

Understanding Raw Milk and Considerations for Human Consumption

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### Introduction

Humans across the world have consumed milk for centuries. Milk is essential to the diet of about six billion people worldwide because it provides important macro- and micronutrients (Visioli & Strata, 2014). In infancy, scientific support for breastfeeding is well documented. However, most mammals stop providing milk to their offspring after weaning. This is not true for humans. People of all ages enjoy drinking milk.

The source of the milk humans drink is primarily various breeds of dairy cattle, although the literature notes other mammal sources, including goats, sheep, and buffalo (*Raw Milk - an Overview | ScienceDirect Topics*, n.d.). In the United States, raw milk sources are primarily cows and goats. This paper will focus on cow's milk in the United States. Much of the safety of cow's milk also applies to goat milk, which is also available in the United States, but to a lesser extent. The background will be provided, which led to public health concerns and the need for pasteurization and standardization of milk and milk products. The diseases associated with cow's milk will be noted. The infection control practices to standardize cow's milk for human consumption will be outlined, including home pasteurization, farm management, safe milk distribution, and refrigeration/storage. Position and policy statements of a subsection of organizations and agencies regarding human consumption of raw milk will be noted. Finally, recommendations needed before raw milk is made widely available in Ohio will be outlined.

### Background

Humans have consumed milk for centuries. Families commonly kept their own dairy cows and produced their own milk (Kurlansky, 2018a). Availability of cow's milk in the United States was first recorded in 1611 when cows arrived in Jamestown, Virginia ("A Brief History of Milk, from 4000 BC to Present," 2024). The farmer milked the cow and drank the milk on their own farm. This changed in the mid-1800s (Currier & Widness, 2018a) during the Industrial Revolution. Large numbers of people moved to major cities, and foreigners came to the United States in large numbers. This led to urban crowding in substandard housing, poor environmental sanitation, and changes in the source and processing of commercial milk. There were also increased outbreaks of infectious diseases and a lack of scientific information about the causes of these diseases. Public health professionals started to see an association between drinking raw milk and human illness.

Kurlansky (2018) notes, "Milk is the most argued-over food in human history, which is why it was the first food to find its way into a modern scientific laboratory and why it is the most regulated of all foods" (Kurlansky, 2018b, p. 3).

"Historically speaking, milk consumption was often associated with severe disease outbreaks stemming from microbial contamination, and it was not until the 1860s that began to change." (Avina, 2025). By the late 1800s, cow milk was known to include many organisms associated with disease, including typhoid and scarlet fevers, diphtheria, cholera in infants (cholera infantum), and tuberculosis ("white plague") ("The Linger Heat over Pasteurized Milk," n.d.). Farmers had large herds of cows, and the conditions on many farms were found to be unsanitary. Raw milk was identified as a public health and agricultural economic problem.

The Journal of Dairy Science published a special issue reviewing 100 years of publishing from 1917 to 2017. One article in this review, titled *A 100-Year Review: A century of dairy processing advancements* – Pasteurization, cleaning and sanitation, and sanitary equipment design, summarizes how dairy products have been produced with consideration for safety, nutrition, and sustainability. (Rankin et al., 2017).

Finally, it is important to understand the processes in place for home pasteurization of raw milk as well as commercial pasteurization of raw milk, and the important safeguards needed to protect the public's health.

### **Public Health Concerns related to drinking raw milk – past and present**

“Public health promotes and protects the health of all people and their communities. This science-based, evidence-backed field strives to give everyone a safe place to live, learn, work, and play.”(American Public Health Association, 2025). In the United States, there are local, state, and federal public health agencies, including Ohio Local Health Districts (LHD, the Ohio Department of Health (ODH), and the federal Centers for Disease Control and Prevention (CDC). It was the health departments in New York City and Chicago that noticed outbreaks, which alerted public health officials.

#### ***Past Concerns***

Currier and Widness (Currier & Widness, 2018a) provide a brief history of milk hygiene and its impact on infant mortality. Although the focus of their study was 1875 to 1926, and specifically related to infant mortality, this study was important for understanding concerns related to drinking raw milk identified before 1875.

These authors note several factors responsible for the decline in the wholesomeness of cow's milk – including expansion of the dairy industry during urbanization (brought on by the Industrial Revolution) and the departure from traditional small dairy herds housed close to consumers. New dairy herds were large, with as many as 2,000 cows confined in cramped urban sections of a city. These cows were fed exclusively distillery waste, referred to as “slop house” feed. After processing grain for the alcohol industry, the leftover “mash” was fed to the cows. The dairies themselves were called “swill dairies”. The wholesomeness of milk was also impacted by inadequate refrigeration, the lack of milk processing standards, and fraudulent practices such as mixing additives into the milk.

In the 1870s, cow's milk was first linked with typhoid fever (Currier & Widness, 2018b, pp. 1713–1714). The background for determining this link was attributed to knowledge produced by scientists Louis Pasteur and Robert Koch in France and Germany, respectively, in the late 1860s. The scientists are credited with identifying the Germ Theory of disease. Pasteur also explained why heat treatment made foods safer (Schwarcz, 2017). Heat treatment had been used for many years to make foods safer, but Pasteur applied it to wine and beer spoilage. Pasteur realized spoilage of beer and wine was due to chemical reactions initiated by living microbes. Heat treatment prevented the destructive effect of these living organisms on beer and wine. It was in 1886, when Frans von Soxhlet, a German agricultural chemist, learned that living microbes caused diseases to spread through milk and suggested heat-treating milk – using Louis Pasteur's process of heat treatment called “pasteurization”. When pasteurization was applied to milk provided to infants in New York City in 1891, infant mortality rates dropped. However, even at this time, people were skeptical of the pasteurization process on milk, claiming it caused a “burnt” flavor.

Finally, by 1917, pasteurization was gaining acceptance as a way to preserve milk and control milk-borne disease (Rankin et al., 2017, p. 9903)

#### ***Present Day Concerns***

The CDC Public Health Law division highlights on its website the reason raw milk is still available (CDC, 2025b). Consumers demand it. This has resulted in expanded legal access to raw milk in several states, and increased legalization of the intrastate sale of raw milk is expected to increase the disease burden associated with the consumption of raw milk (Costard et al., 2017). “Many resources provide evidence of dangers associated with unpasteurized milk and milk products (e.g., cheese, yogurt, cream). Still, there is a prevailing trend toward more natural products and an increased preference for raw milk consumption (Claeys et al., 2013). This trend has been seen in high-income developed countries

actively seeking unpasteurized milk in liquid and product forms. People from these countries claim nutritional and health benefits and improved taste (de Klerk & Robinson, 2022). Often, these claims are anecdotal and not supported by scientific evidence; however, some recent research studies have investigated (and in some cases demonstrated) the positive impact of unpasteurized milk consumption on the prevalence of asthma, atopy, rectal cancer, and respiratory illness.

Concerns persist in the present-day sales of raw milk. Outbreaks of milk-borne diseases are still recorded by local, state, and federal agencies. These agencies are authorized by local, state, and federal laws to investigate outbreaks of reportable infectious diseases, including diseases that result from organisms present in raw milk. Investigations are also conducted and identified in pasteurized milk products, although fewer and with less frequency.

**Comparison Between Raw Milk and Pasteurized Milk – the Health Halo**

A “health halo” exists around choosing raw milk as a healthy option (Ford, 2025). Lynette Johnston at North Carolina State defines the health halo: certain things are viewed as naturally good, and things that are as close as possible to the raw state are often viewed that way. So, if something comes straight off the farm, straight out of the field, straight out of the cow, it must be healthy. This specifically relates to something that is not heated, like the process of pasteurizing milk. This is not always correct. It is not completely true from a nutritional perspective that raw milk and pasteurized milk are no different. However, from a protein, sugar, and vitamin perspective, this is generally true except that some vitamins are knocked down a little during pasteurization. Pasteurized milk is really close to raw milk.

There is a difference between raw milk and pasteurized milk related to the organisms present. The table below provides some epidemiologic information.

**Organisms Detected in Raw or Unpasteurized milk or milk products (COMMITTEE ON INFECTIOUS DISEASES et al., 2014), Mayo Clinic, (Wysok et al., 2024), (An et al., 2018), Minnesota Department of Health Fact Sheets. (Table below.)**

Organism	Where found and how transmitted	Symptoms in humans	Symptoms in dairy cows	Source of animal disease	Prevention of human infection
<b>Bacteria</b>					
<u><i>Brucella species</i></u> (Zoonotic disease, highly infectious to humans)	Cattle, goats, and sheep (among other animals) that shed the organism in their milk, uterine and amniotic fluids, and contaminated genitals	Like those of the flu: fever, chills, loss of appetite, heavy sweating, weakness, tiredness, joint, muscle, and back pain, headache. Symptoms may become chronic.	Spontaneous abortion of fetus; weak milk production	Animals contract directly from other animals or from ingestion of contaminated food, water, semen (from bull)	<b>Pasteurization</b>  No practical treatment.  <b>Vaccination</b> of farm animals
<u><i>Campylobacter species</i></u> (Zoonotic disease)	Animal reservoir. Transmitted via food, water, fecal-oral route. Found in the	Vomiting. Watery or bloody diarrhea, abdominal cramping, and possibly fever. It can be severe disease.	The animal may appear clinically normal. Or, the animal may have abdominal	Farm environment management: bedding and grazing fields (found in feces of animals)	<b>Pasteurization</b>  Difficult to diagnose, even with lab testing.

Organism	Where found and how transmitted	Symptoms in humans	Symptoms in dairy cows	Source of animal disease	Prevention of human infection
	GI tract of animals. Human ingestion of contaminated dairy products, meat, and other animal products.		pain, fever, diarrhea, or blood in feces.		Antibiotics may be required.
<u><i>Coxiella burnetii</i></u> ( <b>Q fever</b> ) (Zoonotic disease, highly contagious)	Birth products, urine, feces, milk of infected animals.	Possible flu-like symptoms: fever, chills, fatigue, muscle pain; pneumonia, heart complications. It can become a chronic disease.	The animal may not be visibly ill. The female may abort the fetus.	Organism naturally infects some animals, i.e., goats, sheep, and cows.	<b>Pasteurization</b> (this organism is the most heat-resistant of public health significance)
Enterotoxigenic <i>Staphylococcus aureus</i> (Shalaby et al., 2024)	Worldwide distribution; colonizes and infects hosts, including humans and animals. Causes mastitis in dairy cattle. Found in food contaminated during harvesting, processing, transportation, storage, cooking, or handling, or from inadequate cooling methods.	Staphylococcal food poisoning: nausea, violent vomiting, abdominal cramping, w/wo diarrhea	Clinical and sub-clinical mastitis	Farm environment contamination with <i>S. aureus</i> and human hand transmission to the udder.	Prolonged boiling or autoclaving is needed to gradually decrease the organism's potency (thermostable organism)
<u><i>Listeria monocytogenes</i></u>	Soil and water. Cows with organisms can shed organisms in dairy products.	Fever, muscle aches, nausea, diarrhea; can spread to the nervous system and cause headache, stiff neck, confusion, loss of balance, convulsions	None	Soil where grazing and drinking water.	<b>Pasteurization</b>  Maintain good hygiene on dairy farms.

Organism	Where found and how transmitted	Symptoms in humans	Symptoms in dairy cows	Source of animal disease	Prevention of human infection
<u><i>Mycobacterium</i></u> ( <i>bovis</i> and <i>tuberculosis</i> )					<b><i>Pasteurization</i></b>
<i>Salmonella</i> species <u>(Weinstein, 2025)</u> species 11/3/25 4:30:00 PM	Found in the intestines of animals and humans. Spread through contamination of water, food, soil, surfaces (on dairy farm)	Diarrhea, stomach cramps, abdominal pain, and fever. Symptoms last 12 hours to 2 weeks.			<b><i>Pasteurization</i></b>  Handwashing
<u><i>Escherichia coli</i></u> (multiple species)  Hemolytic Uremic Syndrome (HUS)	Found in intestines, water, food, soil, and contaminated surfaces. Many strains are harmless and live in the intestines of healthy humans and animals. 0157 is a powerful toxin and causes severe illness.	Severe diarrhea (often bloody), abdominal cramps.  Antibiotics are not helpful.	Mastitis, udder swelling, pain, fever, depression, lack of appetite, diarrhea	Naturally found in most farm animals in the intestines	<b><i>Pasteurization</i></b>  Handwashing  Good farm hygiene  Clean and disinfect surfaces in the household and on the farm  Isolate the animal with diarrhea  Work with a veterinarian  Avoid eating or drinking in barns where animals are housed. Keep house pets out of the barn  Test well water on the farm for coliform bacteria.
<b>Parasites</b>					
<u><i>Cryptosporidium</i></u> species (Zoonotic disease)	Person-to-person transmission. Direct infection from	Self-limiting diarrhea; more severe disease in immunocompromised individuals.	Especially in calves, causes mild to severe diarrhea and	Environmental contamination from infected cows can lead to ingestion of	<b><i>Pasteurization</i></b>  Strict hygiene to eliminate or reduce

Organism	Where found and how transmitted	Symptoms in humans	Symptoms in dairy cows	Source of animal disease	Prevention of human infection
	animals to humans through waterborne infection (contamination of surface water and drinking water).		retarded growth.	the oocyst (egg) of the organism. Highly prevalent organism.	environmental contamination.
<i>Giardia</i> species (Waterborne disease and Zoonotic disease)	Found in the stool of an infected person or animal, the Parasite has a protective shell that allows survival outside the body for long periods of time; it contaminates milk during the process of milking.	Diarrhea, greasy stools that can float, gas and bloating, stomach cramps, loss of appetite, weight loss, and slight fever.  Some people have no symptoms. Symptoms can last 2-6 weeks	Mild or absent; symptoms seen in calves: diarrhea, weight loss, poor weight gain	Common in dairy herds	<b>Pasteurization</b>  Environmental hygiene.
<b>Viruses</b>					
<i>Norovirus</i>	Raw milk from the hands of a milker with active disease and poor handwashing	Gastroenteritis (mistakenly referred to as the “stomach flu”): frequent vomiting, often without notice, low-grade fever, chills, headache, and muscle aches. Recovery within 1-2 days.	N/A	N/A	Proper handwashing and equipment management. <b>NOT KILLED BY PASTEURIZATION</b>
<i>Rabies</i> (Zoonotic disease)	Raw milk from cows	Fatal disease without vaccination and post-exposure prophylaxis	Loss of appetite, ataxia, aggressiveness	Raccoon bite	Identify cow symptoms, test the cow, and provide post-exposure prophylaxis
HPAI A(H5N1)	See below				

### **Raw Milk and Emerging Pathogens like Highly Pathogenic Avian Influenza A(H5N1) virus**

Scientists in the United States and across the world continue to discover new and emerging pathogens. One pathogen, known to exist since 1996, was first associated with dairy cows in March 2024. This highly pathogenic avian influenza (HPAI) A(H5N1) virus can cause serious human illness, hospitalization, or death. It has been proven that an older influenza virus, Avian Influenza (H5N1) virus, is effectively eliminated by pasteurization. The newly identified HPAI A(H5N1) has been tested in clinically ill and asymptomatic dairy cattle (*Raw Milk*, 2024). A farmer selling raw milk may collect milk from an asymptomatic cow. The raw milk from this cow, if consumed by humans, could result in infection. As a result of this concern, the USDA instituted a national milk testing strategy in October 2024 to require raw (unpasteurized) milk samples be collected nationwide and shared with the USDA for testing. The AMA published guidance for physicians answering patient questions about consuming raw milk, which includes this information. The association continues to support the consumption of only pasteurized milk.

### **Economic Benefits for the Farmer Selling Raw Milk**

There may also be economic benefits to the farmer who sells raw milk to consumers. The Weston A. Price Foundation manages a project titled, “A Campaign for Real Milk: pasture-fed, unprocessed, full-fat, nature’s perfect food” (“The Economics of Raw Milk,” n.d.). This initiative is couched in the idea that the power of the government needs to be returned to the people and to local economies. This organization’s solution is “Drink Raw Milk”. [A hypothetical story is provided here.](#)

This story highlights a small dairy farmer with thirty cows selling his milk to a local co-op. The money he receives from the co-op equals about what dairy farmers received during WWII, highlighting poor return on investment. The cost to the farmer includes grain (feed) and veterinarian bills. Generally, the farmer lives just above the poverty level and may not be able to purchase health insurance except through a working spouse.

The story then turns to the farmer owning a dairy farm that has grass-based dairy and sells milk directly to the public. The milk could be sold for more than the co-op paid (current raw milk prices here are about \$6/gal.). If the farmer makes yogurt, kefir, or butter, there will be even more income. Furthermore, the farmer can make cream and cheese, leaving whey as a milk by-product, which is “free” food for pigs and chickens, should the farmer own these animals as well. And the story continues to demonstrate significant financial benefit. The final sentence in the story: “This is real wealth, and every raw milk drinker participates in creating it.”

### **Perspectives of Some State, National, and International, and Academic Groups**

Many agencies and associations across the world have been involved in evaluating raw milk and its nutritional content. These organizations have also conducted studies on the safety of consuming raw milk. The representative list of agencies and associations that have developed policies and position papers regarding raw milk includes:

- American Dairy Association – Mideast ([Program, 2024](#)) Agrees with FDA and CDC.
- USDA - FDA Division (Program, 2024)
  - As a science-based, public health regulatory agency, the FDA strongly supports the application of effective measures, such as pasteurization, to protect the safety of the food supply and maintain public confidence in such important, healthy staples of the diet as milk.
  - The FDA does not regulate the *intrastate* sale or distribution of raw milk. Whether to permit the sale and distribution of raw milk within a state is for the state to decide.

- With respect to *interstate* sale and distribution of raw milk, the FDA has never taken, nor does it intend to take, enforcement action against an individual who purchased and transported raw milk across state lines solely for his or her own personal consumption.
- We urge consumers who purchase raw milk to understand the health risks involved. While raw milk puts all consumers at risk, the elderly, immune-compromised people, children, and pregnant women are especially vulnerable to the hazards of raw milk consumption.
- The FDA's position on raw milk is in concert with the CDC and the AAP.
- Model state law developed by the USPHS FDA was developed and suggested for adoption by states and recommended for enactment by States to enable communities to adopt milk and food ordinances by reference:
  - *An ordinance to regulate the production, transportation, processing, handling, sampling, examination, labeling, and sale of Grade "A" milk and milk products; the inspection of dairy farms, milk plants, receiving stations, transfer stations, milk tank, truck cleaning facilities, milk tank trucks, and bulk milk hauler/samplers; the issuing and revocation of permits to milk producers, bulk milk hauler/samplers, milk tank trucks, milk transportation companies, milk plants, receiving stations, transfer stations, milk tank truck cleaning facilities, haulers, and distributors; and the fixing of penalties.*
- The U.S. Centers for Disease Control and Prevention (CDC) (CDC, 2025a)
  - Pasteurization is crucial for milk safety, killing harmful germs that can cause illness.
  - Consuming raw milk can lead to serious health risks, especially for certain vulnerable populations.
  - Choosing pasteurized milk and dairy products is the best way to safely enjoy the nutritional benefits of milk.
- National Environmental Health Association (NEHA) (National Environmental Health Association, 2023)
  - Implement legislation that requires pasteurization of all milk before sale or distribution to the final consumer, regardless of whether a fee is charged.
  - Adopt current practices in food safety by state, local, tribal, territorial, and federal government agencies, as well as industry food safety professionals, to identify, eliminate, and mitigate potential food safety hazards inherent to their operations.
  - Educate consumers about the dangers inherent in consuming unpasteurized milk or milk products made from raw milk.
  - Prevent arrangements such as cow shares, herd sharing, bartering, exchange, or any other action that would allow the consumer to obtain a portion of the production of raw, unpasteurized milk from a cow, sheep, or goat.
  - Require labeling on containers that warns the consumer that the product is raw milk and could cause illness since it has not been pasteurized.
- Raw Milk Institute (RAWMI): The Raw Milk Institute (*Mission and Vision*, n.d.)
  - Born in 2011 out of the civil rights movement that was awakening the American population that it was being made sick by highly processed, dead, sterilized, immune-depressing, highly allergenic foods.
  - On the website, the disclaimer reads: *With the use of risk management strategies, raw milk can be a low-risk food. However, there is no such thing as a perfectly safe food. Pasteurized milk is not perfectly safe, either, and is implicated in foodborne illnesses and outbreaks every year.*
  - The website disclaimer continues: *The Raw Milk Institute provides information for educational purposes only. Raw Milk Institute does not assume any responsibility or liability for the use of this information.*
  - The Mission of the Raw Milk Institute is to improve the safety and quality of raw milk and raw milk products through:

- Farmer training and mentoring nationally and internationally
- Establishing raw milk guidelines and Common Standards
- Improving consumer access and producer transparency
- Consumer education about the benefits of raw milk on the immune system and gut microbiome
- Investment in raw milk research with the use of the RAWMI test data
- American Academy of Pediatrics (AAP) (COMMITTEE ON INFECTIOUS DISEASES et al., 2014):
  - Strong support for the position of the FDA and other national and international associations in endorsing the consumption of only pasteurized milk and milk products for pregnant women, infants, and children.
  - Endorse a ban on the sale of raw or unpasteurized milk and milk products throughout the United States, including the sale of certain raw milk cheeses, such as fresh cheeses, soft cheeses, and soft-ripened cheeses.
  - There is strong scientific evidence that pasteurization does not alter the nutritional value of milk.
- American Medical Association (AMA) (*Raw Milk*, 2024): All milk sold for human consumption should be required to be pasteurized.
- American Public Health Association (APHA) (*Compulsory Pasteurization APHA Policy Brief 20164*, 2016). Recommendations:
  - States take action to implement or strengthen regulations and enforcement measures to prohibit the sale of raw milk and raw milk products, as well as ban the exchange of unpasteurized milk through herd-share programs. Possible loopholes (e.g., labeling for non-human consumption) should be anticipated and proactively addressed.
  - The FDA should be given sustainable resources to continue to investigate and enforce violations of the ban on interstate sales and to target areas where interstate sales are recurring to inform public education measures on the hazards of raw milk consumption.
  - All public health organizations and regulatory agencies collaborate in developing a joint task force to provide education on the dangers of raw milk. In addition to the general public, key targets for this education would be pediatricians and family practice physicians, particularly in states that allow the sale of raw milk, along with teachers of health education classes. Also, raw milk hazards should be highlighted during National Public Health Week and other public health outreach opportunities (including those involving public health nurses and veterinarians, pediatricians, and other communities).
  - Each state public health authority and state laboratory evaluates its current response plans to disease outbreaks likely caused by consumption of raw milk and to severe illness among minors linked to raw milk consumption. The response should include rapid detection of outbreaks, rapid collection of samples and genetic identification, and referral of information to the state attorney general to pursue consumer protection measures as appropriate. State agencies should actively exercise this capability.
  - A model statute be developed in concert with a nonpartisan policy organization and be distributed to those states that allow the sale of raw milk in any form to advocate for compulsory pasteurization; if states elect not to adopt this measure, constructive provisions aimed at individual risk mitigation and early warning and containment of outbreaks could be put forward (e.g., provisions on permits to sell raw milk, labeling instructions to facilitate trace-back investigations in the event of possible illnesses, warning labels highlighting inherent hazards associated with consumption of raw milk, and warnings against providing it to the most vulnerable populations, including young children, the elderly, and immune-compromised individuals).
  - States currently allowing the sale of raw milk explore declaring it an “inherently dangerous substance” similar to tobacco products and criminalizing its sale or offering to minors.

- American Veterinary Medical Association (AVMA) (*AVMA Raw Milk*, 2025)
  - Supports laws requiring pasteurization of fluid nonhuman mammalian milk intended for direct sale or distribution to consumers.
  - Opposes laws permitting direct sale or distribution of unpasteurized (raw) milk to consumers
  - In those states where the sale of raw milk is allowed, these products should be labeled, “Not Pasteurized and May Contain Organisms that Cause Disease.”
  - AVMA recommends that fluid nonhuman mammalian milk sold or distributed to consumers be pasteurized and that all dairy products be produced under a scientifically validated food safety program.
- American Association of State Public Health Veterinarians (AAPHV) ([https://marlerclark.com/images/uploads/about\\_ecoli/PUBLIC\\_HEALTH\\_VETERINARIAN\\_COALITION\\_COMMITTEE.pdf](https://marlerclark.com/images/uploads/about_ecoli/PUBLIC_HEALTH_VETERINARIAN_COALITION_COMMITTEE.pdf)): The Public Health Veterinarian Coalition Committee final position statement – only pasteurized milk/products be consumed or sold.
- CDC Public Health Law: (CDC, 2025b)
  - Raw milk consumption is linked to many foodborne illnesses that can result in serious complications and death.
  - The federal government regulates interstate milk sales, but states control the sales within their own state.
  - Raw milk sales are trending upward in some states.
- University of Wisconsin-Madison, College of Agricultural and Life Sciences Center for Dairy Research (*CDR Raw Milk Fact Sheet*, n.d.):
  - Consumption of raw fluid milk poses a food safety risk due to routine contamination of milk with pathogens that are commonplace in the farm environment. The consumers most at risk of illness are children, pregnant women, and immunocompromised individuals.
  - Outbreaks and recalls associated with raw fluid milk continue and have increased in prevalence with more states allowing raw fluid milk sales.
  - Improved training for raw milk producers does not eliminate risks from these products.
  - Infrequent testing of raw milk is not an effective approach to identify sporadic contamination of milk, and there are many practical difficulties with testing for pathogens as a means to ensure the safety of the product.
  - Even if there are low initial levels of pathogens in raw milk, temperature abuse and an extended time from milking to human consumption can allow their numbers to increase to levels sufficient to cause illnesses in sensitive individuals.
  - There are no proven nutritional benefits of raw milk over the consumption of pasteurized milk.
  - Claimed benefits of raw milk consumption related to allergies and asthma are likely instead to be a correlation with traditional farming communities, which retain high levels of raw fluid milk consumption. As an example of a traditional farming group, Amish women and their infants have high levels of contact with animals and barns but have very low levels of allergies/asthma.

**“FROM FARM TO FORK”: Supply Chain for Pasteurized Fluid Milk (Wilbanks, 2025) to ensure safety**

The supply chain for fluid milk is shown in a graphic provided at the end of this document (See “From Farm to Fork” document.) Each step in the process for producing pasteurized milk is shown. The process starts on the individual farm, moves to the cows/milking, moves to cooling/storage, moves to collection by a milk tank truck, moves to transport by that milk tank truck, moves to the **dairy plant** where the milk is unloaded and put into raw milk storage, then clarified and separated into skim and cream. The separated skim and cream each go into a separate large container, and for pasteurization through a specific heat-controlled process, and are then homogenized, which reduces the fat globules in milk to extremely small particles to distribute them uniformly throughout the milk. The milk is then

cooled, packaged, and refrigerated for storage before distribution. Distribution is done with refrigerated trucks to a store's loading dock. From there, the milk is placed in the grocery refrigerators for consumer purchasing.

**Pasteurization** kills pathogens known to occur in milk and prolongs the shelf life by destroying undesirable enzymes as well as reducing the number of viable spoilage organisms (Cole et al., 2022, p. 444). The process of pasteurization has been improved since the 1800s, when first invented by Louis Pasteur. The current process is meant to achieve a 99.999% reduction in viable microorganisms. This is not sterilization, where the objective is to kill all microorganisms that are pathogenic or cause spoilage. The process of pasteurization is also meant to minimize the impact on the nutritional quality of milk. Because pasteurized milk is not sterile, it must be stored and distributed under refrigeration. The shelf-life of pasteurized milk is linked to raw milk quality and control of post-pasteurization contamination (p. 444).

It is important to note that transportation of milk occurs in specialized tanker trucks with temperature control systems that maintain the milk temperature between 38-40°F (*Dairy Supply Chain Management Guide 2025 | Industry Insights*, 2025).

Food quality and safety standards are available from many sources and include checklists and mobile apps. The process of milk production for pasteurized milk is highly sophisticated.

### **Raw Milk from Farm to Consumer to ensure safety**

<https://www.rawmilkstitute.org/updates/farmers-switch-to-raw-milk>)to

The Raw Milk Institute provides advice for farmers considering the switch to raw milk (Smith & McAfee, 2025). The institute notes that 27% of pre-pasteurized milk contains pathogens. A caveat is added that raw milk from **well-trained** farmers is very unlikely to contain pathogens. The institute also notes that some raw milk sent for processing using pasteurization is co-mingled with raw milk from multiple dairies (that do not follow hygienic practices) in the processor's bulk tank. The Raw Milk Institute provides these specific guidelines:

- Cleanliness: paramount importance.
  - Udder preparation and cleaning: udder needs to be clean and dry at milking including brushing or cleaning the udders to make sure they are hygienic; using a clean rag and towel for each cow; applying iodine-based teat dip and leaving this on for 30 seconds; wiping off the dip with a clean, dry towel and finally stripping each team with clean hands or gloves and inspecting the milk to look for any signs of clotting, blood, etc.
  - Clean the milking system, chiller, and tank frequently and thoroughly. This usually means cleaning the milking system needs to be cleaned after each milking with cool/tepid water, followed by very hot alkaline cleaner, and finished with hot acidic cleaner. Milk tanks need to be disassembled and cleaned frequently, including the tank valve.
  - Milk bottling should occur in a clean, uncluttered room with smooth, washable walls and floor. Ensure that the milk bottling room is kept clean and is not contaminated with manure or other filth.
- Herd Health: Unhealthy animals are more likely to develop infection and mastitis
  - Raw milk must be verified to be free of tuberculosis, brucellosis, and Johne's disease (paratuberculosis, a chronic and incurable GI infection affecting cattle, sheep, and goats).
  - Biosecurity must be managed to be sure the herd doesn't come into contact with wild or domesticated animals that may be carrying disease.
- Rapid Chilling and Maintaining Cold Chain

- Under ideal growth conditions, bacteria counts double every 20 minutes. With more bacteria, the milk sours more quickly, and some of those bacteria are pathogens.
- Decreased temperatures slow bacterial growth dramatically; thus, raw milk is rapidly chilled. Raw milk should be chilled to 38°F within an hour of milking.
- Keep milk cold throughout the bottling process through to the customer's receipt of the milk.
- Prevent Cross Contamination
  - Other farm animals can spread pathogens to dairy animals. Cows should not lie down in feces from other animals.
  - Chicken and birds should be kept out of the milking barn.
  - Milk stacking should be avoided. This occurs when milk from subsequent milkings is placed in the same tank. One batch can contaminate the other. Milk stacking also raises the temperature of the previously cooled milk, making it more likely to support bacterial growth.
  - If also producing pasteurized milk, be certain that pasteurized milk is kept separately from raw milk.
- Regular testing
  - Testing provides a verification step that practices and procedures are working well to produce low-risk raw milk.
  - According to the Raw Milk Institute (RAWMI) Common Standards, raw milk should be tested regularly for coliforms and standard plate count. These tests provide a good indication of cleanliness and hygiene in the handling of milk.
- The Raw Milk Institute Common Standards for low-risk raw milk production are internationally recognized and adopted across North America.
  - Farmer training and mentoring
  - Risk Analysis and Management Plan (RAMP) for the unique conditions on each farm
  - Stringent yet achievable bacterial test standards for coliforms and Standard Plate Count (SPC)
- Take care of your market
  - Sell to people versus selling to a processor
  - You want your customer to trust you
  - Develop a relationship with your customers, including answering questions
  - RAWMI message, “You don’t sell raw milk. You teach it.” Be a teacher and a producer.
- RAWMI trains and mentors farmers in the production of low-risk raw milk

**Veterinarian Role in Dairy Farms from the National Dairy FARM Program (“What Is FARM?,” n.d.), (American Veterinary Medical Association, 2007)**

The National Dairy FARM Program is open to all U.S. dairy farmers, milk processors, and cooperatives. It was launched in 2009 and was created by the National Milk Producers Federation in partnership with Dairy Management, Inc. There are 5 program areas: Animal Care, Antibiotic Stewardship, Biosecurity, Environmental Stewardship, and Workforce Development.

The American Veterinary Medical Association provides a handout on what a bovine veterinarian does: works with beef cattle or dairy cows and their calves. Provide scheduled care as well as emergency services. The veterinarian provides assessment services, medicines, bandages, vaccines, portable x-rays, and some surgical equipment.

The veterinarian is also careful not to transfer bacteria/viruses/parasites between farms.

A veterinarian also examines animals before they are shipped from one state to another to determine that they are healthy. This results in a *health certificate* from the veterinarian to the farmer.

Veterinarians also keep records, report diseases as the government requires (reportable diseases), maintain animal health and food safety, and stay up-to-date on developments in their profession (continuing education).

### Consumer Education Related to Purchasing and Consuming Raw Milk

- Consult your physician, especially if you are considering providing raw milk to infants, the elderly, or the immunocompromised.
- Resources emphasizing the dangers of raw milk consumption:
  - CDC: [Raw Milk – Know the Raw Facts](#)
  - FDA: [Raw Milk](#)
  - Dairy Farmers of America: [Raw Milk Vs Pasteurized Milk: What You Need To Know For Your Safety](#) Raw Milk Vs. Pasteurized Milk: What You Need To Know
  - Ohio Department of Health, Zoonotic Disease Program: <https://odh.ohio.gov/know-our-programs/zoonotic-disease-program/animals/livestock>
  - Academic Research: Johns Hopkins University, 2014: [Drinking Raw Milk Dramatically Increases Risk for Foodborne Illness, Analysis Finds](#)
- Raw Milk Advocacy:
  - Raw Milk Institute (see above)

### Current Laws in Ohio

The Dairy Division of the Ohio Department of Agriculture has regulatory oversight relative to milk producers, milk haulers, and dairy processors (*About Us | Ohio Department of Agriculture*, n.d.). These regulations meet or exceed those outlined by the FDA and USDA.

The Ohio Department of Agriculture has a Consumer Protection Laboratory, which employs Lab Evaluation Officers who conduct sample collection and testing to maintain FDA compliance. These officers perform mandatory evaluations for bacteria, coliform, and antibiotics, among other tests (*About Us | Ohio Department of Agriculture*, n.d.). Ohio's producers are producing at a rate of 5.4 billion pounds of milk per year. Ohio is the eleventh milk-producing state.

The Ohio Revised Code currently regulates dairy products in Chapter 917. This chapter includes these areas (*Chapter 917 - Ohio Revised Code | Ohio Laws*, n.d.): Changes proposed in red

- **Definitions (917.01)**
- **Powers and duties of the Director of Agriculture (917.02)**
- Milk sanitation board (917.03)
- Authority of milk sanitation board (917.031)
- Subcommittees (3) (917.032)
  - Grade A milk production and processing
  - Manufacture milk production and manufacturing
  - Frozen dessert manufacturing)
- Sales of and labeling for raw milk (917.04)
  - **917.041**
  - **917.042**
- Prohibited acts (917.05)

- No local regulations (917.06)
- Dairy industry fund (917.07)
- Examinations (917.08)
- License types and categories (917.09)
- Application and issuance of temporary weigher, sampler, or tester license (917.091)
- Pasteurization frozen dessert ingredients (917.10)
- Identification, labeling, and branding (917.11)
- Reports and examinations (917.12)
- Payment reports (917.13)
- Adoption of a method guaranteeing payment to the producer (917.14)
- Plans of operation (917.15)
- Rights of agricultural cooperative association (917.16)
- Confidential information (917.17)
- Family member of an employee contracts certain diseases (917.18)
- Inspections – right of entry 917.19)
- Admissibility of test report or document (917.20)
- Injunctive or other relief (917.21)
- Denial, suspension, or revocation of license (917.22)
- Cooling and storage of manufactured milk (917.23)
- Effect of child support default on license (917.24)
- Penalty (917.99)

The Ohio Administrative Code promulgates rules in Chapter 901:11 for dairy products covering Grade A and Manufacture Grade Milk Programs, Frozen Dessert Manufacturing, Milk Haulers, Weigher Sampler and Testers, and Standards of Identity. This chapter covers

- Ohio Grade A Milk Rules (Chapter 901:11-1)
- Ohio Manufacture Milk Rules (Chapter 901:11-2)
- Ohio Frozen Dessert Rules (Chapter 901:11-3)
- Ohio Hauler, Weigher, Sampler, and Tester Rules (Chapter 901:11-4)
- Standards of Identity for Milk, Cream, Butter, Other Dairy Products (Chapter 901:11-5)
- Changes
  - The Director is to adopt rules governing the sanitary production, storage, transportation, manufacturing, handling, sampling, testing, examination, and sale of raw milk to the ultimate consumer and for animal feed.
  - Rules must include a requirement that a raw milk retailer or raw milk feed retailer enroll in a quality milk production service program.
  - Requires rules to establish requirements governing the use of labels to be placed on final delivery containers used for the sale of raw milk to ultimate consumers and for animal feed.
  - Specifies that the rules must include a requirement that each label contain the name and address of the farm where the raw milk was produced and the date of bottling.

Currently in Ohio, no raw milk retailer shall sell, offer for sale, or expose for sale raw milk to the ultimate consumer except a raw milk retailer who, before October 31, 1965, was engaged continuously in the business of selling or offering for sale raw milk directly to ultimate consumers, holds a valid raw milk retailer license issued under section 917.09 of the ORC, and is subject to the rules regulating the sale of raw milk adopted under this chapter. Furthermore, no person shall fail to label, in accordance with rules adopted by the director of agriculture under section 917.02 of the ORC, all final delivery containers used

for the sale of raw milk to ultimate consumers with the words, “this product has not been pasteurized and may contain disease-producing organisms.”

### **Current Raw Milk Availability in Ohio**

Ohio residents have access to raw cow and goat milk from 116 vendors (<https://www.realmilk.com/farm-directory/wpbdm-region/ohio/>). These vendors are designated by whether they provide herd shares, on-farm retail, pick up sites, Farmers’ Markets, or whether they provide multiple services. Cows and goats are the only raw milk noted amongst these vendors. A definition of these terms is helpful:”

- **Herd shares** provide interested parties to “share a cow” through a contractual agreement. There is usually an initial fee and then a monthly fee, which covers feeding and maintaining the cow. Through a herd share, the owners have access to the raw milk the cow or goat produces. These agreements do not go across state lines.
- **On-farm retail** is, as the name implies, raw milk availability by visiting a farm and buying it.
- **Pick-up sites** are available for pre-purchased raw milk, whether that is online or by calling the retailer.
- **Farmers’ Markets** are available in various communities and sell many products from farms, including raw milk.
- Some vendors provide a mix of multiple services.

### **Laws Related to Raw Milk Availability: (*Food Law in the States – 2025 Update – National Agricultural Law Center, n.d.*)**

- 32 states allow the sale of raw milk under certain conditions
- 18-20 states explicitly ban it

### **Further Resources**

#### **The Ohio State University College of Food, Agricultural, and Environmental Sciences: *Pasteurization (Hartschuh, 2024)***

The Ohio State University College of Food, Agricultural, and Environmental Sciences provides a fact sheet titled, “Food Preservation: Pasteurization of Raw Milk for Home Consumption.” Pasteurization is defined as the process of heating milk to a specific temperature for a defined amount of time to kill (inactivate) organisms in milk that may cause spoilage or disease if consumed. This process has been used for over 100 years to keep consumers of commercial milk safe by following the standards of the Grade “A” Pasteurized Milk Ordinance. Unlike sterilization, pasteurization does not eliminate every microbe in the product, but it does ensure that 99.999% of pathogens are destroyed.

#### **USPHS, FDA, 2019: *Grade “A” Pasteurized Milk Ordinance (USPHS, FDA, 2019)***

This ordinance, with Appendices, is recommended for legal adoption by States to encourage a greater uniformity and a higher level of excellence of milk sanitation practice in the United States. An important purpose of this recommended standard is to facilitate the shipment and acceptance of milk and milk products of high sanitary quality in **interstate and intrastate** commerce. Following this ordinance will help to prevent milk-borne diseases.

#### **National Dairy FARM Program: *Farmers Assuring Responsible Management (FARM) (National Dairy FARM Program, n.d.)***

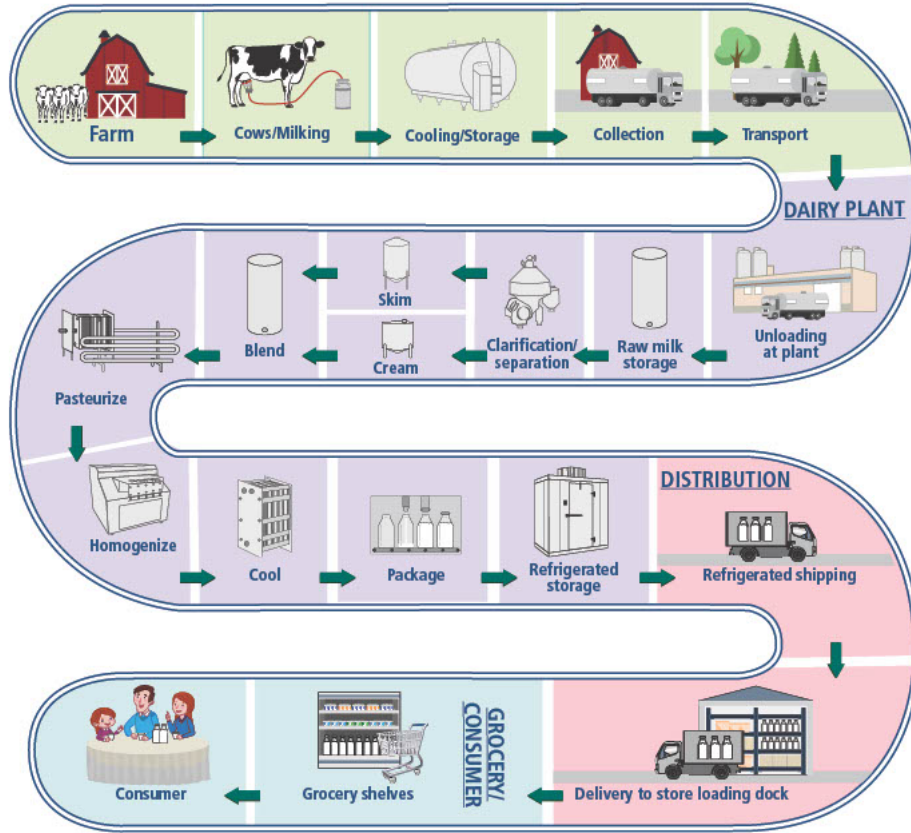
The FARM Program has developed standards, resources, and evaluation materials for U.S. dairy farmers. These include evaluating the workers doing the milking for adequate training. There are also

practices to pre-dip the teat before milking and during milking to observe for abnormalities in the milk, e.g., color and consistency. The udder also needs to be disinfected after milking. The milking equipment needs to be clean and properly maintained.

***NMC: The Global Milk Quality Organization 7-step program re mastitis***

***<https://www.nmconline.org/wp-content/uploads/2025/08/SEVEN-point-NMC-Recommended-Mastitis-Control-08.18.25.pdf>***

SUPPLY CHAIN FOR **FLUID MILK** "FROM FARM TO FORK"



**BIBLIOGRAPHY**

- A Brief History of Milk, from 4000 BC to Present. (2024, May 28). Milwaukee Magazine. <https://www.milwaukeeemag.com/brief-history-of-milk/>
- About Us | Ohio Department of Agriculture. (n.d.). Retrieved October 14, 2025, from <https://agri.ohio.gov/divisions/dairy/about-us>
- American Public Health Association. (2025). What is public health. American Public Health Association. <https://www.apha.org/what-is-public-health>
- American Veterinary Medical Association. (2007). The Life of a Bovine Veterinarian [Professional Association]. The Life of a Bovine Veterinarian. [https://www.avma.org/sites/default/files/resources/bovine\\_bgnd.pdf](https://www.avma.org/sites/default/files/resources/bovine_bgnd.pdf)
- An, J.-U., Ho, H., Kim, J., Kim, W.-H., Kim, J., Lee, S., Mun, S.-H., Guk, J.-H., Hong, S., & Cho, S. (2018). Dairy Cattle, a Potential Reservoir of Human Campylobacteriosis: Epidemiological and Molecular Characterization of Campylobacter jejuni From Cattle Farms. *Frontiers in Microbiology*, 9. <https://doi.org/10.3389/fmicb.2018.03136>
- Avina, S. (2025, May 13). Raw Milk Microbiology: Unfiltered and Unfriendly. ASM.Org. <https://asm.org:443/articles/2025/may/raw-milk-microbiology-unfiltered-and-unfriendly>
- CDC. (2025a, January 31). Raw Milk. Food Safety. <https://www.cdc.gov/food-safety/foods/raw-milk.html>
- CDC. (2025b, March 6). Research Anthology: Raw Milk. Public Health Law. <https://www.cdc.gov/phlp/php/publications/research-anthology-raw-milk.html>
- CDR Raw Milk Fact Sheet. (n.d.). Center for Dairy Research. Retrieved October 14, 2025, from <https://www.cdr.wisc.edu/cdr-raw-milk-factsheet>
- Chapter 917 - Ohio Revised Code | Ohio Laws. (n.d.). Retrieved October 18, 2025, from <https://codes.ohio.gov/ohio-revised-code/chapter-917>
- Claeys, W. L., Cardoen, S., Daube, G., De Block, J., Dewettinck, K., Dierick, K., De Zutter, L., Huyghebaert, A., Imberechts, H., Thiange, P., Vandenplas, Y., & Herman, L. (2013). Raw or heated cow milk consumption: Review of risks and benefits. *Food Control*, 31(1), 251–262. <https://doi.org/10.1016/j.foodcont.2012.09.035>
- Cole, S., Goetze, A., & Meunier-Goddik, L. (2022). Pasteurized Milk☆. In P. L. H. McSweeney & J. P. McNamara (Eds.), *Encyclopedia of Dairy Sciences* (Third Edition) (pp. 444–450). Academic Press. <https://doi.org/10.1016/B978-0-12-818766-1.00142-2>
- COMMITTEE ON INFECTIOUS DISEASES, COMMITTEE ON NUTRITION, Brady, M. T., Byington, C. L., Davies, H. D., Edwards, K. M., Glode, M. P., Jackson, M. A., Keyserling, H. L., Maldonado, Y. A., Murray, D. L., Orenstein, W. A., Schutze, G. E., Willoughby, R. E., Zaoutis, T. E., Bhatia, J. J. S., Abrams, S. A., Corkins, M. R., de Ferranti, S. D., ... Schwarzenberg, S. J. (2014). Consumption of Raw or Unpasteurized Milk and Milk Products by Pregnant Women and Children. *Pediatrics*, 133(1), 175–179. <https://doi.org/10.1542/peds.2013-3502>
- Compulsory Pasteurization of All Non-Human-Derived Animal Milk Products Intended for Human Consumption. (2016, November 1). [Association]. American Public Health Association

Pasteurization of Animal Milk. <https://www.apha.org/policy-and-advocacy/public-health-policy-briefs/policy-database/2016/12/21/pasteurization-of-animal-milk>

Costard, S., Espejo, L., Groenendaal, H., & Zgmutt, F. J. (2017). Outbreak-Related Disease Burden Associated with Consumption of Unpasteurized Cow's Milk and Cheese, United States, 2009–2014. *Emerging Infectious Diseases*, 23(6), 957–964. <https://doi.org/10.3201/eid2306.151603>

Currier, R. W., & Widness, J. A. (2018a). A Brief History of Milk Hygiene and Its Impact on Infant Mortality from 1875 to 1925 and Implications for Today: A Review. *Journal of Food Protection*, 81(10), 1713–1722. <https://doi.org/10.4315/0362-028X.JFP-18-186>

Currier, R. W., & Widness, J. A. (2018b). A Brief History of Milk Hygiene and Its Impact on Infant Mortality from 1875 to 1925 and Implications for Today: A Review. *Journal of Food Protection*, 81(10), 1713–1722. <https://doi.org/10.4315/0362-028X.JFP-18-186>

Dairy Supply Chain Management Guide 2025 | Industry Insights. (2025, July 15). <https://foodtech.folio3.com/blog/dairy-supply-chain-management-guide/>

de Klerk, J. N., & Robinson, P. A. (2022). Drivers and hazards of consumption of unpasteurised bovine milk and milk products in high-income countries. *PeerJ*, 10, e13426. <https://doi.org/10.7717/peerj.13426>

Food Law in the States – 2025 Update – National Agricultural Law Center. (n.d.). Retrieved October 19, 2025, from <https://nationalaglawcenter.org/food-law-in-the-states-2025-update/#>

Ford, D. (2025, January 7). What's the Difference Between Raw and Pasteurized Milk? College of Agriculture and Life Sciences. <https://cals.ncsu.edu/news/whats-the-difference-between-raw-and-pasteurized-milk/>

Hartschuh, J. (2024, March 20). Food Preservation: Pasteurization of Raw Milk for Home Consumption [Academic]. Ohio State University College of Food and Environment Sciences. <https://ohioline.osu.edu/factsheet/hyg-5817>

Kurlansky, M. (2018a). *Milk!: A 10,000-Year Food (First)*. Bloomsbury Publishing.

Kurlansky, M. (2018b). A brief history of milk. <https://www.countryfile.com/how-to/food-recipes/a-brief-history-of-milk>

National Dairy FARM Program. (n.d.). National Dairy FARM Program. Retrieved October 17, 2025, from <https://nationaldairyfarm.com/>

National Environmental Health Association. (2023). NEHA Raw Milk Policy Statement July 2028. NEHA.org. <https://www.neha.org/Images/resources/Raw%20Milk%20Policy%20Statement%20July%202028.pdf>

Program, H. F. (2024). Food Safety and Raw Milk. FDA. <https://www.fda.gov/food/buy-store-serve-safe-food/food-safety-and-raw-milk>

Purpose. (n.d.). [Organization]. Raw Milk Institute With Intent and Purpose. Retrieved October 19, 2025, from <https://www.rawmilk institute.org/purpose>

Rankin, S. A., Bradley, R. L., Miller, G., & Mildenhall, K. B. (2017). A 100-Year Review: A century of dairy processing advancements—Pasteurization, cleaning and sanitation, and sanitary equipment design. *Journal of Dairy Science*, 100(12), 9903–9915. <https://doi.org/10.3168/jds.2017-13187>

Raw milk | American Veterinary Medical Association. (2025). [Association]. American Veterinary Medical Association: Raw Milk Policy Statement. <https://www.avma.org/resources-tools/avma-policies/raw-milk>

Raw Milk - an overview | ScienceDirect Topics. (n.d.). Retrieved September 24, 2025, from <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/raw-milk>

Raw milk: Questions patients may have and how to answer. (2024, December 30). American Medical Association. <https://www.ama-assn.org/public-health/infectious-diseases/raw-milk-questions-patients-may-have-and-how-answer>

Schwarcz, J. (2017, March 20). Who first suggested that milk be pasteurized to make it safer for consumption? [University]. Office for Science and Society. <https://www.mcgill.ca/oss/article/history-science-science-everywhere-you-asked/who-first-suggested-milk-be-pasteurized-make-it-safer-consumption>

Shalaby, M., Reboud, J., Forde, T., Zadoks, R. N., & Busin, V. (2024). Distribution and prevalence of enterotoxigenic *Staphylococcus aureus* and staphylococcal enterotoxins in raw ruminants' milk: A systematic review. *Food Microbiology*, 118, 104405. <https://doi.org/10.1016/j.fm.2023.104405>

Smith, S., & McAfee, M. (2025, January 9). Advice for Farmers Considering the Switch to Raw Milk. Raw Milk Institute. <https://www.rawmilkstitute.org/updates/farmers-switch-to-raw-milk>

The Economics of Raw Milk. (n.d.). Real Milk. Retrieved October 15, 2025, from <https://www.realmilk.com/the-economics-of-raw-milk/>

The Lingering Heat over Pasteurized Milk. (n.d.). Science History Institute. Retrieved September 27, 2025, from <https://www.sciencehistory.org/stories/magazine/the-lingering-heat-over-pasteurized-milk/>

USPHS, FDA. (2019). Grade "A" Pasteurized Milk Ordinance. Milk Ordinance.

Visioli, F., & Strata, A. (2014). Milk, Dairy Products, and Their Functional Effects in Humans: A Narrative Review of Recent Evidence. *Advances in Nutrition*, 5(2), 131–143. <https://doi.org/10.3945/an.113.005025>

Weinstein, E. (2025). Outbreak of *Salmonella* Typhimurium Infections Linked to Commercially Distributed Raw Milk — California and Four Other States, September 2023–March 2024. *MMWR. Morbidity and Mortality Weekly Report*, 74. <https://doi.org/10.15585/mmwr.mm7427a1>

What is FARM? (n.d.). National Dairy FARM Program. Retrieved October 19, 2025, from <https://nationaldairyfarm.com/what-is-farm/>

Wilbanks, D. (2025). Farm-to-Fork-Fluid-Milk. Center for Dairy Research, Dairy Processing. <https://www.cdr.wisc.edu/assets/pipeline-pdfs/Farm-to-Fork-Fluid-Milk.pdf>

Wysocki, B., Rudowska, M., & Wiszniewska-Łaszczyk, A. (2024). The Transmission of *Campylobacter* Strains in Dairy Herds in Different Housing Systems. *Pathogens*, 13(4), 317. <https://doi.org/10.3390/pathogens13040317>