U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta GA 30329-4027

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To: State and Territorial Epidemiologists
State Public Health Veterinarians

The Ongoing Public Health Hazard of Consuming Raw (Unpasteurized) 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 or jurisdiction, 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 pathogens is well documented. Pasteurization is the process of heating milk to a high enough temperature for a long enough time to kill disease-causing pathogens. 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. Disease-causing pathogens such as *Brucella abortus, Campylobacter jejuni*, *Coxiella burnetii, Cryptosporidium*, *Shiga toxin-producing Escherichia coli*, *Listeria monocytogenes,* and *Salmonella* species can contaminate milk during the milking process because they are shed in the feces or milk of healthy animals, including cows and goats. Human infection with some of these pathogens can cause severe illness with long-term consequences, such as hemolytic uremic syndrome, which can result in kidney failure, and Guillan-Barré syndrome, which can result in paralysis. Children aged less than 5 years, adults aged 65 years or older, people with weakened immune systems[1], and pregnant women are at particular risk for severe outcomes or death.

Adherence to good hygienic practices during the milking process can reduce, but not eliminate, the risk of milk contamination. Pasteurization is the only way to ensure that fluid milk and products made from it do not contain harmful pathogens. Routine pasteurization of milk from healthy cows in a hygienic setting began in the 1920s and became widespread in the United States by 1950 as a means to reduce contamination and resulting illness. Pasteurization led to dramatic reductions in many diseases previously associated with milk and is recommended for all animal milk consumed by people 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.

Citing the "significant health risk" it posed, in 1987, the FDA prohibited the distribution of raw milk across state lines for direct sale to consumers. This regulation did not, however, prohibit the intrastate (within the borders) sale of raw milk intended for human consumption. Despite the federal ban on interstate sale of raw milk, human illness and outbreaks associated with consumption of unpasteurized

[1] CDC. People at Risk - People with Weakened Immune Systems. https://www.cdc.gov/listeria/risk-groups/weakened-immunity.html

products continue to occur, especially as raw milk sales increase. Raw milk is available for sale in many states, and CDC data show that the rate of raw milk-associated outbreaks is 2.2 times higher in states where the sale of raw milk is legal compared with states where sale of raw milk is illegal.
A published analysis of outbreaks that occurred during 2007–2012 reported the following:

- Eighty-one outbreaks of infections due to consumption of raw milk were reported, resulting in 979 illnesses, 73 hospitalizations, and no deaths.
- Most outbreak-related illnesses were caused by *Campylobacter,* Shiga toxin-producing *E. coli,* or *Salmonella*, pathogens that are carried by healthy animals, including cattle.
- The number of outbreaks increased during this time, from 30 in 2007–2009 to 51 in 2010–2012.
- Eighty-one percent of outbreaks were reported from states where the sale of raw milk was legal in some form (e.g., on-farm, retail, cow-shares); only 19% occurred in states where the sale of raw milk was illegal.
- A substantial proportion of the raw milk–associated disease burden fell on children; 59% of outbreaks involved at least one young child (aged <5 years).

The reported outbreaks represent only the tip of the iceberg. Many more outbreaks have been reported since then including an outbreak of listeriosis linked to interstate sale of raw milk which resulted in one death, and multiple *Brucella abortus* vaccine strain RB51 infections in humans associated with use of vaccinated cows for production of raw milk. For every outbreak and illness that is reported, many others occur that are not reported; the actual number of illnesses associated with raw milk and raw milk products is likely much greater than that reported in outbreaks.

To protect the health of the public, we recommend that public health officials and regulatory authorities 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's recently updated raw milk website https://www.cdc.gov/foodsafety/rawmilk/raw-milk-index.html contains useful information and materials, including publications and other resources on illnesses linked to raw milk consumption. Some resources are reproduced in the attachment. Please share this information with your staff involved in foodborne disease outbreak investigations and regulation of dairy products.

Sincerely,

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Attachment: Raw milk resources

- Boor KJ, Wiedmann M, Murphy S, Alcaine S. A 100-Year Review: Microbiology and safety of milk handling, Journal of Dairy Science. 2017; 100 (12): 9933-9951. https://doi.org/10.3168/jds.2017-12969.
- Davis, B.J.K.; Li, C.X; Nachman, K. E. (2018, June 1). A literature review of the risks and benefits of consuming raw and pasteurized cow's milk [website]. https://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/_pdf/research/clf_reports/RawMilkMDJohnsHopkinsReport2014_1208_.pdf
- Robinson, TJ, Scheftel JM, Smith KE. Raw Milk Consumption among Patients with Non-Outbreak-related Enteric Infections, Minnesota, USA, 2001-2010. Emerging Infectious Diseases. Jan 2014; 20 (1) 38-44.
- Buzby, JC, Gould LH, Kendall ME, Jones TF, Robinson T, Blayney DP. Characteristics of Consumers of Unpasteurized Milk in the United States. Journal of Consumer Affairs, Spring 2013; 47(1):153-166.
- 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.
- Signs KA, Stobierski MG, Gandhi TN. Q Fever Cluster Among Raw Milk Drinkers in Michigan, 2011, Clin Infect Dis. 2012; 55(10): 1387–1389. https://doi.org/10.1093/cid/cis690
- Lejeune JT, Rajala-Schultz PJ. Unpasteurized Milk: A Continued Public Health Threat. Clin Infect Dis. 2009; 48(1): 93-100.
- Gould LH, Mungai E, Barton Behravesh C. Outbreaks Attributed to Cheese: Differences Between Outbreaks Caused by Unpasteurized and Pasteurized Dairy Products, United States, 1998–2011. Foodborne Pathog Dis. 2014 Epub, ahead of print.

- Position Statements by National Organizations
  - American Academy of Pediatrics
    - http://pediatrics.aappublications.org/content/early/2013/12/10/peds.2013-3502
  - National Environmental Health Association Position Statement
    - https://www.neha.org/sites/default/files/publications/position-papers/NEHA_Policy_Statement_Raw_Milk_0.pdf
  - American Association of Public Health Veterinarians
    - http://www.marlerclark.com/images/uploads/about_ecoli/PUBLIC_HEALTH_VETERINARIAN_COALITION_COMMITTEE.pdf
  - American Veterinary Medical Association Position Statement
    - https://www.avma.org/KB/Policies/Pages/Raw-Milk.aspx
  - Texas Pediatric Society
    - https://txpeds.org/sites/txpeds.org/files/documents/Raw-Milk-One-Pager.pdf
  - Food Fact Sheet on the Dangers of Raw Milk (in English and Spanish)
    - http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm079516.htm
    - FDA Milk Guidance Documents & Regulatory Information https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/Milk/default.htm

Resources for Health Care providers

- American Academy of Pediatrics Committee on Infectious Diseases. Appendix VI: Prevention of Infectious Disease From Contaminated Food Products. Red Book
  - https://redbook.solutions.aap.org/chapter.aspx?sectionId=189640283&bookId=2205&resultClick=1#192305310

Raw Milk Resources

Resources for Consumers

- CDC: Food Safety and Raw Milk
  - https://www.cdc.gov/foodsafety/pdfs/raw-milk-infographic2-508c.pdf
  - http://www.cdc.gov/foodsafety/rawmilk/raw-milk-index.html
  - http://www.cdc.gov/foodsafety/rawmilk/raw-milk-videos.html
  - http://www.cdc.gov/Features/RawMilk/

- FDA: Consumer Information about Milk Safety
  - http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm079516.htm
  - http://www.fda.gov/Food/FoodborneIllnessContaminants/BuyStoreServeSafeFood/ucm341249.htm
- FoodSafety.gov: http://www.foodsafety.gov/keep/types/milk/index.html
- Real Raw Milk Facts: http://www.realrawmilkfacts.com/
- Pregnant Women and Children: http://realrawmilkfacts.com/PDFs/Consumption-of-Raw-Milk-by-Pregnant-Women-Children.pdf

Resources for Public Health Officials

- Selected MMWR Articles
  - Cossaboom CM, Kharod GA, Salzer JS, et al. Notes from the Field: Brucella abortus Vaccine Strain RB51 Infection and Exposures Associated with Raw Milk Consumption — Wise County, Texas, 2017. MMWR Morb Mortal Wkly Rep 2018;67:286. DOI: http://dx.doi.org/10.15585/mmwr.mm6709a4.
  - Rosenthal, M., Pedersen, R., Leibsle, S., Hill, V., Carter, K., Roellig, D. M., Centers for Disease Control and Prevention (CDC) (2015). Notes from the field: cryptosporidiosis associated with consumption of unpasteurized goat milk - Idaho, 2014. MMWR. Morbidity and mortality weekly report, 64(7), 194-5. https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6407a9.htm
  - CDC. Notes From the Field: Recurrent Outbreak of *Campylobacter jejuni* Infections Associated with a Raw Milk Dairy – Pennsylvania, April-May 2013. MMWR Morb Mortal Wkly Rep 2013;34;702-702. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6234a4.htm?s_cid=mm6234a4_w
  - 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
  - McGuill M, Matyas B, Werner B, DeMaria A. Mass Treatment of Humans Who Drank Unpasteurized Milk from Rabid Cows -- Massachusetts, 1996-1998. https://www.cdc.gov/mmwr/preview/mmwrhtml/00056759.htm
- For additional MMWR articles and other publications
  - http://www.cdc.gov/foodsafety/rawmilk/raw-milk-publications.html
- Selected Publications (available online and through research libraries)
  - Mungai EA, Behravesh C, Gould L. Increased Outbreaks Associated with Nonpasteurized Milk, United States, 2007–2012. Emerg Infect Dis. 2015;21(1):119-122. https://dx.doi.org/10.3201/eid2101.140447