Raw Milk Pros: Review of the Peer-Reviewed Literature

POSTED BY FOOD POISONING ATTORNEY ON JUNE 06, 2008

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I thought it might be helpful to bring a bit of rationality to the "raw milk debate." Here is a summary of the findings of a review of peer-reviewed literature on the topic of the consumption of raw milk at least the pros:

- There is substantial epidemiological evidence from studies in Europe that consumption of raw milk products in childhood has a "protective" effect for some allergic conditions (e.g., asthma, hay fever, eczema); other factors associated with living on a farm such as contact with animals and barns showed a similar effect in these studies. Plausible explanations for these observations exist including the "hygiene hypothesis" and modulation of the immune system early in life. At the same time, no author recommends raw milk as a preventive measure for allergies at this time because of the potential hazards due to foodborne pathogens such as EHEC and Salmonella known to occur in raw milk. The body of literature suggests that further studies are needed to identify the specific factors in raw milk (and other farm exposures) that lead to a protective effect for allergic conditions.

- No articles could be found substantiating an increased risk of autism due to pasteurized milk or a protective effect from raw milk consumption, respectively.

- Probiotics are increasingly recognized in the literature as an effective approach for managing some gastrointestinal and allergic conditions. Specific criteria that define "probiotics" have been published and raw milk does not fit this definition. No articles suggested that raw milk should be used as a probiotic.

- Raw milk and cheeses may contain microflora ("beneficial bacteria") that produce metabolites and other antibacterial compounds that may be toxic to foodborne pathogens. The presence and quantity of these specific compounds, the bacterial species involved, and the log reduction for different foodborne pathogens from these bacteria/compounds has not been defined in raw milk; therefore, these properties cannot be considered a substitution for a "kill step."

- Although studies have shown modest reductions in some vitamins and other nutrients after pasteurization of milk, these changes are insignificant according to a review by Potter et al (1984), human nutrition studies have shown no advantage of raw over pasteurized milk. A review of more recent literature did not reveal any changes in this position.

- No references could be found to support some benefits reported by raw milk advocates such as promotion of tooth development/reduction of dental caries; enhanced fertility; or existence of an undefined substance to protect against arthritis ("anti-stiffness" factor)

Detailed Literature Review of the "Pros" of Raw Milk Consumption: I. Protection against

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allergic conditions (e.g., asthma, hay fever, excema)

a. Raw milk advocates frequently cite recent epidemiological studies that have demonstrated a statistically significant inverse relationship between "farm" or "unpasteurized" milk and allergic conditions in children. A number of studies, mostly among children in various European countries, provide convincing evidence that a protective effect is associated with unpasteurized milk consumption during childhood. However, the underlying mechanism for this observation remains unclear and the overwhelming consensus among authors of these papers is that because of the potential health hazards from foodborne pathogens (EHEC, Salmonella, etc.) consumption of raw farm milk cannot be recommended as a preventive measure for allergic conditions.

i. Historical perspective: The "Hygiene Hypothesis"

1. The "hygiene hypothesis" is an accepted phenomenon that states children without (or with reduced) exposure to infectious agents (especially parasites) and other microorganisms are more susceptible to developing allergic disease.
2. In the last decade, researchers documented an association between children from "farming environments" and protection against the development of allergies. A couple papers as examples:

Kilpelainen, M., E. O. Terho, H. Helenius, and M. Koskenvuo. 2000. Farm environment in childhood prevents the development of allergies. Clin Exp Allergy 30:201-8.

Riedler, J., W. Eder, G. Oberfeld, and M. Schreuer. 2000. Austrian children living on a farm have less hay fever, asthma and allergic sensitization. Clin Exp Allergy 30:194-200.

ii. The next step in understanding the statistically significant association between children living in farm environments and reduced allergies involved dissecting out the specific factors that might be involved using epidemiological studies (conducted mostly in Europe). During these studies, raw milk was repeatedly identified as an independent "protective" factor for various allergic conditions. Raw milk was not the only independent factor found to be significant for rural children– others included "barn exposure" and "animal contact," for example. Some of the studies are contradictory (see below) and there were inconsistencies regarding which type of allergic conditions were influenced by raw milk exposure (e.g., asthma, atopy, excema). Below are some of the articles most frequently cited by advocates of raw milk consumption as "evidence" to support using raw milk as a "treatment" or "preventive measure" for allergies in children. Highlights from the abstracts and text are in bullets.

Perkin, M. R. 2007. Unpasteurized milk: health or hazard? Clin Exp Allergy 37:627-30.

- This is an editorial in the same issue with the Waser article below
- Reviews epidemiological evidence of the protective effect of raw milk for allergic disorders in children
- He concludes that the Waser paper "adds to the weight of evidence that a protective effect is associated with unpasteurized milk consumption....The key issue now is to determine what underlies this protective effect and whether it is possible to separate the protective effect from the hazardous [pathogens] substances."

Waser, M., K. B. Michels, C. Bieli, H. Floistrup, G. Pershagen, E. von Mutius, M. Ege, J. Riedler, D. Schram-Bijkerk, B. Brunekreef, M. van Hage, R. Lauener, and C. Braun-Fahrlander. 2007. Inverse association of farm milk consumption with asthma and allergy in rural and suburban populations across Europe. Clin Exp Allergy 37:661-70.

- NOTE: a major limitation of this study – raw milk was not distinguished from boiled "farm milk"
- Study enrolled 14,893 children aged 5-13 from 5 European countries
- "A strong and consistent inverse association was observed for the prevalence of asthma, wheeze, rhinoconjunctivitis, and pollen, in children who consumed farm milk since their first year of life." [Odds ratios/CIs are in the paper].
- No association with eczema (versus other studies showing an association)
- "At present, we can only speculate about the components of farm milk responsible for the observed protective effect."
- "The underlying mechanism of the farm milk effect is not known."
- "In conclusion...Dietary interventions are an attractive means for primary prevention. However, raw milk may contain pathogens such as salmonella or EHEC, andits consumption may therefore imply serious health risks. A deepened understanding of the relevant "protective" components of farm milk and a better insight into the biological mechanisms

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underlying the reported epidemiological observation are warranted as a basis for the development of a safe product for prevention. At this stage, consumption of raw farm milk cannot be recommended as a preventive measure."

Perkin, M. R., and D. P. Strachan. 2006. Which aspects of the farming lifestyle explain the inverse association with childhood allergy? J Allergy Clin Immunol 117:1374-81.

- Cross sectional survey of 879 children in rural England
- Raw milk was the exposure mediating the protective effect on skin prick test positivity (a measure of allergic disease)
- Like others, they speculate that the "diverse milieu" of bacteria in raw milk may explain the association ("hygiene hypothesis), but say these associations do not confirm a causal relationship
- They conclude with "However, it is important to mention that unpasteurized milk consumption is not hazard free, and milk-related outbreaks of Cryptosporidium species and Campylobacter species and E. coli O157 have all been described. It is thus premature to recommend unpasteurized milk as a putative protective agent for allergic disease.

Riedler, J., C. Braun-Fahrlander, W. Eder, M. Schreuer, M. Waser, S. Maisch, D. Carr, R. Schierl, D. Nowak, and E. von Mutius. 2001. Exposure to farming in early life and development of asthma and allergy: a cross-sectional survey. Lancet 358:1129-33.

- Cross sectional survey involving 2,618 parent of 6-13 yo children in rural areas of 3 European countries
- Overall findings: "long term and early life exposure to stables and farm milk induces a strong protective effect against development of asthma, hay fever, and atopic sensitization.
- Speculate that farm milk contains more gram negative bacteria and lipopolysaccharide (LPS, endotoxin) than pasteurized milk, which may be a factor in the allergic effect
- The authors do not comment on the pros or cons of raw milk consumption, per se

Wickens, K., J. M. Lane, P. Fitzharris, R. Siebers, G. Riley, J. Douwes, T. Smith, and J. Crane. 2002. Farm residence and exposures and the risk of allergic diseases in New Zealand children. Allergy 57:1171-9

- Smaller epidemiological study (293 children) from New Zealand
- Consumption of raw milk as part of the infant diet was associated with less allergic disease, especially eczema and allergic rhinitis; exposure to animals also significant
- Speculate that exposure to bacteria in raw milk in early life may stimulate an immune response that protects against allergies
- Supports the hygiene hypothesis
- No recommendation to promote raw milk (pro or con)

Other articles

Barnes, M., P. Cullinan, P. Athanasaki, S. MacNeill, A. M. Hole, J. Harris, S. Kalogeraki, M. Chatzinikolaou, N. Drakonakis, V. Bibaki-Liakou, A. J. Newman Taylor, and I. Bibakis. 2001. Crete: does farming explain urban and rural differences in atopy? Clin Exp Allergy 31:1822-8.

- They hypothesize that rates of atopy would be lower among the rural children compared with urban children because of contact with farm animals ("or perhaps raw milk") in early childhood. The "hygiene hypothesis"
- Regression analysis showed independent protective effects from raw milk consumption on atopy for children under 5 years
- They also found a significant association with animal contact (independent of raw milk consumption)
- The differences between rural/urban were not clear
- No statement regarding raw milk consumption (pro or con)

Bieli, C., W. Eder, R. Frei, C. Braun-Fahrlander, W. Klimecki, M. Waser, J. Riedler, E. von Mutius, A. Scheynius, G. Pershagen, G. Doekes, R. Lauener, and F. D. Martinez. 2007. A polymorphism in CD14 modifies the effect of farm milk consumption on allergic diseases and CD14 gene expression. J Allergy Clin Immunol 120:1308-15.

- These authors explore the genetic mechanism that might explain the protective effect of raw milk consumption and asthma in children
- They find a change in a specific gene (CD14)

Debarry, J., H. Garn, A. Hanuszkiewicz, N. Dickgreber, N. Blumer, E. von Mutius, A. Bufe, S.

Gatermann, H. Renz, O. Holst, and H. Heine. 2007. Acinetobacter lwoffii and Lactococcus lactis strains isolated from farm cowsheds possess strong allergy-protective properties. J Allergy Clin Immunol 119:1514-21.

- The authors show that 2 bacterial species from cowsheds were able to reduce allergic reactions in mice through alterations in the innate immune system.
- They conclude that their findings "strongly support the hygiene hypothesis, which states that an environment rich in microbiologic structures, such as a farming environment, might protect against the development of allergies.

Ege, M. J., R. Frei, C. Bieli, D. Schram-Bijkerk, M. Waser, M. R. Benz, G. Weiss, F. Nyberg, M. van Hage, G. Pershagen, B. Brunekreef, J. Riedler, R. Lauener, C. Braun-Fahrlander, and E. von Mutius. 2007. Not all farming environments protect against the development of asthma and wheeze in children. J Allergy Clin Immunol 119:1140-7.

- Epidemiological study involving 8,263 school age children from rural areas in 5 European countries
- Statistically significant protective effect against asthma by several farm factors (odds ratios and CIs are in the text): farm milk consumption; pig keeping; animal sheds

Hebeisen, D. F., F. Hoeflin, H. P. Reusch, E. Junker, and B. H. Lauterburg. 1993. Increased concentrations of omega-3 fatty acids in milk and platelet rich plasma of grass-fed cows. Int J Vitam Nutr Res 63:229-33.

- They find higher omega 3 fatty acids in milk grass fed cattle
- Black-Sharpe Dietary Fat Hypothesis suggests that omega 3 fatty acids may have a beneficial effect on allergies
- They conclude, "milk from grass fed cows may be nutritionally superior to milk from cows eating conserved grass with regard to omega 3 FAs
- Not stated here, but pasteurization should have no significant effect on FA composition (in other words, do not need to use 'raw milk" for this possible benefit, but whole—full fat—milk may be a factor)

Radon, K., D. Windstetter, J. Eckart, H. Dressel, L. Leitritz, J. Reichert, M. Schmid, G. Praml, M. Schosser, E. von Mutius, and D. Nowak. 2004. Farming exposure in childhood, exposure to markers of infections and the development of atopy in rural subjects. Clin Exp Allergy 34:1178-83

- Survey of 321 young adults from rural environments in Germany
- No independent effect of raw milk and atopy
- Combined protective effect of raw milk + barn animal exposure before age 7
- No comment on use of raw milk (pro or con)

Remes, S. T., K. Iivanainen, H. Koskela, and J. Pekkanen. 2003. Which factors explain the lower prevalence of atopy amongst farmers' children? Clin Exp Allergy 33:427-34.

- Finish study of 366 farmers and non farmers children
- No association with raw milk and allergic disease
- Less atopy among fresh vegetable eaters
- This study conflicts with other studies

Von Ehrenstein, O. S., E. Von Mutius, S. Illi, L. Baumann, O. Bohm, and R. von Kries. 2000. Reduced risk of hay fever and asthma among children of farmers. Clin Exp Allergy 30:187-93

- Study purpose: to test the hypothesis that children living on a farm have lower prevalences of allergic disease
- Cross sectional survey of children aged 10,163 (5-7 years)
- Farmer's children had significantly lower prevalences of hay fever, asthma, and wheeze than children not living in an agricultural environment; increasing exposure to livestock was significant
- Consumption of whole but not skim milk was associated with decreased hay fever and asthma
  - Speculate that protective effect might be from foods rich in fatty acids
  - Suggest that raw milk may have a higher microbial load (especially Lactobacillus) than industrially processed skim milk

II. Raw milk is protective against autism

Nothing in the literature was found to support this in the literature. WAPF cites this article, which seems irrelevant.

Meisel, H. 2005. Biochemical properties of peptides encrypted in bovine milk proteins. Curr Med Chem 12:1905-19

III. Raw milk is a probiotic

An entire issue of Clinical Infectious Diseases was dedicated to probiotics in 2008, but no mention of raw milk as a recommended source of probiotics could be found. The article below is by one of the experts in the field and defines probiotics; raw milk does not meet this definition.

Clinical Infectious Disease Journal, February 2008
http://www.journals.uchicago.edu/toc/cid/2008/46/3

Sanders, M. E. 2008. Probiotics: definition, sources, selection, and uses. Clin Infect Dis 46 Suppl 2:S58-61; discussion S144-51.

- The term "probiotic" should be used only for products that meet the scientific criteria for this term-namely, products that contain an adequate dose of live microbes that have been documented in target-host studies to confer a health benefit.
- Probiotics must be identified to the level of strain, must be characterized for the specific health target, and must be formulated into products using strains and doses shown to be efficacious.
- NOTE: raw milk does not meet this definition

Another recent article concerning probiotics and milk

Ivory, K., S. J. Chambers, C. Pin, E. Prieto, J. L. Arques, and C. Nicoletti. 2008. Oral delivery of Lactobacillus casei Shirota modifies allergen-induced immune responses in allergic rhinitis. Clin Exp Allergy.

- Lactic acid bacteria are among the most important probiotic organisms
- Probiotics are believed to reduce allergic symptoms by modulating the immune system
- The authors provide a rationale for probiotic use by demonstrating 2 lactic acid bacterial species that modified the allergic response, specifically indicators of seasonal allergic rhinitis (SAR)
- They suggest that “probiotics hold much promise as a functional food,” but nowhere is it suggested that “raw milk” would be a recommended food for this purpose
- NOTE: the experiment was carried out by inoculating the specific bacterial species into a milk drink (not explicitly stated, but no indication it was raw milk: “all dairy milk drinks were supplied by...with HACCP certification for the safety...”

IV. Raw milk contains “beneficial” bacteria.

There is evidence that there may be metabolites toxic to foodborne pathogens and antibacterial compounds that are produced by other bacterial species in raw milk. These compounds may help the bacteria that produce them to survive and compete in the food environment. Some of these properties are exploited by the food industry, but often to promote food quality, not foodborne pathogen control per se (at least not as the only method to control pathogens). The presence of these compounds in raw milk has not been defined and thus should not be relied upon as a “kill step” for dangerous foodborne pathogens that may also be present in raw milk.

Representative examples from the literature

Doyle, M. P., and D. J. Roman. 1982. Prevalence and survival of Campylobacter jejuni in unpasteurized milk. Appl Environ Microbiol 44:1154-8.

- This study compared the survival of 8 C. jejuni strains in sterile and raw milk
- The survival time (number of days) of C. jejuni strains varied depending on the specific strain
- Campylobacter survived longer in sterile milk than raw milk at refrigeration temperatures
  - The authors speculated that other microflora in raw milk may have produced toxic metabolites that inactivated the C. jejuni (for example, lactoperoxidase)
  - Although Campylobacter levels dropped off sooner in raw milk over the study period, there could still be enough surviving bacteria to represent an “infectious dose” (see Figure 2)
- The authors conclude: “our results indicate the presence and possible persistence of C.

jejuni in raw grade A milk and reaffirm the need for pasteurization."

V. Raw milk has a higher nutritive value

a. Historical perspective

i. Raw milk advocates frequently cite older articles about pasteurization with nutritional claims that were never substantiated by later research/nutrition studies. For example:

Hess AF. Infantile scurvy: its influence on growth. The American Journal of Diseases of Children. 1916; 152-165.

Bell RW. The effect of heat on the solubility of the calcium and phosphorus compounds in milk. The Journal of Biological Chemistry. 1925;64(2):391-400.

Pottenger FM. Effect of heat-processed foods and metabolized vitamin D milk on dentofacial structures of experimental animals. Am J Orthod 1946;32:467-485.

- In Pottenger article, raw milk advocates erroneously cited this article as having reported that disease occurred in cats fed pasteurized milk (see Potter et al, below).

b. Current literature

i. Potter et al wrote a review discussing the hazards and purported benefits of raw milk consumption for JAMA in 1984.

Potter, M. E., A. F. Kaufmann, P. A. Blake, and R. A. Feldman. 1984. Unpasteurized milk. The hazards of a health fetish. Jama 252:2048-52.

In table 1, they summarize the argument against the purported nutritive benefits as follows:

Pasteurization causes insignificant decreases in thiamine, vitamin B12, and vitamin C content; no effect has ever been demonstrated on the bioavailability of other raw milk constituents with known nutritive value; human nutrition studies have shown no advantage of raw over pasteurized milk.

No current peer-reviewed literature directly supporting "a higher nutritive value" for raw milk was found. One example of a questionable article that the raw milk advocates cite:

Rajakumar, K. 2001. Infantile scurvy: a historical perspective. Pediatrics 108:E76.

- This article is confusing/misleading when compared with other descriptions of the emergence of scurvy (vitamin C) deficiency in infants at the end of the 19th century
- The author repeatedly refers to ""the increased incidence of infantile scurvy during that period was attributed to the usage of heated milk and proprietary foods."
- From other readings, these "ready to eat" formulas became popular and replaced other vitamin C sources in the infant's diet during this time period. Since milk (raw or pasteurized) is not an important source of vitamin C, the most likely explanation for the epidemic was the removal of fruit and vegetable juices from the infant's diet; adding these foods back into the diet resolved the problem.
- This is not a "current day" issue with our diverse food including fruit and vegetable sources for infants.

VI. Some older purported benefits that are not used as frequently by raw milk advocates, and do not have references (mostly anecdotal)

- Promotes proper development of teeth and reduces incidence of caries
- Enhances fertility
  - Potter et al: this concept is based on misrepresentation of animal feeding studies that involved deficient diets
- Contains undefined substance to protect against arthritis ("anti-stiffness" factor)

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Amanda - June 6, 2008 9:51 AM

I have never looked at the definition of probiotics, but raw milk does have beneficial strains and may fit this purpose even if experts don't recommend it. Raw dairy Organic

Pastures in California has planned an asthma study and was going to use pasteurized milk as a control. Perhaps a better idea is to use a probiotic as a control. Of course, I don't know that human subjects would approve of the study in the first place, but if they do, they should use a probiotic.

It would be interesting to see how raw milk performed side-by-side with a good probiotic. Mark McAfee at Organic Pastures emphasizes that the probiotics are the key property in his milk that makes it different.

Organic Pastures also conducted its own challenge test for pathogens testing the competitive exclusion argument. Its results fit with your argument here -- it is not an effective kill step. Pathogens may not grow well, but they don't get wiped out at refrigeration temperatures.

On another angle, since many of us value raw milk as a traditional food, a Russian friend of mine was visiting and said, "In Russia we do not drink milk raw unless it comes from one cow." She proceeded to make the argument that the family cow model is a much more safe model for raw milk consumption. Just like your own batch of chickens, you are exposed to the pathogenic bacteria regularly and perhaps even develop an immunity to it (if that's the right word).

I asked a food safety person about this and, of course, he didn't recommend the family cow approach. "Does the cow have campy?" he asked. But family cows must reduce our risk to some degree and the family cow would go some way to explaining why sicknesses increase when people move to cities. Animal husbandry practices surely matter too, but on-going exposure to pathogens on your on property is probably a safer model than on-and-off exposure to the pathogens of hundreds of cows. Perhaps size matters after all.

Amanda

Shreela - June 6, 2008 4:53 PM

Amanda already covered my points about using milk raised by the family, instead of mixing many sources together. I'd like to think that a family drinking raw milk from their cow or goat would notice fairly quickly if their animal was sick, or they all started having food poisoning symptoms at once, and would remedy the situation pretty quickly. But mixing many milks together from different dairy farms, it takes much more time investigating where the infection came from, contaminating many more people during the investigation.

But what I haven't run across about the hygiene theory is what if it's not the exposure to the farmyard's infectious agents and allergens, but rather that they're not exposed to such high levels of exhaust fumes? I've seen many asthma studies online connecting exhaust fumes to increased symptoms.

Bill - June 6, 2008 10:35 PM

I got this email tonight:

During the 1980s, the main producer of raw milk in the United States was the Alta-Dena Certified Dairy, of City of Industry, California. During this period, it falsely advertised that its raw milk products were safe and healthier than pasteurized milk. These claims were challenged in a lawsuit filed in 1985 against Alta-Dena and its affiliate Stueve's Natural by Consumers Union and the American Public Health Association and later joined by the Alameda County District Attorney. In 1989, a California Superior Court Judge that: (a) "overwhelming evidence proved that Alta-Dena's raw (unpasteurized) milk frequently contains dangerous bacteria that cause serious illness"; (b) the company must stop its false advertising; and (c) that the company's milk containers and advertising must carry conspicuous warnings for ten years The court order also required the dairy to pay $100,000 as restitution to a fund to fight consumer health fraud, and civil penalties of $23,000 to the Alameda County District Attorney.

The article below describes the 1984 FDA hearing.

The Science and Politics of Raw Milk

Odom Fanning

Slogans vied with science at an informal FDA hearing on raw vs. pasteurized milk held in Washington, D.C., on October 11th and 12th, 1984. The hearing's purpose was to help the Secretary of Health and Human Services (HHS) decide whether new rule-making is needed.

Pasteurization is accomplished by heating milk for specified time/temperature combinations, most commonly 161¬∫ (71.6¬∫C) for 15 seconds. This kills microorganisms that can transmit disease to humans through milk, and also kills almost all spoilage bacteria. The process does not sterilize milk, but does make it safe to drink and extends shelf life.

Unpasteurized (raw) milk may be certified or uncertified. Certified raw milk (CRM) is the trademark designation of milk produced according to standards set by the American Association of Medical Milk Commissions, an industry organization. CRM is produced by three large dairies and can be sold through retail food stores in 24 states. In 6 other states, sale is limited to direct farm sales, while in 20 it is prohibited. Uncertified raw milk is typically produced in small quantities by individual dairy farmers and sold on the farm or by home delivery.

Even though a final regulation mandating pasteurization was proposed by the FDA 11 years ago, it was never issued. Last April, Public Citizen's Health Research Group (HRG), an organization founded by Ralph Nader, petitioned HHS to ban all raw milk sales in the United States. Then in September, joined by the American Public Health Association, HRG filed suit in U.S. District Court for the District of Columbia to force the agency to respond.

The hearing was held before FDA Commissioner Frank E. Young, M.D., Ph.D., Walton B. Read, M.D., of the FDA Bureau of Foods, and HHS attorney Fred Degman. Witnesses were not allowed to question the panel or one another-but were interrogated by the panel after giving testimony on two pre-announced questions:

Is the consumption of raw milk, including certified raw milk (CRM) and raw milk products, of public health concern?
Would requiring pasteurization of raw milk, including CRM and such products, be the most reasonable regulatory option?
The Commissioner also asked witnesses whether labeling CRM as to its risks would provide adequate protection for the public. Should he make a finding of fact that consumption of raw milk is of public health concern, he would then make a recommendation to the HHS Secretary-presumably for either compulsory pasteurization or mandatory labeling of milk in interstate commerce. Before a proposed regulation could be published, it would have to be approved by the Office of Management and Budget-and presumably the President. A final regulation is unlikely to be developed and take effect within the next year.

The political strength of raw milk advocates can be judged by the string of witnesses produced for the FDA hearing by Alta-Dena Certified Dairy, of City of Industry, California. According to a press kit distributed by the company, it is the largest producer-dairy in the world. It spans 600 acres and has 8,000 milking cows, 7,000 stock cows, 800 employees, and annual sales of $100 million. Twenty percent of its production is sold as raw milk or raw milk products. About 90% of all raw milk sold in California comes from Alta-Dena, which also funds the Los Angeles County Milk Commission, a certifying body.

Press reports assign to Alta-Dena a high political profile in California, where between 100,000 and 200,000 residents are said to drink certified raw milk or feed it to their children daily. The dairy and its supporters once marshalled 17,000 letters to the governor, against only a handful opposing its position.

One witness at the hearing was Harold Stueve, Alta-Dena's founder and co-owner. More than 60 members of the Stueve family are said to work for the company. Another witness was Rep. William E. Dannemeyer (R-Calif.), who was an attorney for Alta-Dena from the early 1960s until he entered Congress in 1978. Last Spring Dannemeyer got 36 of the other 44 Congressional representatives from California to join him in signing a letter to HHS urging FDA to back off from regulating certified raw milk. (Some have since withdrawn their support.)

"This ostensibly is a battle over public health," he testified at the hearing. "Disabuse yourself. It's a battle over the politics of public health. We are in this controversy because the medical profession for decades has produced doctors who are taught that all milk should be pasteurized. They don't get into the whys. It is only natural that people who achieve positions of responsibility then base their actions on what they were taught. These are dedicated people who believe that milk should be pasteurized."

Dannemeyer traced the history of opposition to Alta-Dena and CRM from 1966 and said that the public has lost respect for public health authorities in California in regard to this issue. He claimed that health department records show that 3.6 million human cases of

salmonellosis were reported between 1971 and 1982 in California, and that almost half of them were attributed to food service establishments, most of the remainder to meat and poultry, and only 103 to certified raw milk. He asked, "If it is the intention of public health authorities to eliminate Salmonellas from humans in the United States, how is it they ignore all except CRM?"

Another witness for Alta-Dena was Joseph L. Fleiss, Ph.D., head of the Division of Biostatistics at Columbia University's School of Public Health. He described an "odds ratio" scheme for controlled retrospective studies, with relative risks from 1 to 15. A value of 1 means "no associated risk." A value of 5 means "important public health risks," while 6 to 15 mean "probable cause and effect." Asked to rate certified raw milk on that scale, Dr. Fleiss responded: "My experience is that, if all things were known, it would not come down to 1, it would come down to 5."

Another Alta-Dena witness was John M. Douglass, M.D., an internist from Los Angeles. "Isn't it better to maintain control in the marketing of certified raw milk than to lose control?" he asked. "We might want to label it with some of the pros and some of the cons. That gives people freedom of choice. The label should be informative. Some people tolerate raw milk better than others. It may contain deleterious antigens."

Also testifying was William Campbell Douglass, M.D. (no relation to John Douglass), president of the Douglass Center for Nutrition and Preventive Medicine and author of The Milk of Human Kindness-Is Not Pasteurized. "For rapid, healthy growth in young children, there is no substitute for raw, certified milk," he asserted. "Pasteurized milk is dead milk, which will rot on standing. One of nature's most perfect foods has been murdered. At the turn of the century, 5,000 babies died annually from drinking raw milk, but instead of requiring dairymen to clean up their act they required pasteurization. Today, milk producers are clinging to outdated methods such as heat treatment to cover up sloppy production methods." [Editor's note: Pasteurization is not the only public health measure opposed by Dr. Douglass. A recent article by him in the National Health Federation's monthly magazine states that chlorinated-fluoridated water causes cancer, chronic fatigue, atherosclerosis, allergy, heart attacks and strokes. Clinton Ray Miller, NHF's Washington lobbyist, also testified.]

Paul M. Fleiss, M.D. (a cousin of Joseph L. Fleiss), a pediatrician from Hollywood, California, admitted that he had been "repelled" to discover that in Hollywood there was a large group of consumers of raw milk. For a number of years, he said, he tried to dissuade mothers from feeding their infants and children a product with such a bad reputation. Finally, he investigated for himself, read the literature, visited dairies, "became a convert," and now heads the Los Angeles County Milk Commission.

"I have a very busy pediatrics practice, and many mothers tell me that their children do better on raw milk," he said. "Some dairies are heating milk far beyond the heating required for pasteurization-they're sterilizing it. This destroys some important nutrients. And you can taste the difference." He also claimed that immunoglobulins and enzymes such as lactases and lipases are destroyed by sterilization. "Raw milk contains lipase, free fatty acids, which when absorbed help the body utilize fat better," he explained. "This is why some allergies might be due to pasteurized milk."

Another witness at the hearing was Mrs. Sandy Gooch, author of the book, If You Love Me, Don't Feed Me Junk. She identified herself as the proprietor of a California health food store which in June sold 5,319 gallons of raw milk, and as vice president of the Natural Foods Network [NF 1:16], which she said has three million customers nationwide. She asserted that she knew of no report of illness ever attributed to raw milk consumption.

Other supporters of raw milk marketing said repeatedly that mandatory pasteurization would threaten consumers' "freedom of choice." One contended that everybody knows that cigarettes cause cancer, but government has not banned them, and everybody knows that passive restraints in automobiles save lives, but government has not mandated them. Another said, "We tried prohibition (of liquor) once, and it didn't work. Is raw milk next?"

The witnesses against raw milk were equally outspoken. One was public health veterinarian Morris E. Potter who, with three others from the U.S. Centers for Disease Control (CDC), published a state-of-the-art report on the hazards of unpasteurized milk in the October 19th Journal of the American Medical Association. The report lists seven supposed benefits claimed by raw milk advocates, including higher nutritive value, reduced incidence of tooth decay, enhanced resistance to disease, and enhanced fertility. Citing 65 references, however, Potter et al. conclude that no significant nutritional difference has been found between raw and pasteurized milk in numerous studies in

both animals and humans.

The report explains that pasteurization affects six milk constituents with known nutritional benefits. Three vitamins for which milk is a minor source (thiamine, B12, and C) are reduced about 10%. About 6% of the calcium in milk is rendered insoluble, about 1% of milk protein is coagulated, and some fat globules are dispersed; but these changes have no effect on the bioavailability of these three nutrients.

On the public health issues, the CDC group states that, "Abundant evidence has shown that raw milk serves as the source of bacteria that cause outbreaks of disease in humans: in recent years, most frequently salmonellosis and campylobacteriosis. In the investigations of such outbreaks, the epidemiologic evidence, combined with knowledge about the occurrence of specific pathogens in cattle and the isolation of some of these pathogens from raw milk, leaves no doubt that raw milk is a vehicle for disease in humans."

The main symptoms of these infections are cramps, diarrhea and fever, but Salmonella dublin presents a special problem. This relatively rare organism is known to be host-adapted to cattle and is more likely to be identified as being derived from raw milk than are the more commonly isolated types of Salmonellae. The authors note that, "Numerous studies in multiple locations have confirmed the role of raw milk in the transmission of S. dublin to humans...S. Dublin infections are of particular concern because the associated illness tends to be severe" -- and is not limited to the digestive tract.

At the FDA hearing, Dr. Potter added that, "From 1980 to 1983, 53% of the foodborne outbreaks of Campylobacter reported to CDC were associated with drinking unpasteurized milk. The reported rate of isolates identified is 20 times greater in states that permit the sale of unpasteurized milk." According to CDC, outbreaks of campylobacteriosis associated with raw milk consumption have been reported recently in Arizona, California, Colorado, Georgia, Kansas, Maine, Oregon and Pennsylvania.

Michael Osterholm, M.D., Minnesota Department of Health epidemiologist, described the investigation of a current mysterious disease outbreak in that state. After months of investigation, in which 94 families have been contacted, the investigators know only this: The causative agent has not been identified, but the method of transmission is undisputed. Unpasteurized milk produced by one dairy had been drunk by all 122 victims during the three weeks before onset. Some have been sick for months. For those under age 18, the median is 76 days' duration. Children have recovered more quickly than adults, but only 11 (9%) have fully recovered. The producing dairy has voluntarily stopped selling raw milk products.

"All cases of which we are aware are associated with raw milk consumption, and there have been no new cases since the implicated milk product was withdrawn," said Dr. Osterholm. "This is no S. campylobacter. It is not a virus or a fungus. It stumps the best experts."

Raw milk's growing popularity as a "supposed health food" is of concern to the American Academy of Pediatrics, said another witness, John Bolton, M.D., a San Francisco pediatrician. The Academy "has reviewed both the nutritional properties and the safety records of raw milk and has found that the risks outweigh the benefits," he declared. "There are no benefits of raw milk that would outweigh the extreme risk of infection that sometimes follows feeding raw milk products to infants, children with malignancies, and children with problems involving the immune system."

He said that, since 1977, 192 isolates of Salmonella have been made in certified raw milk in California. This milk is also transported across state lines by distributors. According to Dr. Bolton, "The most recent finding on September 28, 1984, involved 4,000 gallons of certified raw milk distributed to consumers and retail outlets." Press reports prior to the hearing indicate that California health officials had recalled Alta-Dena's raw milk products 17 times since 1977 because state tests found S. dublin in samples. The incident referred to by Dr. Bolton occurred just hours before Gov. George Deukmejian vetoed a controversial bill that would have freed the dairy from control by state regulatory agencies. The bill would have allowed the sale of CRM shown by state labs to harbor salmonellae. Another recall involving Alta-Dena and two other California dairies has occurred since the FDA hearing.

Dr. Bolton exhibited a chart which analyzed the 123 cases of S. dublin reported in California in 1983. It showed 51 patients who used raw milk, including 44 who used it from Alta-Dena. Only 10 of the 51 had been exposed to such other possible sources of S. dublin infection as raw eggs or raw or rare meat. The list of pre-existing diseases in these patients "reads like the index to a pathology textbook: cancer, leukemia, lymphoma, cirrhosis, lupus, AIDS, etc.," he said. "This points out one of the most tragic

aspects of this problem. Seriously ill patients purchase a so-called 'health food' only to be exposed to S. dublin. Raw milk is even advertised as a basic food for invalids."

In response to certified raw milk producers' claim that the product is made safe by the practice of spraying the udders of the cattle with an antiseptic solution and then using two clean towels to wipe off, Dr. Bolton stated categorically that, "Potentially harmful bacteria still reside on the udders and inside some of the cattle as well."

Advocates of raw milk consumption point to other foods such as poultry which are frequently contaminated with Salmonellae. "What they fail to point out," said Dr. Bolton, "is that these foods are intended to be cooked before consumption. Heat destroys Salmonellae. Pasteurization, heat treatment of milk, is the only way to assure safe milk supplies." Referring to the statistical analysis of Salmonella illnesses cited by Congressman Dannemeyer, Dr. Bolton called it "creative." Literature distributed by Alta-Dena shows that the figure of "3.6 million cases between 1971 and 1982" was derived by multiplying the number of all types of Salmonella infections reported annually (3,000) by 12 years and again by 100, "since some say that only 1 out of 100 Salmonella cases are ever detected/reported." However, the number of S. dublin cases connected with raw milk consumption was given as the actual number reported (103), not the 10,300 which would result from multiplying this figure by 100.

According to state health officials, the fact that the number of S. dublin cases in California is not larger "relates to the fact that the population that drinks CRM is very small and that contamination of CRM appears to be intermittent." In its March 30, 1984 morbidity report, the Infectious Disease Section of the California Department of Health Services estimates that S. dublin infections are 158 times more likely in CRM users than in non-CRM users.

Others testifying in favor of a federal rule regarding raw milk included representatives of the Association of Food and Drug Officials; International Association of Milk, Food, and Environmental Sanitarians; National Conference on Interstate Milk Shipments; and National Milk Producers Federation.

The FDA hearing was but a skirmish in what The Los Angeles Times [Aug. 31] called "a holy war over milk" in California. "Each time the state laboratories have found salmonella in Alta-Dena's milk," the writer noted, "another recall notice has been issued, warnings have appeared in newspaper articles and the raw milk has been pulled off supermarket shelves. In this war of attrition, the state seems to be slowly winning." Although Alta-Dena's total sales have increased steadily in recent years, raw milk sales have declined from almost 20,000 gallons a day in 1977 to about half of that amount today. Yet, the article points out, "after all the recalls and all the press releases, an estimated 200,000 people a day still drink raw milk in California."

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Shreela - June 7, 2008 1:08 PM

I've been mostly about freedom of choice for ADULTS, but am rethinking it after reading about S. Dublin. I'm leaning towards stricter labeling, and if insurance companies cover costs of treatment from drinking unpasteurized milk, then I'd be for insurance companies not covering people knowingly drinking unpasteurized milk.

If anyone thinks that's harsh, what about everyone else having to pay higher premiums because of people choosing to drink/eat high-risk foods. Include that on the stronger labeling that insurances are not required to cover costs due to unpasteurized milk complications; we'd still have freedom of choice.

Melisssa - June 25, 2008 1:21 PM

Quite a good resource you have here. I am wondering what you think of the possibility of haccp + raw milk? Could raw milk be made reasonably safe with haccp? I was just reading the Devil's Picnic by Taras Grescoe where he talks about how Europe has adopted haccp for young raw milk cheeses instead of banning them entirely.

barb - February 20, 2009 7:24 AM

The "hygiene theory" should be tossed out because it is full of holes. Basically it says that there is less food allergy in underdeveloped countries than in developed countries. It ignored vaccines and use of antibiotics as being a cause and attributed the difference to a

dirtier environment that challenged the immune system. Vaccinations are the most likely cause of food allergies and there is some data that would connect asthma to antibiotics.

The Hispanic population of the United States has a lower incidence of food allergy. Certainly their houses are not "dirtier" than their neighbors. They do have a lower vaccination rate.

New Zealand has a very healthy population "The Unicef report, the State of the World's Children, showed New Zealand was on a par or ahead of the world on several counts for child wellbeing, including infant mortality, but it exposed the nation's low ranking for immunisations." New Zealand also has a low rate of food allergy.

The incidence of food allergy climbed when the number of childhood vaccinations was substantially increased.

Vaccines have secret ingredients that do not have to appear on the package insert. This is protected by international trade law. If you read patents for vaccine adjuvants and culture mediums, you will find a long list of foods that are used to produce vaccines. Trace amounts of food protein remains in the vaccine. Injecting food protein along with an adjuvant that increases the body's immune response is the most likely cause of food allergy.

When we try to fix things with vaccines, antibiotics, pasteurization, etc. - we fix one thing and create new problems in the process.

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bonnie - November 18, 2009 12:36 PM

A logical asssumption is not decisevly invalid becasue it has not been the subject of a peer reviewed study! Anectodal evidence has removed many a pharmaceutical that was formerly the recommended on the basis of much peer reviewed research.

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kenny - February 16, 2010 4:04 AM

please give me an introductory to a project (isolation and identification of bacteriaz from raw milk and pasturized milk

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Tom - March 21, 2010 9:29 PM

It is interesting to hear this discusssion from someone that has a vested interest in not discussing both sides of the question honestly. It is disengenuous at best to suggest that there is anything like fair treatment here or that this attorney's information is any more balanced than Fox News. Marler is the Fox News of nutrition.

Donna - October 16, 2011 7:53 AM

My understanding is that drinking raw milk poses less risk of the consumer contracting a foodborne illness, than does eating a salad. Feel free to show me evidence that this is incorrect.

If it's correct, then this is all much ado about nothing, since we are all encouraged to eat a lot more salad.

Life has risks. I'm not impressed by quotes from a pediatrician that state that raw milk shouldn't be fed to infants or immunocompromised and sick individuals, because the risks outweigh the gains. Glaringly absent from that statement is any mention of what would be best for healthy children.

We're in the middle of a huge cantaloupe recall in the US right now. People are getting sick from salmonella, from eating raw cantaloupe. Life is not safe, and it should be our right to decide which risks we choose to take. If you ate only locally produced foods and raw dairy, you certainly wouldn't be sick from the cantaloupe....

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