

# POLICY STATEMENT

Consumption Recommendations for Raw Milk to Minimize Dairy Associated Foodborne Illness | Updated May 2019



## INTRODUCTION

Despite the well-established health risk of foodborne illness, the consumption of unpasteurized milk and dairy products persists due to the perceived health benefits of raw milk compared to pasteurized dairy products<sup>1-5</sup>. Although many of these health claims continue to be largely unsubstantiated, they have fueled a debate concerning access, safety, and benefits of raw milk products that continues throughout the State of Wisconsin and many other states throughout the country<sup>1-3,6</sup>. Therefore, in order to provide the public with accurate information, Public Health Madison and Dane County (PHMDC) reviewed and evaluated the relevant scientific literature to assess the potential impact to individual and community health derived from the consumption of unpasteurized milk products. This document is regularly reviewed to provide a brief overview of the status of public concerns and an overview of the scientific literature.

## BACKGROUND

### Foodborne disease risk

Unpasteurized milk products have been repeatedly shown as vehicles for the transmission of foodborne pathogens<sup>2,7-9</sup>. In the United States, diarrheal diseases derived from the ingestion of enteropathogens including *Campylobacter* spp, *Escherichia coli*, and/or *Salmonella* spp (including multi-drug resistant strains) are the most common illnesses associated with contaminated raw milk products. These diseases are characterized by diarrhea, abdominal cramps, fever, nausea, and vomiting and may lead to hospitalization due to dehydration<sup>10-12</sup>. Additional diseases that have been acquired by the consumption of raw milk products include tuberculosis (*Mycobacterium* spp.), diphtheria (*Corynebacterium diphtheriae*), and febrile diseases such as listeriosis (*Listeria monocytogenes*) and brucellosis (*Brucella* spp.)<sup>7,12</sup>. Although these pathogens can impact anyone that consumes raw milk, they are especially dangerous to pregnant women, children, the elderly, and individuals with weakened immune systems<sup>1,3,5,13</sup>. However, young children are especially at risk from disease outbreaks from raw milk products; approximately 60% of outbreaks reported outbreaks involved children five years old or younger<sup>9</sup>.

During 2007 through 2012, a total of 81 outbreaks associated with the consumption of raw milk were reported to the Centers for Disease Control and Prevention (CDC) from 26 states resulting in 979 illnesses and 73 hospitalizations; over 80% of these outbreaks were caused by *Campylobacter* spp<sup>9</sup>. In comparison, 73 outbreaks associated with raw milk products (46 from fluid milk and 27 from cheese) were reported in the United States from 1993 through 2006; resulting in the risk of outbreak at least 150

times greater than pasteurized dairy products<sup>14</sup>. The majority of these outbreaks occurred in states where it is legal to sell raw milk products but can also impact neighboring states as well<sup>9, 14, 15</sup>.

## Pasteurization and comparison to raw milk products

Pasteurization is the process of heating the raw milk to specified high temperature and time period combinations in order to kill potentially harmful microorganisms that may be present in the milk product<sup>1-3</sup>. Proponents of raw milk consumption argue that this process greatly reduces the health and nutritional benefit of the milk product compared to the raw product; however, these repeated claims have not been substantiated scientifically<sup>1, 3, 5, 16</sup>. The CDC and the United States Food and Drug Administration (US FDA) both report that health and nutritional comparisons between pasteurized and unpasteurized milk products have not demonstrated any meaningful differences with the exception of the reduced risk of disease due to the pasteurization process<sup>3, 5</sup>. The process of pasteurization is recommended by the US FDA, USDA, CDC, the American Academy of Pediatrics, the American Veterinary Medical Association, and several other medical and scientific organizations due to the significant reduction of disease risk<sup>5</sup>.

The changes in milk products that have been noted due to pasteurization are negligible and do not reduce the nutritional benefit<sup>3, 5, 16</sup>. These changes impact six constituents of milk with known nutritional benefits; specifically, three vitamins (thiamine, B<sub>12</sub>, and C), calcium, protein, and fat. None of the vitamin losses exceed 10% and due to the fact that milk is not considered a major source of thiamine, B<sub>12</sub>, and vitamin C these minor changes are not considered nutritionally important. Losses in calcium, protein, and fat are equally minor; approximately 6% of available calcium is rendered insoluble in the pasteurized milk product and an estimated 1% of protein is lost to coagulation. The major effect to fat content is the slight disaggregation of the fat globules<sup>16, 17</sup>. None of the above changes impact the bioavailability of these nutrients<sup>3, 5, 16, 18</sup>. Additional nutritional value of pasteurized milk products is derived from fortification of these products with additional nutrients such as vitamins A and D thereby increasing the health benefits of the product<sup>19</sup>.

## Regulation of raw milk products

Since 1987, federal regulation (21 CFR 1240.61) prohibits the interstate sale of raw milk in final packaged form that is intended for human consumption. However, the legality of intrastate sale of raw milk products is decided at the state level; the result is a patchwork of regulation that ranges from total prohibition of sale to complete legalization dependent upon the state in question<sup>3, 5</sup>. In the state of Wisconsin, the sale of raw milk is prohibited with the exception of incidental sales directly to consumers at the location where the milk is produced and the consumption of raw milk by families and workers from their own livestock; all regularly scheduled and large quantity sales must be pasteurized under current regulatory legislation<sup>20-22</sup>.

## SUMMARY AND RECOMMENDATIONS

Despite the availability of pasteurized milk products a demand for raw milk persists, regardless of legality. The research has clearly demonstrated the historical and continuing disease risk from raw milk consumption, as well as, the reduction of this risk derived from pasteurization. Research has also demonstrated that the perceived health benefit of the consumption of raw milk products in comparison to pasteurized products is unsubstantiated. Therefore, based upon this and other information presented above, PHMDC does not support the sale and consumption of raw milk.

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## REFERENCES

1. LeJeune, J.T. and Rajala-Schultz, P.J. (2009). Unpasteurized milk: A continued public health threat. *Food Safety*, 48. 93 – 100.
2. Headrick, ML, Korangy, S, Bean, NH, Angulo, FJ, Altekruise, SF, Potter, ME, & Klontz, KC. (1998). The epidemiology of raw milk – associated foodborne disease outbreaks reported in the United States, 1973 through 1992. *American Journal of Public Health*, 88(8), 1219-1221.
3. United States Food and Drug Administration (US FDA). (2011). Questions and answers: raw milk. Retrieved on May 15, 2019 from: <https://www.fda.gov/food/buy-store-serve-safe-food/raw-milk-questions-answers>
4. Jay-Russell, M.T. (2010). Raw (unpasteurized) milk: Are health conscious consumers making an unhealthy choice? *Clinical Infectious Diseases*, 51(12), 1418 -1419.
5. The Centers for Disease Control and Prevention (CDC). (2017). Raw milk: Questions and answers. Retrieved on May 15, 2019 from: <https://www.cdc.gov/foodsafety/rawmilk/raw-milk-questions-and-answers.html>
6. Oliver, S.P., Boor, K.J., Murphy, S.C., and Murinda, S.E. (2009). Food safety hazards associated with consumption of raw milk. *Foodborne Pathogens and Disease*, 6(7), 793 – 804.
7. Harrington, P, Archer, J, Davis, JP, Croft, DR, & Varma, JK. (2002). Outbreak of *Campylobacter jejuni* infections associated with drinking unpasteurized milk procured through a cow-leasing program – Wisconsin, 2001. *Morbidity and Mortality Weekly Report*, 51(25), 548-549

8. Jayarao, B.M., Donaldson, S.C., Straley, B.A., Sawant, A.A., Hegde, N.V., and Brown, J.L.(2006). A survey of foodborne pathogens in bulk tank milk and raw milk consumption among farm families in Pennsylvania. *Journal of Dairy Science*, 89, 2451 – 2458.
9. Mungia, E.A., Behravesh, C.B., and Gould, L.H. (2015). Increased outbreaks associated with non-pasteurized milk, United States, 2007 – 2012. *Emerging Infectious Diseases*, 21(1), 119 – 122.
10. Peterson, MC. (2005). *Campylobacter jejuni* enteritis associated with consumption of raw milk. *Journal of Environmental Health*, 65(9), 20-21
11. Lind, L, Reeser, J, Stayman, K, Deasy, M, Moll, M, Weltman, A, et al. (2007). *Salmonella typhimurium* infection associated with raw milk and cheese consumption – Pennsylvania, 2007. *Morbidity and Mortality Weekly Report*, 56(44), 1161-1164.
12. Heyman, DL. (2008). Control of communicable diseases manual (19<sup>th</sup> ed.). Washington, DC: American Public Health Association.
13. Schmidt, R.H. and Davidson, P.M. (2009). International Association for Food Protection (IAFP) position statement: Milk pasteurization and the consumption of raw milk. Retrieved on May 15, 2019 from:  
[http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKewib7tHCuZ7iAhUPLa0KHRA\\_D5UQFjAAegQIABAC&url=http%3A%2F%2Fdairy.nv.gov%2Fsafety%2FInternational\\_Association\\_for\\_Food\\_Protection%2F&usg=AOvVaw1Tbbn1XwkSUfVIqITdmoEE](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKewib7tHCuZ7iAhUPLa0KHRA_D5UQFjAAegQIABAC&url=http%3A%2F%2Fdairy.nv.gov%2Fsafety%2FInternational_Association_for_Food_Protection%2F&usg=AOvVaw1Tbbn1XwkSUfVIqITdmoEE)
14. Langer, A.J., Ayers, T., Grass, J., Lynch, M., Angulo, F.J., and Mahon, B.F. (2012). Nonpasteurized dairy products, disease outbreaks, and state laws – United States, 1993 – 2006. *Emerging Infectious Diseases*, 18(3), 385 – 391.
15. Centers for Disease Control and Prevention (CDC). (2017). Outbreak studies. Retrieved on May 20, 2019 from: <https://www.cdc.gov/foodsafety/rawmilk/rawmilk-outbreaks.html>
16. Potter, ME, Kaufmann, AF, Blake, PA. & Feldman, RA. (1984), Unpasteurized milk. *Journal of the American Medical Association*, 252(15), 2048-2052.
17. Lucey, J.A. (2015). Raw milk consumption: Risks and benefits. *Nutrition and Food Science*, 50(4), 189 – 193.
18. Andersson, I. and Öste, R. (1994). Nutritional quality of pasteurized milk. Vitamin B<sub>12</sub>, folate, and ascorbic acid content during storage. *International Dairy Journal*, 4(2), 161 – 172.
19. Centers for Disease Control and Prevention (CDC). (2018). Fortified cow’s milk and alternatives. Retrieved on May 20, 2019 from: <https://www.cdc.gov/nutrition/infantandtoddlernutrition/foods-and-drinks/cows-milk-and-milk-alternatives.html>
20. State of Wisconsin Department of Agriculture, Trade, and Consumer Protection. (n.d.). Raw milk. Retrieved on May 21, 2019 from: [https://datcp.wi.gov/Pages/Programs\\_Services/RawMilk.aspx](https://datcp.wi.gov/Pages/Programs_Services/RawMilk.aspx)

21. State of Wisconsin. (2019). Wisconsin Statute. Chapter 91 – Food, lodging, and recreation. Retrieved on May 21, 2019 from: <https://docs.legis.wisconsin.gov/statutes/statutes/97.pdf>

22. State of Wisconsin. (2016). Wisconsin Rule. Chapter ATCP 65 – Milk and milk products. Retrieved on May 21, 2019 from: <https://docs.legis.wisconsin.gov/code/register/2016/728B/insert/atcp65>