

Raw Milk in Context[†]

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Most milk consumed in the United States today is pasteurized and homogenized, and comes from large commercial dairies. Raw milk, on the other hand, is obtainable almost exclusively from small-scale family farms using sustainable and organic methods. Technologically, pasteurization is a more intensive process by which a food is heated to a temperature that kills most pathogens. Pasteurization of fluid milk has been required in the United States for about 100 years, and its widespread adoption brought great reductions in infant mortality rates.¹ Depending on the state, raw milk sales in this country are

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¹ Pasteurization was not the only reason for the decline in infant mortality. Better sanitation and a shift from cans and dippers to sterilizable bottles also contributed to a clean milk supply. See HARVEY A. LEVENSTEIN, *REVOLUTION AT THE TABLE: THE TRANSFORMATION OF THE AMERICAN DIET* 134 (1988).

limited to on-farm sales from small farms, limited to milk from “certified” farms, available only through “cow sharing,” or simply illegal. Consumers who prefer raw milk from pasture-fed cows, however, are convinced that it is nutritionally superior to pasteurized milk and that it confers immunological advantages.

I grew up in Corvallis, Oregon, which was then a small university town. There were farms not too far away, but I did not live on a farm, nor did any of my relatives. The milk we all drank came from Sunny Brook Dairy,² which had a plant right over on Ninth Street; the milk was pasteurized and homogenized. In the 1960s, it was actually delivered to the doorstep in glass bottles with paper lids. If not, it came from a grocery store, but it was local milk, bottled in town. Like most people my age, I learned about Louis Pasteur in school, and believed most of my life that in the 1860s he was trying to find a way to keep milk from spoiling. Pasteur’s work actually had nothing to do with milk; rather, he was trying to find a way to keep wine and beer from spoiling.³ Beverage processors at the time already knew that heating the beverage would keep it from spoiling, but the reason was not clear. Pasteur determined that heating the beverage was effective because it killed bacteria.

Readers who are my parents’ age (or anyone who grew up on a farm with cows) may have drunk milk that was not pasteurized. My mother recalls that when her family switched to pasteurized milk, they did not like the taste and thought it “yucky.” In either case, however, most people in this country today grew up drinking milk in one form or another. And most of us accepted without question the notion that milk is necessary for health.⁴ Until one of my students chose to write a paper about “raw milk,” I had never even thought about the possibility that non-pasteurized milk might still be available.

The purpose of this Essay is to explore the societal forces that resulted in the transition from small, low tech, labor intensive raw

² Sunnybrook Dairy opened in 1921. *Agricultural Developments*, CITY OF CORVALLIS, <http://www.ci.corvallis.or.us/index.php?option=content&task=view&id=194&Itemid=149> (last updated Jan. 7, 2003). In 1910, “dairying was the largest single local agricultural industry locally.” *Id.*

³ See DAVID E. GUMPert, *THE RAW MILK REVOLUTION: BEHIND AMERICA’S EMERGING BATTLE OVER FOOD RIGHTS* 44–45 (2009).

⁴ See MARVIN HARRIS, *GOOD TO EAT: RIDDLES OF FOOD AND CULTURE*, 130–31 (1985) (explaining how the author grew up believing milk was “an elixir, a beautiful white liquid manna”).

milk to the commercially produced pasteurized homogenized, often low-fat milk available in grocery stores today. My goal is to shine the spotlight on the changes in society that created an apparent need for increasing the use of technology that became available at the turn of the twentieth century. The current tensions surrounding raw milk—and the adoption of technology and industrialization in milk production during the past century and a half—highlight changes in fundamental farming practices. There is a great tension in this area between corporate agriculture and private farms. But in the case of raw milk, and I suspect, other agricultural products, a changing society came first. Raw milk seems to be getting a lot of attention now. The issue is hot—everyone interested in it seems passionately entrenched on one side or the other.⁵ In this Essay I do not take a side.⁶ Rather, I attempt to trace the transition from generally accepted raw milk to almost universally accepted pasteurization.

As it turns out, social changes preceded the technology that made this shift possible, and social pressures compelled a policy choice of embracing pasteurization. This is a useful starting point for thinking about change. Rather than merely trying to choose one level of technology or another, advocates for change would benefit from working at a deeper, more fundamental social level to change the very forces that make technology and industrialization often seem like the obvious choice.

This Essay begins by describing the current legal status of non-pasteurized milk and the controversy that surrounds it. Parts II and III then look back to where we've been. Part II adds a brief history of milk drinking in general, while Part III explores the social changes that led to adoption of pasteurization. In Part IV, I acknowledge there are no clear answers and identify areas ripe for further research.

⁵ See, e.g., Bill Marler, *Raw Milk Cons: Review of the Peer-Reviewed Literature*, MARLER BLOG (June 28, 2008), <http://www.marlerblog.com/lawyer-oped/raw-milk-cons-review-of-the-peer-reviewed-literature/>; Weston A. Price Found., *Raw Milk: What the Scientific Literature Really Says—A Response to Bill Marler, J.D.*, <http://www.realmilk.com/documents/ResponsetoMarlerListofStudies.pdf> (last visited Mar. 23, 2011). While both of these websites cite studies and present a wealth of information, I have tried to find other sources to support the statements I make so as not to base my Essay on either side. I hold the Marler Clark firm in the highest esteem, and do not mean by this to imply any disregard for their excellent work on behalf of food poisoning victims and on the safety of our food supply in general.

⁶ I do have some biases, however. While I do not drink milk myself, pasteurized or raw, I believe consumers should have access to products and information. I also question our tendency to use technological kill steps, such as pasteurization, to make up for unsafe processing.

I

**ARGUMENT AND REGULATION:
THE MILK DEBATE IN THE TWENTY-FIRST CENTURY**

This Part describes the most common arguments about raw milk.⁷ Most of the debate is about the safety of non-pasteurized milk. Proponents also claim health benefits for raw milk, and these claims are controversial as well.

A. *The Risks of Raw Milk*

Both the U.S. Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC) discourage the public from consuming raw milk.⁸ What follows is merely a description, not an endorsement of information provided on the agency websites. According to the CDC, raw milk can be contaminated with bacteria that can cause serious illness leading to hospitalization and even death.⁹ The very composition of milk, which makes it such a nutritious food for humans, makes it a great medium for bacteria growth. Milk is like a petri dish used in a biology class to grow bacteria cultures. The nutrient-rich nature of milk also allows for the cheese- and yogurt-making processes to be possible. Both of those foods are created using bacteria that finds a wonderful environment to grow in milk.¹⁰ The bacteria have all the nutrients needed in order to multiply exponentially. Depending on which

⁷ Most of the material in this Part is drawn from a student research paper by Nicolas J. Allyn, *Balancing Consumer Choice and Consumer Safety: The Raw Milk Debate*, Food Law and Policy Seminar, William Mitchell College of Law (2010) (on file with author).

⁸ See *Questions and Answers: Raw Milk*, FOOD AND DRUG ADMIN., <http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/ucm122062.htm> (last updated Mar. 26, 2010); *The Dangers of Raw Milk: Unpasteurized Milk Can Pose a Serious Health Risk*, FOOD AND DRUG ADMIN., <http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm079516.htm> (last updated Jan. 27, 2011); *Food Safety and Raw Milk*, CTRS. FOR DISEASE CONTROL AND PREVENTION, <http://cdc.gov/foodsafety/rawmilk/raw-milk-index.html> (last update Jan. 26, 2011). These websites are designed for a lay audience and do not provide citations to studies that would back up their claims. This lack of citation has given raw milk proponents ammunition to accuse the regulatory agencies of basing their positions on unsubstantiated conventional wisdom about the risks of unpasteurized milk.

⁹ *Raw Milk Questions and Answers*, CTRS. FOR DISEASE CONTROL AND PREVENTION, http://cdc.gov/food_safety/rawmilk/raw-milk-questions-and-answers.html (last updated Jan. 25, 2011).

¹⁰ David B. Fankhauser, *Beginning Cheese Making*, UNIV. OF CINCINNATI CLERMONT COLL. BIOLOGY, http://biology.clc.uc.edu/fankhauser/Cheese/Cheese_course/Cheese_course.htm (last modified Dec. 6, 2010).

bacteria are present, the result is spoiled milk, delicious cheddar cheese, or contamination that can cause serious illness in someone who consumes the milk.

Some of the possibly harmful bacteria that milk can harbor are “*Brucella*, *Campylobacter*, *Listeria monocytogenes*, *Mycobacterium bovis*, *Salmonella*, *E. coli* O157:H7,¹¹ *Shigella*, *Streptococcus pyogenes*, and *Yersinia enterocolitica*.”¹² These pathogens can cause a wide range of symptoms ranging from mild abdominal discomfort to possible death.

According to the CDC, only three percent of food-borne outbreaks in 2006 were related to the consumption of both pasteurized and unpasteurized milk, but seventy-one percent of those milk-related outbreaks were attributed to raw milk consumption.¹³ Additionally, the FDA reported that from 1998 to 2008 raw milk consumption was to blame for eighty-five food-borne illness outbreaks that represented more than 1600 separate incidents of illness.¹⁴ The FDA has also stated that food-borne illnesses are underreported, so the incidence of illness resulting from raw milk consumption could be greater than reported. Of the 1614 reported individual illnesses, there were 187 hospitalizations and 2 deaths.¹⁵

To put these numbers in context, illnesses associated with raw milk represent a very small percentage of total food-related outbreaks, so it is somewhat surprising that raw milk draws so much attention. As noted, raw milk consumption was associated with about seventy-one

¹¹ Milk can also harbor *Escherichia (E.) coli* O157:H7, a rare and harmful type of *E. coli* found in the fecal matter of many animals. Normally *E. coli* O157:H7 causes gastroenteritis in humans that can range in severity. Sometimes, however, the consequences are worse. The *E. coli* O157:H7 bacteria can produce a large amount of toxins that attack the lining of the intestine and cause further complications. The bacteria can also cause hemolytic uremic syndrome, which usually affects both the very young and elderly victims. Hemolytic uremic syndrome destroys red blood cells and can lead to permanent loss of kidney function and death. BAD BUG BOOK: FOODBORNE PATHOGENIC MICROORGANISMS AND NATURAL TOXINS HANDBOOK: *ESCHERICHIA COLI* O157:H7, FOOD AND DRUG ADMIN., <http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm071284.htm>.

¹² *Raw Milk Questions and Answers*, *supra* note 9.

¹³ LT Ayres et al., *Surveillance of Foodborne Outbreaks—United States, 2006*, 58 CDC MMWR WEEKLY 609 (2009), available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5822a1.htm> (last visited Apr. 12, 2011).

¹⁴ Press Release, Food and Drug Admin., Public Health Agencies Warn of Outbreaks Related to Drinking Raw Milk (Mar. 26, 2010), available at <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm206311.htm>.

¹⁵ *Id.*

percent of dairy related outbreaks, but only a small percentage of the population—about one to three percent—drinks or has contact with raw milk. So the rate of outbreaks is presumably higher among consumers of raw milk than for consumers of pasteurized milk. But the total rate of illness associated with raw milk consumption is relatively low: one percent of the U.S. population is about 3.1 million people.¹⁶ Between 3 and 9 million people drink raw milk, and over ten years, there were approximately 1600 illnesses. At 160 illnesses per year for every 6 million people (to take the midpoint), that comes out to about 1 out of every 5000 people.¹⁷

A 1998 study concluded that forty of the forty-six reported outbreaks attributed to raw milk between 1973 and 1998 came from states that allowed the sale of raw milk to consumers.¹⁸ The study's authors concluded that easier access to raw milk contributed to a higher incidence of illness, and that illness could have been prevented in some cases if the state had not permitted intrastate sale of raw milk to consumers.¹⁹ The CDC and the FDA have used the epidemiological outbreak data to conclude that while both pasteurized and unpasteurized milk present the risk of illness, pasteurizing milk limits consumer exposure to harmful bacteria.²⁰

The CDC states that “[m]ilk and products made from milk need minimal processing, called pasteurization, which can be done by heating the milk briefly (for example heating it to 161°F for about 20 seconds), to kill disease-causing germs (e.g., *Salmonella*, *Escherichia coli* O157, *Campylobacter*) that can be found in raw milk.”²¹ The website also notes, however, that adding chemicals to the milk can also eliminate disease-causing organisms, but it continues on to conclude that pasteurization is the *best* way to provide safe milk.

The FDA tells a similar story on an attractive website called “FOOD FACTS: The Dangers of Raw Milk: Unpasteurized Milk Can

¹⁶ The U.S. population is 310,930,305 as of March 4, 2011. Population Clock, U.S. CENSUS BUREAU, <http://www.census.gov/main/www/popclock.html> (last visited Apr. 12, 2011). One percent is therefore about 3.1 million people.

¹⁷ If one to three percent of the population drinks raw milk, that's 3.1 to 9.3 million people. Those who choose to drink raw milk must make an extra effort to get it. Perhaps this explains the attention paid to this product.

¹⁸ Marcia L. Headrick et al., *The Epidemiology of Raw Milk-Associated Foodborne Disease Outbreaks Reported in the United States, 1973 Through 1992*, 88 AM. J. PUBLIC HEALTH 1219, 1220 (1998).

¹⁹ *See id.*

²⁰ *See id.*

²¹ *Food Safety and Raw Milk*, *supra* note 8.

Pose a Serious Health Risk.”²² Because the information is provided for a lay audience, it does not provide citations to studies that would support its assertions that “raw milk can harbor dangerous microorganisms that can pose serious health risks to you and your family. . . . [H]armful bacteria can seriously affect the health of anyone who drinks raw milk, or eats foods made from raw milk. However, the bacteria in raw milk can be especially dangerous to **pregnant women, children, the elderly, and people with weakened immune systems.**”²³

A more useful source of information about the hazards associated with raw milk is Real Raw Milk Facts, a website designed to address “the complex issues surrounding raw milk science and policy” and to provide “evidence-based” studies and presentations on raw milk.²⁴ Real Raw Milk Facts is not a government site or an industry promotion. But it does have a very clear position—raw milk is dangerous. The site provides listings of outbreaks, case histories, and lists of articles purportedly addressing raw milk or pasteurization issues.

B. Purported Benefits of Raw Milk

Proponents argue that the pasteurization process significantly lessens the dietary value of milk.²⁵ The FDA asserts that any changes are not nutritionally significant.²⁶ Regardless of the FDA’s position, some vitamins that are naturally occurring in milk are degraded.²⁷

²² *The Dangers of Raw Milk*, *supra* note 8.

²³ *Id.* (emphasis in original). The emphasis on the danger to those with weakened immune systems is interesting because it hearkens back to a debate about the cause of infection that was going on near the end of Pasteur’s life: is infection “caused” by bad bugs, or is it “caused” by failure of the body’s own natural defenses? See DAVID E. GUMPert, *THE RAW MILK REVOLUTION* 45–46 (2009) (describing the debate in Pasteur’s time between theories about microbes versus milieu).

²⁴ REAL RAW MILK FACTS, <http://www.realrawmilkfacts.com/about-us/> (last visited Apr. 12, 2011).

²⁵ *Fresh, Unprocessed (Raw) Whole Milk: Safety, Health and Economic Issues*, REAL MILK, <http://www.realmilk.com/rawmilkoverview.html> (last visited Apr. 12, 2011). The FDA calls this a “myth” and states that “[t]here is no meaningful nutritional difference between pasteurized and raw milk,” Press Release, FDA, FDA and CDC Remind Consumers of the Dangers of Drinking Raw Milk (Mar. 1, 2007), available at <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2007/ucm108856.htm>.

²⁶ *Id.*

²⁷ See P. WESTRAL ET AL., *DAIRY TECHNOLOGY: PRINCIPLES OF MILK PROCESSING* 192, tbl.6.1 (1999). Even the CDC website alludes to this: “Heat slightly affects a few of the vitamins found in milk—thiamine, vitamin B12, and vitamin C—but milk is only a minor source of these vitamins.” Food Safety and Raw Milk, *supra* note 8.

Pasteurization can lower the amount of vitamin B and vitamin C by up to twenty percent, depending on the pasteurization process.²⁸ Pasteurization can also break down the whey protein by ten to eighty percent—again, depending on the type of process used.²⁹ Raw milk advocates argue that milk contains bacteria inhibitors that naturally protect raw milk from bacterial contamination and that pasteurization kills those inhibitors.³⁰ Furthermore, lactic acid has itself been studied as a possible biological preservative because of its inhibitory effect on bacteria.³¹ Studies have shown that pasteurization destroys immunoglobulin domains or antibodies that are designed to attack bacteria known to affect cows.³² In opposition, the FDA and the CDC have concluded that there are no inherent anti-bacterial properties in raw milk.³³

In addition to higher levels of naturally occurring vitamins, raw milk provides other health benefits, according to its proponents. Raw milk drinkers may be less prone to childhood asthma and allergies.³⁴ Proponents of unpasteurized milk widely cite a 2005 European study conducted using Steiner School children who live an anthroposophic lifestyle, which restricts the use of antibiotics and vaccines.³⁵ The study concluded that “consumption of farm milk [(raw milk)] may offer protection against asthma and allergy. A deepened

²⁸ P. WESTRAL ET AL., *supra* note 27 at 193.

²⁹ Damian C. Adams, Michael T. Olexa, Tracey L. Owens, & Joshua A. Cossey, *Deja Moo: Is the Return to Public Sale of Raw Milk Udder Nonsense?*, 13 DRAKE J. AGRIC. L. 305, 311 (2008).

³⁰ See generally WILLIAM C. DOUGLAS & AAJONUS VONDERPLANITZ, SUPPLEMENTAL REPORT IN FAVOR OF RAW MILK (2001), available at <http://www.karlloren.com/aajonus/p15.htm> (presented to members of the Los Angeles County Board of Supervisors during a 2001 vote that successfully allowed for the sale of raw milk certified by the state of California to be sold in Los Angeles County retail stores).

³¹ See, e.g., W. H. Holzapfel, R. Geisen & U. Schillinger, *Biological Preservation of Foods with Reference to Protective Cultures, Bacteriocins and Food-Grade Enzymes*, 24 INT’L J. OF FOOD MICROBIOLOGY 343 (1995).

³² Damian C. Adams et al., *supra* note 29, at 311. See also *Frequently Asked Questions*, ORGANIC PASTURES, <http://www.organicpastures.com/faq.html> (website of a raw milk dairy in California) (“Tests privately performed at [Organic Pastures Dairy Company] (BSK labs) showed that even when these pathogens were added to OPDC raw milk at extremely high levels (7 logs) they would not grow and die off. . .”).

³³ See *The Dangers of Raw Milk: Unpasteurized Milk Can Pose a Serious Health Risk*, *supra* note 7; *Raw Milk Questions and Answers*, *supra* note 9.

³⁴ See FDA and CDC Bias Against Raw Milk, *infra* note 50.

³⁵ See M. Waser et al., *Inverse Association of Farm Milk Consumption with Asthma and Allergy in Rural and Suburban Populations Across Europe*, 37 CLINICAL & EXPERIMENTAL ALLERGY 661 (2006).

understanding of the relevant protective components of farm milk and a better insight into the biological mechanisms underlying this association are warranted as a basis for the development of a safe product for prevention.”³⁶

The heating process also has an adverse effect on the taste of milk because of what is known as the Maillard reaction. When milk is heated during the pasteurization process, the lactose in the milk reacts with amino acids and the reaction changes the flavor of the milk.³⁷ Also, pasteurized milk sold at retail tends to be homogenized, which also changes the texture of the milk because the fat molecules have been reduced in size so that they will stay suspended in the milk liquid.³⁸ If milk is not homogenized, then the milk fat floats to the top and a consumer would have to shake the container in order to disperse the milk fat. Raw milk advocates also attribute some of the health benefits of raw milk to non-homogenized milk. Homogenization is not directly related to pasteurization, but homogenization and pasteurization do become intertwined in many arguments in support of raw milk consumption.

C. The Regulatory Landscape

Federal regulations provide standards of identity for many foods. These standards essentially are requirements that a product must meet in order to bear the name of the food. There is such a standard of identity for “milk.” Federal regulations³⁹ provide in part that “milk” that is “in final package form for beverage use shall have been

³⁶ *Id.* at 661.

³⁷ Adams et al., *supra* note 29, at 310–11.

³⁸ *Homogenization of Milk and Milk Product*, UNIVERSITY OF GUELPH, <http://www.foodsci.uoguelph.ca/dairyedu/homogenization.html> (last visited Apr. 12, 2011).

³⁹ 21 C.F.R. §131.110(a) (2011) (“Milk is the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows. Milk that is in final package form for beverage use shall have been pasteurized or ultrapasteurized, and shall contain not less than 8 ¼ percent milk solids not fat and not less than 3 ¼ percent milkfat. Milk may have been adjusted by separating part of the milkfat therefrom, or by adding thereto cream, concentrated milk, dry whole milk, skim milk, concentrated skim milk, or nonfat dry milk. Milk may be homogenized.”) The standard goes on to provide rules for addition of vitamins A and D, optional flavoring agents, and so on. 21 C.F.R. § 310.110(b)–(e). Colostrum or “first milk” is a lacteal secretion that contains antibodies and minerals produced shortly after birth of an animal and prior to production of actual milk. See Animal and Plant Health Inspection Service (APHIS), *APHIS Info Sheet: Colostrum Feeding*, USDA APHIS (Dec. 2002), http://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairy02/Dairy02_is_Colostrum.pdf.

pasteurized or ultrapasteurized.”⁴⁰ Federal regulations such as this one apply to goods sold in interstate commerce. Accordingly, milk sold in interstate commerce must be pasteurized. This is not true, however, of some cheeses. For example, the standard for “brick cheese” states that “[i]f the dairy ingredients used are not pasteurized, the cheese is cured at a temperature of not less than 35°F for at least 60 days.”⁴¹

Milk that is not “in final package form for beverage use” may be transported unpasteurized.⁴² Such milk would be intended for use as an ingredient in something that would be pasteurized in a later processing step, or possibly for use in an aged cheese, such as the brick cheese mentioned above.

The most interesting aspects of milk regulation are state and local rules. The FDA only has jurisdiction over interstate food commerce. States, on the other hand, may adopt their own rules for commerce within their borders. The rules vary widely from state to state. Most states have adopted some form of the Grade “A” Pasteurized Milk Ordinance (PMO).⁴³ The PMO is a standardized and detailed administrative and technical guide that provides regulators, producers and processors a common platform for milk production. The PMO defines the accepted processes used in milk production, inspection, processing, and packaging to the minutest detail.⁴⁴ Administratively, in order to market milk as Grade “A,” all links in the production chain must possess permits from the regulatory agency in the jurisdiction in question.⁴⁵ Any entity in the supply chain that handles milk without a permit does so unlawfully, except for retailers who do not produce milk.⁴⁶ In other words, traditional retailers such as supermarkets and

⁴⁰ 21 C.F.R. § 131.110(a).

⁴¹ *Id.* § 133.108(a)(1) (defining brick cheese).

⁴² *Id.* § 131.110(a).

⁴³ PUBLIC HEALTH SERVICE & FDA, GRADE “A” PASTEURIZED MILK ORDINANCE, (rev. ed. 2009), available at <http://www.fda.gov/downloads/Food/FoodSafety/Product-SpecificInformation/MilkSafety/NationalConferenceonInterstateMilkShipmentsNCIMSModelDocuments/UCM209789.pdf> (last visited Apr. 12, 2011).

⁴⁴ *See id.* at § 1.

⁴⁵ The permit process requires entities in the production chain to be audited and then inspected at regular intervals to make sure they are complying with the PMO requirements. *Id.* at § 5. The PMO considers a critical violation has occurred if “every particle of milk or milk product may not have been heated to the proper temperature and held for the required time in properly designed and operated equipment.” *Id.* Also a critical violation has occurred if there is cross contamination occurring between pasteurized and unpasteurized milk or direct contamination. *Id.* A critical flaw may result in a halt to distribution of the product until the violations have been corrected. *Id.*

⁴⁶ *Id.* at § 3.

convenience stores do not need permits but a farmer who sells milk directly must have a permit.

The PMO is a national uniform law adopted by most states.⁴⁷ There are exceptions, however, and the exceptions vary widely from state to state. Some states allow no exceptions; sales of non-pasteurized milk are simply illegal. Delaware,⁴⁸ for example, known for tax-free shopping and flexible corporate laws, has no exceptions.⁴⁹ Nor, for that matter does Wisconsin,⁵⁰ “America’s Dairyland.”

A handful of states allow retail sales to consumers. These dairies are carefully regulated and licensed. California is the best-known example, but there are actually about ten states that allow retail sales.

In between these two ends of the spectrum lies a range of approaches. One of the most common is to allow raw milk sales, but only on the farm where the milk is produced. For example, in Oregon, on-farm sales are permitted by persons “owning not more than three dairy cows that have calved at least once, nine sheep that have lactated at least once or nine goats that have lactated at least once.”⁵¹ These producers need not be certified, which means pasteurization is not required (certification requires pasteurization). There are further requirements, and these are fairly typical. The seller may not advertise the milk for sale, the milk must be sold directly to the consumer at the premises where produced, and no more than two producing dairy cows or nine producing sheep or nine producing goats may be located on the premises where the milk is produced.⁵² In Minnesota, the

⁴⁷ *Id.* at Introduction.

⁴⁸ 16 Del. Admin. Code § 4461 (2011).

⁴⁹ See *Raw Milk Nation: State-by-state Review of Raw Milk Laws*, FARM TO CONSUMER LEGAL DEFENSE FUND, http://www.farmtoconsumer.org/raw_milk_map.htm (last visited Apr. 4, 2011) (providing a guide to state laws regarding raw milk and a map of the United States showing that as of May 2010, raw milk sales were illegal in eleven states plus the District of Columbia).

⁵⁰ In 2010, the Wisconsin legislature passed a law that would have allowed some raw milk sales, but the state’s governor vetoed the bill. Cookson Beecher, *Wisconsin Gov Nixes Raw Milk Legislation*, FOOD SAFETY NEWS (May 20, 2010), <http://www.foodsafetynews.com/2010/05/wisconsin-gov-nixes-raw-milk-legislation/>. Many critics, even some promoters of raw milk, criticized the bill for setting standards that were too lax. See *id.* Cookson Beecher, *Wisconsin Gov Nixes Raw Milk Bill*, FOOD SAFETY NEWS, May 20, 2010, available at <http://www.foodsafetynews.com/2010/05/wisconsin-gov-nixes-raw-milk-legislation/>. Discover Wisconsin: Dairy Heiresses—America’s Dairyland (Discover Wisconsin TV broadcast Jan. 29–30, 2011), available at http://video.discovermediaworks.com/WMMB_DW_ITO/player.htm (last visited Mar. 3, 2011).

⁵¹ OR. REV. STAT. § 621.012 (2009).

⁵² *Id.*

pasteurization requirement does not apply to milk “occasionally secured or purchased for personal use by any consumer at the place or farm where the milk is produced.”⁵³ In some states there are further regulations. In Pennsylvania, if consumers must supply their own containers, then a single milking room is sufficient, but if the farmer provides containers, a separate bottle washing room is necessary.⁵⁴

Even where sales are prohibited, consumption of raw milk from one’s own cow is permitted;⁵⁵ this is why most people who grew up on farms say they drank raw milk as kids. Since it is legal to drink milk from one’s own cow, some raw milk enthusiasts share ownership of a cow or herd. The cow lives on a farm, but the farmer sells “cow shares” or “herd shares” to consumers who wish to buy raw milk. If the cow belongs to me, then technically I am not buying milk; I am drinking milk from my own cow. Some states explicitly permit herd shares by statute. The problem is that cow shares and herd shares do not look very different from actual milk sales. Shareholders never take possession of the cows or goats, nor do they assist in their care. Shareholders may visit the farm periodically to pick up their milk, which the farmer has collected in jars, or the farmer may deliver the milk. Since there is no “sale” of milk, an argument can be made that rules prohibiting distribution of non-pasteurized milk do not apply. This was the winning argument in an Ohio case. In 2006, a Darke County Court of Common Pleas judge reversed an injunction against a herd-share operator because the statute does not define “sell” or “sold.”⁵⁶ In a few states, like Tennessee, herd shares are allowed by statute. Title 53, chapter 3, section 119 of the Tennessee Code provides that nothing in the law shall prohibit an “independent or partial owner” of a hoofed mammal from using the milk for personal purposes.⁵⁷

⁵³ MINN. STAT. Ann. § 32.393 (West 2011). This is an interesting way of limiting raw milk sales because it seems to focus on the consumer’s behavior rather than the producer’s.

⁵⁴ 7 Pa. Code § 59.302 (2011).

⁵⁵ Indeed, it is difficult to come up with any food the *consumption* of which is illegal (as opposed to sale or possession), but that will be the topic of another Essay.

⁵⁶ In re Dep’t of Agric. Subpoenas, Case No. 06-CV-63231 (Dec. 29, 2006) (on file with author).

⁵⁷ TENN. CODE ANN. § 53-3-119 (West 2011).

II A BRIEF HISTORY OF MILK DRINKING

One of the things that makes raw milk so interesting to me is that I started out with what I imagine to be common assumptions about milk drinking. They go something like this: People have always consumed milk.⁵⁸ Until pasteurization came along, it was raw milk right out of the cow.⁵⁹ Cows were milked by hand into open-air containers, such as metal pails, which were then poured into those big metal milk bottles. Images of milkmaids in the Swiss Alps come to mind. Images of healthy robust children with milk mustaches come to mind. I am a product of my century.

Why drink milk? Didn't we always drink raw milk? The milk debates split into two main topic areas. While the arguments are different, both debates implicate the same issues. Part of the surprise was to learn that some people think humans should not drink milk from other animals at all.⁶⁰ Since milk is the "perfect food," and was among the four food groups⁶¹ when I was a child, I was a bit surprised to find arguments that we do not need to drink milk at all. But many cultures do not drink milk.⁶² Until recently, for example, the Chinese didn't drink milk.⁶³ The consumption of milk arose in cultures that

⁵⁸ More recently it came to my attention that not everyone drinks milk. Some populations—African Americans, for example—are notoriously lactose intolerant.

⁵⁹ The pro-raw milk website Raw Milk Facts states this quite strongly: "People have been drinking raw milk from animals for thousands of years. . . . unheated, unprocessed milk has been a safe, reliable food source for a good, long time." A BRIEF HISTORY OF RAW MILK'S LONG JOURNEY . . . , RAW-MILK-FACTS.COM, http://www.raw-milk-facts.com/milk_history.html (last visited Apr. 12, 2011).

⁶⁰ "Cow's milk is designed for baby cows" is how the argument might be phrased, and this is actually a good point. In this regard, see MICHAEL CRAWFORD & DAVID MARSH, NUTRITION AND EVOLUTION 133 (1995) (describing the differences among milk of various animals, correlating with the growth requirements of their young).

⁶¹ At that time there were four: meat and beans, milk and cheese, grains and potatoes, and fruits and vegetables. The allocation of food into groups has changed over time. Now that we know that chocolate is its own food group, there must be at least five. See, e.g., *Chocolate, the 5th Food Group*, ACROSS INTERNATIONAL MINISTRIES <http://across.co.nz/ChocolateVeg.html> (last visited Apr. 4, 2011); *Basic Food Groups: Chocolate*, WEBICUREAN, <http://www.webicurean.com/articles/chocolate.shtml> (last visited Apr. 4, 2011).

⁶² And as Harris points out, there would have been no advantage to being able to digest milk prior to domestication of ruminant animals. HARRIS, *supra* note 4, at 138; see also Andrea S. Wiley, "Drink Milk for Fitness": *The Cultural Politics of Human Biological Variation and Milk Consumption in the United States*, 106 AM. ANTHROPOLOGIST 506, 507 (2004).

⁶³ See HARRIS, *supra* note 4, at 150–51 (describing the historical absence of dairy animals in China).

domesticated herd animals and so had access to a ready supply of fresh milk. Evidently, cows and goats simply were not part of the landscape for most of China. Pigs, however, were ubiquitous.⁶⁴ But mother pigs do not produce milk and store it until their young are hungry. Rather, it is the suckling of the baby pig that stimulates milk production. This gives the pig a rather efficient, on-demand production system, but does not give nearby humans the idea that pig milk might be good for humans.⁶⁵ Perhaps a machine could milk a pig now, but before machines, one would have had to actually place one's mouth to a pig in order to sample pig's milk.

The Chinese aversion to milk is not unusual among human preferences; as it turns out, milk drinking was actually the exception and not the rule. In some cultures, however, milk consumption was fairly common once goats or cows were domesticated.⁶⁶ In those cultures, the people evolved a bit differently; they developed the ability to drink milk as adults. They developed what may be termed "lactase persistence."⁶⁷

The main nutritional benefit of consuming milk is that it is a rich source of calcium, which humans need to build strong bones. The problem is that humans don't absorb calcium well without help.⁶⁸ Humans need something to help absorb it, and there are two possibilities—lactose and vitamin D.⁶⁹ Now, a cow's or a goat's milk includes lactose, which is perfect for helping to absorb calcium from milk.⁷⁰ The problem is that most people cannot digest lactose because

⁶⁴ *Id.* at 145.

⁶⁵ *Id.* at 150–51.

⁶⁶ Wiley, *supra* note 62, at 508 (“[A]ll populations with high rates of lactase persistence have long histories of dairying.”).

⁶⁷ RON SCHMID, *THE UNTOLD STORY OF MILK: THE HISTORY, POLITICS AND SCIENCE OF NATURE'S PERFECT FOOD: RAW MILK FROM PASTURE-FED COWS* 244 (2009).

⁶⁸ See generally *Dietary Supplement Fact Sheet: Calcium*, OFFICE OF DIETARY SUPPLEMENTS, NATIONAL INSTITUTES OF HEALTH, <http://ods.od.nih.gov/factsheets/calcium/> (last update Jan. 19, 2011). Humans absorb about thirty percent of dietary calcium, and vitamin D is one of many factors that determine how much we actually absorb. *Id.*

⁶⁹ HARRIS, *supra* note 4, at 143. This is probably oversimplified. As the National Institutes of Health points out, many factors affect calcium absorption. See, e.g., Ron Hoggan & Don Wiss, *Factors that Inhibit Calcium Absorption*, PALEO DIET, <http://paleodiet.com/losspts.txt> (last visited Apr. 4, 2011) (although this is not a peer-reviewed article, it provides citations and may be a good starting point for readers interested in exploring this issue).

⁷⁰ Actually, all mammal milk has lactose, except that of pinnipeds (i.e., seals). HARRIS, *supra* note 4, at 132–33.

as adults, they do not produce the enzyme lactase, which helps us break down the lactose. Those people who produce lactase into adulthood are said to exhibit “lactase persistence.”⁷¹

The origins of lactase persistence are fascinating. If we can get enough calcium from other food sources, there is no need to get it from milk.⁷² In parts of the globe where green leafy vegetables grow well, there was no need to get calcium from milk. But we still need something to help us absorb calcium, and without lactose, that something is generally vitamin D.⁷³ We humans can make our own vitamin D if we are exposed to sunshine. Fortunately, sunshine and leafy vegetables tend to occur together.⁷⁴

But in northern Europe, for a good chunk of the year there are no leafy vegetables, and while there might be sunshine, it is too cold outside for much natural sunlight absorption.⁷⁵ In northern Europe, there was a survival advantage in being able to digest lactose—it made the calcium in milk available, and as a result it warded off osteoporosis or rickets. This is a condensed version of the lactose intolerance story, but it should suffice for our purposes. The point is that in the relatively unusual cultures where milk drinking was advantageous, people evolved the ability to digest lactose. But globally this was the exception.

What do we conclude from all this? Contrary to our beliefs in the United States, humans do not actually need milk in their diets.⁷⁶ Most humans worldwide do not drink milk from cows or goats.⁷⁷ Rather than drinking raw milk from the dawn of time, most humans did not always drink milk at all. Moreover, even in cultures that domesticated herd animals early on, people did not necessarily drink raw fluid milk.⁷⁸ Fermented milk products, which contain less lactose, were (and are) far more frequently consumed—kefir, yogurt, and similar

⁷¹ See generally Wiley, *supra* note 62. Wiley prefers “lactase persistent” over “lactose tolerant/intolerant” because it is more neutral and less value laden. *Id.* at 507.

⁷² HARRIS, *supra* note 4, at 139 (noting a long history of not drinking milk); Wiley, *supra* note 62, at 509 (citing multiple sources for the proposition that other populations maintain growth and bone density without milk consumption).

⁷³ HARRIS, *supra* note 4, at 143 (which explains why pinniped milk does not need lactose—it is rich in vitamin D).

⁷⁴ *Id.*

⁷⁵ See *id.* at 138, 146.

⁷⁶ See Wiley, *supra* note 62, at 509.

⁷⁷ All humans are designed to thrive on human milk, however, and human milk has been prescribed as beneficial for adults at some times in our history.

⁷⁸ Schmid, *supra* note 67 at 244.

products contain plenty of calcium, but less lactose. In warm climates such as the Middle East, vitamin D is readily available from sunlight, so the calcium in fermented dairy products is available through biological processes, even without much lactose. In such climates, lactase persistence is not as pronounced as it is in northern European cultures.⁷⁹

Americans of European descent mostly came from northern Europe, can digest lactose, and must therefore have been drinking raw milk at least since colonial times, if not all the way back to the dawn of time, right? In fact, in early New York City, a family cow in the backyard was the norm.⁸⁰ But it is not so clear that adults were actually drinking the milk. In early America, milk was especially useful for making butter and cheese.⁸¹ Buttermilk left over from butter making is still a favorite ingredient for baking. This does not imply, however, that liquid milk consumption was as common as it is now.⁸² Babies were fed human milk, and adults saw no need to drink milk at all.⁸³ While it seems likely that most people with access to fresh milk from a cow would have tried it at some point, the assumption that everyone drank a glass of liquid milk with each meal is almost certainly wrong.

The story of how we became a nation of milk drinkers, and how all that milk came to be pasteurized, highlights the way in which social changes can lead to profound changes in legal requirements, which in turn create expectations and beliefs that we identify as “common knowledge.” For those seeking a return to less processing and smaller scale agriculture, the raw milk story suggests that society must change first. It is the underlying structure of society that creates the context for change; technology only makes it possible. But the choice to use a higher tech approach is not a given. The next Part focuses on the choices we have made as a society in order to ensure a large, year-

⁷⁹ HARRIS, *supra* note 4, at 143.

⁸⁰ E. MELANIE DUPUIS, NATURE’S PERFECT FOOD: HOW MILK BECAME AMERICA’S FAVORITE DRINK 5 (2002).

⁸¹ *Id.* See also JAMES E. MCWILLIAMS, A REVOLUTION IN EATING 76–79 (2005) (describing the chores of butter churning and cheese making in colonial New England).

⁸² Notwithstanding the claim on Raw-Milk-Facts.com that in 1810 “raw milk and whiskey [were] the main beverages of choice,” A BRIEF HISTORY OF RAW MILK’S LONG JOURNEY . . . , *supra* note 59, it was children, not adults, who were given cow’s milk to drink. See also DUPUIS, *supra* note 80, at 5.

⁸³ *But see* KEN ALBALA, EATING RIGHT IN THE RENAISSANCE 75 (2002) (noting that during the Renaissance, human breastmilk was considered good food for the aged and infirm).

round supply of safe milk. It should be clear from the preceding discussion that something in society must have compelled this choice, since humans evidently do not actually need milk.

III FROM THERE TO HERE

So how did we go from the family cow (mostly for butter) to pasteurized, homogenized two-percent milk from a grocery store? The answer, surprisingly, involves breastfeeding. In *Nature's Perfect Food*, sociologist E. Melanie DuPuis traces the evolution of milk drinking in the United States.⁸⁴ She points to increasing geographic and social mobility in the nineteenth century.⁸⁵ As rural families moved to cities, social “helping out” networks were disrupted. In rural areas, women would get together for butter making, quilting, and other hands-on chores. If a woman was ill, one of her friends could nurse her baby, and according to DuPuis, this is exactly what would happen.⁸⁶ Babies did not need to go hungry when their mothers were temporarily unavailable, nor did babies need something out of a bottle.

Eventually, in the cities, a middle class arose. Social mobility contributed to further disruption of informal networks, and in the case of upper middle class women, led to a social life that was not compatible with breastfeeding.⁸⁷ With the rise of industrialization, poor women increasingly worked outside the home. In both cases, this created a need for a way to feed babies. In an earlier time, wet nurses might have stepped in to fill the need, at first informally—a relative or friend might nurse a woman’s baby occasionally if she were unable to do so, and then more formally, at least for the well-to-do.⁸⁸ A wet nurse might have been hired, and would have lived with the family for a period of time.⁸⁹ But in this new disconnected society, wet nurses fell out of favor. They were likely poor and lived in unhealthy

⁸⁴ DUPUIS, *supra* note 80, at 5.

⁸⁵ *Id.* at 54 (“New England families were becoming increasingly mobile . . .”).

⁸⁶ *Id.* at 54–55 (breast-swapping was common and thought to be necessary because of a mistaken belief that colostrum, the early milk from the mother of a newborn, was unhealthy).

⁸⁷ See LEVENSTEIN, *supra* note 1, at 122 (describing how middle-class social interests led to earlier weaning).

⁸⁸ DUPUIS, *supra* note 80, at 54–55.

⁸⁹ *Id.* at 55. See also LEVENSTEIN, *supra* note 1, at 122 (describing wet nurses in large households).

conditions.⁹⁰ There may have been cultural differences as the so-called melting pot drew immigrants from diverse cultures, but had not yet melted them together. The result was increased “hand” feeding of infants. And that meant that starting sometime in the mid-nineteenth century, the demand for cow’s milk began to increase.⁹¹

This development was not good for infants. While “artificial” feeding of infants was not a new idea, as Professor DuPuis points out, it had never been good for babies.⁹² As population pressures increased in large cities, room for family cows decreased. Simultaneously, demand for milk for infant feeding was rising.⁹³ One source that arose to fill this need was “swill” milk.⁹⁴ The “swill” left over after brewing, it was discovered, could be fed to cows, and so urban dairies arose in conjunction with breweries. These were commercial dairies within the city limits. The milk was of poor quality, and it was often contaminated.⁹⁵ Sanitation was also poor, and the spread of disease was poorly understood. Technology was making larger operations possible. Demand for “country” milk increased because country babies had a better survival rate.⁹⁶ Country milk was seen as pure and wholesome.⁹⁷ Transportation made delivery to city neighborhoods a possibility, but even the possibility of receiving country milk created another opportunity for fraud. Without face-to-face networks,

⁹⁰ DUPUIS, *supra* note 80, at 55. *See also* LEVENSTEIN, *supra* note 1, at 122 (describing the decline in wet nursing and servant shortage in general).

⁹¹ *See* DUPUIS, *supra* note 80, at 64. The rise of bottle feeding of infants contributed to an increased demand for liquid milk year-round. *See also* LEVENSTEIN, *supra* note 1, at 29 (expanding dairy industry providing dairy products year-round by the 1880s).

⁹² DUPUIS, *supra* note 80, at 47 (describing archaeological evidence of hand feeding of infants and emphasizing the correlation between hand feeding and high infant death rates).

⁹³ *See id.* Nineteenth-century parents did not know enough about sterilization to make bottle feeding safe.

⁹⁴ “Swill” is the grain mash left over from the brewing process. The Brooklyn Public Library blog describes it thusly: “A wash tub 16 feet wide and four feet deep with a “mash machine” in it was filled with hot water. Corn was added and left to stand, then rye was added, heated and cooled; then yeast was added and the ‘mass’ run off into fermenting cisterns, producing alcohol [sic].” Brooklyn Public Library, *Distilling in Brooklyn—Whiskey Wars and Swill Milk in the 1860s*, BROOKLYNOLOGY (Jan. 20, 2010), available at <http://brooklynology.brooklynpubliclibrary.org/post/2010/01/20/Brooklyn-Distilleries.aspx>.

⁹⁵ FDA: A CENTURY OF CONSUMER PROTECTION 28 (Wayne L. Pines ed., 2006) (“Milk was one of the most heavily adulterated products in urban America at the turn of the century; it was frequently watered down and preserved with formaldehyde.”).

⁹⁶ DUPUIS, *supra* note 80, at 67 (urban infant mortality twice as high as rural).

⁹⁷ DuPuis ties the demand for country milk to a view of women’s bodies as imperfect. “Rather than seeing the breakdown of women’s economic relationship, reformers represented the problem as the breakdown of women’s bodies . . .” *Id.* at 64.

consumers would have no way to suspect or detect fraudulent substitution of city milk for country milk.⁹⁸

A movement arose to certify dairies that followed good sanitation practices—i.e., that produced milk less likely to be contaminated.⁹⁹ Enter pasteurization.¹⁰⁰ In *Nature's Perfect Food*, Professor DuPuis points to various factors all leading to a need for urban health reform, which became concentrated in “the milk question.”¹⁰¹ By 1910, milk was regarded as a necessity, but it was also dangerous.¹⁰² And New York City faced a choice: either require pasteurization or require certification of dairies. Certification was more labor and capital intensive and would have depended on improvements in city sanitation as well as inspections of barns and milking practices.¹⁰³ Moreover, cows would have to be tested for tuberculosis, resulting in higher costs for farmers.¹⁰⁴ Private certifiers had already arisen, and certified milk was available, but it was expensive.¹⁰⁵

On the other hand, pasteurization was now an option, having first been used to purify milk in the 1890s.¹⁰⁶ It was seen as a second-best choice because “cooked” milk was an inferior product. But the process could be applied to more milk more cheaply.¹⁰⁷ A government that licensed dairies could deliver on its implied promise to provide safe milk.¹⁰⁸ Farmers would not need to incur the additional costs of testing all cows for tuberculosis.¹⁰⁹ In an increasingly technological setting, with larger barns, more mechanized milking, and larger herds, pasteurization would deliver quantities of safe milk more cheaply.

⁹⁸ PINES, *supra* note 95, at 29. This problem of credence exists today. Consumers generally cannot distinguish between organic and conventional produce, between kosher and nonkosher foods, or between GMO foods and non-GMO foods.

⁹⁹ LEVENSTEIN, *supra* note 1, at 130 (describing the certified milk movement at the turn of the twentieth century).

¹⁰⁰ *See id.* Pasteurization was regarded with suspicion at first because some suspected it was used to disguise stale milk.

¹⁰¹ DUPUIS, *supra* note 80, at 55.

¹⁰² *Id.* at 5. *See also* PINES, *supra* note 95, at 28 (describing how milk was heavily adulterated at the turn of the century).

¹⁰³ *See* DUPUIS, *supra* note 80, at 76–77 (describing the certification movement).

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* at 77.

¹⁰⁷ *Id.* (outlining arguments about “raw” versus “cooked”).

¹⁰⁸ *Id.* at 78 (“[G]overnment was not capable of guaranteeing the safety of milk through inspection; pasteurization was necessary.”).

¹⁰⁹ *Id.* at 80–81 (describing how pasteurization allowed farmers to avoid increased costs).

The pasteurization option seems like the obvious choice. And of course, we as a society did choose pasteurization. That choice tended to favor larger operations, resulting in fewer suppliers and increasing dependency on advanced technology, processing, and commercialization.¹¹⁰ We moved a long way away from the family cow. At the time, however, the choice was presented as merely one between careful, sanitary, monitored, inspected production on the one hand, and a relatively easy kill step on the other hand. Did reformers at the time, motivated to solve an infant mortality problem, see mandatory pasteurization as a vote against the family cow? Social pressures had already pushed us away from the family cow.

IV CONCLUSION

The story of how American society went from a family cow in the backyard to large commercial dairies employing advanced technology and mandatory processing techniques could be the story of how we moved from harvesting grain by hand to using giant combines, or from collecting eggs from a few chickens to buying machine packaged eggs from debeaked chickens that never go outside. The questions we ask about raw milk now are similar to the questions we were asking a hundred years ago: Doesn't cooking the milk compromise its nutritional value? And doesn't leaving it uncooked necessarily expose us to infectious diseases? In some ways these are the wrong questions. Perhaps the better questions are these: Why do we find ourselves in a place where we must ask such questions? When did we accept the notion that milk is necessary in our diets? When did we accept the idea that clean, safe, uncooked milk is impossible? And for those who did not accept either of these ideas, to what extent should we honor their choices? These are questions for future research.

In the nineteenth century, for various reasons women chose not to breastfeed their babies, and society supported those choices. Looking back, we can identify the pressures that led to these choices, but as this discussion reveals, the choices we made were not explicitly aimed at a larger, more industrialized system, although that is what we ended up with going forward: Is there a way to address the pressures that led to the choices that created the need for processed

¹¹⁰ See LEVENSTEIN, *supra* note 1, at 41 (pasteurization laws favored larger companies that could invest in equipment and bottles); see also DUPUIS, *supra* note 79, at 82.

milk in the first place? Perhaps rather than focusing on the scale of our food production systems, we should be pushing back against the forces that tended to break down social networks, that convinced women not to breastfeed their babies, that allowed for milk production on a scale that was inconsistent with good sanitation. The raw milk debate probably cannot be solved by either requiring pasteurization or requiring intensive inspections of raw milk dairies.

