



Animal Health Matters.
For Safe Food Solutions.



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Establishment of a risk-based food safety control system in the Ukrainian dairy value chain

Importance of safe raw milk - human health

Awareness Workshop

Jorge Pinto Ferreira

Kyiv, 16.08.2016

Starting point: what is the definition of milk?

“ [Milk is]The integral product of the full and uninterrupted milking of a healthy, well-nourished and not overworked milk-producing female. It should be collected under hygienic conditions and should not contain colostrum. ”

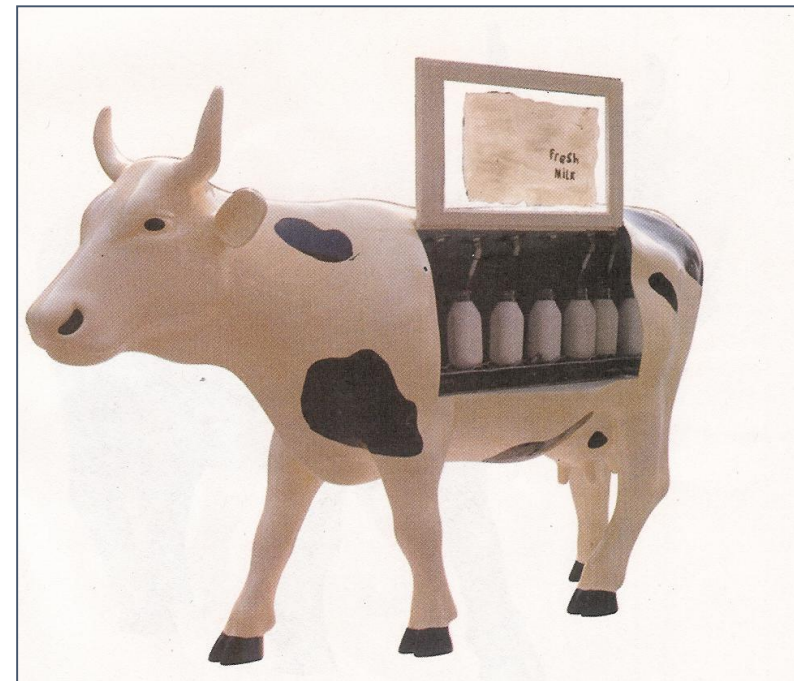
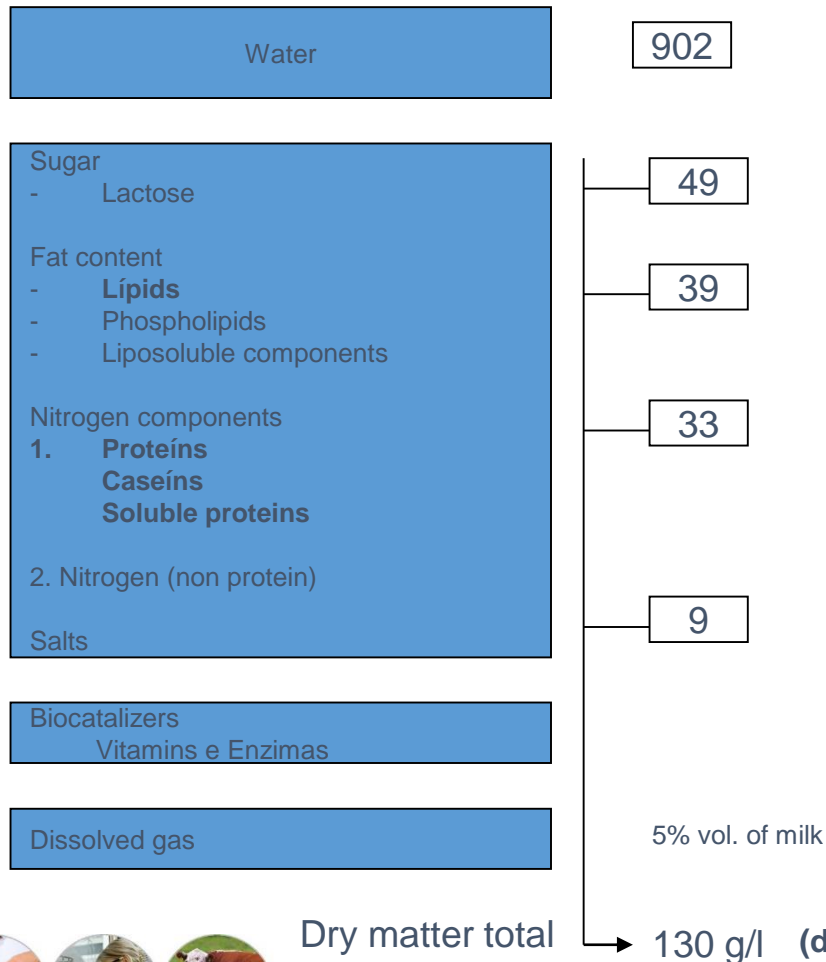
International Congress on Prevention of Fraud in Paris, 1909

cited in Yvan Chouinard & Girard, Animal Frontiers, 2014

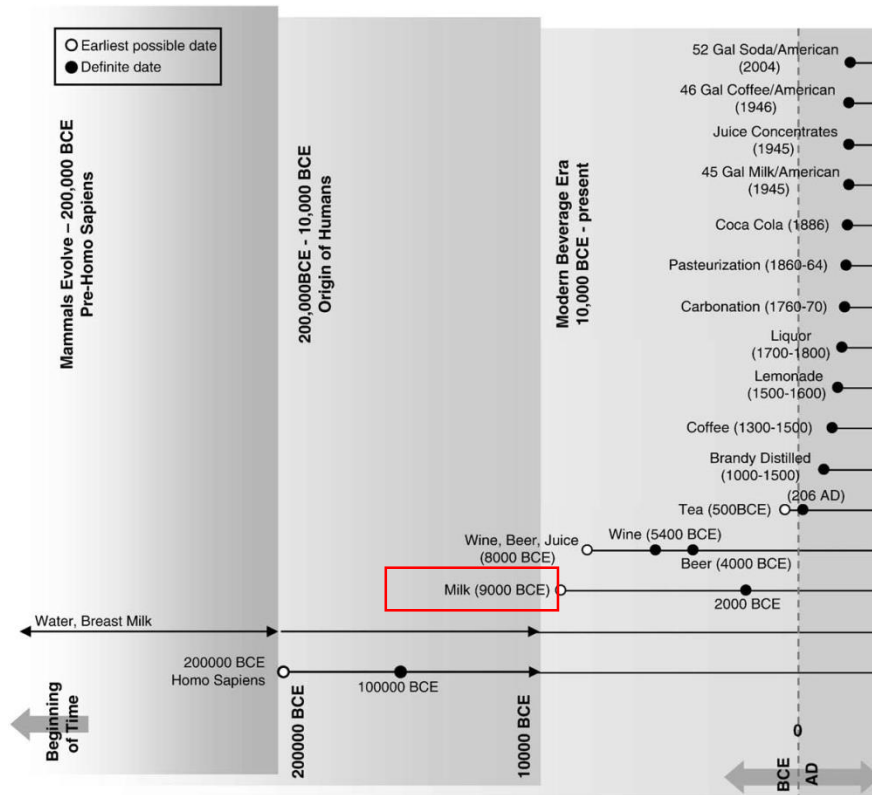


Milk: a major nutritional resource

Composition of 1L of milk (approximate)



And since when has it been part of the human diet?



SCIENTIFIC REPORTS

OPEN Direct evidence of milk consumption from ancient human dental calculus

SUBJECT AREAS:
 PROTEOMICS
 BIOMARKERS
 ZOOLOGY
 ARCHAEOLOGY

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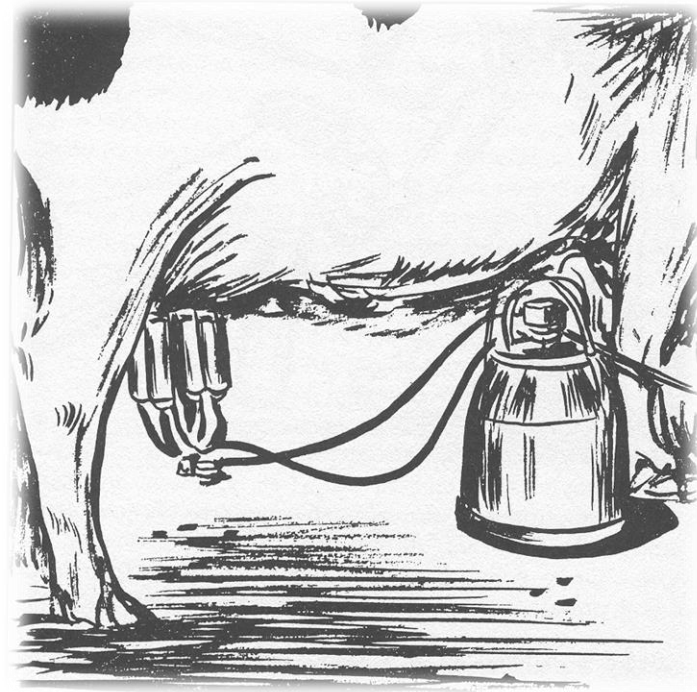
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Fig. in "Patterns of beverage use across the lifecycle", Barry M. Popkin (2010). *Physiology & Behaviour* 100 (4-9)



Recent years: debate about raw milk

«**Raw milk** is the secretion produced by the mammary gland, **not** submitted to a temperature treatment above **40°**, or other of equivalent effect»



Human health: is it safe to drink raw milk?

The screenshot shows the Nourishing the Planet website. At the top left is the logo for 'nourishing the planet' with a green and blue leaf icon. To the right are social media links for 'Follow', 'Like', and '204'. A search bar is also present. Below the logo is a navigation menu with 'ABOUT US', 'BLOG', 'RESEARCH', 'PRESS', 'EVENTS', and 'CONTACT'. The main article title is 'The Raw Milk Debate'. Below the title are social sharing buttons for 'Tweet', 'Like', 'Send', 'Share', 'Print', and '+1'. The author is 'Keshia Pendigast'. The article text states: 'According to a study released in the February edition of *Emerging Infectious Diseases* journal, published by the Centers for Disease Control and Prevention (CDC), raw milk and its products are 150 times more likely than their pasteurized milk counterparts to sicken consumers. Yet according to *Food Safety News*, over 10 million Americans demand access and the choice to consume unpasteurized, raw milk.' There is an embedded map titled 'RAW MILK NATION State-by-State Review of Raw Milk Laws' showing various legal statuses across the US. The text continues: 'In 1948 Michigan was the first state in the United States to mandate that milk be pasteurized, and raw milk consumption was restricted to farm owners only. John Partridge, a Dairy Food Extension Specialist at Michigan State University, explains that "Pasteurized milk is when we cool milk down and then run it through a heat treatment system...to destroy the most heat-resistant pathogens." These include pathogens like *E. coli* and *salmonella*, which can cause extreme sickness and, in some cases, death.' Another paragraph says: 'But processes such as pasteurization and sterilization of milk also reduce milk's nutritional value. For instance, sterilization significantly impairs the bioactivity of vitamin B6, while pasteurization reduces milk's Vitamin C content and also destroys *Beta-lacto globulin*, a heat-sensitive protein that increases intestinal absorption of vitamin A. "Raw Milk didn't make people sick, *campylobacter* did," said co-owner of Your Family Cow Farms, Edwin Shank, in a recent interview for Bloomberg. "That's an important distinction. Whenever it's raw milk, people want to vilify raw milk and say don't drink it. They don't say the same thing about cantaloupe or spinach or peanut butter."' On the right side of the page, there is a 'Blog Topics' section with a 'Select Category' dropdown, a 'Nourishing the Planet Newsletter Sign-Up' form with fields for 'Email*', 'Name*', and 'Country', and a 'Subscribe' button. Below the form is a 'HTML Form Maker' link. At the bottom right, there is a social media feed snippet for 'Anthony Sabbath WorldwatchInst' with two tweets.

„...raw milk and its products are **150 times more likely than their pasteurized counterparts to sicken consumers**. Yet, over 10 million Americans demand access and the choice to consume unpasteurized, raw milk...“



Human health: is it safe to drink raw milk?

Increased Outbreaks Associated with Nonpasteurized Milk, United States, 2007–2012

Elisabeth A. Mungai, Casey Barton Behravesh, and L. Hannah Gould

The number of US outbreaks caused by nonpasteurized milk increased from 30 during 2007–2009 to 51 during 2010–2012. Most outbreaks were caused by *Campylobacter* spp. (77%) and by nonpasteurized milk purchased from states in which nonpasteurized milk sale was legal (81%). Regulations to prevent distribution of nonpasteurized milk should be enforced.

Pasteurization is an effective way to improve milk safety; however, in the United States, illness related to consumption of nonpasteurized milk continues to be a public health problem. The first statewide requirements that dairy products be pasteurized were enacted in Michigan in 1948 (1). In 1987, the US Food and Drug Administration banned the interstate sale or distribution of nonpasteurized milk. However, the laws regulating intrastate sales are set by each state (2). Regulations for intrastate sales of nonpasteurized milk vary from complete bans to permitting sales from farms or retail outlets (2). Even in states in which sale of nonpasteurized milk is illegal, milk can often be obtained through other means. For example, some states allow cow-share or herd-share agreements, in which buyers pay farmers a fee for the care of a cow in exchange for a percentage of the milk produced (3,4).

Consumption of nonpasteurized milk has been associated with serious illnesses caused by several pathogens, including *Campylobacter* spp., Shiga toxin-producing *Escherichia coli*, and *Salmonella enterica* serotype Typhimurium (3,4). Despite the health risks associated with consuming nonpasteurized milk, the demand for nonpasteurized milk has increased (3,5,6). Recently, many state legislatures have considered relaxing restrictions on the sale of nonpasteurized milk (2,6). We report that the number of outbreaks associated with nonpasteurized milk increased from 2007 through 2012.

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The Study

A foodborne disease outbreak is defined as the occurrence of ≥ 2 cases of a similar illness resulting from ingestion of a common food. State and local health departments voluntarily report outbreaks to the Foodborne Disease Outbreak Surveillance System of the Centers for Disease Control and Prevention through a standard web-based form (<http://www.cdc.gov/nors>). We reviewed outbreaks reported during 2007–2012 in which the food vehicle was nonpasteurized milk. Outbreaks attributed to consumption of other dairy products made with nonpasteurized milk, such as cheese, were excluded. We analyzed outbreak frequency, number of illnesses, outcomes (hospitalization, death), pathogens, and age groups of patients. Data on the legal status of nonpasteurized milk sales in each state were obtained from the National Association of State Departments of Agriculture (7–9) and an online search of state regulations. The sources from which nonpasteurized milk was obtained or purchased were categorized according to the description from the state outbreak reports, when available.

During 2007–2012, a total of 81 outbreaks associated with nonpasteurized milk were reported from 26 states. These outbreaks resulted in 979 illnesses and 73 hospitalizations. No deaths were reported. The causative agent was reported for all outbreaks. Of the 78 outbreaks with a single etiologic agent, *Campylobacter* spp. was the most common pathogen, causing 62 (81%) outbreaks, followed by Shiga toxin-producing *E. coli* (13 [17%]), *Salmonella enterica* serotype Typhimurium (2 [3%]), and *Coxiella burnetii* (1[1%]) (Figure 1). Three outbreaks were caused by multiple pathogens (Figure 1). The number of outbreaks increased from 30 during 2007–2009 to 51 during 2010–2012. During 2007–2009, outbreaks associated with nonpasteurized milk accounted for $\approx 2\%$ of outbreaks with an implicated food; during 2010–2012, this percentage increased to 5%. The number of outbreaks of *Campylobacter* spp. infection also increased, from 22 during 2007–2009 to 40 during 2010–2012 (Figure 1).

Information about the age of patients was available for 78 outbreaks (Figure 2). For 59% of outbreaks, at least 1 patient < 5 years of age was involved (Figure 2), and 38% of illnesses caused by *Salmonella* and 28% of illnesses caused by Shiga toxin-producing *E. coli* were in children 1–4 years of age (Figure 2).

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 21, No. 1, January 2015

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The screenshot shows a news article from KCRA 3. The top navigation bar includes links for 'NEWS', 'WEATHER', 'WILDFIRES', '2016 OLYMPICS', 'SPORTS', 'U LOCAL', and 'ON TV'. The main headline reads 'Salmonella forces recall of raw milk from Fresno Co. company' with a sub-headline 'Bacteria detected in Organic Pastures Dairy raw dairy products'. The article is dated 'UPDATED 4:48 PM PDT May 23, 2016'. Below the text is a photo of milk being poured into a glass. The caption reads 'FRESNO COUNTY, Calif. (KCRA) — Raw milk and cream produced by a Fresno County-based dairy company were recalled Monday due to salmonella, the California Department of Food and Agriculture said.'



Raw milk consumption: science or religion?

SCIENTIFIC OPINION

Scientific Opinion on the public health risks related to the consumption of raw drinking milk¹

EFSA Panel on Biological Hazards (BIOHAZ)^{2,3}

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

Raw drinking milk (RDM) has a diverse microbial flora which can include pathogens transmissible to humans. The main microbiological hazards associated with RDM from cows, sheep and goats, horses and donkeys and camels were identified using a decision tree approach. This considered evidence of milk-borne infection and the hazard being present in the European Union (EU), the impact of the hazard on human health and whether there was evidence for RDM as an important risk factor in the EU. The main hazards were *Campylobacter* spp., *Salmonella* spp., shigatoxin-producing *Escherichia coli* (STEC), *Brucella melitensis*, *Mycobacterium bovis* and tick-borne encephalitis virus, and there are clear links between drinking raw milk and human illness associated with these hazards. A quantitative microbiological risk assessment for these hazards could not be undertaken because country and EU-wide data are limited. Antimicrobial resistance has been reported in several EU countries in some of the main bacterial hazards isolated from raw milk or associated equipment and may be significant for public health. Sale of RDM through vending machines is permitted in some EU countries, although consumers purchasing such milk are usually instructed to boil the milk before consumption, which would eliminate microbiological risks. With respect to internet sales of RDM, there is a need for microbiological, temperature and storage time data to assess the impact of this distribution route. Intrinsic contamination of RDM with pathogens can arise from animals with systemic infection as well as from localised infections such as mastitis. Extrinsic contamination can arise from faecal contamination and from the wider farm environment. It was not possible to rank control options as no single step could be identified which would significantly reduce risk relative to a baseline of expected good practice, although potential for an increase in risk was also noted. Improved risk communication to consumers is recommended.

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KEY WORDS

raw milk, food-borne, pathogen, public health, antimicrobial resistance, vending machine, control options

¹ On request from EFSA, Question No EFSA-Q-2013-01026, adopted on 4 December 2014.

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- i. Main hazards: *Campylobacter* spp., *Salmonella* spp., shigatoxin-producing *Escherichia coli* (STEC), *Brucella melitensis*, *Mycobacterium bovis* and tick-borne encephalitis virus
- ii. «there are clear links between drinking raw milk and human illness»
- iii. «A quantitative microbiological risk assessment for these hazards could not be undertaken because country and EU-wide data are limited»
- iv. «Improved risk communication to consumers is recommended»





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Thank you for your attention

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