

# The future relationship between the media, the food industry and the consumer

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The relationship between the media, the food industry and the consumer is probably at its lowest point as we start the new millennium. The frequency of food scares appears to be increasing and news reports sometimes seem both sensational and polarised. High profile issues like the development of bovine spongiform encephalopathy in the UK and the dioxin contamination of poultry products in Belgium have undermined consumer confidence in the food industry. The recent genetically modified foods' debate has served to demonstrate the gulf that has grown between the food industry, food safety experts and the public. This is a rift that has been exploited by environmental pressure groups and fuelled by the media.

This paper examines some of the underlying causes of the current air of mistrust that seems to exist between the media, the food industry and the consumer. Also, by examining the projected trends in these root causes, it draws some conclusions for the future relationship between the parties involved and suggests some changes that may improve the present situation.

Food safety was once a topic debated exclusively by the food industry and the regulatory authorities. Consumers accepted that food was safe. It was not something to be worried about. It was not something that would determine what was eaten or by whom it would be eaten. The media rarely saw the issue of food safety as a news-worthy topic and few, if any, reports on food safety ever found their way into the popular press. That was the relationship between the food industry, the consumer and the media less than 30 years ago.

In the late 1960s and early 1970s, few people could have predicted that food safety would become the major world issue it is today. Even fewer people could have foreseen the part that the media might play in this. Today, food safety is rarely out of the media spotlight. The consumer is now lobbied constantly by pressure groups, the food industry and the government via the media. Debates are public and polarised and increasingly it seems that those who adopt the middle ground are marginalised.

In the industrialised world, food safety has become a global issue that influences political careers and policy, sells television air time, newspapers

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and magazines and frightens the majority of consumers. The relationship that has developed between the food industry, the media and the consumer is one of suspicion and mistrust. This chapter will endeavour to examine some of the issues surrounding the development of this relationship by analysing some of the external and internal influences on the three groups involved. The immediate future development of the relationship between the food industry, the consumer and the media into the new millennium will be shaped by factors at work today.

## Consumers

A consistent supply of good quality and safe food is the major requirement of any consumer. In the non-industrialised world this is still the consumers' main goal and, understandably, it overshadows other considerations. However, in the industrialised world where this goal has been achieved, the consumer can now focus on less fundamental aspects of food supply.

In the industrialised world, the present-day consumer is a very different creature to the consumer of 30 years ago. Today, the consumer perception of food safety has been influenced by many factors and this has shaped their relationship with the food industry. Eating is a fundamental and personal activity that cannot be avoided. Therefore, food influences all our lives and may be it is this shared reality that makes food safety such an emotive issue with universal interest.

### *Consumer perception of risk*

Risk is an unavoidable element of living, it enters every facet of our lives. One of the most difficult messages that the consumer has been asked to accept is that eating food involves an element of risk. Risk, meaning the risk of food-borne illness and, in a small number of cases, illness that can be fatal. Consumers want to know that their food is safe, not that their food is as safe as possible. If society is to halt the cycle of food scares that exemplifies the relationship between the food industry, the consumer and the media then this is a fundamental message that needs to be understood by the consumer. Currently, this is not the case and the food industry, national governments and the media must all accept partial responsibility for this failure. Most communication from these sources is aimed at 'educating' the public, as if a simple statement of the facts is all that is required to get them to see the scientific point of view. All parties will only understand the concept of risk if they enter into dialogue with each other and participate in the risk evaluation process.

Research has shown that there are many factors that modulate the consumers perception of risk (adapted from Covello & Merkhofer<sup>1</sup>):

- Trust (did this person tell the truth the last time?)
- Receptivity (it happens to other people but not to me!)
- Familiarity (the risk of *Escherichia coli* O157 infection versus the risk of slipping on ice)
- Understanding (the risk of genetically modified foods versus the risk of sunburn)
- Scientific uncertainty (the risk of Creutzfeldt-Jakob disease from beef versus the risk of crashing the car)
- Controllability (exposure to antibiotic residues in meat versus the risk of flying)
- How voluntary (exposure to pesticides in food versus contracting cancer from smoking)
- Impact on children (risk perceived greater if children affected)
- Dread (a slow death from Creutzfeldt-Jakob disease versus a quick death from a plane crash)
- Media (source of popular understanding influences risk perception)
- Benefits (risk versus benefit: the risks involved with taking the contraceptive pill versus the benefit of preventing unwanted pregnancy)

Many of these factors are understood either consciously or unconsciously by the food industry, the media and pressure groups that may wish to pursue a particular agenda. Most, if not all, of the recent food scares reported in the media have exploited one or more of the factors aimed at increasing or decreasing the fears of the consumer in the fight to influence food consumption patterns.

### *Environmental awareness*

One of the major changes that has occurred in recent years giving rise to the publicity surrounding the food supply is the rise of environmental awareness in the industrialised world. This has resulted in an increase in the strength and size of the environmental lobby, particularly from those who wish to move away from intensive farming systems to organic food production. The food industry is no longer able to move in the direction it would like without meeting stiff resistance from environmental pressure groups. This has led to some well-publicised clashes, where both parties have attempted to gain the support of consumers by manipulating the

factors that modulate consumer perception of food safety and risk. The recent opposition to genetically modified foods in Europe is without doubt the best example of this new phenomenon.

To cite the rise of environmental awareness as the sole reason for the change in consumer perception of food safety would be to over simplify the current situation. Environmental pressure groups have existed for many years and have been active in their opposition to issues like intensive farming techniques. Yet these techniques have proliferated and expanded with little regard to their opposition. The major change would seem to be that consumer has only recently woken from a long and complacent sleep. The reason for this sudden awareness of food safety is undoubtedly due to a few monumental and catastrophic mistakes by the food industry. The trust of the consumer in the food industry has vanished over the last 10 years and trust is a key factor in the modulation of risk perception. Environmental groups have been able to exploit the distrust that now exists between the food industry and the consumer and hence they have gained a major victory. This may or may not prove a benefit for the consumer in the long-term, only time will tell. However, the food industry can certainly no longer ignore the environmental lobby and the relationship between the two groups that finally emerges will undoubtedly effect the future relationship between the food industry and the consumer.

### *Life-style changes*

Life-style changes over the past 30 years have affected two of the other main factors that modulate the perception of risk. In one version of an ideal world, consumers would be able to produce, process and eat their own food, thus taking control of its safety. However, an increasing proportion of the world population has abandoned this life-style for urban living. In 1955, 32% of the world's population lived urban life-styles. By 1995 this had risen to 45% and by 2025 it is estimated that this figure will grow to 59%<sup>2</sup>. If the rise in world population figures is taken into account, then this would mean that approximately 4.7 billion people will live in cities and towns far removed from the source of food production. For the majority of these people, the ability to control the safety of their own food will be lost and, with the loss of controllability, the fear of a food safety incident is likely to increase.

Urbanisation and an increasing reliance on others to supply wholesome food will also increase the sense of fear because exposure to the risk of food poisoning is not voluntary. This factor can easily be illustrated. According to the World Health Organization, there are currently 4 million deaths per year from smoking-related illness and this is

estimated to rise to 10 million deaths per year by 2030<sup>3</sup>. From a scientific perspective, it is completely illogical for smokers to be concerned about the risk of food poisoning. However, in reality, they are as concerned as any other group and one of the reasons is their voluntary exposure to risk. Smokers know the risks of smoking, but have chosen to continue; in contrast, they have not chosen to suffer from food poisoning. As urbanisation increases, the perception of food safety as a risk factor in life will also increase. Thus, to a certain extent, consumers may feel that they are in a more vulnerable situation than they were and hence they are more susceptible to the influence of the food industry or the media and pressure groups.

The changes in life-style patterns within urban life in recent years may have also contributed to the current climate of distrust and vulnerability. In the UK, for example, the number of women in employment rose from 9.9 million in 1984 to 12 million in 1997 whilst the number of men in employment remained relatively static<sup>4</sup>. The number of families where both parents go out to work has risen dramatically. Families are, therefore, less likely to prepare their own food from basic ingredients. Current trends in eating away from the home are arguably the ultimate expression of the consumers' increasing reliance on the food industry. The level and pattern of employment is not only just exerting time constraints on families but it is increasing affluence. In the US this trend has been at work for longer than in Europe. The average US household spent \$4411 on food in 1994 with 38% being spent away from home. Consumers are now reliant on the food industry from farm-to-fork and have little control over the safety of the food they eat. It is not surprising that fears have intensified as a result of our modern life-styles. In some cases these fears are justified, eating away from home appears to carry with it a greater risk of food poisoning. Analysis of the causes of 42 food poisoning outbreaks in Ireland between 1996 and 1999 showed that 90% of outbreaks occurred outside of the home in institutions and organised functions<sup>5</sup>.

### *Consumer summary*

Consumers are increasingly aware of environmental issues and their life-styles are changing rapidly. Both these trends have eroded some of the social factors that affect perception of risk. It is likely, therefore, that the consumer in the late 1990s is more susceptible to fears about food-borne illness. An increasing reliance on the food industry to supply wholesome food is coupled to an increasing distrust amongst consumers. It is unlikely that this distrust would have materialised without some foundation and clearly the number of incidents of food-borne illness is increasing at an

alarming rate. Therefore, decreasing consumer confidence is only part of the background to the current relationship between the consumer, the food industry and the media.

## The food industry

The food industry, like any other industry, supplies the demand from consumers. If consumers demand low cost food then the industry will supply it. If consumers demand more convenience foods then they will be supplied with those as well. Trends in consumer purchasing drive changes in the food industry. However, the food industry also exists for profit and commercial considerations dictate the approach the industry takes to supply demand. Developments in food science and technology have managed to supply consumer demands, but occasional failures have fuelled current concerns.

### *Intensive agriculture*

The number of people in the world is increasing. Table 1 shows that there is likely to be an extra 2 billion mouths to feed by 2025. In the industrialised world, the population increase will be slower adding 38 million consumers to the burden of food supply. However, with an increase in the number of people comes a decrease in the amount of agricultural land available to produce food. Therefore, each area of land will have to produce more food. For example, in the UK wheat yields increased from 5.9 tonne/hectare in 1980 to 8.1 tonne/hectare in 1996. Similarly, barley yields increased from 4.4 tonne/hectare in 1980 to 6.1 tonne/hectare in 1996<sup>6</sup>. In another development, aquaculture is now the fastest growing food production system in the world expanding at an average of 9.2% over the last decade. At this growth rate, aquaculture will produce more fish for human consumption than capture fisheries by 2007<sup>7</sup>. This pattern is repeated throughout the industrialised world in

**Table 1** Population trends (000s)

Area	1998 Total population	2025 Total population
World	5,926,062	7,919,803
Less industrialised countries	4,750,551	6,708,592
More industrialised countries	1,175,511	1,213,211

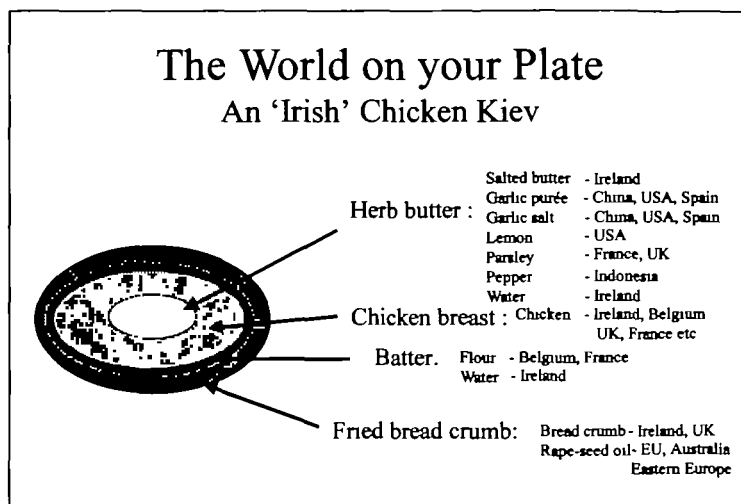
Data from Bureau of the Census USA<sup>19</sup>

both crop and animal production. Intensive agriculture has increased food supply, decreased costs and increased profits. In France, for instance, only 15% of the household budget goes towards food compared to 40% in 1940<sup>8</sup>. Based on the projected population increase and the demand for cheap food, the food production process is unlikely to become less intensive in the future.

The cost of this solution to the demand for plentiful cheap food has been several major and minor food scares. The arrival of bovine spongiform encephalopathy (BSE) in the UK during the late 1980s was a turning point in the relationship between the consumer and the food industry. The link between BSE and new variant Creutzfeldt-Jakob disease (CJD) a few years later was merely confirmation of what the majority of consumers already suspected. Few urbanised consumers realised that intensive agricultural practice involved using animal derivatives in feeds for herbivores. For many consumers this may have been the first time that they had considered the ethics and manner that their food was produced in, despite the work of environmental pressure groups. As consumers themselves, the media were not slow to develop the story and explore the ethical angles. The last decade has, therefore, seen the rise of consumer awareness of the ethical considerations of food production and this has lasted through into the more recent debates surrounding genetically modified foods and biotechnology. However, with the rise in world population and the increase in urbanisation, food production cannot revert to the practices of the 1940s; but, in Europe at least, there is likely to be a growing trend against the increase in the intensity of agricultural practices. With an increase in consumer affluence, the size of the niche market for organic produce will grow. Thus, in the future, we may witness the growth of 'food elitism' where one sector of the population can, in monetary terms, afford ethically-produced food with a perceived image of increased safety. It is important that the food industry and governments ensure that this remains a perception and that mass-produced, cheap food is also safe. If this does not happen, then it is likely that consumers will be justified in feeling that the food industry is letting them down which would put further pressure on the relationship between the two groups.

### *Globalisation of the food supply*

Food is no longer produced and consumed in the same locality. World trade in food is a feature of the late 20th century. Produce is imported from around the world leading to year-round supply of certain fruits and vegetables that in past years would have only been available during a short season. Similarly, the origins of processed foods have become equally diverse. To illustrate this, Figure 1 shows some of the potential



**Fig. 1** An example of processed food origins

origins of a chicken Kiev manufactured in Ireland. Ingredients are imported from many countries and thus a food safety problem in one country can easily find ramifications around the world. Recently, in Belgium, dioxin contaminated fat found its way into animal feeds and contaminated farm animals and products derived from them. Although the full history of this food safety incident may well be clarified in the future, it appears that contamination from one animal feed factory in one country resulted in a massive product recall in all 15 European Union Member States and other countries. In Ireland, a relatively small importer of Belgian produce, over 200 product lines were recalled. Elsewhere, the recall was much larger and affected farms as well as retail product. This amply demonstrates the potential dangers of the globalisation of food supply. The food industry is no longer national; it is international and, hence, food safety problems have become international. They are more frequent and more widespread than ever before increasing the consumers perception of the risk.

### *International food safety standards*

For some consumers, trusting a national food industry is difficult, but trusting the industry in a totally different country with different perceived standards can be almost impossible. The food industry will not stop the globalisation trend, in fact it cannot; it can, however, disseminate food safety practices and hence international organisations like the Codex Alimentarius Commission (CAC) will play an increasing role in the harmonisation of food safety standards. The work of these organisations should help to protect public health across the world and



increase trade in safe foodstuffs. In recent years, the formation of the World Trade Organization and two agreements on Sanitary and Phytosanitary Measures and Technical Barriers to Trade should speed up the standardisation process in the long-term. However, in the short-term, it seems that trade arguments over different interpretations of food safety can serve to increase the perceived risk by the consumer. It is often difficult for consumers to believe what experts say is safe when often they cannot agree what is safe amongst themselves. Opposition groups and the media seeking to influence the choice of consumers often exploit the different opinions held by different sectors of the food industry. International, independent, expert consultations on food safety issues, such as those convened by CAC, may well serve to harmonise scientific opinion in different countries and increase consumer confidence.

### *The adaptation of bacteria and susceptibility of humans*

Bacterial populations can double every 20 min under optimum conditions. Although these simple organisms benefit from only limited heterogenetic diversity, other mechanisms exist which alter the genetic information such as natural mutation and plasmid transfer. When these mechanisms are coupled with the exceptionally fast reproduction rate, the genetic diversity of bacteria is far greater than that found in humans, up to 5 times greater in fact when subjected to similar measures<sup>9</sup>. It is no surprise, therefore, that bacteria can adapt rapidly to their surroundings.

In some instances, bacteria have adapted to modern food production practices. For example, it is no coincidence that the increase in listeriosis in the industrialised world has mirrored the increase in the preservation of food by the use of chill storage temperatures. In the 1980s, consumers began to demand fresher, less preserved food and this demand was supplied by the food industry by the use of chill storage and distribution. *Listeria monocytogenes* is a bacterium that has been known since the early decades of the 20th century, but it was not known to cause food-borne disease. In England and Wales, figures on cases of listeriosis were first collected in 1983 and 111 cases were diagnosed. By 1988, this had peaked at 278 cases falling back to 115 cases by 1996 probably as a result of the recognition, research and control of the organism in the food factory<sup>10</sup>. In another example of adaptation, some bacteria have developed resistance to antibiotics. In the UK, *Salmonella typhimurium* DT104 has been the most common antibiotic resistant strain in humans since 1992 and it is resistant to 5 antibiotics<sup>11</sup>. There is evidence to suggest that some antibiotic-resistant bacteria are transmitted to humans from animals via food, but the extent of the problem remains to be established<sup>18</sup>. Equally, there is some evidence that these organisms cause

illness in humans. It seems likely that resistance has been caused by the selective pressures exerted on enteric bacteria in the guts of farm animals due to the use/mis-use of some antibiotics required by intensive farming methods. By nature of their antibiotic resistance, these bacteria are much more difficult to remove from the food-chain; research/surveillance is being funded to establish more clearly carriage of antibiotic-resistant microbes and their importance.

In other instances, bacteria have emerged that were not present 30 years ago. For example, *E. coli* O157:H7 and related strains cause critical food-borne illness and seem to have emerged from normal gastrointestinal *E. coli* in cattle. Unlike their harmless ancestors, these organisms have acquired a series of virulence factors that have made them into the serious threat they are today. Cases in the England and Wales have risen from 470 in 1992 to 1087 in 1997<sup>10</sup>. World-wide, the pattern is repeated.

Food-borne pathogenic bacteria present a greater hazard to immunocompromised groups than to the general healthy population. These vulnerable groups are the very young, the elderly, pregnant women and people with immune systems weakened by diseases like cancer and AIDS. Although, in industrialised countries, population growth will be slower than in non-industrialised ones, the population will age faster. It is predicted that, in 2025, approximately 21% of people will be older than 65 years. This represents over 900 million more people. The ageing patterns are shown in Table 2. In addition, it is estimated that 30.6 million people world-wide were living with HIV/AIDS at the end of 1997, with figures expected to rise well into the 21st century<sup>12</sup>. Essentially, the population is set to become more vulnerable to food-borne disease.

### Food industry summary

Manufacturing practices shaped by consumer demand and profit margins have increased the risk of delivering new bacteria to vulnerable people. It is inevitable that this has added to the growth in the number

**Table 2** Population trends (000s)

Area	1998		2025	
	Total population	Population aged over 65 years (% total)	Total population	Population aged over 65 years (% total)
World	5,926,062	400,672 (6.8%)	7,919,803	821,096 (10.4%)
Less industrialised countries	4,750,551	234,141 (4.9%)	6,708,592	563,950 (8.4%)
More industrialised countries	1,175,511	166,562 (14.2%)	1,213,211	257,146 (21.2%)

Data from Bureau of the Census USA<sup>19</sup>

of cases of food-borne illness in the past 20 years in particular. The food industry is faced with a growing challenge to the safety of the food supply and, unless it can redress the balance in the next few years, it is unlikely that its relationship with consumers and the media will improve.

## The media

There can be no doubt that currently food is news. A study commissioned by the International Food Information Council and carried out by The Centre for Media & Public Affairs in the US analysed 3 months' of news coverage from May to July in 1995. There were 979 food and nutrition reports from 37 news outlets in that period, covering newspapers to television. This accounted for 10,000 column inches and 11 h of broadcasting<sup>13</sup>.

The food industry has often charged the media with biased reporting of food safety issues. It is difficult to look into the reality of these claims because surveys of reporting bias are lacking or not publicly available. The IFIC study provided a rare opportunity to test this accusation. It was found that, in the area of food safety, stories covered additives, contaminants, food labelling and causes of food-borne illness. In the case of additives and contaminants, they found that the negative effects of these issues were highlighted twice as often than the positive effects and that environmental and health activists were quoted 5 times as often as industry sources. This would, at first sight, appear to lend support to the claims of the food industry. However, a repeat of the survey in 1997 found that this trend had disappeared and activists were no longer the major group quoted.

### *Quality of reporting*

Perhaps the most interesting result of both IFIC studies was the finding that most reports lacked the information required to communicate the context of the topic being reported. Essentially reports were too brief and focussed on black and white issues. Perhaps here lies the problem in the relationship between the media, the food industry and the consumer. The media are often viewed with suspicion by scientists who complain that they have been quoted out of context or even misquoted completely. In reality this does happen, but it can be due to both parties. The media have been known to sacrifice reality for a news angle on occasions, but it occurs far less than some would suspect. Often misquotes and context problems are simply a reflection that the two parties to the interview

speak different languages. Not in the literal sense of course, but the language of science is very different from the language of the media. Few reporters have science training and many scientists, after years of science training, have forgotten how to communicate a simple, clear and unambiguous message. Under such circumstances, the context of reports is often difficult to express and often dropped when there is pressure on column space or broadcast time.

### *Media competition*

Global communications are expanding and the newspaper or television is no longer the sole source of information. However, for the majority of consumers, these traditional forms of reporting are still their sole 'window on the world'. Competition in the media has increased dramatically over the past 30 years. Television has moved from terrestrial-based stations to satellite stations and is now moving into digital format. For example, in 1980, the American cable network CNN was founded and broadcast 24 h news to 1.7 million American cable households. However, in 1998 CNN and CNN International broadcast news to 190 million households in 210 countries around the world via satellite and international broadcast stations<sup>14</sup>. The number of stations available is expanding at an exponential rate and, in addition, people also have access to television stations outside national boundaries. Food safety stories in one part of the world are now rapidly transmitted across the globe raising the awareness of the consumer to the issue.

Newspapers are under stiff competition as well, from new newspapers, magazines and alternative publishing formats like the internet. According to the *American Journalism Review*, on-line newspapers have grown from just 20 in 1994 to 3622 in 1997<sup>15</sup>. Many are traditional newspapers expanding their publishing format, but some are new competitors. The fight for a share of the lucrative world wide web advertising market fuels the fight for readership but now on a global scale. Even so-called 'local' newspapers publishing on the internet no longer have a local readership. In addition, as if the media world were not complex enough, traditional radio and TV news broadcasters have also started multimedia sites on the world wide web consisting of written news, and live TV and radio broadcasts. These sites are becoming increasingly popular, for example, by March 1999, monthly page impressions at BBC On-line had reached over 80 million<sup>16</sup>.

### *Media summary*

It is not surprising that with the proliferation and globalisation of the media, the food industry and consumer believe that they have lost

control of the food safety agenda. This trend is unlikely to change in the foreseeable future and, therefore, it is essential that the food industry learns to communicate clearly and truthfully with the media. A relationship needs to be generated where journalists respect and trust the information disseminated by scientists and scientists need to recognise the constraints and pressures that competition has placed on the journalists. Food-related stories will always interest consumers, but the media has a duty to restrain itself from sensationalist reporting where facts and context are abandoned in the quest for a eye-catching headline. It is important that both parties work to ensure the context to food safety stories is included and, in this way, both their relationships with consumers should improve.

## Conclusions

As we enter the new millennium, the stage is set for further deterioration in the relationship between the media, the food industry and the consumer unless action is taken. The factors that influence consumer acceptance of risk are changing and are likely to ensure that consumers perceive a greater risk involved with their food supply. The intensity of food production and the global supply chain are likely to increase the number of large-scale food safety incidents. As will emerging bacterial pathogens and the increase in the numbers of vulnerable people. There is undoubtedly a greater burden on the food industry to get it right first time and every time. The move towards risk analysis and hazard and critical control point systems is essential to meet this challenge.

The risk analysis approach proposed by the Codex Alimentarius Commission is important for the future of food safety<sup>17</sup>. This approach requires that all interested parties become involved in a transparent risk analysis process. However, for the system to work to the benefit of consumers, two problems must be overcome. Currently, risk analysis exercises are dominated by science based decisions. The 'value' judgements of consumers that include environmental and ethical views do not receive enough consideration either during the risk assessment or risk management procedure. The recent GM foods' debate has demonstrated the need for a broader base to risk analysis than science alone if consumers are to be re-assured. The second problem lies with the independence of experts. Today, the relationship between the scientific community and the public has never been worse. Most industrialised nations have adopted a policy of privatisation of science leaving experts to rely less on public money and more on corporate sponsorship of research. The concept of independent expertise within this framework is

difficult for the public to accept and it exposes scientists to conflicting interests. The risk analysis model should help to repair the relationship between the media, the food industry and the consumer but only if the public can be re-assured that experts are truly independent and that 'value' judgements have been considered.

A transparent risk analysis system also has implications for the media. Faced with intense competition, the media must still adopt a responsible approach to reporting. It is important that the context of the food safety risk is communicated and not lost in the battle for column inches or broadcast time. The media could ensure this approach via a code of practice that could offset any need for national intervention along the lines of existing legislation in the US. Food scientists must work with journalists and strive to convey their message clearly in non-scientific language. A better relationship between the media and the food industry would benefit consumers who rely on the two parties to supply information that influences purchase decisions.

Everybody involved in food, whether they buy it, report about it, make money from it or research into it, should work to repair the relationship that has served only to damage consumer confidence over the past 30 years.

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## References

- 1 Covello, Merkhofer. *Risk Assessment Methods*. New York: Plenum, 1994
- 2 United Nations. *World Population Prospects 1996 Revision*. ISBN 92 11 513162; 1996
- 3 World Health Organization. *Ageing and Tobacco Use*. www.who.int, 1999
- 4 Government Statistics Service, UK. *UK in Figures*. www.statistics.gov.uk/ststs/ukinfigs/employ.htm, 1999
- 5 Food Safety Authority of Ireland. Unpublished figures, 1999
- 6 Ministry of Agriculture, Fisheries and Food, UK. *UK Food and Farming in Figures*. www.maff.gov.uk/esg/miscpdf/ukfff.pdf, 1997
- 7 Reilly A, Kaferstein F. Food safety and products from aquaculture. *J Appl Microbiol Symp Suppl* 1999; 85, 249S–57S
- 8 Usher R. Hard to swallow. *Time* 1999; 154: 30–9
- 9 Feng P, Lampel KA, Karch H, Whittam TS. Genotypic and phenotypic changes in the emergence of *Escherichia coli* O157:H7. *J Infect Dis* 1998; 177: 1750–3
- 10 Public Health Laboratory Service, UK. *Disease Facts* www.phls.co.uk/facts/, 1998

- 11 MAFF. *A Review of Antimicrobial Resistance in the Food Chain*. www.maff.gov.uk, 1998
- 12 McDevitt. *World Health Report Life in the 21st Century – A Vision for All* ISBN 92 4 156189 0. Geneva: World Health Organization, 1998
- 13 Lichter SR, Amundson D. *Food for Thought – Reporting of Diet, Nutrition and Food Safety*. International Food Information Council Foundation. <http://ificinfo.health.org>, 1996
- 14 Anon. CNN: charting a new frontier for news gathering. *Broadcast Engineering*, November 1998
- 15 Meyer EK. An unexpectedly wider web for the world's newspapers. *Am Journalism Rev* <http://ajr.newslink.org>, 21–27 September 1999
- 16 British Broadcasting Corporation. *BBC Annual Report - Review of the Year 1998/1999* <http://www.bbc.co.uk/info/report99/review2f.shtml>
- 17 World Health Organization. *Application of Risk Analysis to Food Standards Issues*. Report of the joint FAO/WHO expert consultation 13–17 March 1995. Geneva: WHO, 1995
- 18 ACMSF (Advisory Committee on Microbiological Safety of Food). *Report on Microbial Antibiotic Resistance in Relation to Food Safety*. London: The Stationery Office, 1999
- 19 Data from US Department of Commerce, Economics and Statistics Administration. Bureau of the Census United States of America. March 1, 1999