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CONSUMERS' KNOWLEDGE, OPINIONS, AND ATTITUDES TOWARD SAFETY IN SELECTED FOOD ITEMS

[By Judith Jones and Jon Weimer, National Economic Analysis Division,
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Federal and State inspection laws have been designed to assure the consumer that food products are wholesome and properly labeled, thus helping to guard against foodborne illness caused by bacteria or insanitary processing. Nevertheless, the incidence of foodborne illness continues to be of great concern. The U.S. Public Health Service reported 23,448 cases of microbial food poisoning in 1970,¹ but most food-related illnesses are probably not reported and estimates range from 2 to 10 million cases per year. The three leading types of illness were staphylococcal food poisoning, clostridium perfringens food poisoning, and salmonellosis. A sizable proportion of the reported cases of foodborne illnesses have been traced to foods prepared or eaten in the home. At present, insanitary food handling practices are among the weakest links in the chain of food protection in the United States. Interest generated by Congress, public health services, and other concerned groups has resulted in an intensified effort to plan consumer education programs. To facilitate these programs, a survey to evaluate consumer awareness of and attitudes toward food safety practices in the home was deemed necessary to provide essential guides for planning. Similarly, such a study would aid in identifying those groups of people having the greatest need for food safety information.

Before delving into specific results obtained from the survey, we would like to give you a little background on how the survey was conducted and why we designed the questionnaire in the manner that we did. The survey was conducted during the summer of 1974. Data was collected via personal interview from approximately 2,200 homemakers. Selection of respondents was based on probability sampling procedures so that we could be assured that the people we interviewed were fairly representative of all homeowners within the continental United States.

In the survey we sought two general types of information from the homemaker: "behavioral" that is what she actually does in the kitchen, and "awareness"—her opinions, ideas and knowledge concerning specific food safety practices and principles. Ideally, to assess accurately what a homemaker does in the kitchen we should use a "candid camera" operation. Obviously, this method was impossible so we had to rely on the homemaker's verbal replies to our questions.

In the first half of our questionnaire we investigated the homemaker's behavior with regard to how she went about preparing and

¹ "Foodborne Outbreaks—Annual Summary," 1970, Center for Disease Control.

storing a number of food products. We tried not to give her an indication of our primary interest in food safety, but simply said we were interested in how consumers like herself fixed food. To give her a proper time frame, we asked her to think about the last time she cooked a specific food product, and we then proceeded to ask her a series of questions about her behavior when she prepared that product. A gamut of behavioral questions were asked about beef roast, pork roast, turkey, chicken, hamburger patties, and salad sandwiches—food products which are commonly incriminated as sources of food poisoning. The second half of the questionnaire dealt with the homemaker's opinions and knowledge on a variety for food safety principles and issues.

Constructing the questionnaire in this manner allowed us to classify respondents beyond the traditional demographic indices such as age, education, and income. Based on their answers to a select number of these "behavioral" and "awareness" questions, homemakers were grouped as to whether their behavior in preparing and storing food constitutes a high or low risk of spawning foodborne illness in the household. In our classification system, a household is considered to be "high risk" if the homemaker does one or more of the following "bad" practices:

Cooked hamburgers rare.....	1
Left cooked meat and poultry at room temperature for more than 2 hours.....	¹ 4
Left poultry, egg, or fish salad sandwiches at room temperature for more than 2 hours.....	1
Kept meat or poultry leftovers in the refrigerator where the temperature was above 45°F.....	¹ 4
Stuffed a turkey a day or more in advance of roasting it.....	1
Cooked a turkey partially at one time and completed the cooking at another time.....	1
Stored leftover stuffing in a turkey.....	1
Total number of behavioral practices.....	13

¹ One each for beef roast, pork roast, chicken, and turkey.

The fact that households are designated as "high risk" for committing any of the aforementioned behavioral practices does not mean, of course, that members of such households would inevitably suffer from foodborne illness. Rather, such households may be judged more vulnerable to an incidence of foodborne illness than they would be if none of these practices were followed. On the basis of these criteria, almost two-thirds (63 percent) of the households sampled would be classified as "high risk."

The demographic profile revealed that older homemakers (65 and older) homemakers with grade school education only, from households with low incomes, and residing in rural areas are less likely than corresponding subgroups to represent "high risk" households. Homemakers from these small and often low-income families are not as apt to serve a whole turkey or beef and pork roasts. Therefore, the number of behavior practices on which they might be found guilty are reduced—as is the risk of foodborne illness.

Of the "high risk" homemakers, 86 percent were classified as such solely because they left cooked meat or salad sandwiches at room temperature for more than 2 hours. For this reason perhaps the main focus of future consumer education programs should be to warn

homemakers of the danger inherent in holding susceptible foods at room temperature.

Homemakers were also grouped on their awareness of specific food safety facts. To be considered knowledgeable a homemaker must be cognizant of the risk of cross-contamination and be aware that leaving cooked meat at room temperature for over 2 hours is a dangerous practice. Seventy-eight percent of the homemakers sampled were classified "unware" of important food safety principles because:

They would not wash hands, utensils, and working surfaces with soap and water after cutting up fresh meat and before chopping vegetables to be eaten raw—67 percent.

They would be "not too concerned" or "not concerned at all" about cooked meat or poultry standing at room temperature for 2 to 3 hours—47 percent.

You will remember that 63 percent of the homemakers surveyed practiced "high risk" behavior in the kitchen increasing their vulnerability to an incidence of foodborne illness and 78 percent were "unaware" of major food safety rules. The matrix below further classifies homemakers into one of four risk/awareness categories.

	Awareness		Total
	Aware	Unaware	
Risk:			
Low risk (percent).....	9	28	37
High risk (percent).....	13	50	63
	22	78	

The challenge to educators is clear. Those "perfect" individuals whose sound knowledge of food safety principles and concepts is reflected in their behavior in the kitchen constitute only 9 percent of the homemakers sampled. We do not have to be too concerned about an additional 28 percent who seemingly do the right thing without knowing why (perhaps they are following the way their mothers taught them). It may be difficult to effect any change in the behavior of the 13 percent who are knowledgeable about food safety principles but who proceed to actually practice unsafe procedures. We probably know people like this—they know better, but they continue a practice nevertheless—perhaps they have never been ill or have "gotten away" with a procedure that is less than safe. An education program should be most effective in the case of the largest group—50 percent (literally millions of homemakers)—who, not aware of certain food safety principles, misbehave in the kitchen and thereby subject their families to increased risk.

In the time remaining we would like to summarize some of the results from a few of the "behavior" and "awareness" questions.

First—let's talk turkey. This is a food product of which the preparation probably provides more opportunity for making errors than any of the other foods we investigated. In this survey, 60 percent of the homemakers interviewed claimed to have prepared a whole turkey in the 12-month period prior to interviewing. A majority of the homemakers who prepared turkey also cooked stuffing with it. Now, as you are probably aware, salmonella bacteria are commonly found in fresh poultry and red meat. When a fresh turkey is stuffed, the salmonella

from the turkey may be transferred to the stuffing. Therefore, for *absolute* safety, stuffing or dressing should be cooked in a separate container. However, most homemakers do not do this—only 26 percent of the homemakers who prepared stuffing cooked all of it in a separate container. We would emphasize that cooking stuffing in the turkey is not necessarily bad—as evidenced in our survey and by casual observation, it is obvious most people prefer to cook stuffing in the turkey. Perhaps they feel the stuffing has a better flavor cooked this way. However, if the homemaker insists on cooking stuffing inside the turkey, it is imperative that the stuffing be thoroughly cooked. In the cavity of the turkey, it takes longer for the stuffing to be sufficiently cooked (it should reach a temperature of at least 165° F. during roasting). Just because the outer surface of the turkey appears to be done does not necessarily indicate the stuffing is safely done too. A majority of the homemakers (67 percent) when asked how they knew the stuffing was done replied that “when the turkey is done, the stuffing is done.” The risk of cooking the stuffing in the turkey may be further compounded when the stuffing is packed tightly. This practice does not allow the oven heat to penetrate as quickly. However, 40 percent of the homemakers who stuffed their turkeys packed the turkey tightly. (Younger homemakers and homemakers with lower levels of education were more inclined to do this.) To the homemakers’ credit, only a small proportion of them (6 percent) indicated they stuffed the turkey a day or more prior to roasting. Advance stuffing of the turkey, of course, would allow time for salmonella bacteria to multiply rapidly.

As indicated earlier in this report, leaving cooked meat/poultry products out at room temperature for more than 2 hours was considered a high risk practice. Approximately 37 percent of the homemakers who prepared turkey indicated that they left their turkey out for 2 hours or more (homemakers from the South were more likely to do this). As you people are probably aware, temperature and time influence the growth of bacteria including salmonella. Like other living things, bacteria need food, warmth, moisture, and time to grow and multiply. A standard rule, recommended by the U.S. Department of Agriculture, is that *hot* foods should be kept hot (about 140° F.) and *cold* foods cold (below 40° F.). Particularly, food may not be safe to eat if held for more than 2 to 3 hours at temperature between 60° and 120° F., the zone where bacteria grows most rapidly and the zone within which “room temperature” is traditionally thought to be.

The reported percentage—37 percent—who left turkey out at room temperature 2 hours or more is probably conservative, since our survey focused essentially on the first meal homemakers had with the turkey. Ninety-three percent of the homemakers who prepared turkey indicated they had turkey left over from the initial meal. However, we did not attempt to examine homemakers’ behavior with every subsequent meal they may have had with leftover turkey (or for that matter, with any other food we investigated). A homemaker’s behavior with leftover turkey and any accompanying stuffing and gravy, however, is critical. The time period (2–3 hours) at room temperature, beyond which bacterial growth may have reached dangerous levels can be obtained cumulatively. Thus, refrigerating or freezing cooked poultry (or gravy) may inhibit the increase of salmonella, but any

already on the poultry will remain alive and will increase when the poultry is put back into the danger temperature zone. Of course, this leftover poultry (or gravy) can be put back into this danger zone by merely "heating up" this food. It was found in this survey, for example, that 41 percent of the homemakers who claimed to have served leftover gravy, cooked it so that it was merely warm or hot—not simmering or boiling as it should have been to destroy bacteria. It is also recommended that leftover stuffing, that which is initially cooked in the turkey, be stored separately, *not* in the turkey as this might permit bacteria from the turkey to contaminate the stuffing. It was found that 10 percent of those respondents who cooked the stuffing in the turkey and had leftover stuffing did not remove the leftover stuffing before returning the leftovers to the refrigerator.

We covered a number of other topics in the questionnaire, which we don't have time to discuss in detail today, but we would like to touch on a few other results that may be of interest to you. Current government inspection procedures do not include provisions for testing for the presence of salmonella on fresh meat and poultry products. Evidently, some homemakers are unaware that absolute protection is not always attainable. Homemakers in this survey were asked how likely it was for meat and poultry, most of which are government inspected, to carry harmful bacteria or germs. Approximately 63 percent of the respondents thought it was "not too likely" or "not at all likely" for meat and poultry to possess such harmful bacteria. As mentioned earlier in this paper, approximately two-thirds of the homemakers appeared oblivious to potential health problems associated with the handling of raw meat and poultry when they prepare these items in conjunction with other foods—in other words, the problem of cross-contamination. Thus, it appears that homemakers may underrate the individual responsibility for hygienic food preparation. This under-rating of individual responsibility for hygienic food preparation was evident in another question of the survey in which approximately one-third of the homemakers stated they would not be concerned about a cut on their hand contaminating meat or poultry while preparing a meal for their family. An additional 13 percent of the homemakers indicated they would be concerned about a cut coming in contact with meat or poultry in the sense they would be worried that the meat or poultry would contaminate their cut! We also found that approximately one-third of the homemakers sampled indicated they would resort to taste to determine if the food inside a suspected can of food was all right—a disconcerting result in view of potential botulism.

Since there is a need to inform the homemaker on how to improve safety in storing, handling and preparing foods, we might ask what are some of the best ways to do this? In fact, we asked our sample of homemakers what was the one best way to get this kind of information to them. Television spots received the most votes—approximately 26 percent of the homemakers cited TV as the preferred manner to get food safety information communicated to them. Food labels were cited by an additional 16 percent of the homemakers. Radio spots were cited by only 3 percent of the homemakers as the best way to get this kind of information to them.

In summary, it appears that many people who buy and prepare food for themselves and their family assume that all products in retail markets are safe and wholesome. Although general experience may tend to support this for many products, consumers are still unaware that absolute protection is not always attainable and thus, as this survey indicates, they may underate their individual responsibilities for proper home storage and hygienic food preparation. A major problem relates to indifference or lack of knowledge on the part of a substantial number of homemakers regarding important time/temperature relationships in the preparation, serving and storage of cooked meat and poultry items and foods containing eggs or milk.