of raw milk for human consumption have more raw milk-related outbreaks of illness than states that do not allow raw milk to be sold legally.

To protect the health of the public, state regulators should continue to support pasteurization and consider further restricting or prohibiting the sale and distribution of raw milk and other unpasteurized dairy products in their states.

CDC has a recently updated raw milk website that contains useful information and materials, including a list of relevant publications and other scientific resources on illnesses associated with raw milk consumption. This information can be shared with persons involved in foodborne outbreak investigations and the regulation of unpasteurized dairy products.

Sincerely,

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Raw Milk Resources

- **RESOURCES FOR CONSUMERS**
  - CDC: Food Safety and Raw Milk
    - http://www.cdc.gov/foodsafety/rawmilk/raw-milk-index.html
    - http://www.cdc.gov/foodsafety/rawmilk/raw-milk-videos.html
    - http://www2c.cdc.gov/podcasts/player.asp?f=8622941
  - FDA: Consumer Information About Milk Safety
    - http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/ConsumerInformationAboutMilkSafety/default.htm
  - FoodSafety.gov
    - http://www.foodsafety.gov/keep/types/milk/index.html
  - Real Raw Milk Facts
    - http://www.realrawmilkfacts.com/
- **RESOURCES FOR PUBLIC HEALTH OFFICIALS**
  - Selected MMWR Articles
    - CDC. Notes from the Field: *Salmonella* Newport infections associated with consumption of unpasteurized milk --- Utah, April--June 2010. MMWR Morb Mortal Wkly Rep 2010;59;817-818. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5926a6.htm?s_cid=mm5926a6_w
    - CDC. *Campylobacter jejuni* infection associated with unpasteurized milk and cheese--Kansas, 2007. MMWR Morb Mortal Wkly Rep 2009;57:1377-1379. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5751a2.htm
    - CDC. *Escherichia coli* 0157:H7 infections in children associated with raw milk and raw colostrum from cows---California, 2006. MMWR Morb Mortal Wkly Rep 2008;57:625-628. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5723a2.htm
    - CDC. Outbreak of multidrug-resistant *Salmonella enterica* serotype Newport infections associated with consumption of unpasteurized Mexican-style aged cheese--Illinois, March 2006---April 2007. MMWR Morb Mortal Wkly Rep 2008;57:432-435. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5716a4.htm
    - CDC. *Salmonella* Typhimurium Infection Associated with Raw Milk and Cheese Consumption --- Pennsylvania, 2007. MMWR Morb Mortal Wkly Rep 56;1161-1164. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5644a3.htm
    - CDC. *Escherichia coli* O157:H7 Infection Associated with Drinking Raw Milk --- Washington and Oregon, November--December 2005. MMWR Morb Mortal Wkly Rep 56;165-167. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5608a3.htm
    - CDC. Multistate Outbreak of *Salmonella* Serotype Typhimurium Infections Associated with Drinking Unpasteurized Milk --- Illinois, Indiana, Ohio, and Tennessee, 2002—2003. MMWR Morb Mortal Wkly Rep 52;613-615. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5226a3.htm

- CDC. Outbreak of *Campylobacter jejuni* Infections Associated with Drinking Unpasteurized Milk Procured through a Cow-Leasing Program --- Wisconsin, 2001. MMWR Morb Mortal Wkly Rep 51;548-549. http://198.246.98.21/mmWR/preview/mmwrhtml/mm5125a2.htm
- CDC. Outbreak of Listeriosis Associated With Homemade Mexican-Style Cheese --- North Carolina, October 2000--January 2001. MMWR Morb Mortal Wkly Rep 50;560-2. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5026a3.htm
- CDC. Outbreak of *Escherichia coli* O157:H7 Infection Associated With Eating Fresh Cheese Curds --- Wisconsin, June 1998. MMWR Morb Mortal Wkly Rep 49;911-3. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4940a3.htm
- CDC. *Campylobacter* Outbreak Associated with Certified Raw Milk Products--California. MMWR Morb Mortal Wkly Rep. 1984;33(39):562. http://www.cdc.gov/mmwr/preview/mmwrhtml/00000412.htm
- CDC. Campylobacteriosis Associated with Raw Milk Consumption – Pennsylvania. MMWR Morb Mortal Wkly Rep. 1983;32;337-8,344. http://www.cdc.gov/mmwr/preview/mmwrhtml/00000104.htm

- Selected Publications (available online and through research libraries)
  - Langer AJ, Ayers T, Grass J, Lynch M, Angulo FJ, Mahon BE. Nonpasteurized dairy products, disease outbreaks, and state laws-United States, 1993-2006. Emerging infectious diseases. Mar 2012;18(3):385-391.
  - MacDonald PD, Whitwam RE, Boggs JD, et al. Outbreak of listeriosis among Mexican immigrants as a result of consumption of illicitly produced Mexican-style cheese. Clin Infect Dis. 2005 Mar 1;40(5):677-82.
  - Villar RG, Macek MD, Simons S, et al. Investigation of multidrug-resistant *Salmonella* serotype Typhimurium DT104 infections linked to raw-milk cheese in Washington State. JAMA. 1999 May 19;281(19):1811-6.
  - Headrick ML, Korangy S, Bean NH, et al. The epidemiology of raw milk-associated foodborne disease outbreaks reported in the United States, 1973 through 1992. Am J Public Health. 1998 Aug;88(8):1219-21.
  - Altekruse SF, Timbo BB, Mowbray JC, Bean NH, Potter ME. Cheese-associated outbreaks of human illness in the United States, 1973 to 1992: sanitary manufacturing practices protect consumers. J Food Prot. 1998 Oct;61(10):1405-7.
  - Fishbein DB, Raoult D. A cluster of *Coxiella burnetii* infections associated with exposure to vaccinated goats and their unpasteurized dairy products. Am J Trop Med Hyg. 1992 Jul;47(1):35-40.

- Position Statements by National Organizations
  - National Environmental Health Association Position Statement http://www.neha.org/position_papers/position_raw_milk.htm
  - American Association of Public Health Veterinarians http://www.dairy.state.nv.us/Position%20Statements/PUBLIC%20HEALTH%20VETERINARIAN%20COALITION%20COMMITTEE.pdf
  - American Veterinary Medical Association Position Statement http://www.avma.org/issues/policy/milk.asp
  - American Medical Association (AMA) – Page 144 http://www.ama-assn.org/ad-com/polfind/Hlth-Ethics.pdf

        - International Association for Food Protection Position Statement http://dairy.state.nv.us/Position%20Statements/International%20Association%20for%20Food%20Protection%20position%20statement%20Final.pdf
        - National Conference on Interstate Milk Shipments http://www.ohiodairyvets.org/wp-content/uploads/2007/08/ncims-raw-milk-resolution.pdf

    - FDA Health Education Materials
        - Educator's Toolkit on Preventing Listeriosis in Hispanic Populations (in English and Spanish) http://www.fda.gov/Food/ResourcesForYou/HealthEducators/ucm062993.htm
        - Food Safety for Moms-to-Be Educator's Toolkit with section on Listeriosis (in English and Spanish) http://www.fda.gov/Food/ResourcesForYou/HealthEducators/ucm081785.htm
        - Moms-to-Be video (with *Listeria* information section in English and Spanish) http://www.fda.gov/Food/ResourcesForYou/HealthEducators/ucm089619.htm
        - Food Fact sheet on the Dangers of Raw Milk (in English and Spanish) http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm079516.htm

    - Abuela Project http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1508756

- **RESOURCES FOR HEALTH CARE PROVIDERS**
    - American Academy of Pediatrics Committee on Infectious Diseases. Appendix VIII. Prevention of Disease From Potentially Contaminated Food Products Red Book.; 2009: 857-859. [Subscription Required] http://aapredbook.aappublications.org/cgi/content/full/2009/1/6.8