



# Motivation for Unpasteurized Milk Consumption in Michigan, 2011

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## ABSTRACT

It is largely unknown why some consumers prefer raw milk over pasteurized milk. We conducted a survey to determine the demographics of those who consume raw milk in Michigan and to summarize their reasons for preferring raw milk to pasteurized milk. Questionnaires were mailed to raw milk producers, who distributed them to their cow- or goat-share members, and 56 (35%) were completed and returned by mail. The typical raw milk consumer in Michigan is a well-educated adult in his/her late 20s. Stated motivations for preferring unpasteurized milk included a desire to support local farms, taste preference, and a belief that raw milk is more healthful and digestible than processed milk. The majority of respondents believed that drinking raw milk is beneficial for relieving allergies, intestinal diseases and digestive problems. Only 4 (7.1%) generally trusted recommendations made by state health officials regarding which foods are safe to eat. Further research is needed regarding the hypothesized health benefits of raw milk and the reasons that some people prefer to drink raw milk when pasteurized milk is more convenient and less expensive.

## INTRODUCTION

Raw milk refers to cow or goat milk that is not pasteurized. It is usually not homogenized, nor has any of its milk fat been removed, thereby giving it a higher fat content than most of the milk sold in retail stores. Also, raw milk frequently is an organic product, as raw milk producers often feed only organic feedstuffs and follow other organic dietary, treatment and management criteria (10).

Milkborne pathogens are a major public health concern because they can cause diseases such as brucellosis, Q-fever, bovine tuberculosis, campylobacteriosis, hemolytic-uremic syndrome, salmonellosis, and listeriosis (1, 7). These foodborne illnesses may range in severity from mild diarrhea to severe disease and death (3, 8, 14, 15, 20). Infants, the elderly, and infirm and immunocompromised persons are the most susceptible to illness from milk-borne pathogens (7). A multi-tiered system for preventing milk-borne disease is employed in the U.S. and most developed countries. Specific diseases such as brucellosis and bovine tuberculosis are eradicated or maintained at very low levels in cattle herds by vaccination and/or national disease control programs (17). Additionally, sanitation and hygiene inspection programs, as specified in the Food and Drug Admin-

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**TABLE 1. Mean, median, and inter-quartile range (IQR) of survey respondents (n = 56) regarding their acquisition of raw milk**

Question	Mean	Median	IQR
How many years have you been drinking raw milk?	6.1 years	2.25 years	4
What percent of the milk your family drinks is raw?	92.9%	100%	3.25
About how many miles must you drive out of your way to pick up raw milk for you and your family?	24.2 miles	20 miles	31.5
About how many times per month do you pick up raw milk for you and your family?	4.1	4	0.5
About how many times per month do you pick up raw milk for friends, relatives, or neighbors?	0.4	0	0

istration's Pasteurized Milk Ordinance, add yet another layer of defense against milk-borne diseases (12). Lastly, U.S. states in the 1940s and 1950s began to require that milk for human consumption be pasteurized as the final defense to destroy pathogens before milk reached consumers (1, 4).

In 1947, Michigan became the first state to require that all milk for sale be pasteurized (11). While it remains illegal to sell raw milk for human consumption in Michigan, it is not illegal to drink raw milk from your own animals (5). Raw milk consumers and producers therefore have developed 'cow share' and 'goat share' systems whereby people who wish to consume raw milk will purchase a share of a herd and thereby be able to claim that they are drinking raw milk produced by a herd of which they are part owners.

Few scientific studies are available regarding the health benefits claimed for raw milk. Additionally, little information is available regarding why some consumers prefer raw milk over pasteurized milk and sometimes go to great effort to obtain raw milk. A recent article by Peirce (13) surveyed 12 raw milk consumers who indicated a desire to have food in its "pure" form, with some respondents stating that pasteurization robs milk of some of its nutritional and health benefits (13, 19). Others preferred raw milk because of health reasons, cultivating relationships with family farmers, a desired flavor, and the wish to support local sustainable farms (13). Some raw milk consumers referred to it as a "living food" containing beneficial probiotics and enzymes especially helpful for digestion (13). It

has been claimed by some that raw milk has holistic health benefits for medical conditions such as psoriasis, allergies, intestinal diseases, digestive problems, and nervous system diseases (13, 19). Supporters of raw milk consumption have stated that raw milk needs to come from healthy cows grazing pasture grown on good soil that contains a variety of organisms, which will help the immune system develop as it should (13, 19). In a California survey of 128 raw milk customers, taste was the leading reason respondents chose to drink raw milk (6). The survey also indicated that consumers were more likely to be male, Hispanic, less than 40 years of age, and to have less than a high school education (6).

The objectives of the current study were to determine the demographics of those who consume raw milk in Michigan, to summarize their motivations for preferring raw milk, and to describe their beliefs regarding the health benefits and health risks of raw milk consumption.

## MATERIALS AND METHODS

For the purposes of this study, "raw milk producer" refers to someone who produces raw milk and distributes it in Michigan through a cow- or goat-share agreement. A list of raw milk producers in Michigan was obtained from a voluntary statewide registry of raw milk producers. Every other producer on this alphabetized list was contacted by phone and asked to assist in the distribution of survey questionnaires. In February of 2011, 20 producers agreed to participate in the study; 18 producers declined to

participate, either directly or indirectly by not returning phone calls. No incentive to participate was provided for either producers or consumers.

Each packet sent to participating producers included a cover letter that briefly reviewed the survey distribution protocol and eight stamped envelopes addressed to our Michigan State University office, each envelope containing one questionnaire. A total of 160 questionnaires were mailed to producers for distribution. Delivery confirmation was purchased for each set to ensure that none were lost in the mail and that the producer was still willing to participate. Each producer was asked to distribute one questionnaire to each of the next eight cow- or goat-share holders who obtained raw milk from their farm. Producers were also asked to ensure that no more than one questionnaire was distributed to each household. To avoid input from the dairy producer, respondents were explicitly asked to complete and mail the questionnaire from home. Zip codes on return envelopes and handwriting were evaluated to verify that respondents did not contribute multiple questionnaires and that questionnaires were not mailed from the farm.

The survey included 17 questions regarding basic demographics, motivations for drinking raw milk, attitudes toward raw milk regulations, and beliefs regarding the safety and health benefits of drinking raw milk. These questions were multiple choice or open-ended. Respondents were asked in an open-ended question to explain their main reasons

**TABLE 2. Perception of health benefits and risks associated with drinking raw milk**

Statement	Agree	Disagree	Not Sure	Non-response
Raw milk is healthier than pasteurized milk.	50 (91.1%)	1 (1.8%)	4 (7.1%)	1 (1.8%)
Drinking raw milk increases your risk of getting a foodborne disease.	6 (10.7%)	44 (78.6%)	5 (8.9%)	1 (1.8%)
Raw milk should be legal to sell in Michigan.	50 (89.3%)	1 (1.8%)	4 (7.1%)	1 (1.8%)
Raw milk should be regulated by the government to ensure quality standards.	9 (16.1%)	27 (48.2%)	17 (30.4%)	3 (5.4%)
I have visited the farm where my raw milk is produced.	55 (98.2%)	0 (0%)	0 (0%)	1 (1.8%)
In general, I trust recommendations made by state health officials regarding which foods are safe to eat.	4 (7.1%)	10 (17.9%)	41 (73.2%)	1 (1.8%)

for preferring to drink raw milk. Because of the difficulty of identifying raw milk consumers, we were not able to pre-test this survey prior to distribution. The project was approved by Michigan State University's internal review board.

## RESULTS

Fifty-six completed questionnaires were returned of the 160 that were distributed to raw milk producers, for a response rate of 35 percent. The results for categorical variables are shown in Tables 1 and 2. Results for continuous variables are shown in Table 3.

The 56 participants listed a total of 179 people in their households that were served raw milk, averaging about three raw milk drinkers per household. Of the 179 raw milk drinkers, 102 (57%) were male and 77 (43%) were female. With an average age of 29 years, raw milk drinkers were reported as being anywhere from less than one year to 75 years of age. Responses to open-ended and multiple-choice questions indicated that participants preferred raw milk because of their belief that it was more healthful and easily digested than pasteurized milk, and because they believed that their dairy animals were being handled and raised humanely on their cow- or goat-share farm. Respondents volunteered other motivations for preferring raw milk, which included beliefs that raw milk was beneficial for heart disease, neurologic disease, acne, and cancer. One respondent claimed that raw milk

helped prevent death in infants when fed as formula. Lactose intolerance, in particular, was mentioned by six respondents as a reason for preferring raw milk. Eleven individuals claimed that they experienced symptoms of lactose intolerance when drinking processed milks but had no ill side effects from drinking raw milk. Six respondents indicated that they prefer raw milk for making homemade milk products such as cheese and yogurt. In the open-ended questions, twelve respondents indicated they believe that raising cows on fresh, open pasture can minimize the risk of contamination with pathogens by boosting the natural immunity of the animals.

## DISCUSSION

Not all milk producers or cow- or goat-share members agreed to participate in the survey, and respondents may not have been representative of all goat- or cow-share members. Although our analysis of return envelope zip codes and handwriting suggested that the study protocol was followed, it is possible that the most dedicated raw milk drinkers were the ones most likely to return the survey. Factors other than pasteurization may confound the results of this study. A desire for goat's milk, unhomogenized milk, milk with a high fat content, and support of small farmers, as well as a perceived higher level of animal welfare, may be the major motivators for goat- or cow-share membership, rather than a rejection of the pasteurization process. Future surveys should clearly delineate

among these highly correlated motivators.

Based on the data collected, the average raw milk consumer in Michigan can be described as a well-educated adult around 29 years of age who typically lives in a rural area. This study also suggests that the movement toward drinking raw milk is a somewhat recent development, as most respondents began drinking raw milk within the last five years. Respondents were evidently very dedicated to drinking raw milk, since a majority drank raw milk exclusively and travel a great distance (mean of 24 miles) to obtain raw milk. The proposed health benefits of raw milk consumption were a major reason for their loyalty to the product. Unfortunately, there is little scientific evidence to support the beliefs regarding raw milk's health benefits.

According to the Centers for Disease Control and Prevention (CDC), 69 outbreaks of human infections resulting from consumption of raw milk were reported from 1993 to 2006. These outbreaks included 1,505 reported illnesses, 185 hospitalizations, and 2 deaths (4). In 2010, Michigan had two *Campylobacter* foodborne outbreaks associated with raw milk (2, 8). In 2011, three probable cases of Q-fever were reported in people who participated in raw milk cow-share arrangements and were presumably caused by raw milk consumption (9). Epidemiologic data on foodborne disease outbreaks reported during 2006 indicated that dairy products accounted for only 3% of single-commodity outbreaks

**TABLE 3. Demographics, preferences and beliefs of consumers of raw milk (n = 56)**

	Frequency	Percentage	95% CI
<b>Level of education</b>			
Did not complete High School	1	1.8	0.089 – 8.49
High School Diploma	6	10.7	4.46 – 20.96
Associates Degree	12	21.4	12.16 – 33.59
Bachelors or Higher	36	64.3	51.15 – 75.98
Non-response	1	1.8	0.089 – 8.49
<b>Residential area</b>			
Urban/City	12	21.4	12.16 – 33.59
Suburbs	15	26.8	16.45 – 39.47
Rural/Country	28	50.0	37.07 – 62.93
Non-response	1	1.8	0.089 – 8.49
<b>Reason for raw milk preference</b>			
Taste	47	83.9	72.55 – 91.87
Immune-related disease prevention	34	60.7	47.53 – 72.81
Doesn't feel processed milk is safe	32	57.1	43.98 – 69.58
Supports local farms	48	85.7	74.67 – 93.14
Holistic Health Benefits	43	76.8	64.43 – 86.44
Other	29	51.8	38.77 – 64.62
<b>Diseases thought to be helped/prevented</b>			
Psoriasis	11	19.6	10.79 – 31.57
Allergies	39	69.6	56.72 – 80.58
Intestinal Diseases	36	64.3	51.15 – 75.98
Digestive Problems	47	83.9	72.55 – 91.87
Cold and Flu	25	44.6	32.06 – 57.77
Tooth Decay	20	35.7	24.02 – 48.85
Orthopedic Disease	18	32.1	20.93 – 45.16
Other	11	19.6	10.79 – 31.57
<b>Animal origin of raw milk obtained</b>			
Cow	21	37.5	25.6 – 50.67
Goat	5	26.8	16.45 – 39.47
Not Specified	20	35.7	24.02 – 48.85

during that year (3). Seventy-one percent of those dairy outbreaks were attributed to raw milk.

Pasteurization does not, however, guarantee a safe product. Failures during or after milk pasteurization have actually caused the third (Cumbria, England, 1999, 117 cases) and fourth (West Loth-

ian, Scotland, 1994, 71 cases) largest *E. coli* O157:H7 outbreaks in the United Kingdom (14). While this proves that pasteurization is not infallible, foodborne illness outbreaks attributed to pasteurized milk products are very uncommon, considering the large number of people who consume them.

Nearly all raw milk consumers who participated in this survey had visited the farm where their milk was produced, and they generally believed that their producers maintained a higher standard of animal care and cleanliness than did the mainstream dairy industry. Support of local farms was the most commonly

chosen reason by respondents for drinking raw milk. Taste was the second most commonly cited reason. One issue not addressed by this study was whether the consumers' reason for drinking raw milk was actually their preference for goat milk. Goat milk is not readily available in retail stores, making goat-share agreements one of the few methods of obtaining goat milk.

Twenty-eight raw milk consumers thought raw milk was a more nutritious product, because they believed that pasteurization altered or destroyed components naturally found in raw milk. Current research indicates that pasteurization has no detrimental effects on the nutritional quality of the milk fat, calcium, phosphorus, fat soluble vitamins, or some of the B-complex vitamins (1). Pasteurization will slightly decrease the amount of some vitamins naturally found in milk, such as thiamin, cobalamin, and vitamin C (1). In a literature review, Alvarez and Parada-Rabell (1) concluded that the detrimental effects of pasteurization on the nutritional and physiological values of milk are negligible compared to the safety benefits for consumer health. While pasteurization does not necessarily have significant effects on the nutritional value, it does change the configuration of some components of milk. Heat denatures whey protein in milk, making it more digestible than the naturally occurring form; this is because the protein structure is loosened and digestive enzymes in the gastrointestinal system can act more easily (16). Nineteen respondents claimed that pasteurization would destroy important enzymes required for digestion. No studies could be found to describe exactly what these enzymes were, or specifically how they might be affected by pasteurization.

Only four respondents (7.1%) generally trusted recommendations made by state health officials regarding which foods are safe to eat. This lack of trust casts doubt on whether or not consumer education by local or state health departments would be effective in preventing milk-borne disease due to raw milk consumption.

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