Foodborne Disease in the Social Media Age

Bernard Dixon

There must now be many people around the world who are alive and well thanks to medical information gleaned from the Internet. Especially with rare conditions, such information has facilitated the recognition of patterns of symptoms whose significance was not apparent even to the patients’ own doctors.

But websites, blogs, and social media also purvey erroneous advice. Gullible individuals are gulled into believing, quite wrongly, that they are suffering from systemic candidiasis or Lyme disease. Others purchase online nostrums that are not only inappropriate and ineffective for their ailments but also cause serious ill effects such as liver failure.

Microbiologists must now be concerned that the electronic media are fostering another parallelism of good and bad. The good is vividly illustrated by the speed with which blogs, tweets, and wikis helped researchers to investigate the outbreak of enterohemorrhagic Escherichia coli infection that began in May this year in northern Germany—the deadliest such incident ever recorded, with at least 46 deaths. After scientists at the BGI (Beijing Genomics Institute) deciphered the organism’s 5.2-million-base-pair genome in June and made it available for downloading, others in many different countries pored over the data, assembled sequence fragments into a coherent genome, and compared it with reference genomes for both E. coli and other bacteria.

The downside is that not only can helpful information and warnings about food risks be disseminated far more quickly and widely than in the past, but so can erroneous claims and ill-founded suspicions regarding specific foods, shops, restaurants, farms, and companies. In the German incident, preliminary findings, amplified by journalists and purveyed instantaneously through both traditional and electronic media first incriminated bean sprouts (wrongly) as the cause, then tomatoes (wrongly), then cucumbers (wrongly), then lettuce (wrongly), and finally (correctly) sprouts from an organic farm.

“Brand names and well-established products can be the center of a food scare with associated reputation risks,” said Alan Reilly of the Food Safety Authority of Ireland, speaking at a recent Society for Applied Microbiology (SfAM) conference in Dublin. “Food businesses and food control authorities are often in the position of responding to media stories and queries from journalists on food safety issues where there is often more detailed information in the public domain than is available in the food sector for risks assessment purposes. Managing food safety crises in the full glare of the media without the possibility of controlling the flow of information can be challenging for all involved.” While acknowledging beneficial contributions by social media, Reilly commented in The Irish Times (5 July) on the need for health authorities to be more cautious in releasing preliminary conclusions.

Such prospects are certainly hair-raising for those of us who remember the anonymized reporting of food-related disease incidents in the past. I recall one research paper, published in a major journal back in the 1960s, that not only failed (understandably) to identify the restaurant whose food had been responsible for five deaths, but did not even divulge the name of the European city where the outbreak had occurred.

The e-revolution and now the advent of social
media have changed all that. So, in the new situation, what can we expect to trigger the next major food scare on blogs, Facebook, and Twitter? Using Dixon’s Principle of Perversity (the least likely may prove to be the most likely), I offer four candidates. All are drawn from the Dublin SfAM conference, and each has that element of novelty or unexpectedness that could enhance public and media interest.

Butter, not normally regarded as a potential hazardous substance, is one possibility. As Phil Voysey of Campden BRI, Chipping Campden, U.K., pointed out, there is reason to be seriously concerned about the risk of listeriosis from butter. There were 17 cases in one outbreak in the north of England in 2003, and Voysey’s own work has thrown fresh light on the reasons why butter may be vulnerable to contamination by *Listeria monocytogenes* and allows its survival and proliferation. Two crucial factors proved to be salt level and water droplet size. “Our findings underline the importance for butter manufacturers of considering *L. monocytogenes* in their food strategies,” Voysey said. “They show the importance of good manufacturing technique in preventing problems from the organism’s growth.”

Another item that could burst onto the world stage as a source of listeriosis is the avocado. Ingrid Bester and colleagues at the University of Stellenbosch, South Africa, pointed out that minimally processed foods such as avocados are subject to contamination by a variety of microorganisms at every stage of cultivation, harvesting, and processing. Their work has demonstrated several different strains of *L. monocytogenes* on the raw fruit, in different parts of a processing plant and in the final product. They believe that these findings reveal a potential health hazard for people eating avocados without heat treatment.

My next example comes from the slaughterhouses of Belgium, where Inge van Damme and coworkers at Ghent University have been investigating the prevalence of human enteropathogenic species of *Yersinia* in pork carcasses. They found pathogenic *Y. enterocolitica* in the tonsils of 103 (57.2%), and in the rectal contents of 36 (20.0%), of 180 pigs. *Y. pseudotuberculosis* was also present, but only in a small proportion of the carcasses. “Taking into account that enteropathogenic *Yersinia* spp. are able to multiply at refrigerated temperatures, a considerable part of pork carcasses represent a potential risk to public health,” the Ghent investigators conclude.

The final item in my potentially newsworthy quartet of hazards is the mussel, *Mytilus galloprovincialis*—specifically the one grown and harvested in Turkey’s Marmara Sea. The high level of organic pollution there prompted Didem Alakvuk of the University of Istanbul to evaluate the danger to consumers, especially for those eating raw or undercooked seafood. He collected 100 mussels from each of 10 catching areas, and examined them for *E. coli* and other coliforms. His findings, presented in Dublin, indicated a high *E. coli* count in 7 of the 10 areas. Greater in the summer than the winter, the counts also exceeded European Union criteria in two of the areas. Alakvuk called for routine safety testing of harvested mussels—which does not happen at the moment—to forestall the threat to consumers.

Whatever the future holds, SfAM participants learned of a wide variety of methods of reducing risks of foodborne disease. Low-technology solutions were exemplified by a report from the University of Plymouth, U.K., where Sahar Al-Kutby and colleagues have demonstrated that treatment of doner kebabs with the spice extract sumac (*Rhus coriaria*) can greatly reduce the risk to consumers of infection by spore-forming bacteria such as *Clostridium perfringens*. High technology was exemplified by a report from Margaret Patterson’s group at the Agri-Food and Biosciences Institute in Belfast, Northern Ireland, that high-pressure processing can significantly improve the microbiological quality of cooked crabmeat—a food at unique risk of contamination from handlers while they are removing shells.

But what of the most comprehensive and powerful method of all, which could abolish a vast amount of foodborne disease and its accompanying misery, morbidity and mortality? Irradiation was indeed on the Dublin menu, described by Bala Balasubramaniam of The Ohio State University, Columbus, as a proven, effective, and safe technique. Like the speakers I have heard virtually every year for the past five decades, he added that, of course, we cannot use this approach because of “public perceptions.” When, oh when, is someone or some organization going to explain precisely what must be done to change this lamentable situation?