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Food safety and the hygiene misnomer

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From a food safety perspective, effective standards of hygiene and cleanliness throughout the food chain are understood to be key factors in reducing the incidence of foodborne disease. Therefore, it is difficult to postulate that we could ever be too clean from the point of view of controlling microbiological hazards in foods. Whilst interactions within the human biome are highly complex and many pathways remain to be understood, it is important that views that we might be 'too clean' are not allowed to overrule application of food hygiene practices either in the food industry or in the home.

The burden of foodborne illness

Foodborne illness is a significant burden globally. Recently published data from the World Health Organisation (WHO) estimate the burden of foodborne diseases in 2010 to be 600 million foodborne illnesses (95% uncertainty interval [UI] 420-960 million) and 420,000 deaths (95% UI 310,000-600,000) due to 31 global hazards.¹ The most frequent causes were foodborne diarrhoeal disease agents, which caused 230,000 deaths (95% UI 160,000-320,000), and the most common agents involved in diarrhoeal disease were norovirus and *Campylobacter*, with deaths particularly associated with non-typhoidal *Salmonella enterica*, *Salmonella* Typhi, *Taenia solium*, hepatitis A virus and aflatoxin.¹ Forty percent of the burden was in children under the age of 5 years old and, as might be expected, there was considerable variation across regions of the world.¹

Whilst it is clear that a large proportion of the burden lies in developing countries¹, foodborne illness affects the food industry and consumers all over the world² with previous estimates reporting that in industrialised countries up to 30% of the population may be affected each year.³ In the UK around a million people suffer foodborne illness every year, and this includes 20,000 people who need hospital treatment, and approximately 500 deaths.⁴ This costs the UK economy close to £1.5 billion each year⁴ whereas recent annual cost estimates in the USA are at \$77.7 billion (90% CI, \$28.6 to \$144.6 billion).⁵ Clearly, foodborne disease remains an important problem to be overcome in both developed and developing countries.

Responsibilities and Problems in the food supply chain

Although the above figures may seem alarming, our food supply in the developed world has probably never been safer⁶; however, data suggest that there are still weaknesses in the way that food safety is managed within the food supply chain, even in some larger food businesses.⁷

HACCP-based Food Safety Management Systems have long been accepted as the mechanisms that food companies should use to protect the consumer by controlling and preventing the potential presence of food safety hazards.⁸ HACCP systems do not work in isolation but in combination with prerequisite hygiene programmes and management practices within the overall food safety culture.⁸ All of these elements are important however it can be a complex balancing act to ensure that all the necessary systems and procedures are working together at all times and that staff and management personnel are all playing their parts effectively.

Looking at the causes of foodborne disease outbreaks, cross contamination and poor hygiene standards have been identified as key causes of foodborne illness. It is therefore somewhat

worrying to read recent summary data, published by one of the largest 3rd party food safety audit bodies, reporting on trends in audits across more than 17,000 food chain sites; this clearly identifies the most common non-conformities are occurring in areas such as housekeeping and hygiene (including cleaning systems), product contamination control, building fabric and equipment.⁹ Considering the importance of prerequisite programmes in supporting HACCP has been understood for many years¹⁰ it is disappointing to note that these key hygiene foundations are being overlooked, at least by some food companies. It is not clear whether the weaknesses are related to systems and resources, lack of understanding and/or cultural or people systems factors. However, these data suggest that the role of hygiene practices as the 'first line of defence'¹¹ against foodborne disease needs to be further promoted in the food supply chain and that more time and effort needs to be directed to getting basic hygiene standards correct.

The importance of the Consumer

Consumer perception of food safety continues to be problematic; consumers expect that food is intrinsically safe and their perception of risk differs from that of experts.⁶ Public health campaigns regularly aim to provide consumers with information about food safety risk and necessary controls, including hygiene practices, but most consumers do not worry about safety in their normal day to day lives.⁶ Food safety is often not a priority in domestic kitchen life but outbreaks of foodborne illness are known to occur in the home and understanding of real life kitchen practices is important in targeting food safety interventions.¹²

Cleaning and hygiene practices in the domestic setting are important tools in reducing food cross contamination but the understanding of different groups of consumers may vary and this may limit effectiveness. For example, historical learned wisdom in the UK often led to the washing of poultry before cooking as part of home preparation; however, this is known to spread harmful microorganisms such as *Salmonella* and *Campylobacter* around the kitchen and onto other foodstuffs. Therefore, recent campaigns from the UK Food Standards Agency have been focused on not washing poultry, e.g. the '*Don't Wash Raw Chicken*' Campaign.¹³ Other concerns about washing and cross-contamination come from the produce industry, where it has been demonstrated that washing can move bacteria from salad leaves to wash water which, in turn, can contaminate previously uncontaminated leaves.¹⁴ These messages have potential to cause confusion about washing and cleaning practices in domestic kitchens and there is a need for better guidance on what to wash and how.

Conclusions

Food safety management is a complex topic. In the food supply chain, it requires application of systems and procedures, such as HACCP, prerequisite (hygiene) programmes and effective management practices, all operating within a positive food safety culture; in the home it requires application of hygienic practices to prevent the spread of contamination, as well as washing of some food items to reduce surface contamination and effective cooking and storage procedures to prevent microbial survival and proliferation. With the number of elements that have to be correctly applied, both in the food supply chain and the home, it is perhaps not surprising that foodborne disease outbreaks occur from time to time. However, from a food safety perspective, the

importance of cleaning and hygiene will remain a cornerstone of health protection. It would be extremely unwise to suggest that we can be too clean for food safety.

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