Consumer Food Safety Behavior: A Case Study in Hamburger Cooking and Ordering

Katherine Ralston, C. Philip Brent, YoLanda Starke,
Toija Riggins, C.-T. Jordan Lin

Introduction

Foodborne pathogens cause 76 million illnesses and 5,000 deaths in the United States each year (Mead et al., 1999). While the 1996 changes to Federal meat and poultry inspection regulations were intended to reduce the probability of pathogen contamination during processing, thorough cooking and safe handling are also required to kill any bacteria that may remain and to prevent cross-contamination. The 1997 Food Safety Initiative recognizes this with a specific component to expand consumer education to improve safe handling practices (U.S. Department of Health and Human Services, U.S. Department of Agriculture, and U.S. Environmental Protection Agency, 1997).

This report focuses on one important food safety recommendation: to cook hamburgers thoroughly and to order them thoroughly cooked in restaurants. The surveys discussed in the report asked consumers how they cook and ordered their hamburgers, using doneness descriptions such as rare, medium rare, medium, medium-well, and well-done, or colors such as red, pink, light brown, or dark brown. The Food Safety and Inspection Service, the Food and Drug Administration, and the Centers for Disease Control and Prevention now recommend that consumers use a thermometer to cook hamburgers to 160 degrees Fahrenheit (USDA, FSIS, 1998a) because research showed that color was not a reliable indicator of whether a hamburger was thoroughly cooked (Killenger, et al. 2000; USDA, FSIS, 1998b; Berry and Stanfield, 1993; Mendenhall, 1989). While the descriptions of hamburger doneness used in recent surveys do not correspond exactly to the safety of the hamburger, the descriptions do give an indication of how well consumers were following previous recommendations.

Consumption of undercooked hamburgers has been identified as a risk factor for infection from *E. coli* O157:H7 (Slutsker, 1998). This pathogen causes an estimated 62,458 illnesses, 1,843 hospitalizations, and 52 deaths per year (Mead et al., 1999). An estimated 21 percent of *E. coli* O157:H7 cases are attributed to ground beef (Powell et al., 1999). While this appears to be a small fraction of the total burden of foodborne illness, *E coli* O157:H7 has been targeted as a high priority for food safety measures because of the severity of the resulting illness and the high level of public concern over the danger to young children (Petersen et al., 1996). Further, cooking hamburgers thoroughly may prevent other illness as well, because ground beef can also be contaminated with other pathogens such as *Salmonella* and *Campylobacter*, although the number of illnesses resulting from these pathogens due to ground beef has not been established.

Consumers learn about food safety from meat labels, supermarket brochures, materials from Federal, State and local agencies, and private-public partnerships. The Food Safety Initiative has expanded consumer education by initiating a national media campaign called Fight BAC!™ to expand consumer compliance with food safety recommendations. Understanding how many consumers follow food safety recommendations, as well as which consumers and why, can help food safety educators reach more consumers in the future through targeting and designing food safety messages for specific subpopulations.

Education and information about food safety risks and the importance of safe handling can affect consumer behavior in ways that help prevent foodborne disease. Consumer awareness about food safety risks can be an important determinant of how safely they cook and order their foods. Consumer awareness is critical,

because it is at the point of cooking and consumption that they can take direct action to protect themselves from health hazards such as *E. coli* O157:H7. Further, specific food safety messages about cooking and ordering hamburgers may encourage consumers to handle other foods more safely.

Consumers have control over the doneness of hamburgers only in their own homes and in restaurants where a choice of doneness is offered. According to USDA's 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII), about 34 percent of hamburgers consumed in the United States are consumed at home, and another 7 percent are consumed in restaurants where consumers may be able to request a specific level of doneness (table 1). Most of the remainder are consumed in fast food establishments, cafeterias, residential dining facilities, and other locations where the preparation of the hamburger is regulated by various State and local authorities and the consumer may have little choice in the level of doneness. Thus, we focus on how consumers cook their hamburgers at home and how they order hamburgers in restaurants.

Table 1—Hamburger consumption by meal location

Location	1989-91	1994-96
	Percent	
Hamburgers eaten at home	54	34
Hamburgers eaten in restaurants	5	7
Hamburgers eaten in fast food establishments or cafeterias/residential dining	29	51
Hamburgers eaten in other locations	12	8
Total hamburgers reported (unweighted)	5,803	4,954

Source: USDA Continuing Survey of Food Intakes by Individuals, 1989-91; 1994-96. Estimated using sample weights.

We estimated the proportion of hamburgers consumed with red or pink in the center based on the 1996 Hamburger and Egg Consumption Diary (HECD). We compared these results to estimates based on usual consumption practices as reported by the same households in another survey module, the Hamburger Preparation Quiz (HPQ).

We used the HPQ to examine the role of consumers' attitudes toward risk and hamburger characteristics in their choices of hamburger doneness. We also used the HPQ to examine the relationship between information sources and risk attitudes and the relationship between demographics and attitudes toward palatability characteristics (taste, texture, and juiciness) of hamburgers. Finally, we used HPQ data on usual behavior in 1996 and respondents' recollections of their choices 5 years earlier to examine how hamburger cooking and ordering behaviors have changed over time and how these changes have altered the risk of becoming ill from a hamburger contaminated with *E. coli* O157:H7.