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Consumption of Raw or Unpasteurized Milk and Milk Products by Pregnant Women and Children

COMMITTEE ON INFECTIOUS DISEASES and COMMITTEE ON NUTRITION

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Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

POLICY STATEMENT

Consumption of Raw or Unpasteurized Milk and Milk Products by Pregnant Women and Children

COMMITTEE ON INFECTIOUS DISEASES and COMMITTEE ON NUTRITION

KEY WORDS
raw milk/milk products, unpasteurized milk/milk products, pregnant women, children

ABBREVIATIONS
AAP—American Academy of Pediatrics
FDA—Food and Drug Administration

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abstract

FREE

Sales of raw or unpasteurized milk and milk products are still legal in at least 30 states in the United States. Raw milk and milk products from cows, goats, and sheep continue to be a source of bacterial infections attributable to a number of virulent pathogens, including *Listeria monocytogenes, Campylobacter jejuni, Salmonella* species, *Brucella* species, and *Escherichia coli* 0157. These infections can occur in both healthy and immunocompromised individuals, including older adults, infants, young children, and pregnant women and their unborn fetuses, in whom life-threatening infections and fetal miscarriage can occur. Efforts to limit the sale of raw milk products have met with opposition from those who are proponents of the purported health benefits of consuming raw milk products, which contain natural or unprocessed factors not inactivated by pasteurization. However, the benefits of these natural factors have not been clearly demonstrated in evidence-based studies and, therefore, do not outweigh the risks of raw milk consumption. Substantial data suggest that pasteurized milk confers equivalent health benefits compared with raw milk, without the additional risk of bacterial infections. The purpose of this policy statement was to review the risks of raw milk consumption in the United States and to provide evidence of the risks of infectious complications associated with consumption of unpasteurized milk and milk products, especially among pregnant women, infants, and children. *Pediatrics* 2014;133:175–179

INTRODUCTION

Foodborne illness accounts for substantial morbidity and mortality in the United States. Estimates suggest that each year, as many as 48 million Americans experience foodborne illness, accounting for 128 000 hospitalizations and 3000 deaths.[1] In addition, surveillance estimates by the Centers for Disease Control and Prevention demonstrated no overall improvement in the incidence of foodborne illness in the United States from 2006 to 2009.[2] Among the most preventable of these foodborne illnesses are infections related to ingestion of raw or unpasteurized milk and milk products because of ubiquitous access to healthy, pasteurized milk and milk products, as well as legislation prohibiting the sale of raw dairy products in much of the United States. Reasons for the continued burden of disease related to raw or unpasteurized milk or milk products are primarily related to

misinformation regarding the purported benefits of these raw dairy products. Consumption of raw dairy products is especially risky among populations such as pregnant women, infants, the elderly, and immunocompromised individuals, who are most susceptible to infection with pathogens ingested in raw milk or milk products. Evidence demonstrates the overwhelming benefits to food safety conferred by pasteurization and consumption of pasteurized dairy products.

EPIDEMIOLOGY OF DISEASES CAUSED BY RAW OR UNPASTEURIZED MILK AND MILK PRODUCTS IN THE UNITED STATES

Before pasteurization of milk began in the United States in the 1920s, consumption of raw dairy products accounted for a significant proportion of foodborne illnesses among Americans and resulted in hundreds of outbreaks of tuberculosis and infections caused by bacteria, such as *Brucella abortus*, streptococcal species, and enteric pathogens.[3] Although most milk and milk products consumed today in the United States are pasteurized, an estimated 1% to 3% of all dairy products consumed are not pasteurized. From 1998 through 2009 alone, consumption of raw milk or milk products in the United States resulted in 93 illness outbreaks, 1837 illnesses, 195 hospitalizations, and 2 deaths.[4] These foodborne illnesses were caused primarily by ingestion of raw milk or milk products contaminated with *Escherichia coli* 0157, *Campylobacter* species, or *Salmonella* species. Seventy-nine percent of the outbreaks involved at least 1 person younger than 20 years.[4] In a second study, 121 dairy-associated foodborne illness outbreaks were identified in the United States from 1993 to 2006. Of these, 73 (60%) were associated with unpasteurized dairy products, resulting in 1571 cases, 202 hospitalizations, and 2 deaths; 60% of the patients were younger than 20 years. Thirteen percent of patients involved in raw milk or milk product foodborne illness outbreaks were hospitalized, compared with 1% of patients involved in outbreaks associated with pasteurized products. In addition, 55 (75%) of all 121 outbreaks occurred in 21 states that permitted the sale of unpasteurized dairy products.[5] Immigrant groups are another population at risk for illness from consumption of traditional foods made with raw milk.[6,7]

A number of pathogenic and opportunistic bacteria, parasites, and viruses (see Organisms Detected in Raw or Unpasteurized Milk or Milk Products) have been detected in raw milk or milk products.[4–22] In addition, patterns of dairy consumption appear to have affected the prevalence of illnesses associated with different dairy products. Among milk- or milk product–associated foodborne illness outbreaks reported to the Centers for Disease Control and Prevention between 1973 and 2009, 82% were attributable to raw milk or cheese. However, increasingly, recent illnesses associated with raw or unpasteurized cheese have been reported. This underscores the importance of all raw milk products as potential sources of illness.

Populations at highest risk of morbidity and mortality from foodborne illnesses include older adults, immunocompromised individuals, young infants, and children. The risks involved with infections attributable to consumption of raw milk and milk products are particularly high among pregnant women and their fetuses, as well as young children. For example, consumption of raw milk or milk products has been associated with a fivefold increase in toxoplasmosis among pregnant women[23]; listeriosis associated with high rates of stillbirths, preterm delivery, and neonatal infections, such as sepsis and meningitis[6]; and *E coli* 0157–associated diarrheal disease and hemolytic-uremic syndrome, primarily among young children.[24] Between 17% and 33% of all cases of invasive disease attributable to *Listeria monocytogenes* in the United States occur among pregnant women, unborn fetuses, or newborn infants, a 13- to 17-fold increase compared with the general population.[25–27] Complications include a 20% risk of spontaneous abortion or stillbirth, with two-thirds of infants developing neonatal infection, including pneumonia, sepsis, or meningitis.[28]

GUIDELINES FOR SALES OF RAW OR UNPASTEURIZED MILK AND MILK PRODUCTS BY THE FOOD AND DRUG ADMINISTRATION AND INDIVIDUAL STATES

The modern pasteurization process consists of raising the temperature of milk to at least 161°F for more than 15 seconds, followed by rapid cooling. Since 1924, the Food and Drug Administration (FDA) has regulated the production, handling, transportation, processing, testing, and sale of milk in all 50 states in the United States. In 1987, the FDA prohibited the interstate shipment of raw milk for human consumption, effectively banning interstate commerce of raw milk or milk products. No federal agencies, however, including the FDA, have jurisdiction in the regulation and enforcement of milk sanitation within individual states. In 2011, the National Association of State Departments of Agriculture conducted a review demonstrating that 30 states allow raw milk sales, but only a few of these allow sales in grocery stores. In addition, the 1987 FDA ban on interstate raw dairy transport allows for an exception of cheese made from raw milk, provided the cheese has been aged a minimum of 60 days and is clearly labeled as unpasteurized. However, there is evidence that *E coli* can survive in cheese products even

after a 60-day aging period,[29] and recent outbreaks of *E coli* 0157 illness associated with such unpasteurized, aged cheese have been documented in Arizona, California, Colorado, and New Mexico.[30]

RISKS AND BENEFITS OF RAW VERSUS PASTEURIZED MILK AND MILK PRODUCTS

Infections associated with consumption of raw and unpasteurized milk and milk products are related to contamination with pathogenic and opportunistic organisms from a variety of sources. Contamination of raw milk occurs by a number of mechanisms, including direct contact with bovine fecal matter; transmission of organisms from bovine skin or hide; clinical or subclinical mastitis; primary bovine diseases, such as tuberculosis; environmental contamination; and contact with insects, animals, and humans, for example, by contamination from soiled clothing.

Proponents of the health benefits of raw or unpasteurized milk and milk products claim that pasteurization destroys or neutralizes important nutrients in milks, such as proteins, carbohydrates, calcium, vitamins, and enzymes.[31–33] For example, claims that consumption of raw milk is not associated with lactose intolerance and that destruction of lactase by pasteurization of milk leads to lactose intolerance have not been substantiated by independent studies.[34–37] Other claims purporting links between pasteurized milk and autism, allergic reactions, and asthma have largely been based on testimonials or anecdotes and have not been demonstrated based on scientific data. In contrast, numerous scientific analyses have demonstrated that pasteurized milk and milk products contain equivalent levels of such nutrients compared with raw, unpasteurized milk and milk products.[31–39]

RECOMMENDATIONS FROM NATIONAL AND INTERNATIONAL ORGANIZATIONS REGARDING CONSUMPTION OF RAW OR UNPASTEURIZED MILK AND MILK PRODUCTS

Virtually all national and international advisory and regulatory committees related to food safety have strongly endorsed the principles of consuming only pasteurized milk and milk products. These include the American Medical Association, the American Veterinary Medical Association, the International Association for Food Protection, the National Environmental Health Association, the FDA, and the World Health Association. In January 2012, the US federal government denied a petition requesting federal-level legalization of all raw milk sales on the basis of its analysis of the scientific basis for the food safety benefits of pasteurization.[40]

The American Academy of Pediatrics (AAP) has strongly endorsed the use of pasteurized milk in its 2012 *Red Book*.[41]

CONCLUSIONS

In summary, the AAP strongly supports 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. The AAP also endorses 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. This recommendation is based on the multiplicity of data regarding the burden of illness associated with consumption of raw and unpasteurized milk and milk products, especially among pregnant women, fetuses and newborn infants, and infants and young children, as well as the strong scientific evidence that pasteurization does not alter the nutritional value of milk. The AAP also encourages pediatricians to contact their state representatives to support a ban on sale of raw milk and milk products. Additional resources containing information regarding the safety of pasteurization and the risks of consuming raw or unpasteurized milk or milk products are provided in this statement.

ORGANISMS DETECTED IN RAW OR UNPASTEURIZED MILK OR MILK PRODUCTS

Bacteria

Brucella species
Campylobacter jejuni
Coxiella burnetii
Cryptosporidium species
Enterotoxigenic *Staphylococcus aureus*
Listeria monocytogenes
Mycobacterium bovis
Salmonella species
Escherichia coli
- Shiga toxin-producing *E coli* (STEC [eg, *E coli* 0157])
- Enterohemorrhagic *E coli* (EHEC)
- Enterotoxigenic *E coli* (ETEC)
- *Shigella* species
- *Yersinia entercolitica*

Parasites

Giardia species

Viruses

Norovirus
Rabies
Vaccinia

RESOURCES

- http://www.realrawmilkfacts.com/
- www.cdc.gov/foodsafety/rawmilk/raw-milk-index.html
- http://www.fda.gov/Food/FoodborneIllnessContaminants/BuyStoreServeSafeFood/ucm277854.htm
- FDA "Grade 'A' Pasteurized Milk Ordinance." 2011 Revision: http://www.fda.gov/downloads/Food/GuidanceRegulation/UCM291757.pdf
- FoodSafety.gov "Myths About Raw Milk": www.foodsafety.gov/keep/types/milk
- www.nationaldairycouncil.org/sitecollectiondocuments/research/dairy_council_digests/2011/dcd11-1w.pdf

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