

# Michigan Fresh Unprocessed Whole Milk Workgroup

## Chapter 1. History.

### Historically, why is milk an important component of our diet?

*“It has been said truly that milk is the only material in the whole range of animal matter that is designed and prepared by nature expressly as food.”* (From the preface to the 6<sup>th</sup> Annual Meeting of the American Association of Medical Milk Commissions, 1916)

As far back as we have recorded evidence, milk and milk products have been a mainstay of infant, child and adult diets. Earliest records document the domestication of animals as a source of fluid milk and other dairy products, and religious texts contain many references to milk.

Historians have repeatedly cited ways in which the use of milk was a competitive advantage for people. It was a rich source of nutrients and water. Domesticated lactating animals accompanied migrating people and moved with armies as they marched across great distances. Many of the early settlers to this country brought dairy animals with them to provide milk during their transatlantic crossings and in their new communities. Traditionally, nearly all milk was obtained directly from the animal, consumed fresh and was not refrigerated.

Milk producing animals were prevalent throughout the world and intentionally bred to produce more milk than was needed for their newborn for human consumption. Fresh milk proved palatable and nutritionally beneficial. It was also cultured into many foods, such as yogurt and kefir (a fermented milk drink), and preserved as butter, ghee (butter fat separated from milk) and a variety of cheeses. This practice increased the nutrient content and portability of these products and extended their storage life, which helped sustain people during harsh times and when animals weren't producing milk. Milk-producing animals were considered – and still are – a sign of personal wealth and security. In some cultures, the cow is considered sacred.

Historically, milk consumption was common and unregulated. Recorded history does not show that milk caused widespread disease. Items in traditional diets, which are developed over generations, remain if they are beneficial and do not have adverse consequences.

### What is the History of Milk Regulation? Focus on the USA.

In the United States, milk and milk products were not regulated until the 20<sup>th</sup> century. Milk producing animals were prevalent and well integrated into the community, family life and local commerce.

Then several things happened:

- There was a huge increase in the population of metropolitan areas resulting from the influx of immigrants and people moving to urban areas for work.
- New dairies were located near these rapidly growing urban centers to provide these huge concentrations of people with the milk they wanted. The industrial model was seen by these urban dairies as the way to maximize profits by efficiencies of scale and the use of locally-available, cheap, alternative feed.

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- Dairies developed extensive distribution systems to get their product to consumers. Some milk production facilities located in cities still obtained milk from rural dairies, which required transportation of farm milk over considerable distances. Farmers left cans of milk on platforms beside the railroad tracks and trains would stop and pick the cans up along the way. This is the origin of the term “milk run” – a train that made repeated stops to pick up cans of milk. This expanded movement of milk resulted in longer times between milking and public consumption. None of this milk was refrigerated.
- As the need for more milk in these urban areas increased, a few dairies exploited this demand to increase profits. Examples included adding water to augment volume, using whiteners to hide discoloration and adding disinfectants to camouflage spoilage.

During this same period, a number of diseases developed into serious public health problems due to overcrowding, inadequate means to dispose of human waste, and rudimentary water and sewage treatment. Scientists began to understand that microorganisms were often the cause of these illnesses.

Federal food safety regulation began when farmers called for a national approach to meat processing so they could compete in the foreign market, resulting in the Meat Inspection Act of 1891. At the time, their domestic and European markets were threatened by growing public concern over diseases such as trichinosis from pork.

The public became outraged when journalists reported the unsanitary conditions in “swill dairies” (so named because they were located near distilleries to take advantage of huge amounts of waste material – known as swill – left over from fermenting grains). The swill was used as a substitute for pasture/forage feeding. Newspapers showed pictures of milk transporters adding water to milk cans and other questionable practices to increase profits (now categorized as adulteration and mislabeling). Groups of physicians made the connection between unsanitary conditions at dairies and children developing diarrhea when consuming bottled milk.

In 1892 a New York physician, Dr. Henry Coit, introduced a system for granting milk from inspected dairy farms as “Certified Milk”. As a strong proponent of pasteurization, Nathan Straus contributed some of his personal wealth to building milk pasteurization plants and distribution centers in large cities as a way of providing subsidized “pure” milk to the poor, particularly for newborns of mothers that were not able to breast feed. Soon 20 large cities had distribution centers, half required pasteurization, all only used Certified Milk. There was vigorous public and scientific debate about the “milk problem”. Some milk processors saw the advantages of pasteurization (e.g., extended time to transport milk, reduced spoilage, and marketing their milk as germ-free). The physician groups were concerned that pasteurization destroyed medical benefits of the milk. Physicians, veterinarians and health officials argued that the solution to the unsanitary conditions and public health issues was to encourage dairies to clean up in order to meet the Medical Milk Commissions’ certification standards. This was a prolonged and contentious debate.

During the first decade of the 20th century, there was an increase in the number of local governments that adopted strict sanitation standards. Many of the Medical Milk Commissions included a requirement for testing cows for tuberculosis using a new test. In Chicago, this

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resulted in municipal regulations requiring that milk from cows not tested for tuberculosis be pasteurized. Most of the local regulations and laws for sanitation standards were later expanded by initially recommending, then requiring pasteurization.

In 1906, the Federal Food and Drug Act was passed. Most large cities had pasteurization requirements by 1917. In 1924, the U.S. Public Health Service developed a model regulation known as the Standard Milk Ordinance for voluntary adoption by state and local agencies. This model regulation is now known as the Grade “A” Pasteurized Milk Ordinance (PMO) and has been adopted by nearly every state. In 1948, Michigan became the first state to require pasteurization of all sold milk. There were still Medical Milk Commissions in the 1970s and 1980s.

### **Why is milk one of the most regulated foods in the USA?**

Food regulation in the United States has a complex history. Microorganisms were discovered that were linked to communicable diseases. There was a common school of thought during the late 19<sup>th</sup> and early 20<sup>th</sup> century that, by eradicating germs, we could eliminate disease. This idea was promoted by a variety of advocacy groups. Milk was one of the earliest foods to stimulate debate related to food safety because of its widespread consumption. Historically, milk regulations were linked to the “war on germs.” In addition, early milk regulations targeted areas such as the adulteration of milk and dairy products, the health of milk-producing animals and the health of people involved in handling milk and dairy products.

With the addition of the pasteurization step in the processing of milk, a whole new set of regulations were needed to maintain the effectiveness of the pasteurization process. The public and manufacturers wanted controls covering mislabeling as imitation dairy products were made commercially available. Various state and local governments developed their own regulations governing milk and dairy products, sometimes with the intent of protecting their local dairies from competing dairies in others cities or states. Following World War II, the problem of regulatory barriers to the free flow of milk between markets increased, leading to the formation of the National Conference on Interstate Milk Shipments (NCIMS) in 1950.

The NCIMS provides cooperative input for the states, the dairy industry and the Food and Drug Administration regarding milk regulation. All proposed changes to the PMO filter through the committee structure of the NCIMS and are voted on by representatives of state regulatory agencies. The NCIMS meets every two years and, typically, over 100 proposals for changes to the PMO and other NCIMS documents are reviewed. These proposals are submitted by states, industry and the FDA. The NCIMS promotes regulatory uniformity across the United States because it allows milk regulatory issues to be thoroughly discussed by stakeholders and alleviates the need for individual states to enact their own dairy laws. In 2004, the Institute of Health, in their report, *Scientific Criteria to Ensure Safe Food*, made a point about the historical background of food regulation: “The need for such standards in the food industry goes to the heart of regulatory theory, which recognizes the necessity for the government to establish standards as a counterbalance to private economic incentives.” The PMO, along with the NCIMS program, are recognized by the FDA as a state and federal cooperative program providing milk regulatory oversight for the entire United States.

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The PMO includes both technology-based and performance-based standards. For example, the construction standards for the floors, walls and ceilings of a dairy plant have been included in the PMO and changed very little over the past 55 years. Performance standards such as cooling temperatures, bacteria counts and coliform counts have been included in the PMO over the years as well. The NCIMS process allows for the adoption of new systems and technology. For example, in 2003, a voluntary Hazard Analysis Critical Control Point Program for dairy plants was adopted and, more recently, standards for automatic (robotic) milking systems have been added to the PMO. The document has evolved to be a complex and comprehensive set of regulations.

The PMO requirements are limited to Grade “A” milk and milk products intended for shipment across state lines. However, states have the authority to regulate milk and milk products that move within their borders. Some states adopt, and may even expand, the PMO requirements as state law to cover intrastate sales. Other dairy products, such as ice cream and cheese, are regulated by individual states.

### **Is there something uniquely hazardous about milk?**

Milk is not inherently hazardous. Fresh milk from the mammary glands is one of the most nutritious and complete foods available to people. Although milk contains water and many other nutrients to sustain growth of bacteria -- whether beneficial or pathogenic -- many other foods have similar characteristics that can readily support the growth of disease-producing bacteria: fresh and processed meat, sea food and foods consumed fresh such as produce, coconut milk and fruit juices. To enhance safe products, animal-based products require good handling practices. Milk is a liquid that is harvested from animals at a body temperature conducive to bacterial contamination from the environment. No food, including milk, is completely safe.

### **Initially, what were the conditions that prompted pasteurization for milk? Have those conditions and knowledge/understanding changed today?**

At the turn of the 20<sup>th</sup> century, much of the public concern about disease and dissatisfaction with milk was caused by the swill dairies in large urban areas and the human illness caused by milk that was contaminated by sick cows, sick humans, insanitary handling, and adulteration. Doctors in orphanages noticed that children were becoming ill from drinking milk. Filthy dairy operations, with both sick animals and sick or unclean workers, led to heavily soiled and contaminated milk. The initial milk commission criteria for certification focused primarily on these conditions. Public outrage, certification criteria and subsequent adoption of these standards into milk regulations resulted in considerable improvement in the sanitation and cleanliness of dairies.

Much of the public concern about disease and dissatisfaction with milk was caused by long distance transportation, mostly unrefrigerated (trains to bottling plants and bottled milk to retail outlets or homes). Milk spoiled, but it's important to clarify that spoiled milk is not hazardous – it is simply unmarketable. The heightened awareness of the importance of refrigeration and manufacturer's testing protocols has improved considerably in recent years. “Pasteurization,”

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which was at that time some sort of heat treatment, helped the manufacturers by enabling more time to transport, process and store milk by killing spoilage organisms.

Other advocates for pasteurization were coming forward from individuals concerned with infant mortality, such as Nathan Strauss. Pasteurization was seen by some public health officials as a quick, cost-effective way to eliminate pathogens in milk.

Epidemics publicly perceived to be associated with drinking milk at that time, including brucellosis (known as Bangs or undulant fever), diphtheria, typhoid and tuberculosis, spread mostly in urban areas that lacked sanitation. Each of these serious diseases is now under control; diphtheria and typhoid by treatment of people who were spreading the disease and improved sanitation requirements for food and water. Brucellosis and bovine tuberculosis were controlled by a massive program of testing and depopulation of cattle. These are all public health successes resulting from federally mandated disease eradication policies.

Conditions have changed considerably since the early 20<sup>th</sup> century in terms of sanitation and public health. Our knowledge of what it takes to maintain the quality and safety of milk has grown, including our understanding of good herd management, disease-causing and healthy bacteria, our ability to test for pathogens, the capacity to rapidly chill milk and give attention to constant refrigeration, use of stainless steel, improved design of processing equipment, and improved cleaning techniques. Regulations at the state and federal level have and continue to improve milk quality and safety, as do dairy farmers and milk processors.

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