

Q Fever and Milk Pasteurization

A SIGNIFICANT number of human cases of Q fever have occurred in the United States in recent years. In certain Western and Southwestern States, the disease has been found to be endemic in cattle, goats, and sheep.

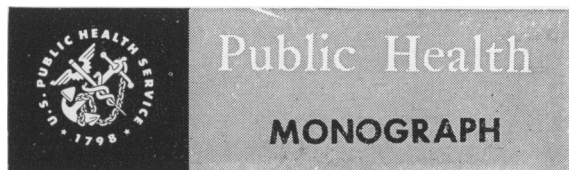
Contaminated milk from animals infected with *Coxiella burnetii*, the organism of Q fever, constitutes one method of introducing the organism into man's environment. Furthermore, early studies of Q fever in California had shown that *C. burnetii* survived the procedures recommended for the pasteurization of milk. Therefore, at the request of the director of the California State Department of Public Health, a cooperative study was organized to determine the times and temperatures required to eliminate viable rickettsiae from a community's milk supply.

The study was conducted in the department of public health, School of Veterinary Medicine, University of California. The Milk and Food Program and the Robert A. Taft Sanitary Engineering Center, both components of the Division of Sanitary Engineering Services, and the Communicable Disease Center were participating agencies of the Public Health Service, and the Dairy Industries Supply Association, Inc., and the Milk Industry Foundation also participated.

Thermal regression lines were constructed from the data obtained in the study and evaluated by statistical methods. For the regression line constructed from the minimum times at each temperature at which no surviving organisms could be demonstrated, a two-sigma or a 97.7 percent confidence interval was calculated. The addition of this confidence interval to the minimum time of destruction regression line was considered to represent an adequate margin of safety and the conclusions reached in the study are based on this method of treating the data.

It was concluded from the results of the study

that the minimum recommended standard for the pasteurization of milk of 143° F. for 30 minutes was inadequate to eliminate all the viable rickettsiae from cow's milk. However, heating the milk for 30 minutes at 145° F.



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The accompanying summary covers some of the principal findings presented in Public Health Monograph No. 47, published concurrently with this issue of Public Health Reports. The authors are with the department of public health, School of Veterinary Medicine, University of California, and the Robert A. Taft Sanitary Engineering Center, Public Health Service.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and of major universities and in selected public libraries.

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Enright, John B., Sadler, Walter W., and Thomas, Robert C.: Thermal inactivation of *Coxiella burnetii* and its relation to pasteurization of milk. Public Health Monograph No. 47 (PHS Publication No. 517). 30 pages. Illustrated. U. S. Government Printing Office, Washington, D. C., 1957. Price 25 cents.

would accomplish this. Results of the study strongly supported as adequate the minimum recommended standard for the pasteurization of milk at 161° F. for 15 seconds.

A study committee composed of representatives of the Public Health Service and of the milk industry recommended the minimum standards for pasteurization of milk be changed to conform with the findings of the study. The recommendations of this committee were disseminated to State and local milk control authorities and to the dairy industry.

The first part of the study was concerned with the investigation of two vitally important problems. The first was the determination of the maximum number of *C. burnetii* to be found in cow's milk in order to determine the concentration of organisms to be subjected to various temperature-time combinations. This was accomplished by testing milk from various areas of California, by testing the milk of individual cows in a herd in which the infection had existed for some time, by artificially inoculating a lactating dairy cow and testing her milk, and by determining the experience of other Q fever investigators in the United States. This type of field study encompassed many different kinds of husbandry, many different breeds of dairy cows, dairy herds of various epidemiological statuses, and individual

animals in different physiological conditions, especially in relation to parturition.

The second problem investigated early in the study was the determination of the best method of detecting the survival of small numbers of *C. burnetii* after the test population had been subjected to various conditions of time and temperature.

It was also determined that no demonstrable difference existed in the thermal resistance of *C. burnetii* when found in the milk of infected cows or when the organisms were grown in embryonating chicken eggs and then added to the milk of normal cows.

In the thermal resistance studies that followed, *C. burnetii* grown in embryonating chicken eggs were added to whole raw milk, adjusted to contain 3.8 percent butterfat, so that the test population of rickettsiae was of the same magnitude as that number found in 100,000 infectious guinea pig doses per milliliter. This test population was subjected to various combinations of time and temperature in both a laboratory study and a study using full-scale commercial pasteurization plant equipment. Tests to determine the presence or absence of surviving organisms consisted of examination of the serums of second-passage guinea pigs for the appearance of specific complement-fixing antibody.

First PHS Grant for Aging Research

An award of \$306,922 for research on aging has been granted by the Public Health Service to Duke University, Durham, N. C. The award, announced August 1, 1957, launched the Service's new program to stimulate the establishment of research centers in which university departments and local health and related agencies cooperate in the study of various aspects of aging.

Objectives of the Duke University program are to develop a center for aging research through universitywide effort; to support fundamental research on health problems of aging and to include research contributions from social and behavioral sciences and related fields; to train investigators for such research; and to foster a regional resource for the dissemination of scientific knowledge in the field of aging.

The program of the Public Health Service is under the Center for Research on Aging established in October 1956 at the National Institutes of Health.