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Biographies

Roman Buckow holds a PhD in Engineering from the Berlin Institute of Technology, Germany. In 2006, Roman joined Food Science Australia (now CSIRO) to complete his postdoctoral research fellowship in the area of novel nonthermal food processing technologies. Roman currently leads the Process Engineering Science Research Group of CSIRO which focuses on process systems engineering, separations science and delivery systems to enable sustainable transformation of agri-food materials into safe and healthy food ingredients and products. Roman's research interests include designing new food structures and enhancing the

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Cooking meat at home



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One of the five keys to safer food promoted by the World Health Organization for consumers is “cook thoroughly” as cooking food properly kills almost all dangerous microorganisms¹. While this simple message is similarly promoted throughout Australia, beliefs and self-reported behaviours among consumers concerning cooking can vary. Here we describe consumer surveys on cooking meat as an example.

Preparing food at home remains a common practice for most Australians. In 2009, when 1,421 people were interviewed about the dinner meal they had the previous night, more than 7 out of 10 meals were prepared at home and common food items were vegetables (92%) and meats, including fish and poultry (90%; MLA, 2011)². In Australia, between 2001 and 2009, 9.8% of 1,025 reported

foodborne outbreaks were located in private residences³. There are multiple factors within and/or outside the home that could have contributed to these outbreaks although this information is limited. For the consumer and home food preparer, practising basic food safety measures will help to prevent foodborne illness and these include: Clean (wash hands, utensils and surfaces), Separate (prevent cross-contamination), Cook (cook to proper temperature), and Chill (refrigerate promptly to the right temperature)⁴.

The Food Safety Information Council (FSIC) is an independent, not-for-profit group supported by Federal, State and Local government agencies, professional, industry and community organisations, and individual members. It provides food safety information for Australian consumers through its online resources, media releases,

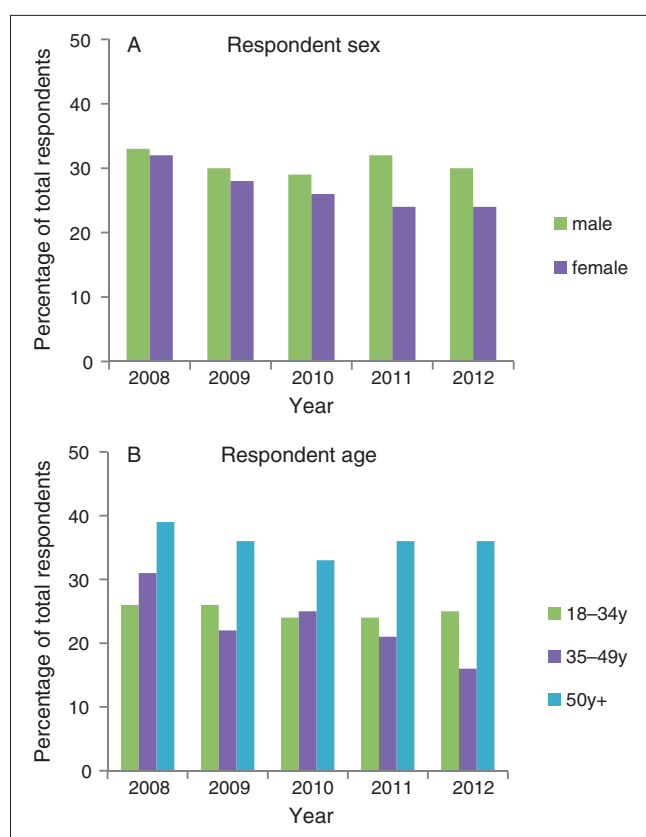


Figure 1. Percentage of respondents in surveys between 2008–2012 that believed steak cuts of beef need to be cooked right through to be safe categorised by (A) sex and (B) age of the respondent.

television and radio community service announcements and Australian Food Safety Week. Each year after Food Safety Week the FSIC contracts a public opinion polling agency to conduct a nationwide survey of consumer knowledge and self-reported behaviours related to its key food safety messages. The survey is conducted by telephone among persons over 18 y (>1,000) selected by a random process including capital and non-capital cities and subdivisions, telephone numbers and household positions; return calls for those frequently away; and, to reflect population distributions results are post-weighted using Australian Bureau of Statistics data. Here, we present some results of FSIC surveys related to cooking, one of the key food safety measures, and cooking meat, one of the most common foods cooked.

Between 2002 and 2012, respondents have been asked which of a selection of meats and meat products must be cooked all the way through to avoid food poisoning. Respondents have consistently believed chicken (>97%) was most important followed by sausages (overall range 86–92%) and hamburgers (overall range 78–84%). The belief hamburgers should be thoroughly cooked had a downward trend to 79% in 2012 mainly among younger adults, males, university educated and highest income groups. This trend should be monitored as consuming hamburgers has been identified as a risk



Figure 2. A thermometer used to determine the adequate cooking temperatures are reached when cooking meat.

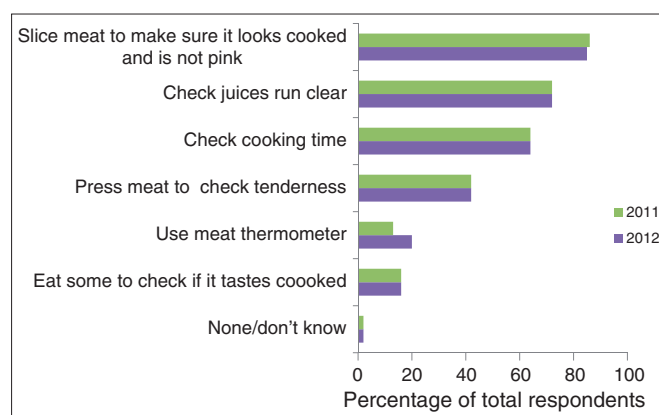


Figure 3. Survey respondents' choice of methods to determine when chicken is cooked and safe to eat in 2011 and 2012.

factor for Shiga toxin-producing *Escherichia coli* in Australia⁵. About a third of respondents believed beef steaks should be thoroughly cooked with a progressive and significant downward trend among females and 35–49 y olds (Figure 1). This practice is safe unless steaks are not intact through tenderising, or, if marinade is internalised during vacuum tumbling. Pork was included in 2011 with 85–86% believing this meat required thorough cooking, particularly older respondents, non-city dwellers, and households with children.

This may reflect continuing misbeliefs about parasites present in pork (DAFF, 2004)⁶.

Rolled roast meats need to be thoroughly cooked to inactivate internalised vegetative cells and were included in 2011 and 2012. Responses were consistent, though varied, with meat species: 87–86% believed boneless rolled turkey and 44–43% believed boneless rolled lamb roasts needed to be cooked through; about half of respondents over 50 y believed the latter. Further investigation is required as consumers may differentiate cooking requirements based on the meat species, although they may not understand the requirements for different preparations e.g. when internalising surfaces and/or ingredients not directly exposed to heat.

The surest way to determine when meats reach safe cooking temperatures is using a thermometer⁷ (Figure 2). In 2011 and 2012, 23–25% respondents claimed to have a meat thermometer in their home. Ownership was negatively linked with low household income and those over 65 y. Of those owning a thermometer in 2012, 44%, 35% and 10% claimed to have used it ≤ 1 , 2–12 and >12 months ago, respectively. Thermometer use has been actively promoted for domestic use more recently in Australia. In the United States of America thermometers have been promoted for longer and ownership was reported to have increased to 70% and linked with socio-economics⁷. In the USA self-reported usage varies with meats e.g. roasts, followed by chicken and hamburgers. Continuing promotion of usage and retail availability of appropriate thermometers should be encouraged.

Chicken dishes have been commonly attributed in foodborne illness outbreaks in Australia³. Thermometers are recommended to test that safe temperatures are reached during cooking. Ensuring the meat is not pink and the juices run clear has been widely recommended, although this is not always a reliable indicator of reaching safe temperatures or “doneness”. Pink colour can be due to characteristics of the bird, storage conditions, ingredients or marinades. Respondents were surveyed from 2011 on how they check if poultry is cooked and safe to eat (Figure 3). Most respondents, both years, claimed to test for colour change in flesh (85%) and juices (72%) and 62% used both; a lesser number used cooking time (64%) and tenderness (42%). Of concern is the 16%, mainly males, and lower income and education level groups, who “eat some to see if it tastes cooked”. These results flag an ongoing need to inform consumers on the hazards of consuming undercooked chicken and safe cooking practices. On the other hand, the use of

a meat thermometer increased from 13% to 20% indicating a promising increased awareness of this more safe method.

The results presented are beliefs and self-reported behaviours that have not been validated by observations. However, the value of these results is a consistent methodology, following food safety campaigns over 10 years, providing trends linked with demographic data. Just one of the surveyed issues is presented here to illustrate how food safety messages are perceived and practiced, and this could guide consumer information messages.

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Biographies

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