Trust in Crisis: Consumer Confidence Loss During Zoonotic Foodborne Outbreaks in Europe: A Narrative Review

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1. Plain language summary

When people hear about a foodborne outbreak, such as Salmonella found in eggs, it makes them nervous about food safety. Those outbreaks can be caused by zoonotic pathogens, which means that they can be spread from animals to humans. Commonly found examples are Campylobacter or Salmonella in poultry or pigs. These lead to thousands of outbreaks yearly in the EU. Of the most important foodborne outbreaks, around 60% were caused by zoonotic pathogens, and even 70% of the deaths due to foodborne illnesses could be attributed to those pathogens.

Seeing the quantifiable burden of the zoonotic foodborne outbreaks, this review looked at how much these outbreaks affect consumer confidence, meaning how much consumers trust the food system after something has gone wrong. Furthermore, it analysed how this loss can lead to further intangible costs, such as the avoidance of buying certain food products. Because there aren't many studies focusing on zoonotic outbreaks, this review also included non-zoonotic outbreaks (e.g., Escherichia coli in spinach) to compare how people react. These outbreaks have helped to identify patterns in how consumers respond. For this review, three common databases have been searched to find the most fitting articles. Furthermore, governmental websites have been screened to be sure everything important has been included.

In the included articles, it was found that trust in institutions, such as government food safety agencies, plays a big role. When consumers believe that those authorities are managing an outbreak situation well, they are more likely to return to their initial behaviour shortly after the outbreak. But even if the purchases return to normal, consumer confidence might still be reduced. This confidence is not necessarily visible in purchase data.

Usually, after an outbreak, consumers reduce or avoid buying affected food products and then shortly after the outbreak source has been found, the behaviour returns to normal. Moreover, considering that general knowledge on pathogens, besides Salmonella, is quite low, and that most consumers could not connect the different pathogens to any food group, we had to use the results from non-zoonotic outbreaks to analyse consumer confidence.

This study has revealed a gap in research around the loss of consumer confidence, indicating a need for standardised methods to quantify this loss. It has also shown how important institutional trust is, showing a need for proper communication strategies.

2. Abstract

Background: Foodborne outbreaks remain a persistent public health challenge across Europe, with zoonotic pathogens such as Salmonella posing significant risks to consumers.

Methods: This narrative review explores the intangible impacts of zoonotic foodborne outbreaks in Europe, with a particular focus on consumer confidence. Synthesising findings from 25 studies across Europe, it examines how consumer confidence is defined, measured, and influenced by outbreak events.

Results: The review identifies institutional trust as a central mediator of consumer behaviour, shaping responses to both zoonotic and non-zoonotic threats. While outbreaks often trigger short-term avoidance and reduced purchase intention, these effects are moderated by trust in regulatory actors and the clarity of official communication. Consumer knowledge about pathogens varies widely, with high awareness of Salmonella but limited understanding of Campylobacter and other emerging risks. Food safety perception has shifted over time, with declining concern for microbiological contamination and rising attention to chemical hazards such as microplastics and chemical contamination.

Discussion: Despite changes in sales, low consumer confidence may persist, as it reflects deeper concerns that are connected to system trust. The review highlights a lack of standardised methods to measure consumer confidence loss. Future research should focus on longitudinal research and more transparent communication in research.

3. Introduction

In 2023, the European Union (EU) 27 and the United Kingdom (UK) reported 5,691 foodborne outbreaks, 52,127 cases, 2,894 hospitalisations, and 65 deaths resulting from foodborne illnesses (EFSA, 2024). While the number of documented outbreaks has slightly decreased (-1.2%), increases in cases (7.2%), hospitalisations (4.0%), and deaths (1.6%) underscore the remaining public health burden. The most frequently identified pathogen was Salmonella. Of all the strong evidence outbreaks that year, 60.4% were of zoonotic nature, and 77.8% of all deaths caused by foodborne illnesses could be attributed to zoonotic agents. Figure 1 shows the top 10 pathogen/food product pairings of strong evidence outbreaks, showing clearly that most of the outbreaks are of a zoonotic nature (orange in the figure) compared to non-zoonotic (blue in the figure). The figure also includes outbreaks for which the cause, zoonotic or non-zoonotic, is not clearly specified (green in the figure).

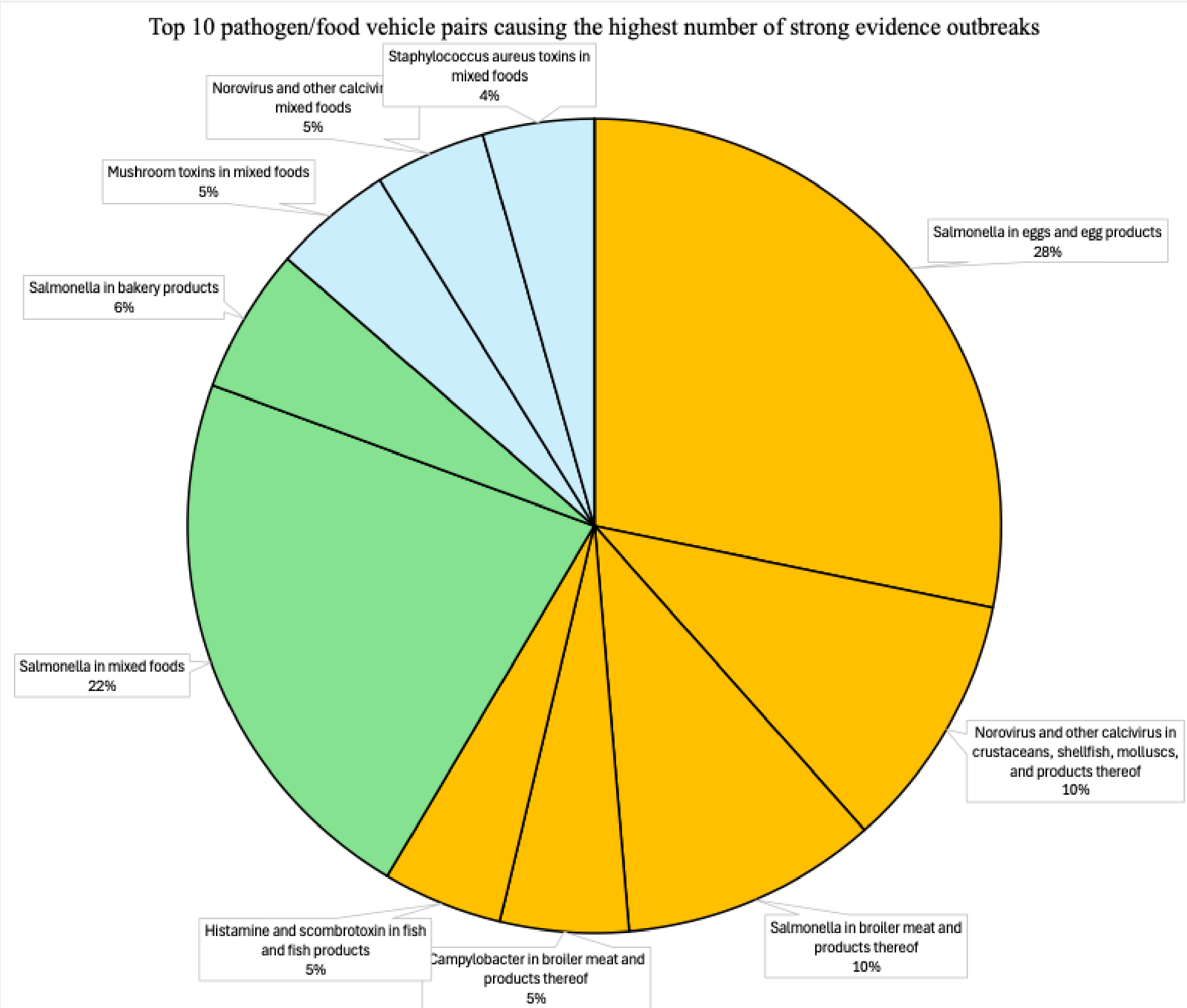

Figure 1: Top 10 pathogen/food vehicle pairs causing the highest number of strong evidence outbreaks (adapted from EFSA (2024))

Over the years and following past zoonotic foodborne outbreaks, the EU has been working on the control of those outbreaks. The Regulation (EC) 2160/2003, for instance, lays down the basics for the control of Salmonella and other zoonotic agents. This has been an important step in the surveillance of these zoonotic agents, but also in keeping all the involved stakeholders accountable.

Beyond clinical and regulatory responses, foodborne outbreaks can reduce consumer confidence. It refers to how confident consumers feel about the overall state of the economy (Eurostat, n.d.). Loss of consumer confidence can lead to behavioural changes such as avoidance, reduced purchase intention, brand switching, or increased scepticism towards food safety. Closely related is consumer knowledge, defined as "the degree of experience and familiarity of the individual with a product before an external search for information" (Garrido-Castro et al., 2024). Food safety perception, however, refers to the consumers' perception of the health risk associated with food (Verbeke et al., 2007).

Importantly, the erosion of consumer confidence can result in intangible costs – impacts that are difficult to quantify but significant in scope. These include willingness to pay or long-term shifts in trust. There already exist tools to quantify economic losses due to zoonoses, but there is limited knowledge on these intangible costs (Martins et al, 2015). This review investigates how the intangible impacts of zoonotic outbreaks – particularly the loss of consumer confidence – have been documented or estimated in past EU foodborne outbreaks. First, it examines how consumer confidence has been defined, measured, or modelled in the context of foodborne outbreaks and food safety. Second, it explores whether and how consumer confidence changes following an outbreak, distinguishing between zoonotic and non-zoonotic pathogens. Third, it considers the extent of consumer knowledge about foodborne pathogens, including familiarity with specific risks and transmission routes. Finally, it assesses how food safety perception is shaped across Europe, identifying differences in how consumers evaluate the safety of their food in light of outbreak events and regulatory responses.

4. Methods

The presented study adopts a narrative literature review. This study design was chosen to best approach this broad topic. It brings together the findings of all the relevant studies.

Search strategy

This narrative review aimed to identify the current knowledge on the loss of consumer confidence following a foodborne zoonotic outbreak. This type of narrative approach was deemed appropriate given the limited number of available studies, the exploratory nature of the research questions, and the need to synthesise evidence from diverse study designs, including grey literature (Sukhera et al., 2022). The review doesn't include quantitative modelling or economic effects estimation that could result from a shift in consumer behaviour. Its focus is on identifying pattern or determinants of behaviour in consumers. The geographic focus was on Belgium, the Netherlands, and Denmark, but to be able to include all the important literature, the scope was broadened to include other European studies where appropriate. Three electronic databases, namely PubMed, Web of Science, and Embase, were searched. Furthermore, grey literature, such as governmental reports, was included. Grey literature was searched for on the websites of: EFSA, the governments of the Netherlands and the UK, and the NVWA (Nederlandse Voedsel- en Warenautoriteit). Reference lists of all the included articles were screened (snowballing) to capture all additional relevant studies.

The primary focus was on foodborne zoonotic pathogens. However, because of the scarcity of articles directly addressing zoonotic outbreaks, non-zoonotic pathogens were also included where deemed relevant. These were conceptually considered close enough to provide comparative insights into consumer behaviour and confidence. To maintain transparency, zoonotic and non-zoonotic evidence were extracted and reported separately.

Tailored search strings were built for each subquestion. For the first subquestion, terms emphasising consumer confidence, modelling, and measurement were included. For the second subquestion, outbreak-related terms, such as Salmonella, Listeria, or foodborne, were combined with behavioural outcomes. For the last subquestion, searches focused on consumer knowledge, risk perception, and awareness of pathogens. Boolean operators and MeSH terms were applied as needed to refine the search. The complete search strings and corresponding results for each subquestion are provided in Appendix 1.

Study selection

Articles were eligible if they addressed consumer confidence in relation to foodborne pathogens. The inclusion criteria prioritised studies conducted in Belgium, the Netherlands, and Denmark; however, studies from other European countries were considered when local evidence was limited. The primary focus was on zoonotic pathogens, but non-zoonotic studies were considered when zoonotic evidence was lacking. Publications in English, German, and Dutch were included, while no language restrictions were applied to governmental reports and other grey literature. Furthermore, all articles published from 2000 onwards were considered.

Exclusion criteria were studies unrelated to foodborne pathogens, those not addressing consumer confidence or knowledge, and articles without an accessible full text. Studies outside of Europe were excluded, unless they provided insights into the European situation. Moreover, studies targeting populations other than the general consumers were excluded (e.g., farmers, retail).

The searches were conducted in September 2025. First, after applying the search strings to the databases, the abstracts and titles of the found articles were screened and judged on the in- and exclusion criteria. The screened articles that did not fit the criteria were excluded. After that, a full-text screening of the retrieved articles that had not been excluded was performed, again applying the inclusion criteria. The same procedure was done for the grey literature search and snowballing.

Table 1: In- & exclusion criteria

Inclusion	Exclusion
Foodborne pathogens	Unrelated to foodborne pathogens
European countries as a setting	No consumer confidence
Language: English, German, Dutch	No full-text available
Year of publication: from 2000 onwards	Not general consumers as the population

Data extraction

Data were extracted and documented in a structured Excel spreadsheet (Microsoft Corporation, 2025). For all included articles, the author's name, year of publication, study design, study setting, and sample size were extracted. Extraction was aligned with the four subquestions:

- Subquestion 1: determinants, "consumer confidence" definition, main results
- Subquestion 2: pathogen, food product, outbreak size and date, behavioural change
- Subquestion 3: pathogen, food product, results
- Subquestion 4: pathogen, food product, results

Critical appraisal

For every included article, key strengths and limitations were added to the data extraction table (see Appendix 2). The grey literature wasn't critically appraised.

5. Results

The reviewed literature revealed the central role of institutional trust, working as a mediator in consumer behaviour response to outbreaks. Furthermore, it shared the lack of consumer knowledge on common zoonotic pathogens in foodborne outbreaks. A main theme was also the decline in food safety concerns regarding microbiological contaminants, as those concerns have declined in recent years while worries on other risks (e.g., chemical) have increased.

A final sample size of 25 articles was obtained for this narrative review (see Figure 2). Of those 25, seven were used to answer the first subquestion on the consumer confidence definition. Six of the included articles explored consumer behaviour after a foodborne outbreak, of which three were non-zoonotic pathogens, two zoonotic, and one based on a fictive Salmonella outbreak from a specific food product. Eight studies analysed consumer knowledge of either zoonotic or non-zoonotic pathogens. Lastly, six studies focused on food safety perception. An overview of the included studies' characteristics and results can be found in the data extraction tables 5, 6, 7, and 8 in Appendix 2. The key strengths and limitations of the studies can also be found in those tables.

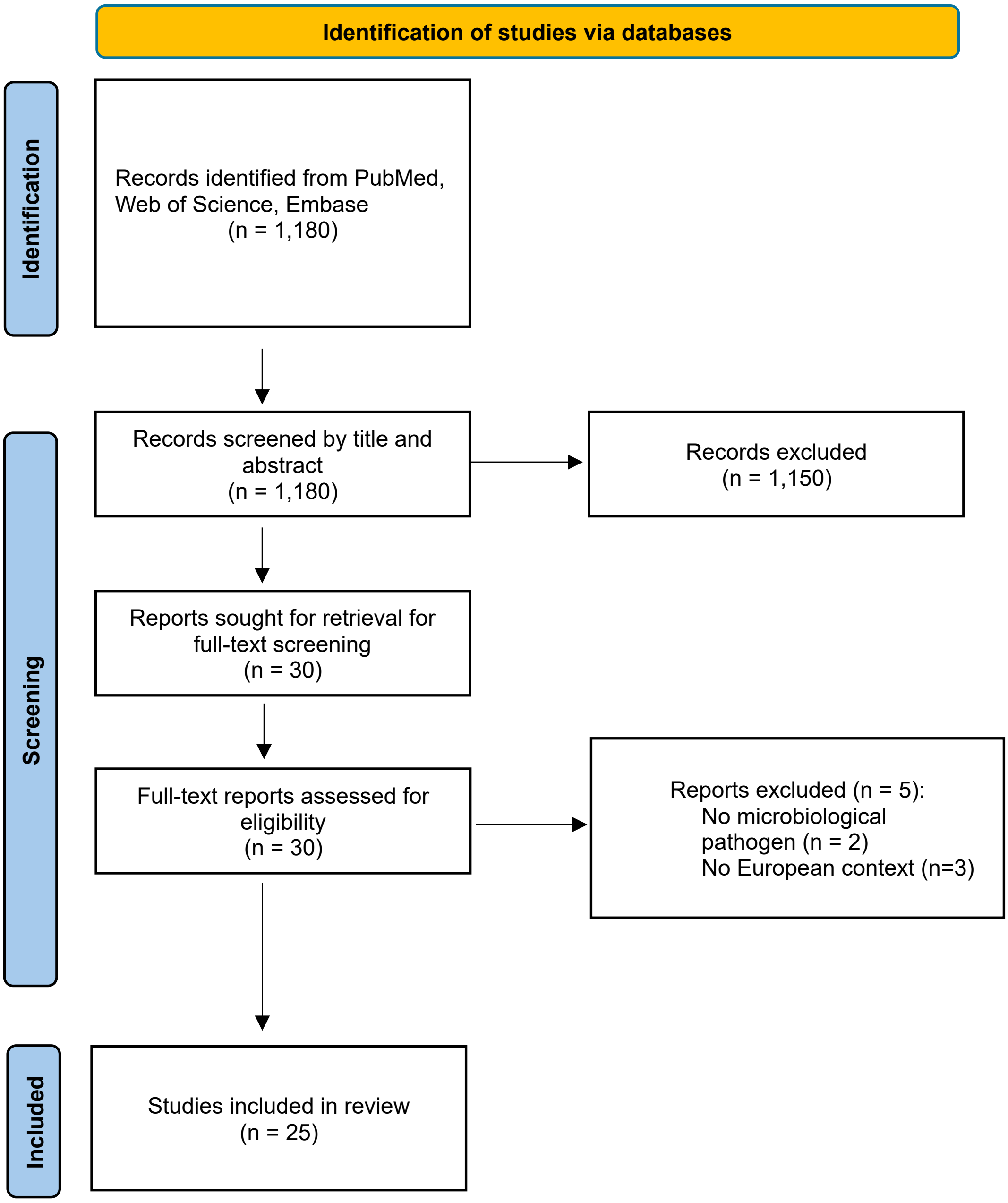

Figure 2: PRISMA flowchart (Page et al., 2021)

5.1. Consumer confidence: definition, measurement, model

Seven studies addressed consumer confidence in their work. Three of the studies were conducted in the Netherlands, one in the UK, and one spanned Belgium, the UK, and Norway. One was a literature review without a specific focus, and one covered France, Germany, Poland, Spain, and the UK.

The three Dutch studies defined consumer confidence in food safety as: “the consumer’s general expectation that food products will not cause any harm to their health or environment" (de Jonge et al., 2004; de Jonge et al., 2007; de Jonge et al., 2010). What the authors found is that consumer confidence can be explained by five determinants: (1) trust in regulatory institutions and actors in the food chain, (2) the occurrence of food safety incidents, (3) media coverage of food risks, (4) consumer recall of food safety incidents, and (5) consumer confidence in the safety of particular product groups (de Jonge et al., 2004). These determinants formed the basis of a measurement instrument designed to trace the pathway to general consumer confidence and its behavioural consequences.

Using a longitudinal design, de Jonge et al. (2004) interviewed Dutch consumers at three different time points to analyse how they perceive those determinants. Their findings indicated that consumer confidence remains generally high and stable over time. This suggested that confidence is not solely influenced by the frequency of foodborne outbreaks, especially when such incidents receive limited media attention.

In a related study, de Jonge et al. (2007) found that the importance of these determinants varies. Trust in societal actors and perceived safety of consumed foods were strongly linked to consumer confidence, with trust in government and manufacturers playing a more significant role than trust in retailers and farmers. Consumers most vividly recalled outbreaks involving fish and meat products. The authors also introduced a dual-dimensional model of consumer confidence, comprising optimism (characterised by satisfaction and trust) and pessimism (characterised by worry and suspicion). These dimensions can coexist – for example, a consumer may be critical of food labels yet still trust them. Optimism is primarily shaped by trust in product safety, while pessimism is influenced by individual factors such as allergies or intolerances. Importantly, foodborne outbreaks affected these dimensions unequally.

The final Dutch study assessed the stability of the proposed model over time (de Jonge et al., 2010). It confirmed that the model and its most influential determinants - trust in the government and manufacturers, and consumer perception of food safety in meat and fish – remain constant. These findings supported the robustness of the model across different time points.

In contrast, Berg (2004) did not define consumer confidence explicitly but used it to explore the spectrum between trust and distrust. Her typology identified four consumer types – naïve, sensible, sceptical, and denying – which are shaped directly by food events and indirectly by institutional actors and personal food practices. The model is structured along two dimensions: trust vs. distrust and reflexive vs non-reflexive. Berg's cross-country analysis compared consumer responses in the UK (BSE scandal), Belgium (dioxin scandal), and Norway (no major scandal). Her results indicated that countries with food incidents have a higher proportion of denying consumers: UK (19%), Belgium (23%), compared to Norway (14%). Similarly, the share of sceptical consumers was statistically higher in Belgium (39%) and the UK (28%) than in Norway (24%). These results suggested that food scandals lead to a more sceptical and denying public. Conversely, trusting consumers were most prevalent in Norway (58%), followed by the UK (52%) and Belgium (34%). The most influential factor on the trust-reflexivity scale was the country of residence, highlighting the long-term impact of food safety incidents on consumers' attitudes. Another explanation for differences has been discussed by Macready et al. (2020), namely that trust is impacted by social trust and the country's context.

In their multi-country study (France, Germany, Poland, Spain, UK), they distinguished between consumer trust and consumer confidence, treating them as causally related but conceptually distinct (Macready et al., 2020). Similarly to previous studies, they defined confidence as: "evidence- or experience-based belief that certain future events will occur as expected", rooted in past performance, while trust involves moral judgement and morality. An example they gave was that consumers have confidence in the characteristics of the food supply, thus they believe that the food is safe, whereas trust in producers relates to the fact that they may act in a way that compromises the product. Their findings showed that consumer confidence cannot be fully explained by trust alone. In short, it means that consumer confidence is the outcome of trust in the actors of the food chain, grounded in beliefs that they are competent, accompanied by social trust and the country's context.

Wu et al. (2021) took a different approach, suggesting that consumer confidence is built through direct assurances of safety and quality, primarily via food packaging. While system actors may not have directly influenced consumer confidence, they could reinforce it by adding layers of perceived safety and quality.

Finally, the Food Safety Agency (FSA) (2025) in the UK report supported the distinction between trust and confidence, noting that trust is future-oriented while confidence reflects past and present performance. The report found that countries with modernised food systems tended to exhibit higher consumer confidence. It also highlighted the damaging effects of food scandals, such as the BSE crisis, on public trust, emphasising how difficult it is to rebuild confidence once lost. Consumers reportedly placed greater trust in regulators and farmers, while expressing lower confidence in the broader food industry.

5.2. Consumer behaviour after an outbreak

Six articles discussed consumer behaviour following a foodborne outbreak. The most frequently referenced incident was the 2011 EHEC (Enterohemorrhagic Escherichia coli) O104:H4 outbreak in Germany, which served as a focal point for studies on consumer trust, media influence, and behavioural responses. Besides that outbreak, the studies were evenly distributed between countries (see Figure 4). Overall, most studies found a decline in purchases after an outbreak, with some of them finding that it quickly stabilises again after the source of the outbreak was found. Furthermore, most of the consumer behaviour was mediated by consumer trust.

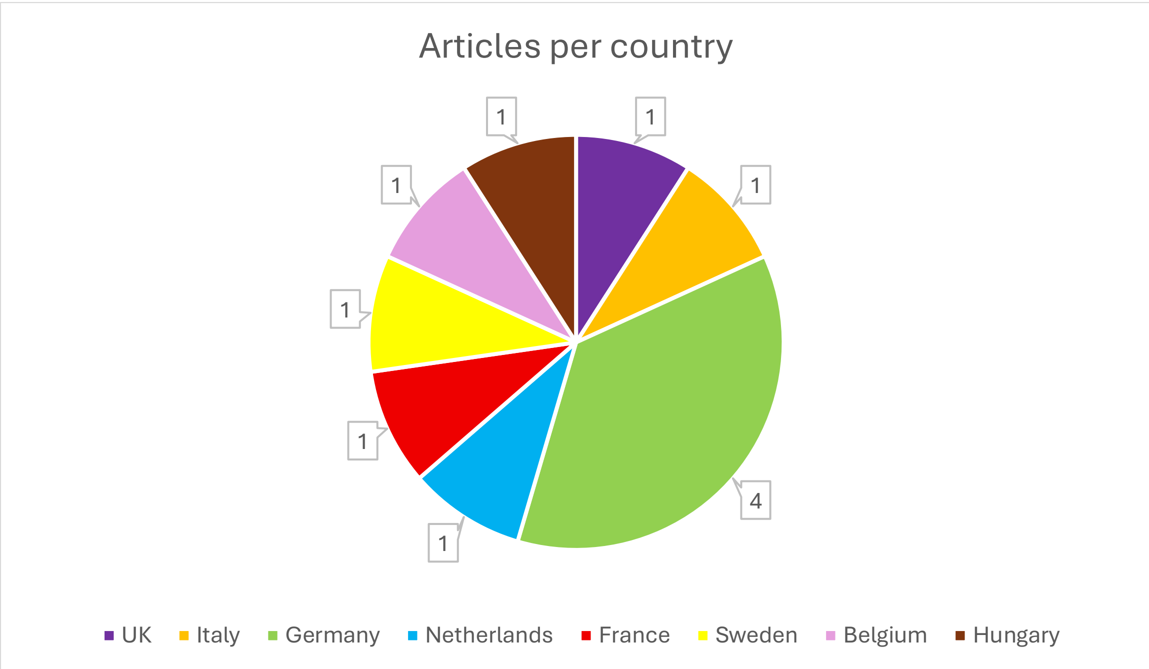

Figure 3: Articles per country for behaviour following an outbreak

5.2.1. Zoonotic pathogen

Two studies explored consumer responses to hypothetical Salmonella outbreaks, offering cross-national and economic insights. Mazzocchi et al. (2008) conducted a cross-national survey in the UK, Italy, Germany, the Netherlands, and France, comparing consumer intentions to purchase chicken under normal conditions versus a hypothetical Salmonella outbreak. They found statistically significant differences between the countries. Italy showed the largest decline in purchase intention of -40.89%, followed by Germany with -30.48%, the UK with -22.52%, the Netherlands with -11.69%, and lastly France with -5.53%. Even in the absence of an outbreak, baseline purchase intention varied, ranging from 4.49 (France) to 5.57

(UK) on a 7-point scale (4 as the neutrality point). These changes have been visualised in Figure 4. The findings show that while there are different changes in purchase intention in the included countries, all show a significant change (a decrease between -5.53 and -40.89%). These results suggest that cultural and national context significantly shape consumer sensitivity to food safety risks.

	UK	Italy	Germany	the Netherlands	France
Standard purchase intention	5.57	5	4.85	4.94	4.49
Purchase intention after Salmonella scare	3.41	2.53	2.88	2.87	2.8
% change (average)	-22.52	-40.89	-30.48	-11.69	-5.53

Figure 4: Change in intention to purchase after a Salmonella scare (adapted from Mazzocchi et al.(2008))

Sundström et al. (2009) approached the issue from an economic valuation perspective, assessing Swedish consumers' willingness-to-pay (WTP) to reduce the risk of Salmonella in poultry. WTP refers to the amount a consumer is willing to spend to avoid a negative health outcome. Based on survey data, Swedish consumers were willing to pay between SEK 14-42 (€1.27-3.80) more for poultry that would reduce Salmonellosis by one to three cases per 10,000. From this, the authors calculated the value of statistical case (VSC) – the monetary value assigned to reducing the risk of one illness case – which ranged from SEL 112,000-150,000 (€10,131-13,569). They also estimated the value of a statistical life (VSL), which represents the societal cost of preventing one statistical death, at SEK 13.3 million or 48.3 million, depending on the method used. However, neither VSL estimate reached statistical significance, suggesting uncertainty in how consumers economically value mortality risk reduction.

Together, these studies illustrate how consumer behaviour in response to zoonotic threats is shaped by both perceived risk and economic considerations, with notable variation across national contexts.

5.2.2. Non-zoonotic pathogen

Three studies examined consumer behaviour following the 2011 EHEC O104:H4 outbreak in Germany, which involved contamination of fresh produce. Each study offers a distinct perspective on how consumers respond to real-world food safety crises.

Bitsch et al. (2014) compared the German outbreak to a similar incident in the United States (2006), focusing on media coverage and consumer reactions. Using German market data, they found a sharp decline in household purchases of fresh cucumbers immediately after the outbreak. Sales only began to recover once the source was identified. Their findings suggest that consumers avoided implicated products based on government press releases and media reports, and that public trust in official communication played a key role in shaping behaviour.

De Vocht et al. (2013) studied Flemish consumers' reactions to online news about the German outbreak using the Extended Parallel Processing Model (EPPM). Although Belgium had no clinical EHEC cases and issued no food avoidance recommendations, the study found that consumer behaviour was influenced by perceived severity, susceptibility, self-efficacy, and affective response. Trust in government emerged as a critical moderating factor: consumers with higher trust were less likely to reduce fresh produce consumption (mean intention scores: 2.92 vs. 3.56 on a 7-point scale). Even when perceived risk was high, government reassurance helped mitigate behavioural avoidance.

Appel et al. (2012), reporting on a national survey by the German Federal Institute for Risk Assessment (BfR), found that 51% of respondents changed their behaviour during the outbreak. The likelihood of behavioural change was strongly linked to perceived threat: 92% of those who felt threatened altered their habits, compared to only half of those who felt slightly or not at all threatened. Among those who changed their behaviour, 72% stopped eating certain foods, and 48% modified their shopping behaviour.

Together, these studies demonstrate that trust in government, perceived threat, and media framing are central to understanding consumer responses to non-zoonotic outbreaks.

5.2.3. Non-specific pathogen

One study assessed consumer validation of Salmonella risk without linking it to a specific outbreak

Vajda et al. (2021) estimated the WTP of Hungarian consumers to avoid Salmonellosis in any food product, based on annual survey data. The mean WTP was €86.30, with a median of €30.70. Notably, 13% of respondents were unwilling to pay more, while 12% were willing to pay over €153.80, indicating a wide range of perceived risk tolerance and economic valuation.

5.3. Consumer knowledge of pathogens

Eight studies examined consumer knowledge of foodborne pathogens, with a strong focus on Salmonella and Campylobacter, and additional attention to Listeria, Toxoplasma, Escherichia coli, Norovirus, and Bacillus cereus. See figure 6 to see how many articles were conducted per country, and figure 7 to see how each pathogen was represented in the articles. The findings reveal substantial variation in awareness across pathogens and countries, as well as gaps in understanding transmission and prevention. Overall, high knowledge on Salmonella contrasted with limited knowledge on Campylobacter and other emerging pathogens.

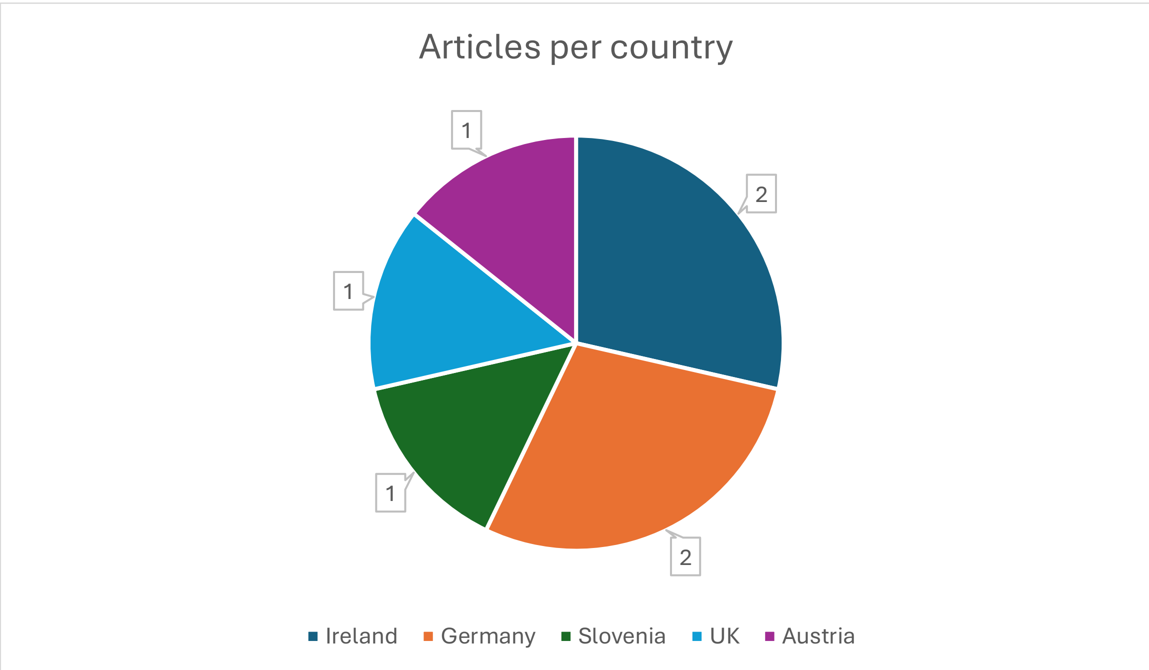

Figure 5: Articles per country for consumer knowledge

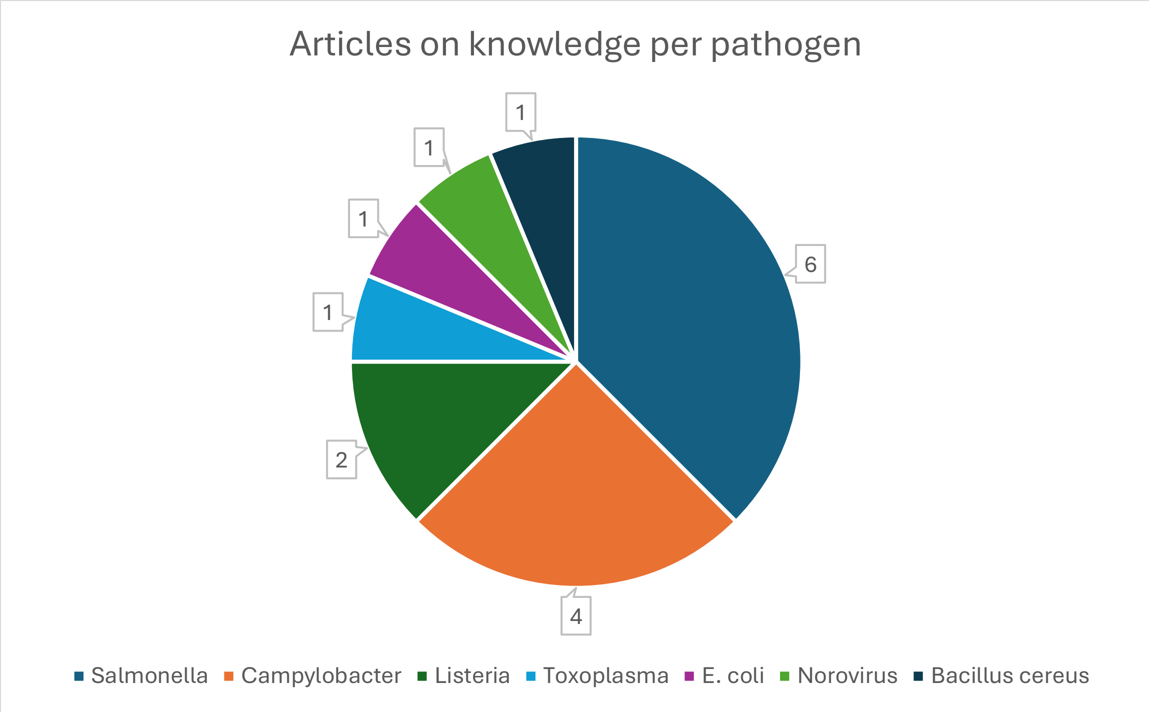

Figure 6: Articles on knowledge per pathogen

5.3.1. Salmonella

Six studies assessed consumer knowledge of Salmonella, consistently showing high general awareness but limited understanding of specific characteristics (Conway et al., 2022; Henke et al., 2020; BfR, 2018; FSA, 2020; Hölzl et al., 2011; Myintzaw et al., 2020).

In Ireland, Conway et al. (2022) found that 94% of respondents knew Salmonella could cause disease in poultry or humans. However, only 5% correctly identified its latency period (4-5 days). Most respondents recognised transmission routes (72%) and their presence in eggs (62%) and non-poultry sources (58%). Myintzaw et al. (2020) confirmed similar trends in Ireland, with 62.8% aware of Salmonella on supermarket poultry. However, 38.2% incorrectly identified it as the most commonly reported gastrointestinal illness in the Irish population.

In Germany, Henke et al. (2020) reported that 97.2% of respondents knew about Salmonella. The participants were further questioned, and it was found that 77.3% knew how to protect themselves from Salmonella, and among them, 88.7% recognised meat as a transmission vector. Among those who did not know how to protect themselves, 78.6% still recognised meat as a transmission route. The difference between those that still recognised it as a transmission route (78.6%) and those that don't (21.4%) was statistically significant.

While the previous studies were focusing on Salmonella deriving from merely animal sources, some of the included studies were focusing on food products in general in their analysis (BfR, 2018; FSA, 2020; Hölzl et al., 2011). In the German survey for consumers for food in general, similar values were found for knowledge about Salmonella (BfR, 2018). In comparison, they found that 97.2% of German respondents know about Salmonella in meat (Henke et al., 2020), while they found in the present study that 96% know of it. A similar survey in the UK has shown that most British consumers (92%) are aware that Salmonella can cause foodborne illnesses (FSA, 2020). In the UK, consumers most frequently associated foodborne illnesses with raw poultry (81%), shellfish (57%), and eggs (42%).

These studies suggest that while Salmonella is widely recognised, knowledge about its transmission, latency, and prevalence is uneven and often superficial.

5.3.2. Campylobacter

Compared to Salmonella, Campylobacter was far less recognised. In Germany, Henke et al. (2020) found that 68.3% of respondents had never heard of Campylobacter. Among those who had, only 11.5% knew how to protect themselves. Awareness of meat as a transmission vector varied significantly: 45.6% among those unaware of protective measures vs. 63.8% among those who were informed. The BfR (2018) survey showed slightly higher unawareness in Germany (75%), while Hölzl et al. (2011) reported that 22% of Austrian consumers did not know the pathogen. Notably, 75% of Austrian respondents couldn't link Campylobacter to any food group, and none mentioned poultry.

In Slovenia, Sterniša et al. (2018) showed that 57.8% of the participants knew that poultry found in retail can be contaminated with harmful microorganisms. Overall, 16.7% of them knew of Campylobacter, which was less than in studies conducted in other countries. 10.2% connected this pathogen with poultry. Only in one other country, a lower percentage was found, namely in Ireland, where a study has found that only 5.9% of the survey respondents knew that there could be Campylobacter in poultry (Myintzaw et al., 2020).

These findings reveal a consistent gap in public knowledge about Campylobacter, especially its association with poultry and its health risks.

5.3.3. Other pathogens

Several studies explored consumer knowledge of less frequently discussed pathogens.

A survey conducted in the UK found that 61% of respondents were aware of Listeria (FSA, 2020). A close percentage was found in an Austrian study, where respondents shared that 63% of them knew that Listeria can be found in their food (Hölzl et al., 2011).

Toxoplasma was further analysed by Henke et al. (2020). They found that around half (48.3%) of the participants had never heard of the pathogen. Among those who have, only

32.8% knew how to protect themselves from it. Of those who have heard of it, approximately half (50.7%) knew that it is transmissible via meat.

The FSA (2020) found that 86% of British consumers knew of Escherichia coli. For Norovirus, the awareness stood at 60%. This was higher than what was found when questioning Austrian consumers on their knowledge of Bacillus cereus (Hölzl et al., 2011). Overall, only 19% knew this pathogen.

5.4. Food safety perception

In total, six articles studied consumers' perception of food safety in Europe, focusing on risk awareness, concern levels, and trust in regulatory systems. See Figure 8 for the article count per country. This directly links to consumer confidence, as trust in institutions is a central factor shaping perceptions of food safety. The findings reveal differences in how consumers evaluate food-related risks and how these perceptions have evolved.

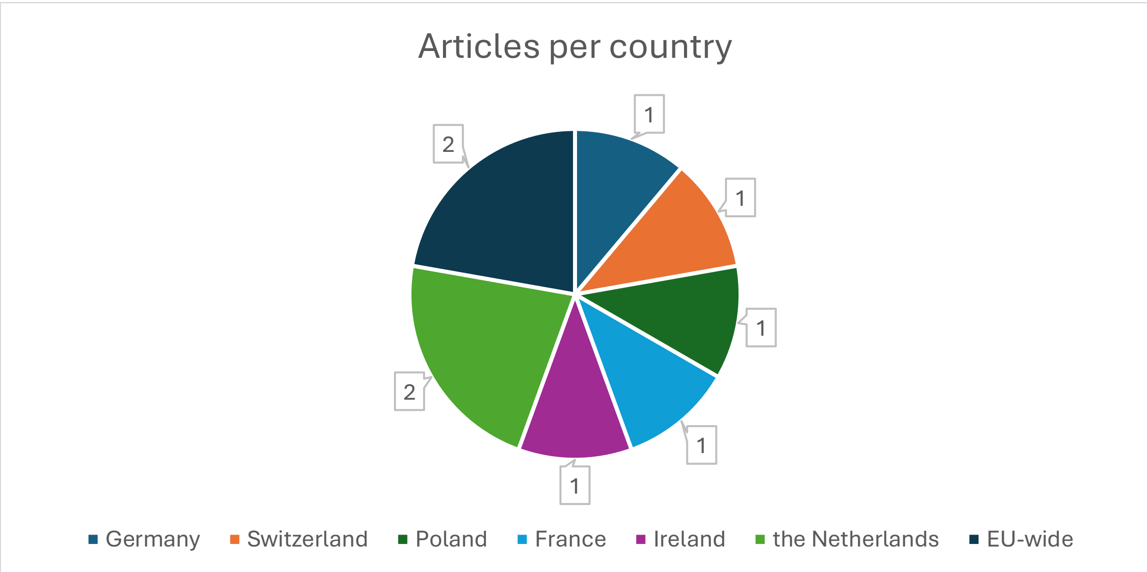

Figure 7: Articles per country for food safety perception

Appel et al. (2012), in the context of the 2011 EHEC outbreak in Germany, assessed consumer risk perception across various food-related threats. Participants rated bacteria in food (such as Salmonella) as posing a higher health risk (mean score 3.6) than other concerns, such as unhealthy diets or new food technologies (mean score 3.4). Although the difference was statistically significant, the authors noted that it was minimal in practical terms (scale: 1 = no risk to 5 = very high risk).

Bearth et al. (2014) focused on Swiss consumers' perception of Campylobacter, finding that pathogenic bacteria in meat were rated relatively low in perceived risk (score: three out of six). Risks perceived as more severe included excess calorie intake and hormone residues in meat, suggesting that microbial threats may be underestimated compared to chemical or nutritional concerns.

Kher et al. (2013) conducted a comparative study across Brazil, France, Ireland, the Netherlands, and Poland, examining perceptions of chemical and microbiological contaminants in food chains. European participants generally perceived lower risk in the farmed salmon supply chain than Brazilian respondents. For the chicken supply chain, Dutch and Irish consumers viewed post-purchase contamination (e.g., after bringing the food home) as the highest risk stage, whereas French and Polish participants perceived greater risk earlier in the supply chain. Notably, the study found that product recalls tend to increase consumer confidence as they signal responsiveness to public concerns. European respondents also expressed high trust in food safety systems and regulations.

The EFSA (2025) Special Eurobarometer surveyed EU citizens on their top food safety concerns. Foodborne illnesses ranked fifth (32%), behind issues like pesticide residues (39%). This ranking has remained stable since the 2022 Eurobarometer, indicating consistent concern levels over time. Interestingly, 41% of respondents said they do not pay attention to food safety information because they trust that the food sold is safe.

A Dutch survey by Peeters et al. (2025) found that the most prominent concerns were microplastics (mean score: 3.8) and hormones in meat (3.7), while foodborne illnesses scored 3.3, slightly lower than in 2023. These results suggest a shift in public focus toward emerging contaminants and chemical risks, which is similar to what has been found in the Eurobarometer.

Bánáti et al. (2024) traced changes in food safety concern over time using Eurobarometer data. While 32% of respondents cited foodborne illnesses as a major concern in 2022 and 2025, this figure was 30% in 2019, but significantly higher in earlier years: 62% in 2010 and 65% in 2005. This long-term trend indicates a decline in public concern about bacterial contamination, possibly reflecting increased trust in food safety systems or shifting attention to newer risks.

Altogether, these data indicated a declining concern for microbiological contamination and rising attention to other concerns, such as chemical contamination. With this change, a change in priorities could be seen.

6. Discussion

This review set out to assess how loss of consumer confidence following a zoonotic foodborne outbreak has been documented and to identify how intangible costs can be quantified. Because zoonotic-specific evidence was limited, the review deliberately included comparable non-zoonotic outbreak studies to broaden the base and reveal shared response mechanisms. Organising results into four themes – consumer confidence, outbreaks, knowledge, and food-safety perception – made it possible to identify how institutional trust, media dynamics, pathogen literacy, and perceived risk shape behavioural and economic outcomes to consumer loss.

Across the included studies, consumer confidence was strongly moderated by trust in government and food-safety institutions. Outbreaks often trigger avoidance behaviour and short-term reductions in purchase intention, yet these effects are smaller and shorter-lived in contexts where authorities respond promptly and communicate clearly and credibly. Institutional trust can therefore reduce market loss and complicate the interpretation of consumer confidence, as loss of consumer confidence can persist even when purchases resume. Especially considering that it has been explained to be connected to past performance. That means that low consumer confidence might persist while sales have stabilised at old levels. Several cases have shown little apparent market disruption despite outbreak events, often because consumers trusted regulators, which was, for instance, the case in Germany during the EHEC outbreak, where the market quickly stabilised and turned back to normal after the outbreak source was found.

The role of trust in shaping consumer behaviour is consistent with Siegrist's (2019) review, which found that trust functions as a mental shortcut, helping consumers handle unfamiliar risks without having full information. In the context of foodborne outbreaks, consumers' trust in actors often replaces their own risk assessment, especially when pathogen literacy is low.

Belluco et al. (2025) further support the idea that consumer confidence can remain high even when risk perception is low. Their findings on raw milk and raw milk-based cheeses align with the broader pattern of this review, where consumer responses to outbreaks are not only driven by hazard severity but are also directed by trust, familiarity, and perceived naturalness.

Behavioural and economic responses to zoonotic and non-zoonotic outbreaks show overlap. Perceived severity and institutional communication explain much of the cross-country variability in consumer reactions. Non-zoonotic outbreaks, therefore, provide useful insights when zoonotic-specific data are sparse, but they need to be put in context. Furthermore, considering that many consumers cannot connect pathogens to the right food product/group, they might not know the difference between zoonotic and non-zoonotic pathogens. For policy, this can help in providing effective communication strategies, using non-zoonotic risk management during zoonotic outbreaks.

A central gap in the evidence is the absence of a standardised, directly comparable measure of consumer confidence loss. Studies typically report heterogeneous proxies such as purchase intentions, WTP changes, and short-term sales declines, but differ widely in timing, scope, and methods.

Further research is warranted to identify specific consumer behaviour for actual zoonotic outbreaks to confirm what has been found in this review. Additionally, longitudinal studies on consumer behaviour after a zoonotic outbreak would be most beneficial. There was no focus on media influence on consumer behaviour in this review, which might be interesting to include in future studies. Moreover, it would be beneficial to analyse expert opinions to see whether they believe that there is a problem with loss of consumer confidence for this topic or if there is no research done until now because there is no real change.

Considering the role of institutional trust, containing and improving credible communication is key to maintaining consumer confidence during foodborne outbreaks.

6.1. Strengths and limitations

A substantial aspect of this review is its narrative nature, which made a broad explorative search possible. Moreover, given the sparse literature on the main topic, organising the results into four explicit themes has helped to clarify pathways and aided in the interpretation. The review emphasised the absence of a standardised measure for the loss of consumer confidence, offering a clear direction for future work.

Nevertheless, the findings in this paper should be viewed with limitations in mind. First, while having a broad explorative search has helped in identifying the most relevant papers, it has also reduced replicability and transparency. Furthermore, the search was limited to three databases, which could lead to potentially missing out on relevant studies. Considering its broad nature, this review has resulted in a heterogeneous group of articles, which has made it challenging to compare them. Similarly, the small number of studies actually analysing zoonotic illnesses limits direct inference for those pathogens. Also, many included studies relied on self-reported data and one-time surveys, increasing the risk of bias and weakening their claims. Another limitation is the lack of studies that include cultural differences as explanations for some variations. Only one country mentions the influence cultural influences can have on food safety (Mazzocchi et al., 2008). Finally, applying insights from non-zoonotic cases to zoonotic scenarios has helped and made this review possible, but it has also required making assumptions about framing, attribution, and sectoral impacts that may not always hold.

7. Conclusion

Outbreak impacts on consumer behaviour and confidence are shaped by institutional trust, media dynamics, pathogen knowledge, and perceived vulnerability. This highlights the need for rapid, transparent risk communication during outbreaks. Absence of visible sales shocks does not necessarily imply absence of the loss of consumer trust and confidence. Accurately capturing the intangible cost of confidence loss requires standardised instruments, adequate study designs, and careful attention to the local context. Future work should prioritise longitudinal monitoring and integrated valuation approaches so that both visible and masked consumer impacts can be detected and appropriately addressed.

8. GenAI use

In this writing assignment, I utilised GenAI, specifically ChatGPT, to assist in brainstorming during the initial phase (OpenAI, 2025). The AI tool was additionally used to make the sentence structuring clearer to understand. I critically reviewed all AI-generated content, and I can assure that the text is accurate and of high academic integrity. Using GenAI improved my efficiency, but I remained vigilant to validate all information to maintain the rigour and originality of the work.

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10. Appendix

10.1. Appendix 1: Search strings

Table 2: Search string for subquestion 1

Database	PubMed	Web of Science	Embase
Search string	("consumer confidence"[Title/Abstract] OR "consumer trust"[Title/Abstract]) AND (defin*[Title/Abstract] OR meas*[Title/Abstract] OR model*[Title/Abstract]) AND (food[Title/Abstract] OR zoon*[Title/Abstract]))	TS=("consumer confidence" OR "consumer trust") AND TS=(defin* OR meas* OR model*) AND TS=(food OR zoon*)	('consumer confidence':ti,ab OR 'consumer trust':ti,ab) AND (defin*:ti,ab OR meas*:ti,ab OR model*:ti,ab) AND (food:ti,ab OR zoon*:ti,ab)
Results	90	20	72

Table 3: Search string for subquestion 2

Database	PubMed	Web of Science	Embase
Search string	("consumer behaviour"[Title/Abstract] OR "consumer perception"[Title/Abstract] OR "consumer confidence"[Title/Abstract]) AND ("salmonella"[Title/Abstract] OR "listeria"[Title/Abstract] OR "campylobacter"[Title/Abstract] OR "shiga toxin producing e coli"[Title/Abstract] OR "STEC"[Title/Abstract] OR "Trichinella"[Title/Abstract] OR "zoonotic"[Title/Abstract] OR "outbreak"[Title/Abstract] OR foodborne[Title/Abstract] OR "food-borne"[Title/Abstract] OR infectio*[Title/Abstract])	TS=("consumer behaviour" OR "consumer perception" OR "consumer confidence") AND TS=("salmonella" OR "listeria" OR "campylobacter" OR "shiga toxin producing e coli" OR "STEC" OR "Trichinella" OR "zoonotic" OR "outbreak" OR foodborne OR "food-borne" OR infectio*)	('consumer behaviour':ti,ab OR 'consumer perception':ti,ab OR 'consumer confidence':ti,ab) AND ('salmonella':ti,ab OR 'listeria':ti,ab OR 'campylobacter':ti,ab OR 'shiga toxin producing e coli':ti,ab OR 'stec':ti,ab OR 'trichinella':ti,ab OR 'zoonotic':ti,ab OR 'outbreak':ti,ab OR foodborne:ti,ab OR 'food-borne':ti,ab OR infectio*:ti,ab)
Results	98	266	82

Table 4: Search string for subquestion 3

Database	PubMed	Web of Science	Embase

Search string	"knowledge"[Title/Abstract] AND "consumer"[Title/Abstract] AND ("salmonella"[Title/Abstract] OR "listeria"[Title/Abstract] OR "campylobacter"[Title/Abstract] OR "shiga toxin producing e coli"[Title/Abstract] OR "STEC"[Title/Abstract] OR "Trichinella"[Title/Abstract] OR "zoonotic"[Title/Abstract] OR "outbreak"[Title/Abstract])	TS=("knowledge" AND "consumer") AND TS=("salmonella" OR "listeria" OR "campylobacter" OR "shiga toxin producing e coli" OR "STEC" OR "Trichinella" OR "zoonotic" OR "outbreak")	("knowledge":ti,ab AND "consumer":ti,ab) AND ("salmonella":ti,ab OR "listeria":ti,ab OR "campylobacter":ti,ab OR "shiga toxin producing e coli":ti,ab OR "STEC":ti,ab OR "Trichinella":ti,ab OR "zoonotic":ti,ab OR "outbreak":ti,ab)
Results	115	318	82

Search string for subquestion 4
Web of Science search only
TS=("consumer perception*" AND ("food safety" OR "food chain*") AND ("zoonotic" OR "bacteria*" OR "pathogen*" OR "microbiological contaminant*") AND risk*)
23 results

10.2. Appendix 2: Data extraction tables

Table 5: Data extraction table for subquestion 1

Author	Year of publication	Study design	Setting	Sample size	Definition "consumer confidence"	Determinants	Main results	Key strengths	Key limitations

de Jonge et al.	2004	Longitudinal using quantitative data (& short review of relevant literature)	Netherlands	1,432	Confidence = "the belief that future events will occur as expected" -> in food safety: belief that "the consumption of food products will not result in adverse health effects, which is (under normal conditions) the expected outcome of consumption" or also: the consumer's general expectation that there are no health issues resulting from food consumption	(1) Consumer trust in regulatory institutions and actors in the food chain, (2) the occurrence of food safety incidents, (3) media coverage of food risks, (4) consumer recall of food safety incidents, (5) consumer confidence in safety of particular product groups	Food safety is perceived as normal by consumers if there are no food incidents Food safety is only perceived as an issue if there are incidents	Samples on three time points Big sample size	No reflection of their own strengths and limitations Quota sampling -> risk of selection bias & possible lack of generalisability

de Jonge et al.	2007	Cross-sectional with online questionnaires	Netherlands	657	Consumer confidence consists of two dimensions: optimism (satisfaction and confidence) & pessimism (worry and suspicion).	(1) Consumer confidence in the safety of food, (2) trust, (3) consumer recall, (4) safety of product groups, and (5) individual differences	Strongly related to consumer confidence in safety of food: consumer trust in societal actors & consumer safety perceptions of particular product groups Optimism is strongly based on trust and consumer confidence while pessimism is also strongly influenced by individual difference variables (e.g., food allergies)	Clear description of statistical analysis Use of previously defined and analysed determinants	Cross-sectional design -> only represents one point of the time Small sample Possible volunteer bias -> might overrepresent a specific group of consumers (strong opinions, health conscious, …)

de Jonge et al.	2010	Mixed methods longitudinal study (2003-2006): repeated cross-sectional surveys and content analysis	Netherlands	2,504	see de Jonge et al. (2004)	see de Jonge et al. (2004)	Most important determinants: Consumer trust in food manufacturers and government & consumer perception of the safety of meat and fish (this observation is constant over time) In 2003, the level of pessimism about food safety was significantly higher than other years (possibly due to the Avian Influenza H7N7 outbreak in the Netherlands)	Repeated measurements -> increased reliability of the results Well described methodology Determinants used from existing study	It was not clear for some of the determinants how they've questioned the participants about it No reflection on own strengths and limitations

Berg	2004	Cross-sectional with telephone interviews	Belgium, UK, Norway	2,916	Difficulty to differentiate between trust and confidence -> no real definition	Consumers can be divided in different groups depending on where they stand regarding food safety (sensible, sceptical, naive, denying)	Consumers are mostly influenced by national food safety events (such as a foodborne zoonotic outbreak) If such an event takes place, more people tend to become sceptical and denying towards their trust in food It takes time to reinstall trust: countries with recent incidents are more sceptical and denying	The existing model they've used in their study was clearly explained Clearly stated hypotheses Random selection of participants	Descriptives about the study population not presented Data analysis was only mentioned in the methods section, not explained at all

Wu et al.	2021	Literature review	/	/	No clear definition	Product assurance supports consumer confidence and influences consumer trust	There is higher confidence from consumers in products that are supported by trusted food system actors	Bases their framework on multiple data sources	No quality appraisal of the included studies Overlap of results and discussion sections, no clear distinction

Macready et al.	2020	Cross-sectional with questionnaires	France, Germany, Poland, Spain, UK	5,870	Trust and confidence are different but causally related Confidence is related to past performances and trust involves judgements of morality	Belief about the openness of food manufacturers and other actors, perceived competence of food manufacturers, trust in manufacturers	Trust explains confidence to a large extent, but other factors need to be included as well, such as cultural differences and the diverse institutional and geopolitical histories	Inclusion of evidence from 5 countries Big sample size	They mention random sampling but don't describe what they were sampled from

FSA	2025	Governmental research project	UK	/	Consumer confidence often used interchangeably with trust; higher trust in food chain actors results in higher confidence. Trust is connected to the future and confidence is connected to the past	/	Consumers have high trust institutions & farmers and low confidence in the food industry Higher confidence can result in higher trust Countries with modernised food systems tend to have higher consumer confidence & trust Media coverage can immensely hurt consumer confidence (e.g., horse meat scandal)	/	/

Table 6: Data extraction table for subquestion 2

Author	**Publication year**	**Study design**	**Setting**	**Sampl e size**	**Pathogen**	**Food product**	**Outbreak size & date**	**Behaviour after outbreak**	**Key strengths**	**Key limitations**

Bitsch et al.	2014	Comparativ e, exploratory case study with qualitative content analysis	US & Germany	/	Shiga toxin-producing strain of E. coli (STEC)	Spinach (US) Fenugreek sprouts (DE)	US (2006): 205 infected DE (2011): 3,842 infected, 53 deaths	Once the government and media reported on the outbreak, consumers avoided the product, but this was in general just a short-term effect So, consumers trusted the governmental recommendations and trusted them	Use of real-life outbreak	Only two newspapers included for the content analysis Not fully clear which data belonged to which sources

Mazzocchi et al.	2008	Cross-sectional survey study	UK, Italy, Germany, Netherlands, France	2,725	Salmonella	Chicken	No outbreak: survey questions in case of an outbreak	Average change of behaviour (change in likelihood to purchase the product) in all countries at -21.58% IT: -40.89 UK: -22.52 DE: -30.48 NL: -11.69 FR: -5.53 Scenario of Salmonella outbreak: weight of attitude decreased, risk perception and subjective norms (for non-trusters) strengthened	Based their work on a validated framework They used a random location sampling as their sampling method	Cross-sectional design -> participants only questioned at one time point

de Vocht et al.	2013	Cross-sectional survey study	Belgium (Flemish region)	6,312	Enterohemorrhagic Escherichia coli (EHEC) O104:H4 outbreak	Fresh produce	May and June 2011: see Bitsch et al. (2014)	No intention to eat less fresh produce (the Belgian government didn't warn of it, because the cases were from Germany, not Belgium) When the perceived susceptibility was high, there was a higher intention to eat less fresh produce When people felt less capable of protecting themselves (low self-efficacy—which is likely to happen as awareness of new food safety risks grows), they were least likely to reduce their fresh produce consumption if they trusted the source	Reflection on study limitations Based their work on a validated framework Big sample size	Findings limited to the included online newspaper -> limited generalisability

Vajda et al.	2021	Cross-sectional survey study	Hungary	456	Salmonella	/	/	The mean WTP for avoiding Salmonella infection was 86.3€ Median & mode were both 30.7€ 12.9% said they wouldn't pay more	Well explained methodolog y	Quota sampling -> possible bias Limited generalisabilit y due to the simulation nature of the study
Appel et al.	2012	Scientific report	Germany	/	Enterohemorrhagi c Escherichia coli (EHEC) O104:H4 outbreak	Fresh produce	May and June 2011: see Bitsch et al. (2014)	A clear majority has never heard of EHEC before that outbreak (85%) 51% stated they changed their behaviour to protect themselves Of those, 72% avoided certain foods, 48% changed their shopping behaviour	/	/

Sundström et al.	2009	Contingent valuation study	Sweden	1,017	Salmonella	Poultry	/	Respondents would pay between SEK 14-42 (1.27-3.8€) more for a poultry product that would reduce the risk of salmonellosis between 1 and 3 cases in 10,000 This gives a VSC of SEK 112,000-150,000 (10,131.17-13,568.53€) and a VSL of SEK 13.3 million or 48.3 million depending on the method but none of the VSL are statistically significant	Big sample size Randomly selection of participants	Volunteer bias (response rate of 48.5%)

Table 7: Data extraction table for subquestion 3

Author	Year of publication	Study design	Sample size	Setting	Pathogen	Food product	Results	Key strengths	Key limitations

Conway et al.	2022	Cross-sectional study with questionnaires	1,557	Ireland	Salmonella	Poultry	94% of the respondents replied they knew Salmonella can cause disease in animals or humans 62% said that it can be found on all parts of eggs 58% said it can not only be found in poultry 72% could identify the different modes of transmission Only 5% knew that symptoms take 4-5 days to develop	Sample size quite large	Sampling not explained Participants too homogenous (not representative of the Irish population)

Henke et al.	2020	Cross-sectional survey	1,008	Germany	Campylobacter, Salmonella, Toxoplasma	Meat	68.3% have never heard of Campylobacter 20.2% heard of it but did not know how to protect themselves the other 11.5% knew how 2.8% never heard of Salmonella 19.9% have heard of it but did not know how to protect themselves the other 77.3% knew how to 48.3% never heard of Toxoplasma 32.8% knew about it but not how to protect themselves the other 18.8% knew how to for those that have heard of Campylobacter, 52.2% knew it is transmissible via meat of those not knowing how to protect themselves, 45.6% thought it could be transmissible via meat 63.8% of those that knew how to Salmonella: not how: 78.6%, knew how: 88.7% Toxoplasma: not how: 40.8%, knew how: 64.2%, total: 50.7	Statistical analysis well described	Cross-sectional nature

Bundesinstitut für Risikobewertung	2018	Cross-sectional survey	1,017	Germany	Salmonella, Campylobacter	Food in general	96% have heard of Salmonella in food (4% haven't) 23% have heard of Campylobacter in food (75% haven't) 46% were worried about Salmonella in food 9% were worried about Campylobacter in food	/	/
Food Standards Agency	2020	Cross-sectional survey	2.101	UK	Salmonella, E. coli, Norovirus, Listeria	Food in general	92% were aware of Salmonella in food 86% were aware of E. coli in food 60% Norovirus 61% Listeria Respondents on sources of food poisoning: raw chicken or turkey (81%), shellfish (57%) reheated takeaway (50%), eggs (42%), unwashed vegetables or salad (34%), cooked sliced meats (26%), pre-prepared sandwiches (28%), bread and frozen vegetables (18%)	/	/

Hölzl et al.	2011	Cross-sectional survey	353	Austria	Salmonella, Listeria, Campylobacter, Bacillus cereus	Food in general	Respondents knew Salmonella (98%), Listeria (63%), Campylobacter (22%), Bacillus cereus (19%) Connected Salmonella with eggs (73%), poultry (67%), fish (12%), dairy products (4%) Listeria: no connection (36%), dairy products (24%), other cheeses (20%), raw milk (4%), salmon (1%) Campylobacter: no connection (75%), poultry (0%) Bacillus cereus: no connection (85%), warmed up rice/pasta (0%), meat and dairy (3%)	/	/
Sterniša et al.	2018	Cross-sectional	560	Slovenia	Campylobacter	Poultry	57.8% of the respondents said that poultry meat in retail can be contaminated with harmful microorganisms 16.7% knew what Campylobacter is 10.2% knew that Campylobacter can contaminate poultry meat	Statistical analysis well described	Small sample size Some assumptions without confirmation (more women in the sample resulted in them saying that it is because there are more women doing groceries without basing it on a reference)

Myintzaw et al.	2020	Cross-sectional	1,171	Ireland	Campylobacter, Salmonella	Poultry	Consumers have poor knowledge on pathogens in poultry Only 5.9% knew there could be Campylobacter and 62.8% Salmonella	Statistical analysis well described Big sample size	No reflection on strengths and limitations

Table 8: Data extraction table for subquestion 4

Author	Year of publication	Study design	Setting	Sample size	Pathogen	Food product	Results	Key strengths	Key limitations
Bearth et al.	2014	Cross-sectional surveys	Switzerland	465	Campylobacter	Poultry	17% said that there are no bacteria on the inside of poultry Consumers deem pathogenic bacteria as less dangerous than other potential risks , which are not conceived as such a big problem (e.g., food additives)	Reported on strengths and limitations of their study Initial qualitative expert interviews to guide the study	Small sample size
Peeters et al.	2025	Cross-sectional questionnaires	Netherlands	/	Bacteria, viruses, parasites in general	Food in general	Dutch consumers' worries on food safety regarding bacteria, viruses, and parasites has increased from 2009 (3.25) to 2019 (3.46), but has experienced a small decrease ever since (3.35 in 2025) They are in general more worried about other factors related to food, such as the living conditions of the animals (3.53), or animal diseases (3.45)	/	/

Kher et al.	2011	Cross-sectional interviews	Brazil, France, Poland, the Netherlands, Ireland	86	Microbiological contaminents	Food in general	Europeans: low risk in the Salmon chain For chicken, Dutch and Irish: risk post-purchase, Frnech and Polish: early in supply chain risk Europeans: high trust in food system and institutions	Cross-country setting	Coding scheme not explained
EFSA	2025	Cross-sectional survey	European Union	/	Microbiological contaminents	Food in general	Concerns in microbiological contaminents has been decreasing in the recent years Other concerns have been rising (e.g., chemical risks)	/	/
Bánáti et al.	2024	/	European Union	/	Microbiological contaminents	Food in general	2022 & 2025: 32%-> foodborne illnesses as major concern 2019: it was 30% 2010: 62% 2005: 65%	/	/