# **Communicating Risk**

A review of guidance and academic literature on communicating risk in relation to food

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# **Document Control**

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# **Executive summary**

This study considers the current state-of-play of available risk communication guidance that is potentially applicable to food, the current academic literature on risk communication and the extent to which current guidance reflects existing academic literature.

The study has assessed the structure of risk communication guidance documents as well as the approach and level of detail provided on appropriate messaging and framing, channels for communication and how to approach different types of risk and audiences. Academic literature on risk communication has been reviewed and the state of evidence on different aspects of risk perception and communication has been summarised. The study has brought these two literatures together and identified where evidence is strongest, where there are still gaps and the extent to which risk communication guidance reflects the available academic evidence on risk communication.

# **Findings**

For **risk perception**, extensive evidence is available in the academic literature on the various factors (including heuristics, emotions and experiences) that influence how individuals perceive risk. This is reflected in guidance, but in varying ways. The evidence is often presented in guidance as something to consider, rather than alongside concrete recommendations.

There is some literature on how to frame and present **risk messaging**. For presenting risk quantitatively, there are empirical findings from the literature that could inform risk communication, but which do not appear in the guidance. Less evidence is available for verbal presentations of risk and very little evidence was identified for visual presentations of risk. In guidance, recommendations on messaging often recommend testing and retesting messages, rather than prescribing specific formats or presentations. Communicating uncertainty is a growing area of research, and although guidance documents generally encourage practitioners to communicate uncertainty, there is little specific guidance on how to do so.

There is some evidence available in the academic literature on **communication channels**, including a growing evidence base on the use of social media. Recommendations on when to communicate through what channels are also provided in guidance documents, although there is a notable gap in guidance on the use of social media for risk communication, and in particular for two-way communication.

There is some evidence in the academic literature on **developing communications**, including some findings related to timing communications and the role of listening to audiences and distinguishing between groups. Many of the guidance documents reviewed place a strong focus on the development process and offer frameworks for step-by-step approaches to the risk communication process.



## **Conclusions and recommendations**

This study found that guidance documents on risk communication differed in their length, level of detail and scope, and the extent to which they incorporated the available evidence. However, in general, the risk communication guidance documents reviewed tend to focus on high level principles. They do not provide detailed guidance, nor do they prescribe how one should communicate about food risk. There are some exceptions to this, where more detailed guidance has been developed. This study therefore recommends that future research is needed to establish:

- What level of detail is most appropriate to risk communication practitioners (generally and regarding specific aspects of risk communication); and
- Whether other formats, including interactive formats, may be suitable for this purpose.



# 1 Introduction

Communicating food safety risks is an important function that the FSA fulfils in England, Wales and Northern Ireland. The FSA issues messages and engages in dialogue aiming to change behaviours and support informed decision-making. This is not a straightforward task. Repackaging the results of risk assessments performed by scientists so as to make them understandable by non-scientists is not sufficient for accurate and effective risk communication.

The effectiveness of risk communication is dictated largely by how individuals perceive risk. Risk perceptions are, in turn, influenced by a range of factors beyond the information they receive about those risks from regulators such as the FSA. These factors have been studied to some extent and evidence on how people perceive risk has informed best practice guidance on risk communication.

There is also a sense among risk communication scholars and practitioners that context has changed (greater distrust towards public authorities, uncontrolled information flowing through multiple channels; Kasperson, 2014), while debunked ideas about risk communication endure (Arvai, 2014).

As Charlebois and Summan put it:

"Contemporary risk mitigation requires an increase in the sophistication of communication practices and a clear recognition of the importance of transparency and responsiveness as establishing partnerships and nurturing knowledge networks supersedes the attraction of communicating factual risks with perfect information" (Charlebois and Summand, 2015:153)

This study has meant to contribute to an enhanced risk communication strategy for the FSA. For that purpose, it has considered the current state-ofplay of available risk communication guidance as it might relate to food, as well as the current academic literature on risk communication.

For risk communication guidance, the study has assessed the structure of guidance documents as well as the approach and level of detail provided on appropriate messaging and framing, channels for communication and how to approach different types of risk and audiences. For the academic literature on risk communication, it has summarised the state of evidence in relation to different aspects of risk perception and communication.

Bringing these two literatures together, the study has sought to understand where evidence is strongest, where there are still gaps and the extent to which risk communication guidance reflects the available evidence on risk communication.

On the basis of this synthesis, this study provides recommendations to the FSA on best practices for risk communication guidance and on key areas for future research.



# 2 Methodology

This study was conducted in two main phases. The first phase involved a review of frameworks (e.g. guidance documents) related to the communication of risk published by either government organisations or similar. The second phase involved a review of the academic literature on risk communication.

This report provides a synthesis of both reviews and considers the extent to which existing frameworks reflect the available evidence on risk communication.

#### 2.1 Review of frameworks

The first phase involved a review of frameworks (e.g. guidance documents) related to the communication of risk published by either government organisations or similar.

The study used a fairly broad definition of risk communication 'framework': any published document resembling an approach or guidance to risk communication was included.

Web-search using Google enabled the identification of frameworks. The search focused on frameworks relevant to:

- risk communication, both specific to food and to science communication more broadly, including uncertainty communication; and
- the UK context, but including examples from other countries and international organisations.

Additional frameworks were included based on recommendations received from peers.

An overview of all 18 frameworks reviewed is available in Annex 1.

The review of frameworks assessed the manner different aspects of risk communication were addressed, including:

- the overall approach to communication;
- types of risk;
- audiences;
- communication channels;
- messaging, and
- uncertainty.

The study team reviewed the frameworks both in terms of the recommendations given and their level of detail.



### 2.2 Review of the academic literature

For the second phase, the following search strategy informed the selection of the literature.

A search on Google Scholar and EBSCO used the following keywords, and retained all sources published in the last five years (i.e. published since 2014):

- Risk communication, including:
  - Risk perception
  - Risk presentation
  - Risk behaviour
  - Trust
  - Plain Language
  - Policymakers
  - Consumers / citizens
  - Crisis communications
- Uncertainty communication, including:
  - Uncertainty perception
  - Uncertainty presentation
- Risk and food
  - Emerging risks
  - Established risks
- Media and risk
  - Media discourse / mass media / media coverage
  - Fake news / social amplification of risk
  - Social media

The review also included some older sources identified by the team as highly influential and important. The initial list of sources developed through the search strategy was then complemented by snowballing: identifying key relevant sources cited within texts, as well as newer sources that had cited the sources reviewed.

The review of academic literature considered the evidence across similar themes to those used to review the frameworks.



# 3 Findings

This section presents the findings from the literature review. After a brief overview of the sources, the section moves to discussing briefly the literature on risk perception. It then discusses in more detail the literature on risk communication.

### 3.1 Overview of the sources

#### 3.1.1 Government frameworks

A total of 18 frameworks were reviewed for this report. Further details on each of the frameworks are included in <u>Annex 1</u>. Frameworks reviewed differed in their length, level of detail and scope. Some frameworks were specific to food risk communication, others were more general. There did not appear to be significant differences between those specific to food risk and more general frameworks on risk communication.

Most of the frameworks reviewed address risk communication in the context of pre-planned ongoing, lengthy processes to prepare for a risk event in advance of it occurring. Only one framework<sup>1</sup> reviewed was specifically written in relation to crisis communication. Two others incorporated some aspects of crisis communication into their discussion, but did not provide a significant amount of detail.<sup>2</sup>

Most of the frameworks begin by setting out general principles for good risk communication: these generally include openness, transparency, timeliness and independence.

Most frameworks stop short of providing direct advice or recommendations. This is intentional, as there is a focus on risk communication always being tailored to a particular situation. As stated in EFSA's food risk guidelines:

"Decision-making on risk communications cannot be made into an exact science, and judgements need to be made, but a thorough and systematic consideration of all possible relevant factors can help to make that judgement more informed."

As such, most of the frameworks present risk communicators with a series of questions to ask themselves about the type of risk, the context and the intended audience. They do not necessarily indicate how risk communication might be altered depending on the answers to those questions. In many of these frameworks, more attention is paid to providing an overview of the available evidence on risk perception and communication and providing case studies that illustrate best practice, rather than offering direct advice.

<sup>&</sup>lt;sup>2</sup> EUFIC (2017) How to talk about food risk? A handbook for professionals and HSE (1998) Risk communication: a guide to regulatory practice



<sup>&</sup>lt;sup>1</sup> EFSA (2016) Best practice for crisis communicators: how to communicate during food or feed incidents

Some of the frameworks reviewed provide a lengthy and detailed overview of the evidence. The US FDA's guide stands out thanks to a particularly thorough review. Some sources present the underlying evidence alongside guidance. Others, such as EFSA's uncertainty guidance, include the evidence base as a separate chapter.

#### 3.1.2 Literature

96 studies were reviewed and included in this report. The most robust evidence on risk communication in the literature comes largely from studies on risk perception, where there has been a long history of empirical work. Studies that focus more directly on communication, particularly in relation to food risk, tend to rely on narrative reviews of the literature, case studies and on interviews with experts and practitioners.

The review was not restricted to evidence on food risk and has incorporated findings from other types of risk communication. Research does suggest that risks associated with food are perceived differently to other types of risk. Some recent work suggests that there is a particular public anxiety in relation to food and food risks (Jackson, 2015) and there is empirical evidence that suggests that individuals perceive the same risk to be more severe when they are exposed to it through food as compared to other channels (McEntaggart et al, 2019; Capon et al, 2015). Nevertheless, findings on other types of risk still provide valuable insight on the general presentation of risk. For example, some of the strongest research on how to communicate risk, particularly in terms of framing messages, comes from research looking at other areas than food, in particular healthcare.

# 3.2 Risk perception

The literature on risk communication is anchored in theoretical and empirical studies of risk perceptions: the subjective views that an individual may have about a risk, including how often it might occur or how harmful to them or others it might be.

This is because how risk communication is received and the impact it has will depend on how an individual perceives risk, and the extent to which the nature of the communication (including its content, framing, format, channel, timing etc.) accounts for the other factors influencing risk perception. Therefore, a strong understanding of what shapes risk perception is crucial to developing communication that is impactful. Indeed, much of the literature on risk communication measures outcomes on the basis of how it influences risk perceptions.

The evidence base on what shapes risk perceptions is large. There is widespread agreement between scholars that risk perceptions depend on a wide range of factors (as summarised for example in Charlebois and Summand, 2015; or McGloin et al, 2009). The breadth of factors discussed in the literature is representative of several disciplines and theoretical approaches.



### 3.2.1 Factors contributing to risk perception

#### 3.2.1.1 Heuristics, biases and emotions

Psychology and psychological factors figure prominently in determining risk perceptions, with seminal work showing that the perception of risk is shaped by heuristics and biases (e.g. the loss aversion heuristic; Tversky and Kahneman, 1981). The way outcomes are framed may thus have an impact on how severe the risk is perceived to be. Another example of psychological factors identified in the literature is what has been called an 'optimism bias', with people seeing their personal risk as lower than other people's, perhaps because of confidence in their own ability to prevent a risk, while consistently underestimating the cumulative impact of small risk mitigation strategies (Fischhoff, 2013). This is sometimes linked to what has been called an 'illusion of control' (e.g. de Freitas et al, 2019).

Emotions can play an important role in risk perceptions. The 'dread' factor as it is sometimes called (e.g. McGloin et al, 2009; Liu et al, 2016) can drive individuals to respond particularly strongly to information about a risk, and can drive behaviours in a way that overrides numbers and evidence (Rakow et al, 2015).

There is a wide literature exploring how characteristics of the risk appear to contribute to the manner it is perceived. There is strong evidence showing that the perceived naturalness (or lack of) of the risk matters, with man-made risks driving perceptions of higher risk (e.g. Frewer et al, 2009; Kaptan et al, 2017). This is particularly relevant and important to consumers when it comes to food (Roman et al, 2017). There is also strong evidence showing that one's perceived level of control over the risk (i.e. one's ability to choose not to expose themselves to the risk, for example by not consuming a risky product) contributes to the perceived risk level (e.g. De Vocht et al, 2015; Frewer et al, 2009; FSA, 2016; Kaptan et al. 2017). Other parameters that appear to increase perceptions of risk are the severity of the consequences and whether those may materialise immediately, whether the risk is novel/emerging as opposed to established, whether it is poorly-understood, etc. (see McGloin et al, 2009).

#### 3.2.1.2 Cultural differences and personal experience

Cultural dispositions (social norms and values) have been mentioned as well, for example to account for what some scholars have qualified as different levels of tolerance to risk and / or uncertainty or different attitudes to risk more generally, which have been documented between representatives from different groups (e.g. van Dijk et al, 2008; de Freitas et al, 2019).

An individual's background has been associated with their perception of risk, including any previous experience of being exposed to the risk (directly or through peer or kin), as well as their education or training. For example, de Freitas et al. (2019) note that perceptions of risk among food workers vary depending on whether they have received a scientific education or not, and whether they have been trained. This echoes observations Johnson and Slovic (1995) made on how 'science literacy' appeared to influence the extent



to which uncertainty affected risk perceptions. More generally, the more familiar one is with a risk, the lower the perceived risk, although in some instances that is not true (e.g. Brook Lyndhurst, 2009; on chemical mixtures McEntaggart et al, 2019; on nanotechnologies in food Satterfield et al, 2009; Etienne et al, 2018c).

Lastly, some scholars have argued perceptions of risk cannot be viewed in isolation, and that instead they are part of a more general attitude toward risk that is shaped by an individual's understanding of other recent risks and how they have emerged, materialised and the manner in which they have been responded to (or not). For example, when discussing and criticising the social amplification of risk model, Murdoch et al. note that one best understands risk perceptions and how they are influenced by the media "not as discrete responses to bounded events, but as the latest episodes in an intersecting series of continuing narratives about chance, choice, science, power, and accountability" (2003: 171). Understanding the history of risk in a local, national or international context helps one understand individual views of how well a risk has been regulated, which itself contributes to risk perceptions (Charlebois and Summan, 2015). Levels of trust and distrust in public institutions, which are built over time, are well-documented determinants of risk perceptions (e.g. Capon et al, 2015; Viklund, 2003). Far from anecdotal, trust in public institutions and organisations, and what has been seen as a growing trend of distrust, notably in science and public authorities,<sup>3</sup> are seen by leading scholars as a key determinant of risk perceptions and a fundamental issue for risk communicators (e.g. Kasperson, 2014).

<sup>&</sup>lt;sup>3</sup> For a more detailed discussion of trust in the food system in the UK, see Etienne et al. 2018b.



#### Risk perception in government frameworks

All of the government frameworks reviewed made some reference to risk perception research and encourage consideration of risk perception as part of the development of communications. Frameworks often note that perception is impacted by the severity and likelihood of the risk, the impact on the population and how acceptable a risk is perceived to be, what mitigating actions are available and previous lived experiences of a risk. Although there is extensive discussion in guidance on risk perception, there is little information on how to translate this research into communications. Some examples of how risk perception is handled in frameworks include:

- EFSA's When Food is Cooking Up a Storm guidance provides significant details on different aspects of risk perception. Rather than offering direct guidance on how to incorporate this information into a strategy, instead it suggests key questions for consideration based on this research, which can be used by practitioners to shape their approach (illustrated in Figure A2.1). For example, it asks readers to consider whether the risk in question is natural or stems from technological intervention, and to consider this in the design of a communication strategy.
- DEFRA's risk communication guidance makes direct reference to the academic literature on this topic and includes the psychometric model of risk from Slovic (1987) in their discussion of risk perceptions (illustrated in Figure A2.4). It notes that understanding how risks are perceived should be taken on board as part of the policy-process, and that work on this is more advanced in some fields than others, citing work in the field of public health.
- The Cabinet Office's guidance also makes reference to the academic literature in this area, and includes insights from Cultural Theory, separating potential audiences into four groups: fatalists, hierarchists, individualists and egalitarians (illustrated in Figure A2.5).
- The FSANZ framework provides some practical advice on how to incorporate an understanding of risk perceptions. It sets out recommendations based on an understanding of both how a risk is perceived and the actual risk. For example, if actual risk is low but perceived risk is high, the focus is on proactive media liaison and social media engagement to manage expectations. When both perceived and actual risk are high, then a more proactive risk communication strategy is required (illustrated in Figure A2.6).

### 3.3 Communicating risk: messaging

Risk communicators can choose to present and frame risk information in various ways. Much of the literature in this area distinguishes between quantitative and qualitative (or verbal) presentations of risk information. Findings suggest that both types of presentation are important and in many instances are complementary. For example, Visschers et al (2009) finds that



although people prefer to receive information to evaluate a risk in a quantitative form, they will describe that risk to others qualitatively.

#### 3.3.1 Presenting risk quantitatively

Research into the quantitative presentation of risks—and probability in particular—generally considers two main types of presentation: 'absolute' and 'relative' risk (Fagerlin and Peters, 2011). Individuals' perceptions of risk and the comprehension of information differs based on these presentations and the framing of quantitative information. Although risk encompasses both the probability and the severity of a hazard, most of the research around quantitative presentations of risk relates to expressing probabilities rather than severity.

#### 3.3.1.1 Presenting risk quantitatively: absolute risk

'Absolute risk' is a term often used to describe the overall likelihood of a risk event happening. The higher the absolute risk, the more likely something is to happen. For example, the absolute risk of selecting a diamond from a shuffled deck of cards is 25%, or one in four, and the absolute risk of selecting the ace of diamonds card is 1.9%, or one in fifty-two.

While absolute risk can provide individuals with a more definitive likelihood of a risk occurring, the literature recommends that absolute risk always be presented alongside contextual information. This means providing a reference point: either for what is considered an appropriate or acceptable level of absolute risk, or a baseline risk that would exist without the proposed intervention. Without this context, individuals may have difficulty interpreting absolute risk information (Fagerlin and Peters, 2011; Rakow et al, 2015).

#### 3.3.1.2 Presenting risk quantitatively: relative risk

'Relative risk' is a way to explain how much more, or less, likely a risk event is for one group over another. It can also be used to compare risks, to work out how much more likely one risk is over another. For example, there are two groups, each containing 100 people. If one person out of the 100 smoked in group A, and four people out of the 100 smoked in group B, then the relative risk of picking a smoker at random from group B is four times, or 300%, that of group A. However, the 'absolute risk' of picking a smoker in either group remains small, at just 1% and 4% respectively.

People will often seek to understand data by making relative judgments towards risk and mitigation strategies, even in scenarios where absolute judgements may be more appropriate (Rakow et al, 2018). Several studies illustrate how the use of relative risk probabilities can obscure an individual's actual risk and overinflate what could be a miniscule or non-significant level of risk (Visschers et al, 2009; Rakow et al, 2015; Waters et al, 2016). This problem of overinflating risk is particularly notable in media stories that report relative risk, for whom 'increased risk' is a captivating headline irrespective of the risk magnitude (Spiegelhalter, 2017b).



Relative risks are often presented by changing the denominator of the risk, rather than the numerator, such as a risk being 'one in ten' or 'one in one-thousand'. This adds to the challenge of comparison, particularly for less numerate groups, who may associate a higher denominator with a riskier situation (Waters et al, 2016). As such, denominators should be kept consistent when possible (Lipkus, 2007).

Accordingly, it may be appropriate to provide absolute and relative risks alongside each other, to contextualise both the magnitude and likelihood of a risk event (Fagerlin and Peters, 2011; Spiegelhalter, 2017b). Any presentations of absolute or relative risk may also benefit from clear information summaries, including lay-friendly explanations of absolute and relative risks, to support individuals seeking information to identify the most appropriate data (Freeman et al, 2017).

#### 3.3.1.3 Presenting risk quantitatively: percentage or frequency

Research in healthcare has suggested that less numerate individuals perceive medicine as less risky when side-effects are presented in percentages rather than frequencies (Fagerlin and Peters, 2011), and more generally there is a tendency for individuals to interpret risks as more significant when they are presented as frequencies and less significant when they are presented as percentages (Slovic et al, 2000). This is explained in part by the fact that risk presented as a frequency is less abstract and leads to more emotional engagement with a risk message as compared to percentages (Slovic et al, 2000; Fagerlin and Peters, 2011). Presenting risk as a frequency has also been found to facilitate the interpretation of statistical information—in particular, the ability of individuals to make further calculations based on that information—and research has indicated that this is the case for both experts and laypeople (Hoffrage et al, 2000).

Presenting risk as a frequency requires decisions to be made on the most appropriate numerators and denominators. As indicated in the discussion on relative risk, when presenting different risks alongside one another, it is important to keep denominators consistent. Presenting risk as a frequency may also be subject to ratio bias, where a larger numerator (e.g. 33 in 100 compared to 2 in 5) suggests a larger risk (Spiegelhalter, 2017a). Schapira et al (2001) also suggests that the use of lower denominators may be misinterpreted by some individuals as low sample sizes and therefore more uncertainty in outcomes.

Ultimately, Spiegelhalter (2017a) notes that while there has been an ongoing dispute over whether it is better to express a proportion as a percentage or as a frequency, no clear preference has emerged. Instead, he proposes that it is more important to explain what the probability of a risk means, rather than what format the risk estimate is presented in. Similarly, any risk communication should where possible also include the timeframe over which the risk occurs, as a failure to do so deprives an individual from being able to understand and critically engage with the communication (Waters et al, 2016). Further, if the intended purpose of the communication is to compare



between risks, these timeframes should be kept consistent where possible (Fagerlin and Peters, 2011).

#### 3.3.1.4 Presenting risk quantitatively: how much information?

While providing context for risk presented quantitatively is important to ensure that individuals can interpret information, the amount of context and detail necessary will vary depending on the situation. Risk communications that provide extensive quantitative details on risk can be overwhelming and difficult to understand (Rakow et al, 2015) and in general, providing less information rather than more improves an individual's comprehension and requires lower cognitive effort to make better decisions in response to risk (also Kasperson, 2014). This is particularly apparent among individuals with lower numeracy skills (Fagerlin and Peters, 2011). For example, one study requiring respondents to identify high-quality hospitals found that only providing the most important quantitative variable, rather than all variables, made it easier for respondents to identify the hospitals correctly (Peters et al, 2007).

The challenge of both providing context around risk information presented quantitatively and avoiding information overload has led to the use in many fields of new quantitative tools to present risk information in a simple but informative way. For example, several studies have been done on the use of effective age tools, such as 'heart age' tools as a way to present cardiovascular risk in health care communications. Although some research has found that the use of such a tool, rather than a thorough list of test results, improves risk comprehension and behavioural intentions (Damman et al, 2018; Spiegelhalter, 2016), other research has found that the use of a 'heart age' tool led to inflated risk perception and did not motivate behaviour change any more than presenting absolute risk information (Bonner et al, 2015).

#### 3.3.1.5 Presenting risk quantitatively: framing

In addition to the amount of information, the framing of information has also been identified as an important variable to communicate risk quantitatively:

- There is some evidence that 'gain-framed messages' (communicating the benefits of action) are effective for preventative behaviours (such as installing infant car seats or taking regular physical activity), while 'loss-framed messages' are more effective when communicating uncertainty (such as the outcomes of cancer screening) (Fagerlin and Peters, 2011);
- In a study on different methods of presenting risk quantitatively, Peters et al (2007) found that presenting quantitative information where higher numbers are associated with more positive outcomes required lower cognitive effort, facilitated comprehension and helped respondents identify their most appropriate treatment option;
- More immediate risks (e.g. total risk over one year as opposed to risk over five years) are easier for audiences to understand and are more likely to affect risk perception (Polak and Green, 2015);
- Risks that are less than 1% are liable to be dismissed by audiences as representing no risk (Lipkus, 2007).



#### Quantitative expressions of risk in government frameworks

Despite extensive research in the literature, frameworks provided either no or little advice on how best to communicate risk quantitatively. The only apparent exception to this is the US FDA guidance, which provides an extensive literature review on the subject. Other examples of advice are high level, for example, Defra's (2017) guidance cites general principles included in the National Flood Resilience Review, including "express estimations of the likelihood of events in intuitive, consistent and unambiguous ways" (p 10). However, no further guidance is provided on how to fulfil this principle.

#### 3.3.2 Verbal (qualitative) presentations of risk

Presenting risk information in qualitative formats (i.e. using words rather than numbers) can help to provide context for audiences and facilitate the interpretation of risk information. Verbal information is often used to help individuals identify the relative riskiness of different scenarios. For example, when communicating relative risks verbally, it may be appropriate to use 'low', 'medium' and 'high' as descriptors for the risk (Bonner et al, 2018). For the risk communicator, verbal information is also necessary to communicate the assumptions, caveats and uncertainties arising from the nature, volume, quality and consistency of evidence used to define a risk (van der Bles et al, 2019).

However, there is no standardised set of terms used to communicate risk verbally (Schneider, 2016), although there have been some attempts to develop such a standardised terminology and link this to quantitative information (such as, for example, the IPCC's guidance note on the consistent treatment of uncertainties; also Ho et al, 2014). Because there are no standard terms, and because such terms are inherently subjective. studies have identified significant differences in how different people interpret the same risk terms (e.g. Bonner et al, 2018; Budescu et al. 2014; Visschers et al, 2009; Han et al, 2009). The inherent subjectivity and consequently the ambiguity of using qualitative terms to describe risk has long been noted in the literature (Kent, 1994 and Wallsten et al, 1986 in Fischhoff, 2013). For example, terms such as 'low risk', 'uncommon' or 'unlikely' will lead to differing interpretations of a risk's scale or severity between individuals. Some research has indicated that some of these differences in interpretation may be specific to audience groups (Knapp et al, 2016). For example, the use of the word 'unlikely' may be interpreted by a lay audience as unrealistic, while for scientists 'unlikely' may be unrealistic but entirely plausible (Ho et al. 2014; Visschers et al, 2009; Schneider, 2016).

Such differences in interpretation also mean that the use of verbal descriptions in risk communication may contribute to the over- or underestimation of risks, depending on how the risk is presented (Fagerlin and Peters, 2011; Rakow et al, 2015). For example, Knapp et al (2016) found that adding verbal risk expressions (a scale of 'very common', 'common', 'uncommon', 'rare', 'very rare') to quantitative presentations of risk (e.g. 'may



affect 1 in X people') resulted in participants significantly overestimating perceived levels of risk when compared to presenting quantitative information alone.

Over- or underestimations of risk may also be due to the use of specific terms used. For example, the use of the term 'radioactivity' when discussing the risks associated with X-ray use may evoke emotive imagery of nuclear waste and contamination and contribute to a heightened perception of risk (Downs and Fischhoff, 2011). Such trigger words will likely differ depending on the risk and audience in question, and much of the literature therefore recommends pretesting messages (Visschers et al, 2009; van der Bles et al, 2019; Downs and Fischhoff, 2011). As risk perception is largely driven by emotion, it follows that appeals to emotion or the use of emotionally triggering terminology could be a powerful tool for risk communication. However, there is little evidence for such methods and some authors question the efficacy of such approaches, noting that appealing to emotion may lead to unintended (and undesirable) consequences (Waters et al, 2016; Rakow et al, 2015).

In addition to providing context to risk information through the use of qualitative terminology, risk communicators may also seek to provide context through the use of analogies. This may be particularly helpful for more complex subject areas and some research has looked into the use of analogies to better explain climate change. Rakow et al (2015) consider the available evidence on this, citing research that shows certain analogies improving understanding of climate change, but noting that there is limited evidence that this then impacts risk perceptions. Some research also suggests that presenting risk information as stories is more effective at communicating important information than presenting facts and statistics alone (Jacob et al, 2010 and McCarthy and Brennan in Ueland, 2018).

Research also suggests that the most effective risk communication also provides audiences with actions they can take to mitigate risk (Veil et al, 2011; Janoske et al, 2013), and that not including information on mitigating actions in a risk communication can lead audiences to seek information from other (potentially less reputable) sources (Seeger, 2006; Dixon and Clarke, 2012).



#### Verbal risk in government frameworks

The frameworks reviewed consistently recommend that risk messaging should be presented as simply as possible and avoiding jargon. Messaging should also be consistent and avoid conjecture.

There was limited guidance otherwise in terms of how messages should be constructed. This is not dissimilar from literature on the subject. There are some exceptions:

- EFSA's uncertainty guidance provides specific instructions on how to write about uncertainty and accompanies this with examples. For example, it recommends that when writing about an inconclusive assessment for an entry-level audience, text should indicate clearly that no conclusion can be provided, and explain briefly what the sources of that uncertainty are. This is contrasted with information provided to more informed audiences, where it is appropriate to provide further details on the sources of uncertainty, including quantifications for more technical audiences (illustrated on page Figure A2.8). Similar guidance is also offered for other aspects of uncertainty communication: prescribing the level of detail and wordings appropriate for different audiences. This is also relevant to Communicating uncertainty in government frameworks.
- The BfR's guidance recommends that risk communication should avoid trying to convince or persuade and instead should only provide information to help people assess a risk. The BfR have developed a 'risk profile' model that highlights the key aspects of a risk for this purpose. This includes information on the affected group, the probability of the risk, the severity of the risk, the validity of the available data and the controllability by the consumer (illustrated in Figure A2.10).
- The USFDA's guidance recommends an extended process for developing qualitative communications. The first step is to develop and refine a model of how the practitioner understands the risk, then to develop interviews with members of the intended audience that seek to understand what perceptions are around different aspects of that model and then to draft, test and retest messaging based on an understanding of those perceptions and how they differ from the model. This avoids providing specific guidance, but instead sets out a method for developing messages appropriate to the context in question. This guidance also recommends the use of plain language writing and design strategies, for example, limiting the number of main messages within a communication and using active voice (illustrated in Figure A2.11).

#### 3.3.3 Visual presentations of risk

Visual presentations of risk are particularly useful for building understanding about topics that are intangible because of scale, complexity or uncertainties (McInerny et al, 2014; Schneider, 2016) and can illustrate probabilities of harm in a way that is more likely to attract people's attention and promote accurate understanding than other forms of risk communication (Visschers et al, 2009, Arrick et al, 2019).



However, there is no single method for visually presenting risk, and the most appropriate visualisation will differ depending on the type of risk being conveyed (Fagerlin and Peters, 2011). Spiegelhalter (2017a) notes that developing visual presentations of risk is an ongoing process, that requires assessing the needs of the audience, and repeat testing of different iterations to produce a final design. Frewer et al (2016) find that there has been limited research thus far on visual presentations of risk and there is a need for further research.

#### 3.3.3.1 Strengths and weaknesses of different visualisations

In general, visualisations are best used to communicate the gist of information, rather than extensive detail. Different visual presentations of risk serve different goals. Accordingly, the format of the visualisation is important, and the same principles apply here as to science communication more generally. For example:

- Line graphs can be effective in communicating risk trends over time (Spiegelhalter, 2017a; Fagerlin and Peters, 2011; Waters et al, 2016);
- Pie charts are effective at communicating the proportions of different risks (Fagerlin and Peters, 2011);
- Bar graphs are effective at helping people understand and compare between multiple different risks (Fagerlin and Peters, 2011).
- Pictographs, such as icon arrays (e.g. an image of ten identical body shapes, with different colours to show those affected by a risk as a proportion of the total) are effective at presenting binary risks that either do or do not exist or numerical changes in risk in 'before and after' scenarios (Bonner et al, 2018) and the proportion of risk relative to the whole, a target or an average (Waters et al, 2016);
- Data tables or 'fact boxes' are appropriate for more detailed, verbatim information (Fagerlin and Peters, 2011; Spigelhalter, 2017a; Freeman et al, 2017).
- For geographic risks, maps can convey considerable amounts of data by being engaging and familiar, but any overlaid data (topography, borders etc) may contribute to information overload and distract from the purpose (McInerny et al, 2014). Some research on the use of maps has indicated that where appropriate (e.g. for localised risks), the use of aerial photographs improves understanding (Haynes et al, 2007).

There has also been limited research on how people react to particular symbols, icons and imagery. While symbols add meaning to a visualisation, they should ideally be tested across population groups as they may have different effects based on a person's numeracy (Peters et al, 2007). For example, one study visualising cardiovascular disease as a binary risk (the probability of being at risk of, or not at risk of, the disease) noted positive emotional responses to green smiling faces, with negative emotional responses to red frowning faces (Bonner et al, 2018). As another example, traffic-light symbols were easy to use by highly numerate groups, but not well understood by low-numerate groups (Peters et al, 2007). One study found that most images accompanying online information about GMOs evoked



unnaturalness and contributed to emotive responses and risk perception (Ventura et al, 2017).

As with other formats for presenting risk, the "less-is-more" principle has also been found to apply to the design of visual representations of risk (Waters et al, 2016). Elements that overcomplicate risk presentations, such as 3D bar charts or distorted data and axes that exaggerate the magnitude of risk are to be avoided. Multiple graphics communicating the same data are to be avoided where this could be presented more concisely (Waters et al, 2016). Such aspects influence the apparent quality and design of visualisations, and this in turn has implications for trust: graphics that appear to be poorly designed are liable to reduce audience's confidence in the information conveyed (McInerny et al, 2014).

Interactivity and animations may have some benefit for engaging users, but may also introduce unnecessary complexity (McInerny et al, 2014; Spiegelhalter, 2017a) and while vivid narratives, images and metaphors may gain attention, they may also evoke unintended emotional responses that result in the user not engaging with the visualisation (Spiegelhalter, 2017a). Two studies were identified exploring the use of interactive games to communicate risk. Crovato et al (2016) found that the use of a video game to communicate risk to students led to increased knowledge of risks and appropriate mitigating actions. However, Ancker et al (2010) compared the use of game-like graphics to static images presenting risk information and found no difference in terms of how these affected risk perceptions, estimates or intentions.

#### 3.3.3.2 Differences between audiences

There is limited research investigating the suitability of visual presentations of risk for different audience groups. Well-designed visualisations can be particularly effective in improving comprehension among people with low numeracy (Spiegelhalter, 2017a, Fraenkel et al, 2018). For lay audiences, "well-designed" means avoiding overly complex visualisations, as these can have the opposite effect on comprehension. This was shown in Damman et al (2018), where visualisations of cardiovascular disease risk had an unintended, negative effect on how information was understood and risks were recalled, with particular detriment to less numerate and health literate groups. What will be considered overly-complex will likely differ significantly by audience group and visualisations that may be preferred and considered more comprehensible by experts can be challenging for laypeople to understand (Haynes et al, 2007; Rakow et al, 2018).

#### Visual presentations of risk in government frameworks

No frameworks were identified that provided specific guidance on how to visualise risk. This is in line with the literature, which only provides general principles for visual communication of risk. The USFDA guidance



recommends using graphics to show fractions, but more generally avoiding the use of graphs and charts where possible.

#### 3.3.4 Uncertainty

Uncertainty is an inherent aspect of most risk assessment, particularly for emerging or complex risks. It is also crucial for developing new research questions and hypotheses, searching for processes and mechanisms, and gaining knowledge about how things work (Schneider, 2016).

Research indicates that there is value in helping audiences understand that scientific uncertainty is not a failure of science, but rather an expected outcome needed to build knowledge and understanding (Guenther et al, 2015).

Much of the literature recommends and encourages communicating uncertainty, and this stems in part from concerns that withholding uncertainty information lacks transparency and can undermine public trust in an authority (Lofstedt et al, 2017). Failing to acknowledge or adequately communicate uncertainty can lead to an inaccurate focus on certain pieces of evidence in the process of decision-making, with potentially disastrous consequences (van der Bles et al, 2019). Communicating uncertainty in a transparent manner can also mitigate against the professional misconduct of some groups, who willingly use uncertainty to discredit research and as a weapon of propaganda (Schneider, 2016).

However, uncertainty may be received by audiences as unwanted and synonymous with making mistakes (Schneider, 2016). This was tested by Etienne et al (2018a), who found that the provision of uncertainty information did not significantly impact confidence in the risk information provided.

Some audiences may find uncertainty information distracting and confusing. Lofstedt et al (2017) found this, noting that when given a straightforward choice, most respondents preferred to know if a food/chemical was safe or not, rather than hearing the risk estimates and scientific uncertainties that underpinned this safety. Etienne et al (2018c) also found this to be true for members of the general public with lower awareness of scientific risk assessment.

Ultimately, public perceptions of uncertainty are likely to be subjective, and it is difficult to identify common messages that will be well-received by all groups. Even among those members of the public who were more receptive to uncertainty information in Etienne et al (2018c), there was no clear consensus as to a preferred format.

Etienne et al (2018c) also tested the communication of uncertainty information with other stakeholder groups. Uncertainty information was considered important and was understood by technical policy-makers and political decision-makers. NGOs and civil society groups also welcomed and encouraged the communication of uncertainty information, but participants from this group also had a tendency to believe that the presence of uncertainties in evidence meant that risk was higher.



#### 3.3.4.1 Communicating uncertainty

When communicating uncertainty, it is important to ensure that uncertainty information is not conflated with risk information. Van der Bles et al (2019) gives the example that while the incidence of cancers caused by consuming processed meat is relatively low compared to other factors such as smoking, the certainty in the evidence base that processed meat causes cancer is very high.<sup>4</sup>

As with risk messages more generally, there is debate as to whether uncertainty information should be communicated in a quantitative or qualitative format. This was explored by Etienne et al (2018a), who found that although policymakers assumed that qualitative statements would be preferred by the general public and better understood, among members of the general public themselves, there were mixed preferences as to the type of uncertainty information they wanted to receive.

Some research has looked into how framing can impact the communication of uncertainty. For example, Juanchich et al (2017) finds that experts who take a personalised approach to communicating uncertainty, such as "I am 90% certain", have been perceived as more knowledgeable than experts using an external probability phrase, such as "it is 90% likely". Interestingly, this analysis found that the opposite was the case for lay speakers, with personal certainty perceived as less influential than broader judgements.

There has been some research into the use of visualisations for representing uncertainty, particularly for communications to policy-makers and other decision-makers, but there is little consensus on the best approach to this (Papadopoulou et al, 2018; Goerlandt and Reiners, 2016) and as noted by McInerny et al (2014), this is an *"active...[but] unresolved issue in information visualisation research"* (McInerny et al, 2014: 150).

#### 3.3.4.2 Uncertainty in crisis communications

For crisis situations and emerging risks, uncertainty is often an inherent and defining aspect of the crisis. In a review of literature on communicating uncertainty in crisis contexts, Liu et al (2016) note that practical findings or guidance in this area is sparse.

<sup>&</sup>lt;sup>4</sup> Although this has been recently contradicted; see <u>https://www.nytimes.com/2019/09/30/health/red-meat-heart-cancer.html</u>



#### Communicating uncertainty in government frameworks

Most guidance on risk communication states that one should acknowledge uncertainty and provide information on what is being done to address that uncertainty. Limited additional detail is provided.

The exception to this is EFSA's guidance on uncertainty communication, which provides significant detail on how to address uncertainty depending on the audience and offers an interactive template to help communicators determine how best to communicate uncertainty in their situation. An example of this is provided in the section on <u>Verbal risk in government frameworks</u> and in <u>Figure A2.8</u>.

Other examples of how uncertainty is addressed in frameworks include:

- EUFIC's Guidance suggests that cultures differ in their acceptance of uncertainty information, and this should help dictate the extent to which uncertainty information is communication. It considers the UK to be a country with "*lower*" uncertainty avoidance (illustrated in Figure A2.12).
- The FAO's Guidance describes why risk managers are often reluctant to communicate uncertainties, citing: fear of panic, fear of losing control, fear of economic loss and impact on the business sector and a lack of dietary alternatives and impact on public health. Nevertheless, it recommends communicating uncertainties and provides some general guidance on this consistent with the type of guidance provided in other frameworks (illustrated in Figure A2.14).

### 3.4 Communicating risk: channels

Risk communicators have many options for disseminating information on risk. Traditional media channels appear to remain the most preferred and effective channels for disseminating food-related risk messages. Recent research commissioned by EFSA on emerging risks (Etienne et al, 2018c) found that most consumers (71% across the EU; 72% in the UK) preferred TV news and programmes as the best channel to receive information on new food risks. This was followed by the websites of national competent authorities. In this study, social media was mostly unpopular with UK consumers (only 25% indicating this as a preferred channel), but it is not clear whether this extends to the official social media channels of national food safety authorities, particularly as consumers in the UK indicated above average confidence in national food safety authorities (65% as compared to 56% EU-wide).

### 3.5 Traditional media channels

Although traditional media channels are the most effective for widely disseminating risk messages to the general public, the use of traditional media channels means that journalists become responsible for setting the agenda, defining what constitutes 'public interest' and selectively framing and presenting issues (Wilson et al, 2014). Literature considering this field has been based largely on content analyses, case studies and interviews with journalists.



Some of the literature in this area posits that inaccuracies in reporting risk and uncertainty stem from the fact that many journalists lack the required level of mathematical and scientific literacy to report difficult statistical information (Ashe, 2013). However, misrepresentations of risk and uncertainty also occur because of how journalists view their role and what they believe makes good news. Studies on how traditional media channels report risk have noted that the media will only report on those cases they consider to be newsworthy. Newsworthiness does not necessarily correlate with the importance or implications of a risk. Examples of risks that are more likely to be considered newsworthy include, for example:

- Risks that can be described as a sudden event are more likely to be considered newsworthy than risks that occur over a longer period of time (Kitzinger, 1999 in Ashe, 2013);
- Risks that harm many individuals at once (Kitzinger, 1999 in Ashe, 2013);
- Risks that are unusual rather than common (Kitzinger, 1999 in Ashe, 2013);
- Issues that are considered controversial are particularly newsworthy and therefore more likely to be reported on. This includes stories where there are questions of blame, secrets and cover-ups (Pidgeon, 2012 in Ashe, 2013). For example, Lofstedt (2019a) reviews the timeline of media reporting on a campylobacter outbreak in Swedish chickens, and finds that the story received only marginal media interest until it was reported on as part of an "exposé" based on an interview with a whistle-blower who had worked at a large Swedish slaughterhouse.

Reporting will often seek to skew stories to increase newsworthiness and interest, and even where this is not the case for articles themselves, headlines written to draw attention (and clicks) will still often misrepresent the risk (Ashe, 2013; Spiegelhalter, 2017b). For example, as noted in the section on presenting risk quantitatively, media stories will often choose to discuss relative risk without providing the context of absolute risk, making findings appear more significant than they are (Spiegelhalter, 2017a).

Where risk events are considered newsworthy and are reported on significantly in the press, approaches to reporting on the event will differ. Even within a single case, media coverage of food risk will encompass different narratives, meaning that consumers are likely to receive information in different forms and from different (possibly conflicting) angles (Fuentes and Fuentes, 2015). Differences between these narratives are due in part to how journalists perceive their own role in reporting risk. In a study considering journalistic intentions to report on risk, Stocking and Holstein (2009) find that previous frameworks developed to describe journalistic motivations more generally (Weaver and Wilhoit, 1996 in Stocking and Hostlein, 2009) also apply to the communication of risk. These categories are not mutually exclusive and break journalists down into: a 'disseminator' of information, an 'interpreter' who validates and filters information, a 'populist mobiliser' keen to integrate non-expert views into reporting, and an 'adversary' sceptical of new developments. Wilson et al (2014) explored how journalists in Australia, New Zealand and the UK view their own roles in relation to risk communication and found that journalists saw themselves both as conduits of



information (e.g. disseminators and interpreters) and as public watchdogs (e.g. populist mobilisers and adversaries).

Across these journalistic types, actors will often seek to provide a 'balance' of competing viewpoints on an issue in an attempt to maintain objectivity, but without contextualising the evidence that underpins each viewpoint. This can create uncertainty and potentially legitimise false information (Stocking and Holstein, 2009; Spiegelhalter, 2017b). For example, in a study examining responses to information about vaccination, Dixon and Clarke (2012) found that texts seeking to balance pro- and anti-vaccination arguments resulted in readers being more uncertain about vaccines' relationship with autism. Beyond simply maintaining objectivity, the preference for controversy can lead some journalists to intentionally seek out more extreme viewpoints, rather than moderate, critical voices (Sandman, 1998 in Ashe, 2013), exacerbating this effect.

Research also suggests that risk information provided through social media channels often lacks advice on how to mitigate risk or what actions can be taken (Fuentes and Fuentes, 2015; Parmer et al, 2016 in Ueland, 2018).

Research also suggests a media preference for reporting certainty in outcomes, rather than communicating the uncertainties and knowledge gaps within the research field (Freeman et al, 2017; Heidmann and Milde, 2013), although this differs between journalists, and in some instances journalists may choose to emphasise uncertainty as a way to highlight controversy and attract attention (Simmerling and Janich, 2016; Guenther and Ruhrmann, 2016).

To address issues with how the media reports on risk, the literature suggests a proactive approach to maintaining relationships with journalists and ensuring that they have access to clear information and advice (Janoske et al, 2013; Veil et al, 2011). Where stories on risk are taken up by the media, this can significantly reduce the costs of publicising risk information for public bodies and increase the audience size (Lofstedt, 2019b).

Despite the potential benefits, Cope et al (2010) note that experts are often cautious about media communications on risk events, because of an assumption that the above-mentioned reporting styles contribute to the social amplification of risk. However, the authors also note that research with consumers shows that they value traditional media as an important information source and that most consumers feel that they can distinguish between media amplification and genuine risk.

#### 3.5.1 Social media and other innovative approaches

Research into the role of social media for food safety communication is still emerging and therefore evidence is limited (Overbey et al, 2017). It is assumed that social media is an effective tool for reaching certain audience groups, particularly younger people (Rutsaert et al, 2014), but there has been a lack of research into what demographics are actually reached by social media campaigns and what groups should be targeted by other means



(Eckert et al, 2018). In general, literature notes the need for continued research in this area (e.g. Frewer et al, 2016; Ueland, 2018) and that there is no consensus between different actors (e.g. media actors, regulators, industry) on how social media should best be used (Henderson et al, 2017). As such, social media is generally seen as an additional channel to be used within a broader risk communication strategy (Regan et al, 2016; Charlebois and Summan, 2015).

The discussion here is focused on the direct use of social media by food safety authorities. However, much of the risk information content on social media originates from traditional news coverage (Overbey et al, 2017). For example, analysis of the flow of media information during a risk event found the highest coverage of a risk event on social media was not until after traditional media had peaked, in part because social media relied on traditional media as a source of content (Shan et al, 2014). This means that outputs from food safety authorities become part of a wider conversation alongside traditional media outlets.

#### 3.5.1.1 Benefits and risks of social media risk communication

There are several perceived benefits to the use of social media for risk communication. Firstly, social media allows food safety authorities quick and direct access to an audience in a way that can encourage transparency and bypass traditional media and concerns over journalistic misrepresentation of risk (Rutsaert et al, 2013; Eckert et al, 2018; Rutsaert et al, 2014). Secondly, social media allows for two-way interaction with the general public. This means that risk communicators are more easily able to listen to and engage with their target audience (Regan et al, 2016; Charlebois and Summan, 2015) and it allows the general public to contribute to discussions previously reserved for risk managers, media actors and decision-makers (Sutton and Veil, 2017). This interactivity also allows authorities to manage queries and complaints more directly, including redirecting queries that are outside the organisation's expertise, and linking experts and the public together (Shan et al, 2015).

However, although social media offers many benefits for risk communication, there are also several risks associated with its use:

- Firstly, the democratic nature of social media means that it is difficult to control messages once they have been put out and there is no barrier to people posting whatever comes to mind and for those messages to gain traction (Rutsaert et al, 2014). Such messages may not align with the goal of risk communication. For example, previous FSA research (Draper et al, 2016) notes that at least in relation to the horsemeat incident, the messages that proliferated on Twitter following the incident were largely humorous.
- Secondly, many risk communicators assume there is an audience preference for communications from traditional media, due to low trust in content on social media (Rutsaert et al, 2014). This preference is confirmed by recent consumer research commissioned by EFSA (Etienne et al, 2018c), which showed that social media was the least preferred



channel across consumers. However, it is not clear to what extent this distrust also applies to social media communications from official sources.

 Thirdly, although social media offers opportunities for engaging directly with audiences, there is a relative lack of privacy and confidentiality in messages put out through social media. Engaging successfully with audiences through social media also requires a significant time commitment, if the intention is to address queries in real-time to keep control of the message (Shan et al, 2015; Rutsaert et al, 2014). Moreover, although the potential of social media as a platform for two-way communication is recognised (Eckert et al. 2018; Henderson et al. 2017) and to some extent it is being used as such (Panagiotopoulous et al, 2015), research with social media stakeholders suggest that the majority viewed social media as a one-way tool to disseminate information, rather than as a two-way interaction (Regan et al, 2016), suggesting that opportunities to use social media as an engagement tool are taken up less frequently in practice. Frewer et al (2016) also find this in a review of literature on risk/benefit communication, noting that of 54 papers reviewed, only three looked at interactive dialogue.

These risks mean that if social media communication is inadequately managed, particularly during a crisis, social media could contribute to escalating risk by promoting confusion, panic and alarmism (Rutsaert et al, 2013), particularly given the unregulated nature of the platform (Regan et al, 2016) and the possibility for inaccurate information to reach a wide audience (Rutsaert et al, 2013). This may also push people to find answers on outlets scientific experts cannot control, such as those that do not accurately reflect the evidence base or are driven by ideology and misunderstanding (e.g. the growth of anti-vaccination social media accounts) (Stocking and Holstein, 2009; Dixon and Clarke, 2012).

The proliferation of misinformation on social media and the rise of fake news has also been addressed in the literature. It is not clear to what extent this impacts risk perception. Scheufle and Krause (2019) find that such information is most likely to be trusted and accepted by those with low understanding of the scientific process and that trust in certain sources is determined more by the extent to which people believe sources to be in line with their own ideology (e.g. confirmation bias) than by exposure. In a recent experimental study however, Lutzke et al (2019) show that at least to a small extent, providing individuals with guidelines for identifying fake news helps reduce trust and acceptance of such sources. Although the growth of misinformation remains an issue, case studies have shown that official materials or articles from reputable sources gain significantly more traction than less reputable sources (Kostkova et al, 2014; Panagiotopoulos et al, 2016).

#### 3.5.1.2 Best practices in social media risk communications

Some research in this area has been able to provide suggestions for potential best practice when communicating risk through social media. These findings are based mostly on a single case study, and therefore may not be



universally applicable, but provide starting points for best practice and could benefit from further testing. For example:

- Timing is important. Previous FSA research looking at Twitter (Draper et al, 2016) found that retweets were more likely when tweets were sent at night and on any day of the week other than Wednesdays;
- Previous FSA research also finds that including URLs in tweets makes them less likely to be retweeted (Draper et al, 2016). This has been confirmed in a study on non-food risks (Sutton et al, 2015). Other research has noted, however, that the inclusion of links increases the perceived credibility of a tweet's message (Hamshaw et al, 2018);
- The use of imperative sentence styles (e.g. instructional tones) and ALL CAPS messages is associated with a higher number of retweets (Sutton et al, 2015);
- The use of hashtags is associated with a higher number of retweets (Sutton et al, 2015); and
- Initial audience size is important: having a larger number of followers exponentially increases the dissemination of risk communication messages (Kostkova et al, 2014; Sutton et al, 2015).



#### Channels in government frameworks

The frameworks reviewed contain little detail on when certain communication channels are more appropriate than others. There is a general agreement across frameworks of the need to cover multiple outlets, to reflect media consumption behaviours, and that social media is a key component that has become increasingly important. Some sources offer more detail in terms of channels:

- Health Canada's guidance offers suggestions for channels/risk communication documents based on the urgency of the risk. This is based on channels and communication types specific to Health Canada's work (illustrated in <u>Figure A2.17</u>). It then provides further information for each option, indicating the audience and scope for which it is most appropriate.
- The FSANZ's guidance offers some limited suggestions based on the type of risk. For example, suggesting the use of social media for "responsive" communication strategies and increased media and stakeholder interaction for "proactive" communication strategies (illustrated in Figure A2.6).
- EFSA's When food is cooking up a storm guidance addresses the issue of channels by providing an overview of options with pros and cons for each. For example, it suggests that the use of social media sites is appropriate for simple messages intended for a broad audience, but inappropriate for sensitive subjects, unless there are resources to actively manage discussions (illustrated in Figure A2.2).
- The FAO's guidance on food risk communication provides some more specific detail on this. The FAO's guidance notes that the body delivering the message should be trusted by the public and specifically trusted to provide information on the topic at hand. It offers an example of an incident in Canada, where communication on a food risk incident came from the Ministry for Agriculture rather than the public health agency whose responsibility it is to communicate such information. In that case, this undermined the effectiveness of the communication.
- The POST Note on risk communication addresses this briefly and makes reference to the BBC's editorial policy on risk. The latter provides pointers intended to ensure that media reporting does not misrepresent the nature and severity of risks.
- The UK Department of Health's guidance from 1997 also sets out a list of 'media triggers' to look out for in a risk story (illustrated in Figure A2.3), as these are likely to lead to extensive coverage. These triggers reflect many of the findings in the literature on media reporting of risk.

No extensive guidance was identified on the use of social media for risk communications, although some frameworks referred to its usefulness for communicating short 'gist' messages to lay audiences (see, for example, EFSA's guidance illustrated in Figure A2.2). As this is an emerging area of research, the literature appears to offer several best practices that are not apparent in existing frameworks.



# 3.6 Developing communications

Styles of communicating risk and therefore how communications are developed have evolved over time. Sutton and Veil (2017) provide a framework for this, charting how the early focus in the 1970s and 1980s on managing risk irrespective of public perceptions transformed into risk communications that prioritised persuasive one-way messages to correct public perception in the 1980s and 1990s. Ramirez-Andreotta et al (2014) characterise this as the technical model of risk communication. More recently, risk communication strategies have begun to focus more on engaging with the public and developing two-way risk communication strategies, characterised by Ramirez-Andreotta et al (2014) as the cultural model of risk communication (also Arvai 2014; Charlebois and Summan 2015). At the same time, there has been an increase in the availability of competing narratives of risk through social media.

The literature on the development of communications is based largely on narrative case studies and on interviews with experts.

#### 3.6.1 Listening to audiences

Much of the literature on developing risk communication emphasises audience listening and engagement as a helpful first step in establishing a risk communication strategy, as well as a way to keep audiences interested and address concerns as they emerge (e.g. Janoske et al, 2013; Hartmann et al, 2018). In some instances, such techniques can also be used as part of risk assessment. Particularly for emerging risks or outbreaks, tracking media or social media reports may provide more timely updates on incidents than official or academic sources (Alomar et al, 2015).

For the purposes of risk communication, regular monitoring of traditional and social media can be used as a tool to capture public sentiment, both before and during risk crisis events (Eckert et al, 2018; Janoske et al, 2013). For example, Harmann et al (2018) use the extent of media coverage of an issue as a proxy measurement for public concern. Social media monitoring can also be used as a tool to track public sentiment and concern, although research in this area suggests that social media users are not necessarily representative of the wider population (Shan et al, 2015) and the responses published may be more reflective of a desire to entertain than of risk perceptions (Draper et al, 2016).

Listening to audiences can also be done by directly engaging with members of the general public to test potential messages and risk communications. Across the literature, authors comment on the value of continually testing and pretesting risk messages (Spiegelhalter, 2018a; Visschers et al, 2009; van der Bles et al, 2019; Downs and Fischhoff, 2011; Rakow et al, 2015; Lofstedt, 2019b).

These actions can also help to distinguish between different audience groups and develop tailored messages to address different needs. This can mean distinguishing between groups based on level of knowledge or demographic factors, or based on their role in relation to the risk. For example, Charlebois and Watson (2016) recommend distinguishing between "risk makers" and



"risk takers". Frewer et al (2016) finds that although several studies recommend tailoring communications to different audiences, there is a gap in understanding what those differences between audiences might be and therefore what tailoring is required.

#### Addressing different audiences in government frameworks

Most guidance lists the importance of identifying and considering your intended audience. A few of the frameworks present guidance and strategy that takes the intended audience into account.

Identifying audiences is done in different ways. For example:

- EFSA's uncertainty communication guidance categorises audiences based on their level of knowledge (illustrated in <u>Figure A2.9</u>).
- EFSA's crisis communications guidance categorises audiences into four groups based on their association to the risk: Helpers, Victims, Resolvers and Bystanders. It suggests developing separate strategies for each group (illustrated in <u>Figure A2.19</u>).
- Some examples (Health Canada's, Health Protection Scotland's and the HSE's guidance) make a distinction based on stakeholder type, distinguishing between public audiences, academic audiences and media stakeholders.
- The FAO's food risk communication guidance takes a similar approach, based on original work from Health Canada. This method identifies four groups and sets them in order of importance (illustrated in Figure A2.15). The FAO's guidance also addresses the issue of audience in terms of cultural or socioeconomic differences, noting that careful attention should be paid to the type and level of language used depending on the group. This includes specific guidance on how best to reach vulnerable groups (illustrated in Figure A2.19).
- The Cabinet Office's guidance groups audiences by worldview based on Cultural Theory, considering: fatalists, hierarchists, individualists and egalitarians. For each group, it then provides problems that may emerge when communicating risk and potential solutions for these problems (illustrated in Figure A2.5).

#### 3.6.2 Timing

Where the literature considers the timing of risk communications, there appears to be consensus that risks should be communicated to the public as soon as possible and that timely communications promote transparency and build trust (Jacob et al, 2011; Regan et al, 2016). This advice is confirmed by Etienne et al (2018c), who found that a majority of UK consumers indicated that they would prefer information on emerging risks either as soon as a possible risk has been identified or as soon as there was some evidence of health consequences, even where information remained uncertain.

To ensure that risk communication is timely, the literature recommends proactively developing communications strategies before risk events occur (Janoske et al, 2013). This requires building risk communication into the risk assessment process from the start (Veil et al, 2011).



For some types of risk communication, it may make sense to time communications to coincide with particular seasons or holidays. For example, Lofstedt (2019b) describes the risk communication strategy of the Swedish Food Agency in regard to dioxin in fatty fish, where communications were put out to coincide with periods in the year where Swedes were traditionally more likely to consume these fish. This helped to increase media interest and coverage of the guidance.

Where the purpose of risk communication is to encourage behaviour change, it is particularly important to continue to communicate on the risk at frequent intervals following any initial communication (Redmond and Griffith, 2006 in Ueland, 2018).

Timely communications also means communicating after a risk, to ensure stakeholders know when a risk has passed. In a study on consumer understanding and perceptions following food recalls, Charlebois and Watson (2016) found that although 75% of study participants knew that a recall had taken place, fewer (57%) knew that it had ended, likely because the media report more frequently on crises than on the resolution of crises, meaning that important information does not reach consumers.



#### Developing communications in government frameworks

Most frameworks set out an overarching approach to risk communication. There is broad consistency across frameworks in terms of how a strategy for risk communication should be developed. Most suggest that a multidisciplinary project team should design and consult on risk communication strategies with public, expert and industry stakeholders. It should develop messaging, before reviewing strategies on an ongoing basis to ensure they are fit-for-purpose.

Some frameworks define risk communication as a step-by-step process, differing in the level of detail offered. For example:

- The FSANZ Risk Analysis document defines a three-step process: (i) identify the target audiences; (ii) design messages for those audiences; and (iii) use the most appropriate communication vehicles for those audiences (illustrated in Figure A2.7).
- Health Canada defines a seven step process: (i) define processes, goals, and/or outcomes in an 'opportunity statement'; (ii) characterise risk; (iii) assess stakeholder perceptions; (iv) assess how stakeholders perceive different risk responses; (v) develop and pre-test strategies in consultation with stakeholders; (vi) implement risk communication plans; and (vii) evaluate effectiveness (illustrated in Figure A2.18).
- EUFIC's guidance defines a five-step process: (i) evaluate the situation;
  (ii) know your audience; (iii) craft your communications; (iv) evaluate; and
  (v) engage with others (illustrated in Figure A2.13).
- DEFRA's guidance suggests a four-step approach: (i) characterise the risk; (ii) characterise any controversies; (iii) specify the communication aims and methods; and (iv) identify the 'informed public' and other expert stakeholders.
- EFSA's guidance on crisis communication describes an approach where the risk communication process is constantly ongoing, as lessons learnt are constantly being fed into the process (illustrated in <u>Figure A2.20</u>).

Many frameworks advise that assessing stakeholder perceptions should be a preliminary step. This is either a stand-alone step or part of characterising the risk. DEFRA's guidance notes that this can be supported through the use of 'issue-crawler' technologies, which harvest social media to help illustrate public perceptions of risk. Other guidance also notes the usefulness of social media in helping to establish initial public sentiment: EFSA's crisis communications guidance recommends monitoring both traditional and social media as soon an incident is suspected or occurring so as to be prepared to respond.



# 4 Findings

This section presents the findings from the literature review. After a brief overview of the sources, the section moves to discussing briefly the literature on risk perception. It then discusses in more detail the literature on risk communication.

### 4.1 Overview of the sources

#### 4.1.1 Government frameworks

A total of 18 frameworks were reviewed for this report. Further details on each of the frameworks are included in <u>Annex 1</u>. Frameworks reviewed differed in their length, level of detail and scope. Some frameworks were specific to food risk communication, others were more general. There did not appear to be significant differences between those specific to food risk and more general frameworks on risk communication.

Most of the frameworks reviewed address risk communication in the context of pre-planned ongoing, lengthy processes to prepare for a risk event in advance of it occurring. Only one framework<sup>5</sup> reviewed was specifically written in relation to crisis communication. Two others incorporated some aspects of crisis communication into their discussion, but did not provide a significant amount of detail.<sup>6</sup>

Most of the frameworks begin by setting out general principles for good risk communication: these generally include openness, transparency, timeliness and independence.

Most frameworks stop short of providing direct advice or recommendations. This is intentional, as there is a focus on risk communication always being tailored to a particular situation. As stated in EFSA's food risk guidelines:

"Decision-making on risk communications cannot be made into an exact science, and judgements need to be made, but a thorough and systematic consideration of all possible relevant factors can help to make that judgement more informed."

As such, most of the frameworks present risk communicators with a series of questions to ask themselves about the type of risk, the context and the intended audience. They do not necessarily indicate how risk communication might be altered depending on the answers to those questions. In many of these frameworks, more attention is paid to providing an overview of the available evidence on risk perception and communication and providing case studies that illustrate best practice, rather than offering direct advice.

<sup>&</sup>lt;sup>6</sup> EUFIC (2017) How to talk about food risk? A handbook for professionals and HSE (1998) Risk communication: a guide to regulatory practice



<sup>&</sup>lt;sup>5</sup> EFSA (2016) Best practice for crisis communicators: how to communicate during food or feed incidents

Some of the frameworks reviewed provide a lengthy and detailed overview of the evidence. The US FDA's guide stands out thanks to a particularly thorough review. Some sources present the underlying evidence alongside guidance. Others, such as EFSA's uncertainty guidance, include the evidence base as a separate chapter.

#### 4.1.2 Literature

96 studies were reviewed and included in this report. The most robust evidence on risk communication in the literature comes largely from studies on risk perception, where there has been a long history of empirical work. Studies that focus more directly on communication, particularly in relation to food risk, tend to rely on narrative reviews of the literature, case studies and on interviews with experts and practitioners.

The review was not restricted to evidence on food risk and has incorporated findings from other types of risk communication. Research does suggest that risks associated with food are perceived differently to other types of risk. Some recent work suggests that there is a particular public anxiety in relation to food and food risks (Jackson, 2015) and there is empirical evidence that suggests that individuals perceive the same risk to be more severe when they are exposed to it through food as compared to other channels (McEntaggart et al, 2019; Capon et al, 2015). Nevertheless, findings on other types of risk still provide valuable insight on the general presentation of risk. For example, some of the strongest research on how to communicate risk, particularly in terms of framing messages, comes from research looking at other areas than food, in particular healthcare.

# 4.2 Risk perception

The literature on risk communication is anchored in theoretical and empirical studies of risk perceptions: the subjective views that an individual may have about a risk, including how often it might occur or how harmful to them or others it might be.

This is because how risk communication is received and the impact it has will depend on how an individual perceives risk, and the extent to which the nature of the communication (including its content, framing, format, channel, timing etc.) accounts for the other factors influencing risk perception. Therefore, a strong understanding of what shapes risk perception is crucial to developing communication that is impactful. Indeed, much of the literature on risk communication measures outcomes on the basis of how it influences risk perceptions.

The evidence base on what shapes risk perceptions is large. There is widespread agreement between scholars that risk perceptions depend on a wide range of factors (as summarised for example in Charlebois and Summand, 2015; or McGloin et al, 2009). The breadth of factors discussed in the literature is representative of several disciplines and theoretical approaches.


## 4.2.1 Factors contributing to risk perception

#### 4.2.1.1 Heuristics, biases and emotions

Psychology and psychological factors figure prominently in determining risk perceptions, with seminal work showing that the perception of risk is shaped by heuristics and biases (e.g. the loss aversion heuristic; Tversky and Kahneman, 1981). The way outcomes are framed may thus have an impact on how severe the risk is perceived to be. Another example of psychological factors identified in the literature is what has been called an 'optimism bias', with people seeing their personal risk as lower than other people's, perhaps because of confidence in their own ability to prevent a risk, while consistently underestimating the cumulative impact of small risk mitigation strategies (Fischhoff, 2013). This is sometimes linked to what has been called an 'illusion of control' (e.g. de Freitas et al, 2019).

Emotions can play an important role in risk perceptions. The 'dread' factor as it is sometimes called (e.g. McGloin et al, 2009; Liu et al, 2016) can drive individuals to respond particularly strongly to information about a risk, and can drive behaviours in a way that overrides numbers and evidence (Rakow et al, 2015).

There is a wide literature exploring how characteristics of the risk appear to contribute to the manner it is perceived. There is strong evidence showing that the perceived naturalness (or lack of) of the risk matters, with man-made risks driving perceptions of higher risk (e.g. Frewer et al, 2009; Kaptan et al, 2017). This is particularly relevant and important to consumers when it comes to food (Roman et al, 2017). There is also strong evidence showing that one's perceived level of control over the risk (i.e. one's ability to choose not to expose themselves to the risk, for example by not consuming a risky product) contributes to the perceived risk level (e.g. De Vocht et al, 2015; Frewer et al, 2009; FSA, 2016; Kaptan et al. 2017). Other parameters that appear to increase perceptions of risk are the severity of the consequences and whether those may materialise immediately, whether the risk is novel/emerging as opposed to established, whether it is poorly-understood, etc. (see McGloin et al, 2009).

#### 4.2.1.2 Cultural differences and personal experience

Cultural dispositions (social norms and values) have been mentioned as well, for example to account for what some scholars have qualified as different levels of tolerance to risk and / or uncertainty or different attitudes to risk more generally, which have been documented between representatives from different groups (e.g. van Dijk et al, 2008; de Freitas et al, 2019).

An individual's background has been associated with their perception of risk, including any previous experience of being exposed to the risk (directly or through peer or kin), as well as their education or training. For example, de Freitas et al. (2019) note that perceptions of risk among food workers vary depending on whether they have received a scientific education or not, and whether they have been trained. This echoes observations Johnson and Slovic (1995) made on how 'science literacy' appeared to influence the extent



to which uncertainty affected risk perceptions. More generally, the more familiar one is with a risk, the lower the perceived risk, although in some instances that is not true (e.g. Brook Lyndhurst, 2009; on chemical mixtures McEntaggart et al, 2019; on nanotechnologies in food Satterfield et al, 2009; Etienne et al, 2018c).

Lastly, some scholars have argued perceptions of risk cannot be viewed in isolation, and that instead they are part of a more general attitude toward risk that is shaped by an individual's understanding of other recent risks and how they have emerged, materialised and the manner in which they have been responded to (or not). For example, when discussing and criticising the social amplification of risk model, Murdoch et al. note that one best understands risk perceptions and how they are influenced by the media "not as discrete responses to bounded events, but as the latest episodes in an intersecting series of continuing narratives about chance, choice, science, power, and accountability" (2003: 171). Understanding the history of risk in a local, national or international context helps one understand individual views of how well a risk has been regulated, which itself contributes to risk perceptions (Charlebois and Summan, 2015). Levels of trust and distrust in public institutions, which are built over time, are well-documented determinants of risk perceptions (e.g. Capon et al, 2015; Viklund, 2003). Far from anecdotal, trust in public institutions and organisations, and what has been seen as a growing trend of distrust, notably in science and public authorities,<sup>7</sup> are seen by leading scholars as a key determinant of risk perceptions and a fundamental issue for risk communicators (e.g. Kasperson, 2014).

<sup>&</sup>lt;sup>7</sup> For a more detailed discussion of trust in the food system in the UK, see Etienne et al. 2018b.



## Risk perception in government frameworks

All of the government frameworks reviewed made some reference to risk perception research and encourage consideration of risk perception as part of the development of communications. Frameworks often note that perception is impacted by the severity and likelihood of the risk, the impact on the population and how acceptable a risk is perceived to be, what mitigating actions are available and previous lived experiences of a risk. Although there is extensive discussion in guidance on risk perception, there is little information on how to translate this research into communications. Some examples of how risk perception is handled in frameworks include:

- EFSA's When Food is Cooking Up a Storm guidance provides significant details on different aspects of risk perception. Rather than offering direct guidance on how to incorporate this information into a strategy, instead it suggests key questions for consideration based on this research, which can be used by practitioners to shape their approach (illustrated in Figure A2.1). For example, it asks readers to consider whether the risk in question is natural or stems from technological intervention, and to consider this in the design of a communication strategy.
- DEFRA's risk communication guidance makes direct reference to the academic literature on this topic and includes the psychometric model of risk from Slovic (1987) in their discussion of risk perceptions (illustrated in Figure A2.4). It notes that understanding how risks are perceived should be taken on board as part of the policy-process, and that work on this is more advanced in some fields than others, citing work in the field of public health.
- The Cabinet Office's guidance also makes reference to the academic literature in this area, and includes insights from Cultural Theory, separating potential audiences into four groups: fatalists, hierarchists, individualists and egalitarians (illustrated in Figure A2.5).
- The FSANZ framework provides some practical advice on how to incorporate an understanding of risk perceptions. It sets out recommendations based on an understanding of both how a risk is perceived and the actual risk. For example, if actual risk is low but perceived risk is high, the focus is on proactive media liaison and social media engagement to manage expectations. When both perceived and actual risk are high, then a more proactive risk communication strategy is required (illustrated in Figure A2.6).

# 4.3 Communicating risk: messaging

Risk communicators can choose to present and frame risk information in various ways. Much of the literature in this area distinguishes between quantitative and qualitative (or verbal) presentations of risk information. Findings suggest that both types of presentation are important and in many instances are complementary. For example, Visschers et al (2009) finds that



although people prefer to receive information to evaluate a risk in a quantitative form, they will describe that risk to others qualitatively.

## 4.3.1 Presenting risk quantitatively

Research into the quantitative presentation of risks—and probability in particular—generally considers two main types of presentation: 'absolute' and 'relative' risk (Fagerlin and Peters, 2011). Individuals' perceptions of risk and the comprehension of information differs based on these presentations and the framing of quantitative information. Although risk encompasses both the probability and the severity of a hazard, most of the research around quantitative presentations of risk relates to expressing probabilities rather than severity.

## 4.3.1.1 Presenting risk quantitatively: absolute risk

'Absolute risk' is a term often used to describe the overall likelihood of a risk event happening. The higher the absolute risk, the more likely something is to happen. For example, the absolute risk of selecting a diamond from a shuffled deck of cards is 25%, or one in four, and the absolute risk of selecting the ace of diamonds card is 1.9%, or one in fifty-two.

While absolute risk can provide individuals with a more definitive likelihood of a risk occurring, the literature recommends that absolute risk always be presented alongside contextual information. This means providing a reference point: either for what is considered an appropriate or acceptable level of absolute risk, or a baseline risk that would exist without the proposed intervention. Without this context, individuals may have difficulty interpreting absolute risk information (Fagerlin and Peters, 2011; Rakow et al, 2015).

## 4.3.1.2 **Presenting risk quantitatively: relative risk**

'Relative risk' is a way to explain how much more, or less, likely a risk event is for one group over another. It can also be used to compare risks, to work out how much more likely one risk is over another. For example, there are two groups, each containing 100 people. If one person out of the 100 smoked in group A, and four people out of the 100 smoked in group B, then the relative risk of picking a smoker at random from group B is four times, or 300%, that of group A. However, the 'absolute risk' of picking a smoker in either group remains small, at just 1% and 4% respectively.

People will often seek to understand data by making relative judgments towards risk and mitigation strategies, even in scenarios where absolute judgements may be more appropriate (Rakow et al, 2018). Several studies illustrate how the use of relative risk probabilities can obscure an individual's actual risk and overinflate what could be a miniscule or non-significant level of risk (Visschers et al, 2009; Rakow et al, 2015; Waters et al, 2016). This problem of overinflating risk is particularly notable in media stories that report relative risk, for whom 'increased risk' is a captivating headline irrespective of the risk magnitude (Spiegelhalter, 2017b).



Relative risks are often presented by changing the denominator of the risk, rather than the numerator, such as a risk being 'one in ten' or 'one in one-thousand'. This adds to the challenge of comparison, particularly for less numerate groups, who may associate a higher denominator with a riskier situation (Waters et al, 2016). As such, denominators should be kept consistent when possible (Lipkus, 2007).

Accordingly, it may be appropriate to provide absolute and relative risks alongside each other, to contextualise both the magnitude and likelihood of a risk event (Fagerlin and Peters, 2011; Spiegelhalter, 2017b). Any presentations of absolute or relative risk may also benefit from clear information summaries, including lay-friendly explanations of absolute and relative risks, to support individuals seeking information to identify the most appropriate data (Freeman et al, 2017).

#### 4.3.1.3 Presenting risk quantitatively: percentage or frequency

Research in healthcare has suggested that less numerate individuals perceive medicine as less risky when side-effects are presented in percentages rather than frequencies (Fagerlin and Peters, 2011), and more generally there is a tendency for individuals to interpret risks as more significant when they are presented as frequencies and less significant when they are presented as percentages (Slovic et al, 2000). This is explained in part by the fact that risk presented as a frequency is less abstract and leads to more emotional engagement with a risk message as compared to percentages (Slovic et al, 2000; Fagerlin and Peters, 2011). Presenting risk as a frequency has also been found to facilitate the interpretation of statistical information—in particular, the ability of individuals to make further calculations based on that information—and research has indicated that this is the case for both experts and laypeople (Hoffrage et al, 2000).

Presenting risk as a frequency requires decisions to be made on the most appropriate numerators and denominators. As indicated in the discussion on relative risk, when presenting different risks alongside one another, it is important to keep denominators consistent. Presenting risk as a frequency may also be subject to ratio bias, where a larger numerator (e.g. 33 in 100 compared to 2 in 5) suggests a larger risk (Spiegelhalter, 2017a). Schapira et al (2001) also suggests that the use of lower denominators may be misinterpreted by some individuals as low sample sizes and therefore more uncertainty in outcomes.

Ultimately, Spiegelhalter (2017a) notes that while there has been an ongoing dispute over whether it is better to express a proportion as a percentage or as a frequency, no clear preference has emerged. Instead, he proposes that it is more important to explain what the probability of a risk means, rather than what format the risk estimate is presented in. Similarly, any risk communication should where possible also include the timeframe over which the risk occurs, as a failure to do so deprives an individual from being able to understand and critically engage with the communication (Waters et al, 2016). Further, if the intended purpose of the communication is to compare



between risks, these timeframes should be kept consistent where possible (Fagerlin and Peters, 2011).

## 4.3.1.4 **Presenting risk quantitatively: how much information?**

While providing context for risk presented quantitatively is important to ensure that individuals can interpret information, the amount of context and detail necessary will vary depending on the situation. Risk communications that provide extensive quantitative details on risk can be overwhelming and difficult to understand (Rakow et al, 2015) and in general, providing less information rather than more improves an individual's comprehension and requires lower cognitive effort to make better decisions in response to risk (also Kasperson, 2014). This is particularly apparent among individuals with lower numeracy skills (Fagerlin and Peters, 2011). For example, one study requiring respondents to identify high-quality hospitals found that only providing the most important quantitative variable, rather than all variables, made it easier for respondents to identify the hospitals correctly (Peters et al, 2007).

The challenge of both providing context around risk information presented quantitatively and avoiding information overload has led to the use in many fields of new quantitative tools to present risk information in a simple but informative way. For example, several studies have been done on the use of effective age tools, such as 'heart age' tools as a way to present cardiovascular risk in health care communications. Although some research has found that the use of such a tool, rather than a thorough list of test results, improves risk comprehension and behavioural intentions (Damman et al, 2018; Spiegelhalter, 2016), other research has found that the use of a 'heart age' tool led to inflated risk perception and did not motivate behaviour change any more than presenting absolute risk information (Bonner et al, 2015).

## 4.3.1.5 **Presenting risk quantitatively: framing**

In addition to the amount of information, the framing of information has also been identified as an important variable to communicate risk quantitatively:

- There is some evidence that 'gain-framed messages' (communicating the benefits of action) are effective for preventative behaviours (such as installing infant car seats or taking regular physical activity), while 'loss-framed messages' are more effective when communicating uncertainty (such as the outcomes of cancer screening) (Fagerlin and Peters, 2011);
- In a study on different methods of presenting risk quantitatively, Peters et al (2007) found that presenting quantitative information where higher numbers are associated with more positive outcomes required lower cognitive effort, facilitated comprehension and helped respondents identify their most appropriate treatment option;
- More immediate risks (e.g. total risk over one year as opposed to risk over five years) are easier for audiences to understand and are more likely to affect risk perception (Polak and Green, 2015);
- Risks that are less than 1% are liable to be dismissed by audiences as representing no risk (Lipkus, 2007).



#### Quantitative expressions of risk in government frameworks

Despite extensive research in the literature, frameworks provided either no or little advice on how best to communicate risk quantitatively. The only apparent exception to this is the US FDA guidance, which provides an extensive literature review on the subject. Other examples of advice are high level, for example, Defra's (2017) guidance cites general principles included in the National Flood Resilience Review, including "express estimations of the likelihood of events in intuitive, consistent and unambiguous ways" (p 10). However, no further guidance is provided on how to fulfil this principle.

## 4.3.2 Verbal (qualitative) presentations of risk

Presenting risk information in qualitative formats (i.e. using words rather than numbers) can help to provide context for audiences and facilitate the interpretation of risk information. Verbal information is often used to help individuals identify the relative riskiness of different scenarios. For example, when communicating relative risks verbally, it may be appropriate to use 'low', 'medium' and 'high' as descriptors for the risk (Bonner et al, 2018). For the risk communicator, verbal information is also necessary to communicate the assumptions, caveats and uncertainties arising from the nature, volume, quality and consistency of evidence used to define a risk (van der Bles et al, 2019).

However, there is no standardised set of terms used to communicate risk verbally (Schneider, 2016), although there have been some attempts to develop such a standardised terminology and link this to quantitative information (such as, for example, the IPCC's guidance note on the consistent treatment of uncertainties; also Ho et al, 2014). Because there are no standard terms, and because such terms are inherently subjective, studies have identified significant differences in how different people interpret the same risk terms (e.g. Bonner et al, 2018; Budescu et al. 2014; Visschers et al, 2009; Han et al, 2009). The inherent subjectivity and consequently the ambiguity of using qualitative terms to describe risk has long been noted in the literature (Kent, 1994 and Wallsten et al, 1986 in Fischhoff, 2013). For example, terms such as 'low risk', 'uncommon' or 'unlikely' will lead to differing interpretations of a risk's scale or severity between individuals. Some research has indicated that some of these differences in interpretation may be specific to audience groups (Knapp et al, 2016). For example, the use of the word 'unlikely' may be interpreted by a lay audience as unrealistic, while for scientists 'unlikely' may be unrealistic but entirely plausible (Ho et al. 2014; Visschers et al, 2009; Schneider, 2016).

Such differences in interpretation also mean that the use of verbal descriptions in risk communication may contribute to the over- or underestimation of risks, depending on how the risk is presented (Fagerlin and Peters, 2011; Rakow et al, 2015). For example, Knapp et al (2016) found that adding verbal risk expressions (a scale of 'very common', 'common', 'uncommon', 'rare', 'very rare') to quantitative presentations of risk (e.g. 'may



affect 1 in X people') resulted in participants significantly overestimating perceived levels of risk when compared to presenting quantitative information alone.

Over- or underestimations of risk may also be due to the use of specific terms used. For example, the use of the term 'radioactivity' when discussing the risks associated with X-ray use may evoke emotive imagery of nuclear waste and contamination and contribute to a heightened perception of risk (Downs and Fischhoff, 2011). Such trigger words will likely differ depending on the risk and audience in question, and much of the literature therefore recommends pretesting messages (Visschers et al, 2009; van der Bles et al, 2019; Downs and Fischhoff, 2011). As risk perception is largely driven by emotion, it follows that appeals to emotion or the use of emotionally triggering terminology could be a powerful tool for risk communication. However, there is little evidence for such methods and some authors question the efficacy of such approaches, noting that appealing to emotion may lead to unintended (and undesirable) consequences (Waters et al, 2016; Rakow et al, 2015).

In addition to providing context to risk information through the use of qualitative terminology, risk communicators may also seek to provide context through the use of analogies. This may be particularly helpful for more complex subject areas and some research has looked into the use of analogies to better explain climate change. Rakow et al (2015) consider the available evidence on this, citing research that shows certain analogies improving understanding of climate change, but noting that there is limited evidence that this then impacts risk perceptions. Some research also suggests that presenting risk information as stories is more effective at communicating important information than presenting facts and statistics alone (Jacob et al, 2010 and McCarthy and Brennan in Ueland, 2018).

Research also suggests that the most effective risk communication also provides audiences with actions they can take to mitigate risk (Veil et al, 2011; Janoske et al, 2013), and that not including information on mitigating actions in a risk communication can lead audiences to seek information from other (potentially less reputable) sources (Seeger, 2006; Dixon and Clarke, 2012).



## Verbal risk in government frameworks

The frameworks reviewed consistently recommend that risk messaging should be presented as simply as possible and avoiding jargon. Messaging should also be consistent and avoid conjecture.

There was limited guidance otherwise in terms of how messages should be constructed. This is not dissimilar from literature on the subject. There are some exceptions:

- EFSA's uncertainty guidance provides specific instructions on how to write about uncertainty and accompanies this with examples. For example, it recommends that when writing about an inconclusive assessment for an entry-level audience, text should indicate clearly that no conclusion can be provided, and explain briefly what the sources of that uncertainty are. This is contrasted with information provided to more informed audiences, where it is appropriate to provide further details on the sources of uncertainty, including quantifications for more technical audiences (illustrated on page Figure A2.8). Similar guidance is also offered for other aspects of uncertainty communication: prescribing the level of detail and wordings appropriate for different audiences. This is also relevant to Communicating uncertainty in government frameworks.
- The BfR's guidance recommends that risk communication should avoid trying to convince or persuade and instead should only provide information to help people assess a risk. The BfR have developed a 'risk profile' model that highlights the key aspects of a risk for this purpose. This includes information on the affected group, the probability of the risk, the severity of the risk, the validity of the available data and the controllability by the consumer (illustrated in Figure A2.10).
- The USFDA's guidance recommends an extended process for developing qualitative communications. The first step is to develop and refine a model of how the practitioner understands the risk, then to develop interviews with members of the intended audience that seek to understand what perceptions are around different aspects of that model and then to draft, test and retest messaging based on an understanding of those perceptions and how they differ from the model. This avoids providing specific guidance, but instead sets out a method for developing messages appropriate to the context in question. This guidance also recommends the use of plain language writing and design strategies, for example, limiting the number of main messages within a communication and using active voice (illustrated in Figure A2.11).

## 4.3.3 Visual presentations of risk

Visual presentations of risk are particularly useful for building understanding about topics that are intangible because of scale, complexity or uncertainties (McInerny et al, 2014; Schneider, 2016) and can illustrate probabilities of harm in a way that is more likely to attract people's attention and promote accurate understanding than other forms of risk communication (Visschers et al, 2009, Arrick et al, 2019).



However, there is no single method for visually presenting risk, and the most appropriate visualisation will differ depending on the type of risk being conveyed (Fagerlin and Peters, 2011). Spiegelhalter (2017a) notes that developing visual presentations of risk is an ongoing process, that requires assessing the needs of the audience, and repeat testing of different iterations to produce a final design. Frewer et al (2016) find that there has been limited research thus far on visual presentations of risk and there is a need for further research.

## 4.3.3.1 Strengths and weaknesses of different visualisations

In general, visualisations are best used to communicate the gist of information, rather than extensive detail. Different visual presentations of risk serve different goals. Accordingly, the format of the visualisation is important, and the same principles apply here as to science communication more generally. For example:

- Line graphs can be effective in communicating risk trends over time (Spiegelhalter, 2017a; Fagerlin and Peters, 2011; Waters et al, 2016);
- Pie charts are effective at communicating the proportions of different risks (Fagerlin and Peters, 2011);
- Bar graphs are effective at helping people understand and compare between multiple different risks (Fagerlin and Peters, 2011).
- Pictographs, such as icon arrays (e.g. an image of ten identical body shapes, with different colours to show those affected by a risk as a proportion of the total) are effective at presenting binary risks that either do or do not exist or numerical changes in risk in 'before and after' scenarios (Bonner et al, 2018) and the proportion of risk relative to the whole, a target or an average (Waters et al, 2016);
- Data tables or 'fact boxes' are appropriate for more detailed, verbatim information (Fagerlin and Peters, 2011; Spigelhalter, 2017a; Freeman et al, 2017).
- For geographic risks, maps can convey considerable amounts of data by being engaging and familiar, but any overlaid data (topography, borders etc) may contribute to information overload and distract from the purpose (McInerny et al, 2014). Some research on the use of maps has indicated that where appropriate (e.g. for localised risks), the use of aerial photographs improves understanding (Haynes et al, 2007).

There has also been limited research on how people react to particular symbols, icons and imagery. While symbols add meaning to a visualisation, they should ideally be tested across population groups as they may have different effects based on a person's numeracy (Peters et al, 2007). For example, one study visualising cardiovascular disease as a binary risk (the probability of being at risk of, or not at risk of, the disease) noted positive emotional responses to green smiling faces, with negative emotional responses to red frowning faces (Bonner et al, 2018). As another example, traffic-light symbols were easy to use by highly numerate groups, but not well understood by low-numerate groups (Peters et al, 2007). One study found that most images accompanying online information about GMOs evoked



unnaturalness and contributed to emotive responses and risk perception (Ventura et al, 2017).

As with other formats for presenting risk, the "less-is-more" principle has also been found to apply to the design of visual representations of risk (Waters et al, 2016). Elements that overcomplicate risk presentations, such as 3D bar charts or distorted data and axes that exaggerate the magnitude of risk are to be avoided. Multiple graphics communicating the same data are to be avoided where this could be presented more concisely (Waters et al, 2016). Such aspects influence the apparent quality and design of visualisations, and this in turn has implications for trust: graphics that appear to be poorly designed are liable to reduce audience's confidence in the information conveyed (McInerny et al, 2014).

Interactivity and animations may have some benefit for engaging users, but may also introduce unnecessary complexity (McInerny et al, 2014; Spiegelhalter, 2017a) and while vivid narratives, images and metaphors may gain attention, they may also evoke unintended emotional responses that result in the user not engaging with the visualisation (Spiegelhalter, 2017a). Two studies were identified exploring the use of interactive games to communicate risk. Crovato et al (2016) found that the use of a video game to communicate risk to students led to increased knowledge of risks and appropriate mitigating actions. However, Ancker et al (2010) compared the use of game-like graphics to static images presenting risk information and found no difference in terms of how these affected risk perceptions, estimates or intentions.

#### 4.3.3.2 Differences between audiences

There is limited research investigating the suitability of visual presentations of risk for different audience groups. Well-designed visualisations can be particularly effective in improving comprehension among people with low numeracy (Spiegelhalter, 2017a, Fraenkel et al, 2018). For lay audiences, "well-designed" means avoiding overly complex visualisations, as these can have the opposite effect on comprehension. This was shown in Damman et al (2018), where visualisations of cardiovascular disease risk had an unintended, negative effect on how information was understood and risks were recalled, with particular detriment to less numerate and health literate groups. What will be considered overly-complex will likely differ significantly by audience group and visualisations that may be preferred and considered more comprehensible by experts can be challenging for laypeople to understand (Haynes et al, 2007; Rakow et al, 2018).

#### Visual presentations of risk in government frameworks

No frameworks were identified that provided specific guidance on how to visualise risk. This is in line with the literature, which only provides general principles for visual communication of risk. The USFDA guidance



recommends using graphics to show fractions, but more generally avoiding the use of graphs and charts where possible.

## 4.3.4 Uncertainty

Uncertainty is an inherent aspect of most risk assessment, particularly for emerging or complex risks. It is also crucial for developing new research questions and hypotheses, searching for processes and mechanisms, and gaining knowledge about how things work (Schneider, 2016).

Research indicates that there is value in helping audiences understand that scientific uncertainty is not a failure of science, but rather an expected outcome needed to build knowledge and understanding (Guenther et al, 2015).

Much of the literature recommends and encourages communicating uncertainty, and this stems in part from concerns that withholding uncertainty information lacks transparency and can undermine public trust in an authority (Lofstedt et al, 2017). Failing to acknowledge or adequately communicate uncertainty can lead to an inaccurate focus on certain pieces of evidence in the process of decision-making, with potentially disastrous consequences (van der Bles et al, 2019). Communicating uncertainty in a transparent manner can also mitigate against the professional misconduct of some groups, who willingly use uncertainty to discredit research and as a weapon of propaganda (Schneider, 2016).

However, uncertainty may be received by audiences as unwanted and synonymous with making mistakes (Schneider, 2016). This was tested by Etienne et al (2018a), who found that the provision of uncertainty information did not significantly impact confidence in the risk information provided.

Some audiences may find uncertainty information distracting and confusing. Lofstedt et al (2017) found this, noting that when given a straightforward choice, most respondents preferred to know if a food/chemical was safe or not, rather than hearing the risk estimates and scientific uncertainties that underpinned this safety. Etienne et al (2018c) also found this to be true for members of the general public with lower awareness of scientific risk assessment.

Ultimately, public perceptions of uncertainty are likely to be subjective, and it is difficult to identify common messages that will be well-received by all groups. Even among those members of the public who were more receptive to uncertainty information in Etienne et al (2018c), there was no clear consensus as to a preferred format.

Etienne et al (2018c) also tested the communication of uncertainty information with other stakeholder groups. Uncertainty information was considered important and was understood by technical policy-makers and political decision-makers. NGOs and civil society groups also welcomed and encouraged the communication of uncertainty information, but participants from this group also had a tendency to believe that the presence of uncertainties in evidence meant that risk was higher.



## 4.3.4.1 Communicating uncertainty

When communicating uncertainty, it is important to ensure that uncertainty information is not conflated with risk information. Van der Bles et al (2019) gives the example that while the incidence of cancers caused by consuming processed meat is relatively low compared to other factors such as smoking, the certainty in the evidence base that processed meat causes cancer is very high.<sup>8</sup>

As with risk messages more generally, there is debate as to whether uncertainty information should be communicated in a quantitative or qualitative format. This was explored by Etienne et al (2018a), who found that although policymakers assumed that qualitative statements would be preferred by the general public and better understood, among members of the general public themselves, there were mixed preferences as to the type of uncertainty information they wanted to receive.

Some research has looked into how framing can impact the communication of uncertainty. For example, Juanchich et al (2017) finds that experts who take a personalised approach to communicating uncertainty, such as "I am 90% certain", have been perceived as more knowledgeable than experts using an external probability phrase, such as "it is 90% likely". Interestingly, this analysis found that the opposite was the case for lay speakers, with personal certainty perceived as less influential than broader judgements.

There has been some research into the use of visualisations for representing uncertainty, particularly for communications to policy-makers and other decision-makers, but there is little consensus on the best approach to this (Papadopoulou et al, 2018; Goerlandt and Reiners, 2016) and as noted by McInerny et al (2014), this is an *"active...[but] unresolved issue in information visualisation research"* (McInerny et al, 2014: 150).

## 4.3.4.2 Uncertainty in crisis communications

For crisis situations and emerging risks, uncertainty is often an inherent and defining aspect of the crisis. In a review of literature on communicating uncertainty in crisis contexts, Liu et al (2016) note that practical findings or guidance in this area is sparse.

<sup>&</sup>lt;sup>8</sup> Although this has been recently contradicted; see <u>https://www.nytimes.com/2019/09/30/health/red-meat-heart-cancer.html</u>



## Communicating uncertainty in government frameworks

Most guidance on risk communication states that one should acknowledge uncertainty and provide information on what is being done to address that uncertainty. Limited additional detail is provided.

The exception to this is EFSA's guidance on uncertainty communication, which provides significant detail on how to address uncertainty depending on the audience and offers an interactive template to help communicators determine how best to communicate uncertainty in their situation. An example of this is provided in the section on <u>Verbal risk in government frameworks</u> and in <u>Figure A2.8</u>.

Other examples of how uncertainty is addressed in frameworks include:

- EUFIC's Guidance suggests that cultures differ in their acceptance of uncertainty information, and this should help dictate the extent to which uncertainty information is communication. It considers the UK to be a country with "*lower*" uncertainty avoidance (illustrated in Figure A2.12).
- The FAO's Guidance describes why risk managers are often reluctant to communicate uncertainties, citing: fear of panic, fear of losing control, fear of economic loss and impact on the business sector and a lack of dietary alternatives and impact on public health. Nevertheless, it recommends communicating uncertainties and provides some general guidance on this consistent with the type of guidance provided in other frameworks (illustrated in Figure A2.14).

# 4.4 Communicating risk: channels

Risk communicators have many options for disseminating information on risk. Traditional media channels appear to remain the most preferred and effective channels for disseminating food-related risk messages. Recent research commissioned by EFSA on emerging risks (Etienne et al, 2018c) found that most consumers (71% across the EU; 72% in the UK) preferred TV news and programmes as the best channel to receive information on new food risks. This was followed by the websites of national competent authorities. In this study, social media was mostly unpopular with UK consumers (only 25% indicating this as a preferred channel), but it is not clear whether this extends to the official social media channels of national food safety authorities, particularly as consumers in the UK indicated above average confidence in national food safety authorities (65% as compared to 56% EU-wide).

## 4.4.1 Traditional media channels

Although traditional media channels are the most effective for widely disseminating risk messages to the general public, the use of traditional media channels means that journalists become responsible for setting the agenda, defining what constitutes 'public interest' and selectively framing and presenting issues (Wilson et al, 2014). Literature considering this field has been based largely on content analyses, case studies and interviews with journalists.



Some of the literature in this area posits that inaccuracies in reporting risk and uncertainty stem from the fact that many journalists lack the required level of mathematical and scientific literacy to report difficult statistical information (Ashe, 2013). However, misrepresentations of risk and uncertainty also occur because of how journalists view their role and what they believe makes good news. Studies on how traditional media channels report risk have noted that the media will only report on those cases they consider to be newsworthy. Newsworthiness does not necessarily correlate with the importance or implications of a risk. Examples of risks that are more likely to be considered newsworthy include, for example:

- Risks that can be described as a sudden event are more likely to be considered newsworthy than risks that occur over a longer period of time (Kitzinger, 1999 in Ashe, 2013);
- Risks that harm many individuals at once (Kitzinger, 1999 in Ashe, 2013);
- Risks that are unusual rather than common (Kitzinger, 1999 in Ashe, 2013);
- Issues that are considered controversial are particularly newsworthy and therefore more likely to be reported on. This includes stories where there are questions of blame, secrets and cover-ups (Pidgeon, 2012 in Ashe, 2013). For example, Lofstedt (2019a) reviews the timeline of media reporting on a campylobacter outbreak in Swedish chickens, and finds that the story received only marginal media interest until it was reported on as part of an "exposé" based on an interview with a whistle-blower who had worked at a large Swedish slaughterhouse.

Reporting will often seek to skew stories to increase newsworthiness and interest, and even where this is not the case for articles themselves, headlines written to draw attention (and clicks) will still often misrepresent the risk (Ashe, 2013; Spiegelhalter, 2017b). For example, as noted in the section on presenting risk quantitatively, media stories will often choose to discuss relative risk without providing the context of absolute risk, making findings appear more significant than they are (Spiegelhalter, 2017a).

Where risk events are considered newsworthy and are reported on significantly in the press, approaches to reporting on the event will differ. Even within a single case, media coverage of food risk will encompass different narratives, meaning that consumers are likely to receive information in different forms and from different (possibly conflicting) angles (Fuentes and Fuentes, 2015). Differences between these narratives are due in part to how journalists perceive their own role in reporting risk. In a study considering journalistic intentions to report on risk, Stocking and Holstein (2009) find that previous frameworks developed to describe journalistic motivations more generally (Weaver and Wilhoit, 1996 in Stocking and Hostlein, 2009) also apply to the communication of risk. These categories are not mutually exclusive and break journalists down into: a 'disseminator' of information, an 'interpreter' who validates and filters information, a 'populist mobiliser' keen to integrate non-expert views into reporting, and an 'adversary' sceptical of new developments. Wilson et al (2014) explored how journalists in Australia, New Zealand and the UK view their own roles in relation to risk communication and found that journalists saw themselves both as conduits of



information (e.g. disseminators and interpreters) and as public watchdogs (e.g. populist mobilisers and adversaries).

Across these journalistic types, actors will often seek to provide a 'balance' of competing viewpoints on an issue in an attempt to maintain objectivity, but without contextualising the evidence that underpins each viewpoint. This can create uncertainty and potentially legitimise false information (Stocking and Holstein, 2009; Spiegelhalter, 2017b). For example, in a study examining responses to information about vaccination, Dixon and Clarke (2012) found that texts seeking to balance pro- and anti-vaccination arguments resulted in readers being more uncertain about vaccines' relationship with autism. Beyond simply maintaining objectivity, the preference for controversy can lead some journalists to intentionally seek out more extreme viewpoints, rather than moderate, critical voices (Sandman, 1998 in Ashe, 2013), exacerbating this effect.

Research also suggests that risk information provided through social media channels often lacks advice on how to mitigate risk or what actions can be taken (Fuentes and Fuentes, 2015; Parmer et al, 2016 in Ueland, 2018).

Research also suggests a media preference for reporting certainty in outcomes, rather than communicating the uncertainties and knowledge gaps within the research field (Freeman et al, 2017; Heidmann and Milde, 2013), although this differs between journalists, and in some instances journalists may choose to emphasise uncertainty as a way to highlight controversy and attract attention (Simmerling and Janich, 2016; Guenther and Ruhrmann, 2016).

To address issues with how the media reports on risk, the literature suggests a proactive approach to maintaining relationships with journalists and ensuring that they have access to clear information and advice (Janoske et al, 2013; Veil et al, 2011). Where stories on risk are taken up by the media, this can significantly reduce the costs of publicising risk information for public bodies and increase the audience size (Lofstedt, 2019b).

Despite the potential benefits, Cope et al (2010) note that experts are often cautious about media communications on risk events, because of an assumption that the above-mentioned reporting styles contribute to the social amplification of risk. However, the authors also note that research with consumers shows that they value traditional media as an important information source and that most consumers feel that they can distinguish between media amplification and genuine risk.

## 4.4.2 Social media and other innovative approaches

Research into the role of social media for food safety communication is still emerging and therefore evidence is limited (Overbey et al, 2017). It is assumed that social media is an effective tool for reaching certain audience groups, particularly younger people (Rutsaert et al, 2014), but there has been a lack of research into what demographics are actually reached by social media campaigns and what groups should be targeted by other means



(Eckert et al, 2018). In general, literature notes the need for continued research in this area (e.g. Frewer et al, 2016; Ueland, 2018) and that there is no consensus between different actors (e.g. media actors, regulators, industry) on how social media should best be used (Henderson et al, 2017). As such, social media is generally seen as an additional channel to be used within a broader risk communication strategy (Regan et al, 2016; Charlebois and Summan, 2015).

The discussion here is focused on the direct use of social media by food safety authorities. However, much of the risk information content on social media originates from traditional news coverage (Overbey et al, 2017). For example, analysis of the flow of media information during a risk event found the highest coverage of a risk event on social media was not until after traditional media had peaked, in part because social media relied on traditional media as a source of content (Shan et al, 2014). This means that outputs from food safety authorities become part of a wider conversation alongside traditional media outlets.

## 4.4.2.1 Benefits and risks of social media risk communication

There are several perceived benefits to the use of social media for risk communication. Firstly, social media allows food safety authorities quick and direct access to an audience in a way that can encourage transparency and bypass traditional media and concerns over journalistic misrepresentation of risk (Rutsaert et al, 2013; Eckert et al, 2018; Rutsaert et al, 2014). Secondly, social media allows for two-way interaction with the general public. This means that risk communicators are more easily able to listen to and engage with their target audience (Regan et al, 2016; Charlebois and Summan, 2015) and it allows the general public to contribute to discussions previously reserved for risk managers, media actors and decision-makers (Sutton and Veil, 2017). This interactivity also allows authorities to manage queries and complaints more directly, including redirecting queries that are outside the organisation's expertise, and linking experts and the public together (Shan et al, 2015).

However, although social media offers many benefits for risk communication, there are also several risks associated with its use:

- Firstly, the democratic nature of social media means that it is difficult to control messages once they have been put out and there is no barrier to people posting whatever comes to mind and for those messages to gain traction (Rutsaert et al, 2014). Such messages may not align with the goal of risk communication. For example, previous FSA research (Draper et al, 2016) notes that at least in relation to the horsemeat incident, the messages that proliferated on Twitter following the incident were largely humorous.
- Secondly, many risk communicators assume there is an audience preference for communications from traditional media, due to low trust in content on social media (Rutsaert et al, 2014). This preference is confirmed by recent consumer research commissioned by EFSA (Etienne et al, 2018c), which showed that social media was the least preferred



channel across consumers. However, it is not clear to what extent this distrust also applies to social media communications from official sources.

 Thirdly, although social media offers opportunities for engaging directly with audiences, there is a relative lack of privacy and confidentiality in messages put out through social media. Engaging successfully with audiences through social media also requires a significant time commitment, if the intention is to address queries in real-time to keep control of the message (Shan et al, 2015; Rutsaert et al, 2014). Moreover, although the potential of social media as a platform for two-way communication is recognised (Eckert et al, 2018; Henderson et al, 2017) and to some extent it is being used as such (Panagiotopoulous et al, 2015), research with social media stakeholders suggest that the majority viewed social media as a one-way tool to disseminate information, rather than as a two-way interaction (Regan et al, 2016), suggesting that opportunities to use social media as an engagement tool are taken up less frequently in practice. Frewer et al (2016) also find this in a review of literature on risk/benefit communication, noting that of 54 papers reviewed, only three looked at interactive dialogue.

These risks mean that if social media communication is inadequately managed, particularly during a crisis, social media could contribute to escalating risk by promoting confusion, panic and alarmism (Rutsaert et al, 2013), particularly given the unregulated nature of the platform (Regan et al, 2016) and the possibility for inaccurate information to reach a wide audience (Rutsaert et al, 2013). This may also push people to find answers on outlets scientific experts cannot control, such as those that do not accurately reflect the evidence base or are driven by ideology and misunderstanding (e.g. the growth of anti-vaccination social media accounts) (Stocking and Holstein, 2009; Dixon and Clarke, 2012).

The proliferation of misinformation on social media and the rise of fake news has also been addressed in the literature. It is not clear to what extent this impacts risk perception. Scheufle and Krause (2019) find that such information is most likely to be trusted and accepted by those with low understanding of the scientific process and that trust in certain sources is determined more by the extent to which people believe sources to be in line with their own ideology (e.g. confirmation bias) than by exposure. In a recent experimental study however, Lutzke et al (2019) show that at least to a small extent, providing individuals with guidelines for identifying fake news helps reduce trust and acceptance of such sources. Although the growth of misinformation remains an issue, case studies have shown that official materials or articles from reputable sources gain significantly more traction than less reputable sources (Kostkova et al, 2014; Panagiotopoulos et al, 2016).

#### 4.4.2.2 Best practices in social media risk communications

Some research in this area has been able to provide suggestions for potential best practice when communicating risk through social media. These findings are based mostly on a single case study, and therefore may not be



universally applicable, but provide starting points for best practice and could benefit from further testing. For example:

- Timing is important. Previous FSA research looking at Twitter (Draper et al, 2016) found that retweets were more likely when tweets were sent at night and on any day of the week other than Wednesdays;
- Previous FSA research also finds that including URLs in tweets makes them less likely to be retweeted (Draper et al, 2016). This has been confirmed in a study on non-food risks (Sutton et al, 2015). Other research has noted, however, that the inclusion of links increases the perceived credibility of a tweet's message (Hamshaw et al, 2018);
- The use of imperative sentence styles (e.g. instructional tones) and ALL CAPS messages is associated with a higher number of retweets (Sutton et al, 2015);
- The use of hashtags is associated with a higher number of retweets (Sutton et al, 2015); and
- Initial audience size is important: having a larger number of followers exponentially increases the dissemination of risk communication messages (Kostkova et al, 2014; Sutton et al, 2015).



## Channels in government frameworks

The frameworks reviewed contain little detail on when certain communication channels are more appropriate than others. There is a general agreement across frameworks of the need to cover multiple outlets, to reflect media consumption behaviours, and that social media is a key component that has become increasingly important. Some sources offer more detail in terms of channels:

- Health Canada's guidance offers suggestions for channels/risk communication documents based on the urgency of the risk. This is based on channels and communication types specific to Health Canada's work (illustrated in <u>Figure A2.17</u>). It then provides further information for each option, indicating the audience and scope for which it is most appropriate.
- The FSANZ's guidance offers some limited suggestions based on the type of risk. For example, suggesting the use of social media for "responsive" communication strategies and increased media and stakeholder interaction for "proactive" communication strategies (illustrated in Figure A2.6).
- EFSA's When food is cooking up a storm guidance addresses the issue of channels by providing an overview of options with pros and cons for each. For example, it suggests that the use of social media sites is appropriate for simple messages intended for a broad audience, but inappropriate for sensitive subjects, unless there are resources to actively manage discussions (illustrated in Figure A2.2).
- The FAO's guidance on food risk communication provides some more specific detail on this. The FAO's guidance notes that the body delivering the message should be trusted by the public and specifically trusted to provide information on the topic at hand. It offers an example of an incident in Canada, where communication on a food risk incident came from the Ministry for Agriculture rather than the public health agency whose responsibility it is to communicate such information. In that case, this undermined the effectiveness of the communication.
- The POST Note on risk communication addresses this briefly and makes reference to the BBC's editorial policy on risk. The latter provides pointers intended to ensure that media reporting does not misrepresent the nature and severity of risks.
- The UK Department of Health's guidance from 1997 also sets out a list of 'media triggers' to look out for in a risk story (illustrated in Figure A2.3), as these are likely to lead to extensive coverage. These triggers reflect many of the findings in the literature on media reporting of risk.

No extensive guidance was identified on the use of social media for risk communications, although some frameworks referred to its usefulness for communicating short 'gist' messages to lay audiences (see, for example, EFSA's guidance illustrated in Figure A2.2). As this is an emerging area of research, the literature appears to offer several best practices that are not apparent in existing frameworks.



# 4.5 Developing communications

Styles of communicating risk and therefore how communications are developed have evolved over time. Sutton and Veil (2017) provide a framework for this, charting how the early focus in the 1970s and 1980s on managing risk irrespective of public perceptions transformed into risk communications that prioritised persuasive one-way messages to correct public perception in the 1980s and 1990s. Ramirez-Andreotta et al (2014) characterise this as the technical model of risk communication. More recently, risk communication strategies have begun to focus more on engaging with the public and developing two-way risk communication strategies, characterised by Ramirez-Andreotta et al (2014) as the cultural model of risk communication (also Arvai 2014; Charlebois and Summan 2015). At the same time, there has been an increase in the availability of competing narratives of risk through social media.

The literature on the development of communications is based largely on narrative case studies and on interviews with experts.

## 4.5.1 Listening to audiences

Much of the literature on developing risk communication emphasises audience listening and engagement as a helpful first step in establishing a risk communication strategy, as well as a way to keep audiences interested and address concerns as they emerge (e.g. Janoske et al, 2013; Hartmann et al, 2018). In some instances, such techniques can also be used as part of risk assessment. Particularly for emerging risks or outbreaks, tracking media or social media reports may provide more timely updates on incidents than official or academic sources (Alomar et al, 2015).

For the purposes of risk communication, regular monitoring of traditional and social media can be used as a tool to capture public sentiment, both before and during risk crisis events (Eckert et al, 2018; Janoske et al, 2013). For example, Harmann et al (2018) use the extent of media coverage of an issue as a proxy measurement for public concern. Social media monitoring can also be used as a tool to track public sentiment and concern, although research in this area suggests that social media users are not necessarily representative of the wider population (Shan et al, 2015) and the responses published may be more reflective of a desire to entertain than of risk perceptions (Draper et al, 2016).

Listening to audiences can also be done by directly engaging with members of the general public to test potential messages and risk communications. Across the literature, authors comment on the value of continually testing and pretesting risk messages (Spiegelhalter, 2018a; Visschers et al, 2009; van der Bles et al, 2019; Downs and Fischhoff, 2011; Rakow et al, 2015; Lofstedt, 2019b).

These actions can also help to distinguish between different audience groups and develop tailored messages to address different needs. This can mean distinguishing between groups based on level of knowledge or demographic factors, or based on their role in relation to the risk. For example, Charlebois and Watson (2016) recommend distinguishing between "risk makers" and



"risk takers". Frewer et al (2016) finds that although several studies recommend tailoring communications to different audiences, there is a gap in understanding what those differences between audiences might be and therefore what tailoring is required.

## Addressing different audiences in government frameworks

Most guidance lists the importance of identifying and considering your intended audience. A few of the frameworks present guidance and strategy that takes the intended audience into account.

Identifying audiences is done in different ways. For example:

- EFSA's uncertainty communication guidance categorises audiences based on their level of knowledge (illustrated in <u>Figure A2.9</u>).
- EFSA's crisis communications guidance categorises audiences into four groups based on their association to the risk: Helpers, Victims, Resolvers and Bystanders. It suggests developing separate strategies for each group (illustrated in <u>Figure A2.19</u>).
- Some examples (Health Canada's, Health Protection Scotland's and the HSE's guidance) make a distinction based on stakeholder type, distinguishing between public audiences, academic audiences and media stakeholders.
- The FAO's food risk communication guidance takes a similar approach, based on original work from Health Canada. This method identifies four groups and sets them in order of importance (illustrated in Figure A2.15). The FAO's guidance also addresses the issue of audience in terms of cultural or socioeconomic differences, noting that careful attention should be paid to the type and level of language used depending on the group. This includes specific guidance on how best to reach vulnerable groups (illustrated in Figure A2.19).
- The Cabinet Office's guidance groups audiences by worldview based on Cultural Theory, considering: fatalists, hierarchists, individualists and egalitarians. For each group, it then provides problems that may emerge when communicating risk and potential solutions for these problems (illustrated in Figure A2.5).

## 4.5.2 Timing

Where the literature considers the timing of risk communications, there appears to be consensus that risks should be communicated to the public as soon as possible and that timely communications promote transparency and build trust (Jacob et al, 2011; Regan et al, 2016). This advice is confirmed by Etienne et al (2018c), who found that a majority of UK consumers indicated that they would prefer information on emerging risks either as soon as a possible risk has been identified or as soon as there was some evidence of health consequences, even where information remained uncertain.

To ensure that risk communication is timely, the literature recommends proactively developing communications strategies before risk events occur (Janoske et al, 2013). This requires building risk communication into the risk assessment process from the start (Veil et al, 2011).



For some types of risk communication, it may make sense to time communications to coincide with particular seasons or holidays. For example, Lofstedt (2019b) describes the risk communication strategy of the Swedish Food Agency in regard to dioxin in fatty fish, where communications were put out to coincide with periods in the year where Swedes were traditionally more likely to consume these fish. This helped to increase media interest and coverage of the guidance.

Where the purpose of risk communication is to encourage behaviour change, it is particularly important to continue to communicate on the risk at frequent intervals following any initial communication (Redmond and Griffith, 2006 in Ueland, 2018).

Timely communications also means communicating after a risk, to ensure stakeholders know when a risk has passed. In a study on consumer understanding and perceptions following food recalls, Charlebois and Watson (2016) found that although 75% of study participants knew that a recall had taken place, fewer (57%) knew that it had ended, likely because the media report more frequently on crises than on the resolution of crises, meaning that important information does not reach consumers.



#### Developing communications in government frameworks

Most frameworks set out an overarching approach to risk communication. There is broad consistency across frameworks in terms of how a strategy for risk communication should be developed. Most suggest that a multidisciplinary project team should design and consult on risk communication strategies with public, expert and industry stakeholders. It should develop messaging, before reviewing strategies on an ongoing basis to ensure they are fit-for-purpose.

Some frameworks define risk communication as a step-by-step process, differing in the level of detail offered. For example:

- The FSANZ Risk Analysis document defines a three-step process: (i) identify the target audiences; (ii) design messages for those audiences; and (iii) use the most appropriate communication vehicles for those audiences (illustrated in Figure A2.7).
- Health Canada defines a seven step process: (i) define processes, goals, and/or outcomes in an 'opportunity statement'; (ii) characterise risk; (iii) assess stakeholder perceptions; (iv) assess how stakeholders perceive different risk responses; (v) develop and pre-test strategies in consultation with stakeholders; (vi) implement risk communication plans; and (vii) evaluate effectiveness (illustrated in Figure A2.18).
- EUFIC's guidance defines a five-step process: (i) evaluate the situation;
  (ii) know your audience; (iii) craft your communications; (iv) evaluate; and
  (v) engage with others (illustrated in Figure A2.13).
- DEFRA's guidance suggests a four-step approach: (i) characterise the risk; (ii) characterise any controversies; (iii) specify the communication aims and methods; and (iv) identify the 'informed public' and other expert stakeholders.
- EFSA's guidance on crisis communication describes an approach where the risk communication process is constantly ongoing, as lessons learnt are constantly being fed into the process (illustrated in <u>Figure A2.20</u>).

Many frameworks advise that assessing stakeholder perceptions should be a preliminary step. This is either a stand-alone step or part of characterising the risk. DEFRA's guidance notes that this can be supported through the use of 'issue-crawler' technologies, which harvest social media to help illustrate public perceptions of risk. Other guidance also notes the usefulness of social media in helping to establish initial public sentiment: EFSA's crisis communications guidance recommends monitoring both traditional and social media as soon an incident is suspected or occurring so as to be prepared to respond.



# 5 **Conclusions and recommendations**

This rapid evidence assessment has explored the academic literature on risk communication and risk communication guidance documents.

Overall, the risk communication guidance documents reviewed tend to focus on high level principles. They generally do not provide detailed guidance, nor do they prescribe how one should communicate about food risk. This focus on high level principles likely reflects the fact that effective risk communication will depend heavily on context. The focus on context is supported by the evidence provided in the academic literature, which highlights the many contextual factors that may shape the way individuals perceive risks and the manner they may respond to information about those risks.

The focus on high-level principles in guidance documents may also stem from a concern that a greater amount of detail discourages potential users.

Where existing frameworks provide more detailed guidance, there is a tendency for the text to be long and dense (see for example, <u>the USFDA's 2011 guidance</u>). One example that attempts to compromise between high-level principles and detail is EFSA's Uncertainty Guidance (see Figure A2.8 and Figure A2.9). This framework offers a more interactive format. The answers that a practitioner gives to questions about the type of uncertainty they are managing lead to the respondent being steered towards specific guidance that is differentiated by audience type. This approach to the presentation of guidance allows for detailed and practical recommendations, while also remaining accessible for users.

It would be helpful for future research to identify:

- the usefulness of interactive formats to practitioners; and
- what level of detail is most appropriate for risk communication guidance.

Conclusions are provided below for each of the aspects considered in the study:

- Risk perception: risk perception research is always mentioned in guidance, but it is handled in markedly different ways. Some guidance offers insight into a single theory (e.g. Slovic's psychometric model or Cultural Theory). Other guidance documents provide more of an overview. There is also variation in the level of detail provided. Guidance often does not offer recommendations for communication based on this research, but instead provides questions a practitioner can ask themselves based on the research. It would be helpful for future research to identify:
  - the extent to which practitioners are interested in having more detail on risk perception research and where this detail should be provided;
  - how understandable and useful commonly referenced theories/illustrations, such as the psychometric model and Cultural Theory, are;



- whether the 'questions to consider' approach is helpful to practitioners and if it is not helpful, what alternative approach would be more effective; and
- the extent to which findings from the literature on risk perception are applicable to different types of food risks, and whether there are different tendencies associated with certain types of risk (e.g. emerging risks).
- Quantitative presentations of risk: research on the quantitative presentation of risk does provide some principles on presentation that can help to improve the comprehension of risk, not only for lay audiences but also for experts. For example: avoiding the presentation of relative risk alone; or maintaining consistency in denominators and format across a communication. Most research in this area comes from a public health/clinical setting. This research was not reflected in the guidance reviewed. It would be helpful for future research to identify whether:
  - practitioners would benefit from more specific guidance on how to present risk numerically; and
  - the extent to which findings from a public health/clinical setting are also applicable to food risk.
- Verbal presentations of risk: the academic literature provides fewer actionable conclusions on verbal presentation of risk than it does on quantitative presentation of risk. The literature suggests that risk communicators could benefit from checking messages for potential 'trigger' words, or words which may lead to assumptions or an emotional response. Specifically, risk communicators could test or clarify any use of probability terms so that these do not contribute to the over- or underestimation of the risk by the communication's target audience. Much of the guidance focuses on the need to test messaging thoroughly before use. One guidance document mentioned the use of plain language principles. It would be helpful for future research to identify whether:
  - guidance suggesting the testing and retesting of messages is practical;
  - there is an interest in plain language techniques and how this could be incorporated into risk communication guidance.
- Visual presentations of risk: the academic literature and guidance provided only limited evidence and advice on this subject. Incorporating visual representations of risk has the potential to either improve comprehension or impede it. Many of the formats that available for use in communicating risk have not been tested. It would therefore be helpful for future research to identify:
  - what practitioners would like to be able to represent visually;
  - how alternative formats are received by different target groups; and
  - where visualisations are currently used, what guidance has been used to develop these and whether it would be helpful to incorporate this into risk communication guidance.



- Uncertainty communication: there is a general consensus that reporting on uncertainty is important for communicating accurately, transparently and for maintaining or gaining trust. Uncertainty should be communicated even where audiences may find it uncomfortable. It should be accompanied by information on what is being done to reduce uncertainties. EFSA's guidance goes further than others in helping practitioners decide how specifically to communicate uncertainty. It would be helpful for future research to identify whether:
  - practitioners would be interested in receiving more specific guidance on ways to communicate on uncertainties, such as those provided in EFSA's guidance; and
  - EFSA's guidance has been tested in the field and what sort of feedback it has received.
- Communicating through traditional media: content analyses and studies with journalists have provided a strong foundation for understanding how risk is interpreted and reported on by journalists. An understanding of this evidence, such as the tendency to not include advice on how to mitigate risks or the tendency to report relative risk without providing context, can potentially help practitioners to structure communications with journalists. These journalistic tendencies are mentioned in some of the guidance documents reviewed for this study. Some guidance also explains what specific risks and situations are better suited to communication through traditional media, and when this channel is best avoided. For communicating through traditional media, it would be helpful for future research to identify whether:
  - practitioners would benefit from guidance on how media stakeholders tend to interpret and report on risk; and
  - practitioners would be interested in further guidance on what channels are better suited to what risk communication tasks.
- Communicating through social media: although there is a need for more and better research in this area—particularly on the use of social media for two-way communication on risk—empirical evidence has informed the development of some helpful principles for social media communication . For example, including hyperlinks likely reduces further dissemination but may improve credibility. Using hashtags and all caps can also increase dissemination. A better understanding of such principles could help practitioners reach wider audiences. It would be helpful for future research to identify whether:
  - practitioners would benefit from more guidance on using social media for two-way communication;
  - practitioners would be interested in receiving more specific guidance related to crafting messages for social media and the types of risk that are most appropriate for social media; and
  - there is existing guidance from other disciplines on social media and two-way communication that have been tested and could be adapted for a food risk context.



- Developing communications: the guidance documents contain several principles and describe processes to follow for the development of communications. These generally begin with testing and end with an evaluation and lessons learnt. These models offer a helpful framework for structuring guidance. The extent to which official evaluations are conducted and best practice in evaluation has been defined is unclear, despite numerous recommendations that regular evaluation is an embedded part of the risk communication process. It would be helpful for future research to identify whether:
  - existing step-by-step models for the development of communications appear useful and practical to practitioners;
  - any particular model seems preferable; and
  - practitioners incorporate evaluations into the development process, why/why not, and if not, whether further guidance on this would be helpful.



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Annex 1 Frameworks reviewed



Author	Document	Year	Scope	Differentiates by type of risk?	Differentiates by audience?	Approach to media/social media
Australia and New Zealand - FSANZ	FSANZ Risk Analysis in Food Regulation (Introduction, Chapters 4 & 7)	2014	This report provides an overview of what risk analysis processes are used by FSANZ to manage food- related health risks. The stated chapters contain the content most relevant to risk communication, as opposed to risk assessment or management. This guidance is specific about the strategies and rationale for using risk communication and different methods, not specific about particular issues.	Yes, with distinctions based on the 'actual' and 'perceived' levels of a risk resulting in four different responses.	Partially, only recognising the need to identify the target audience, and designing the most appropriate communication response for them, but without further detail.	Recognises the need to use both traditional and social channels for responsive communications, but no information on the role of social media beyond being <i>"one of</i> <i>a suite of tools"</i> .



Canada –	Description of	2008	This guidance	Yes, with different	Partially, only	No distinction in
Health	<u>current risk</u>		document provides	communication	drawing distinction	media approach,
Canada	<u>communicatio</u>		information on what	outputs depending	in risk	apart from issuing
	<u>n documents</u>		industry and other	on the following	communications for	advisories to media
	for marketed		stakeholders must	variables: the	health professionals	actors when they are
	<u>health</u>		consider when	availability and	and the public as	the target audience.
	products for		marketing health	reliability of data; the	separate audiences.	
	<u>human use</u>		products in the	magnitude of the		
			Canadian	risk event and		
			marketplace,	amount of public		
			and/or any	exposure, and the		
			products that fall	treatability and		
			within the	potential mitigation.		
			regulatory oversight			
			of the Health			
			Products and Food			
			Branch of the			
			Canadian			
			Government. This			
			is guidance			
			targeted at industry			
			rather than to the			
			public sector.			
			This guidance is			
			technical and			
			provides a			
			decision-framework			
			to identify what			
			other Health			
			Canada or industry			
			documents might			
			be helpful to			



			communicate risk. This document also linked to Health Canada's Strategic Risk Communications Framework, which was also reviewed as part of this synthesis and is summarised below.			
Canada – Health Canada	Strategic Risk Communicati on Framework	2006	This guidance document summarises how Health Canada and the Public Health Agency of Canada can integrate risk effective risk communications into their portfolios. This guidance is a generic framework to be applied across different risk events, from corporate risk issues to health- specific risk events.	No, as it is designed as a broad decision- making framework.	Partially, recognising the need to assess how stakeholders perceive the various risk management options provided, but with no further detail.	Recognises the benefit of using media to identify key stakeholders and to disseminate information, but no further detail on distinctions between traditional and social media.



– BfR	<u>Communicati</u> on in Practice	2010	summarises how the German Federal Institute for Risk Management sets best-practice guidance for communicating risk in the fields of food safety, chemical safety and product safety. It is not in itself a guidance document, but it provides an overview of the channels and approaches used. The document explains the different avenues and approaches to risk communication, particularly transparency and stakeholder engagement. There is little information on how risks are prioritised, or	variables of a risk to consider, rather than tailored responses based on different types of risks. These variables are: the affected population, the severity and likelihood of health impact, the reliability of data, and potential mitigation.	recognising the need to pre-test messaging with different audiences, but without more detail on how to best to address their communication needs.	recognises value of using both traditional and social media to analyse how messages and content of a risk event have been communicated to the public so far, and as a communication channel.
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			distinctions between urgent and non-urgent communications.			
Japan – Food Safety Commissi on	Planning Committee Report on Food Safety Risk Communicati on	2015	The report sets out common challenges in risk communication, including how risk in food is perceived, and makes recommendations on how risk communication can be adopted by different stakeholders. This guidance provides overarching principles of risk communication, but only addresses proactive risk communication planning, rather than reacting to crisis communications.	Partially, recognising the need for different responses if the goal is to share scientific information, raise awareness or gather stakeholder insight, but without further detail for each.	Partially, recognising the need to account for a spectrum of audience responses to risk, affected by logic, and intuition and emotion, but without further detail for each.	Recognises the value of social media to both understand public perceptions of risk, and as an information outlet.



United States - FDA	<u>'Communicati</u> ng Risks and <u>Benefits: An</u> <u>Evidence-</u> <u>Based User's</u> <u>Guide'</u>	2011	This report is designed to be used by risk communication practitioners. It is highly detailed and provides both evidence and specific chapters on implementing evidence-based communication. It is an edited book with chapters from academics on different components of risk communication. It is written as a commentary and is more of an evidence review as opposed to guidance.	Yes, depending on if the goal is to share information, change beliefs or change behaviours.	Partially, recognising the need to ensure each audience has the information needed to make effective decisions, but with no further detail.	Recognises the value of a social network analysis to understand public perceptions of risk, and how information flows through multiple channels to different audiences.
UK – Cabinet Office	<u>Communicati</u> <u>ng Risk</u>	2011	These include guidelines and a toolkit intended for use by practitioners. This also includes	Yes, depending on the primary risk need, either 'information', 'public protection' or 'imposing risk'.	Yes, recognising the need to account for different emotional responses to risk, such as being fatalistic, egalitarian,	Provides guidance about how to work effectively with the media, but does not distinguish between



			guidance on understanding how the media reacts to risk.		respectful of authority or libertarian.	traditional and social media.
			As noted by the document itself: "The guidelines are not intended to give definitive information on every aspect of risk communication. What they do attempt to do is to bring together in one place a wealth of experience from recent incidents and best practice from a range of eminent and authoritative sources."			
UK – Parliament ary Office of Science and Technolog y (POST)	<u>POST Note:</u> <u>Communicati</u> <u>ng Risk</u>	2017	This POST note is an externally peer- reviewed literature review across a range of social and health issues (for example, ranging	No, the review focuses on providing general principles for effective risk communication.	Partially, recognising the need to tailor communication to the target audience, but with no further detail.	Recognises the value of social media as a real-time source of risk information. No distinction of traditional and social media beyond



			from consumer advice on savings to informing patients about the benefits and harms of screening). The note is comprehensive, covering most aspects related to risk communication, but it is not very detailed. For a short document, it contains a lengthy list of references.			recognising the need for communications to be multi-channel.
UK – Defra	<u>Communicati</u> <u>ng Risk</u> <u>(November</u> <u>2017)</u>	2017	A report that considered risk communication in the context of Defra's policy portfolio and provides recommendations and strategies for the communication of risk.	No, provides a broad framework to inform decision- making.	Partially, recognising the need to tailor communication to the target audience, but with no further detail.	Recommends using both traditional and social media for raising risk awareness. Also notes the benefit of using social media data for 'digital issue-crawling' and 'citizen science' to harvest social media data to understand



			This provides strong guidance on public perceptions of risk, and best practice from other government departments where it exists. Little distinction of how to respond to different forms of risk, or how to engage the public at large.			public perceptions of risk.
European Food Safety Authority (EFSA)	When food is cooking up a storm: proven recipes for risk communicatio ns	2017	A framework to assist decision- making in communications responses to assessing and responding to risks related to food safety in Europe. Around half of the document is focused on case studies. It intentionally does not provide specific guidance, noting that it is something	Partially, describing variables of a risk to consider, rather than tailored approaches based on different types of risks. These variables include: the nature of the risk including its acceptability; the quality of the evidence base; the societal, agricultural and environmental impacts; and the access to expertise to provide further context.	Partially, recognising the need to tailor communication to the target audience, but with no further detail.	Recommends using both traditional and social media to reach target audiences. Recognises social media is beneficial for reaching broad audiences with simple, time-bound content, to facilitate discussion, and to signpost to more detail. Traditional media may be more suitable for tailored, in-depth and



			that should be contextual. It describes the various things that should be considered around the nature of the risk and communication needs, but does not necessarily explain how different aspects might then influence risk communication strategies.			referenced messaging.
European Food Safety Authority (EFSA)	<u>Guidance on</u> <u>Communicati</u> <u>on of</u> <u>Uncertainty in</u> <u>Scientific</u> <u>Assessments</u>	2019	This report was prepared by EFSA's Scientific Committee and Emerging Risk (SCER) and its Communication (COM) Units to develop practical guidance on how to communicate uncertainty that results from research. Accordingly, while	Partially, describing variables of a risk to consider, rather than tailored responses based on different types of risks. These variables include: the quality of scientific evidence; the risk nature and urgency; potential societal impacts; public perceptions; and risk to governance,	Yes, recognising the need to tailor messaging based on how informed an audience is, and their past relationship with the risk information organisation.	Recommends using social media for contextual information for less- informed audiences, with this information assuming little scientific or institutional knowledge. Recommends using traditional media for both less-informed and partially- informed audiences



broader than iust	institutions and
food, it may	markets.
highlight ways to	
communicate	
vague, uncertain or	
complex scenarios.	
This guidance	
presents a series of	
questions about the	
uncertainty, with	
hyperlinks to more	
specific guidance	
depending on	
whether the	
questions apply. It	
provides guidance	
specific to different	
audiences	
alongside	
examples of what	
this looks like,	
based on the type	
of uncertainty. The	
guidance then	
separately	
discusses the	
sources of	
evidence	
underpinning the	
guidance.	



European Food Safety Authority (EFSA)	Best practice for crisis communicator s: how to communicate during food or feed incidents	2016	This report was prepared to assist individuals responsible for communicating about food or feed incidents with external audiences, such as those where there is high risk to public health, high actual or anticipated media interest in an issue, or where vulnerable populations are disproportionately affected. This document is detailed in terms of how to specifically handle a crisis but not specific in how to communicate risk within that crisis.	No, as it is written for crisis communications only.	Partially, recognising that audiences are likely to be one of four groups: 'helping and supporting', 'intervening' to uphold standards, direct 'victims' of a risk or 'bystanders' engaged but not directly affected. However, it does not provide tailored responses for each audience group.	In addition to being an information outlet, it recommends using both traditional and social media for risk monitoring and horizon scanning, including tracking during a risk event. It also recognises that social media creates real-time perceptions of a risk to be engaged with.
Agriculture	<u>communicatio</u>	2010	a background to	variables of a risk to	recognising the	monitoring both
Organizati	n applied to		food safety risk	consider when	need to identify the	traditional and social



United Nations (FAO)	handbook	communication, principles for good risk communication, key factors to consider when designing a risk communication plan and putting risk communication into action. It is designed to inform national food safety authorities and food chain stakeholders to establish or improve their risk communication practices. This guidance is lengthy, with extensive discussion of background information and evidence. There is some practical information, but this is not presented in any succinct way	about food safety, rather than tailored responses. These variables include: the nature of the risks and benefits; quality of the evidence base; the social and political context; mitigating actions, and likely consequences.	designing the most appropriate communication response for them, without further detail.	inedia channels to understand risk profiles. Recognises the value of both traditional and social media as communication channels, but no specific detail on when one is more appropriate than the other.
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Food Informatio n Council (EUFIC)	about food risk? A handbook for professionals		focuses on lay- friendly guidance about risk communication for everyday use and in crisis situations. It is intended to be a reference guide of themes designed to inform effective communication, rather than a thorough analysis of all components of risk management. This guidance focuses on "things to consider" rather than what to actually do when communicating risk. It does contain a potentially helpful table on the different channels available for communication and where they are most appropriate.	on general communication principles, but there are also additional questions for considerations for crisis risk events.	recognising the need to identify the target audience, and designing the most appropriate communication response for them.	value of using social media as to communicate short, real-time 'gist' information and traditional media to communicate more thorough content.
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Internation al Risk	Introduction to the	2017	This framework sets out best	Partially, describing variables to assess	Yes, recognising the need to tailor	Recognises the value of social media
Governanc	International		practice for the	a risk, rather than	messaging based	as a monitoring tool
e Council	Risk		process of	tailored responses.	on how different	to provide
	Governance		governing all forms	These variables	stakeholders	information on public
	Framework:		of risks,	include: the scale of	conceptualise a risk,	risk perceptions and
	Revised		emphasising the	the risk; the nature	and the nature of	the emergence of
	Version 2017		need for processes	of risks and benefits;	the risk. Increasingly	new phenomena.
			from risk pre-	stakeholder risk	'complex' or	Does not provide
			assessment,	perceptions; social,	'uncertain' risks	further detail on the
			appraisal and	political and	require the input of	suitability of
			characterisation, to	institutional	all affected	traditional and social
			monitoring risk	contexts; mitigating	stakeholders, while	media outlets.
			management and	actions and ability	risks that are	
			evaluation. As	for evaluation.	'ambiguous' require	
			such, the focus is		civil society input to	
			broader than		understand social	
			merely responding		constructions of risk.	
			to a risk event.			
			Accordingly while			
			not specific to risk			
			communication it			
			establishes good			
			practice and			
			identifies areas			
			where governance			
			deficits may			
			undermine how			
			risks are managed			
			and communicated.			
			It also summarises			



			the importance of understanding contextual variables of risk, such as stakeholder perceptions.			
UK – Health and Safety Executive	Risk communicatio n: a guide to regulatory practice	1998	This guidance was written to support UK Government Departments to critically analyse and improve their risk communication practices, primarily how to integrate communication when designing regulations. It encourages the use of two-way communication about risk to understand how to frame risks, how risk perceptions influence how people evaluate different options, and a source of	Partially, the focus is on general risk communication, there is also a section on additional considerations in a crisis.	Partially, recognising the need to identify the target audience, and tailor communications accordingly, without further detail.	No mention of social media, as this report predates social media. It provides principles for communicating with the media.



			information to inform decision- making.			
UK – Health Protection Scotland	<u>Communicati</u> <u>ng with the</u> <u>public about</u> <u>health risks</u>	2008	This guidance was written for public health organisations to communicate risk with the populations they serve, with a particular focus on engaging with the media and managing uncertainty. It is written in a quick reference format supplemented by longer guidance, and emphasises the need for pre- planning and a consideration of the barriers people may face to receive risk communication information.	No, the document uses risk and crisis interchangeably throughout to describe risk events.	Yes, recognising the need to design different risk communication strategies for the public (itself not a homogenous group), the media and academic communities.	No distinction, beyond recognising that multiple channels may be needed to reach all intended audiences.



UK –	Communicati	1997	This report focuses	No, the focus is on	Partially,	This report predates
Departme	<u>ng about risks</u>		on identifying risks	embedding practices	recognising the	social media.
nt of	to public		that might result in	to pre-empt risk,	need to	However, it does
Health	health:		challenging	rather than reacting	communicate	recognise the
	pointers to		communication	after it emerges.	differently between	importance of 'word-
	good practice		issues, with		expert and lay	of-mouth'
			communication		audiences, and	communication in
			seen as part of a		consider how the	setting public
			wider decision-		emotional tone of	perceptions of risk.
			making process		communications	
			that evolves based		may affect how they	Notes 'media
			on evidence, rather		are received. It also	triggers' that are
			than an activity in		recognises that	likely to increase
			isolation. The		messages may	media coverage of a
			guidance is		reach others beyond	risk.
			developed from		their target	
			both empirical		audience.	
			research into public			
			perceptions,			
			attitudes and			
			reactions to risk			
			information, and			
			how structural			
			processes are			
			necessary to			
			manage, evaluate			
			and plan for risk			
			events.			



# **Annex 2** Examples from Frameworks

Figure A2.1 EFSA (2017) When food is cooking up a storm: proven recipes for risk communications (p 16)

# III.2. The nature of the hazard

Hazards can take many different forms and, in relation to food safety, may include: substances, products, processes, technologies and conditions. The type of hazard will have an influence on what is needed in terms of communications, particularly as certain hazards/substances may elicit a subjective fear factor, for example when something is artificially added to food as opposed to occurring naturally. Some hazards will simply be well known and potentially have a higher profile as reflected by the quantity of media coverage, political attention, public health focus as well as consumer, industry and NGO-related activities. The following factors have been identified:

The nature of the hazard (for example, substance) is:

- Occurring naturally
- Added to food or created during processing

Where the hazard is used or found

- " Used or found in a product/brand commonly used in the home or for food production purposes
- " Used or found widely in a range of products
- " Not widely used or found
- " Illegal/regulated under EU law

#### At a glance:

- Is the substance natural or artificial?
- Does the hazard occur naturally or does it arise from technological intervention?
- Is the technology perceived as unacceptable due to the possible related risk?
- Is there an acceptable alternative to the technology associated with the risk?

#### At a glance:

- How many people are likely to be affected by the risk?
- Which sectors of society are likely to be affected by the risk? Do they include vulnerable groups such as children or the elderly?
- What is the impact on the environment?
- " What is the impact on plants?
- What is the impact on animals?

Return to **Risk perception in government frameworks** 



# Figure A2.2 EFSA (2017) When food is cooking up a storm: proven recipes for risk communications (p 16)

Informal engagement with consumers.



# Social networking (Facebook, LinkedIn, etc.)

#### GOOD FOR

#### SOMETIMES GOOD FOR

- Rapidly informing and engaging with interested parties.
  - Simple, narrow messages that need to reach a
- broad range of consumers. Can be very effective due to online community
- discussions to use as a catalyst for behavioural change.
- Can support outreach to new audiences.

# Twitter

#### **GOOD FOR** SOMETIMES GOOD FOR **INAPPROPRIATE FOR** Sending fast, topic-related alerts (maximum 140 Informing subscribers about latest news, updates, Obtaining in-depth user feedback. Characters characters) to interested subscribers. are limited, and these online fora do not focus on publications, etc. dialogue. Driving subscribers to online content where there Engaging with interested parties to a limited is more information and greater context. extent. Duplicating organisation's website content. Enabling dissemination of the original message Testing concepts with loyal followers. as accurately as possible, given the ease of the forwarding function.

# Return to Channels in government frameworks

#### 90

#### INAPPROPRIATE FOR

- Duplicating organisation's website content.
- Sensitive subjects if resources cannot be found to manage community discussions and needs.

Figure A2.3 UK Department of Health (1997) Communicating about risks to public health: pointers to good practice (p 17)

# **Box 6: Media Triggers** A possible risk to public health is more likely to become a major story if the following are prominent or can readily be made to become so: Questions of blame 1. 2. Alleged secrets and attempted "cover-ups" 3. "Human interest" through identifiable heroes, villains, dupes, etc. (as well as victims) 4. Links with existing high-profile issues or personalities 5. Conflict 6. Signal value: the story as a portent of further ills ("What next?") Many people exposed to the risk, even if at low levels ("It could be 7. you!"). 8. Strong visual impact (e.g. pictures of suffering)

9. Links to sex and/or crime

Return to Channels in government frameworks



# Figure A2.4 DEFRA (2017) Communicating Risk (November 2017) (p 5)



Figure 1: Perception of Risk (from Slovic, P. (1987). "Perception of Risk." Science 236: 280-285.)

Return to **Risk perception in government frameworks** 



# Figure A2.5 Cabinet Office (2011) Communicating Risk (p 16 & 17)

### 3.4 How do attitudes towards risk vary?

There are a number of frameworks for understanding how attitudes to risk vary across society. One framework uses Cultural Theory <sup>(4)</sup> to identify four basic attitudes or "world views":

Fatalists tend to see life as capricious and attempts at control as futile.	Hierarchists want well-established rules and procedures to regulate risks.
They may not knowingly accept risks, but will accept what is in store for them.	They tend to see nature as "robust within limits".
Individualists see personal choice and initiative as paramount. They tend to see risks as presenting opportunities - except those that threaten freedom of choice and action within free markets.	Egalitarians tend to see the balance of nature as fragile and strongly fear risks to the environment, the collective good and future generations. They tend to distrust expertise and demand public participation in decisions. They react strongly against any "Government knows best" approach.

Although in practice, people are likely to conform to different types in different circumstances, this framework provides a simple tool for identifying the range of possible reactions to a risk and for selecting approaches to addressing them. It can also help Departments to anticipate and resolve conflicting views, for example between individualists and egalitarians.

The table below suggests the main difficulties that Departments may face in communicating with each of the four "world views" and suggests how these may be addressed. While there is no easy way of reconciling opposing views, it may be possible to build a degree of consensus and mutual trust by encouraging dialogue with other "world views".

Fatalis Potentia	ts al problem:	Hierarchists Potential problem:		
Hard to engage in dialogue		<b>\$</b>	More likely to rely on technical assessments	
÷	Difficult to persuade to act to tackle risks to society as a whole			
Potentia	al solution:	Potential solution:		
*	Active consultation to obtain views		Involvement in dialogue with other "world views"	
*	Emphasis on individual benefits of action to tackle risks		Provide with empirical evidence	

Individualists Potential problem:		Egalitarians Potential problem:		
*	More likely view attempts to regulate risks as unnecessarily intrusive	٠	More likely to demand regulation to tackle risks	
Difficult to persuade to act to tackle risks to society as a whole		Likely to distrust "establishment" view		
Potentia	solution:	Potential solution:		
*	Involvement in dialogue with other "world views"		Involvement in dialogue with other "world views"	
*	Clear evidence to support chosen course of action		Open and inclusive debate, involving trusted independent sources	
Emphasis on individual benefits of action to tackle risks		*	Clear evidence to support chosen course of action	
*	Information and advice to support choice	٠	Polling and other evidence to show breadth of support for chosen course of action	

# Return to Risk perception in government frameworks or Addressing different audiences in government frameworks



#### 7.2.2 General matters

Individual communication strategies are not mutually exclusive and may be used in combination. The strategies indicate the main direction and level of communication activity required for a particular health risk. They are 'preferred' strategies, which does not preclude adopting other strategies if the need arises.

#### Table 2. Communication strategies

Level	Risk combinations	Communication strategy
1	LOW risk - LOW perceived risk	PASSIVE
2	LOW risk - HIGH perceived risk	RESPONSIVE
3	HIGH risk - LOW perceived risk	EDUCATIVE
4	HIGH risk – HIGH perceived risk	PROACTIVE

It is necessary to have a good understanding of how a risk is perceived by the public in order to identify which communication strategy should be applied to a particular food issue.

This understanding may be developed by monitoring media and online debate, or through research designed to measure and assess public risk perceptions. Such studies may have been initiated to answer specific risk assessment or risk management questions, but can also collect data useful in constructing risk communication messages and strategies. In addition to new research, existing studies on the factors influencing consumer perceptions of risk will form an important evidence base.

Communication vehicles that can be employed in each of the strategies vary. They may include media liaison, web publishing, interactive web forums, fact sheets<sup>26</sup>, reports, meetings, conferences, advice line, displays, launches, email bulletins and advertising.

#### Passive communication strategies

Passive communication strategies involve notifying and alerting interested and affected individuals and groups to the food issue. These strategies are used generally when the scientific evidence supports a low level of risk and where there is a low perceived risk by the community e.g. the proposed use of processing aids.

#### Responsive communication strategies

Responsive communication strategies are used where the community, or a section of the community, perceives a much greater risk in a food issue than the scientific evidence would indicate. In these cases, the degree of communication activity will be increased and will include media releases; proactive media liaison; providing regular and updated web material; and using social media.

#### Educative communication strategies

Educative communication strategies are particularly useful when the scientific evidence shows a high risk for the food issue, of which the community is unaware. Education campaigns are developed in an attempt to effect behaviour changes in the target groups e.g. increasing knowledge and awareness in pregnant women about mercury in fish.

#### Proactive communication strategies

Proactive communication strategies are used when the scientific evidence and the community awareness of the food issue indicates a high risk. In these situations, media and stakeholder interaction is initiated early, and is put in place when all parties agree there is significant public health and safety risk e.g. BSE.

# Return to Risk perception in government frameworks or Channels in government frameworks

# Figure A2.7 FSANZ (2014) FSANZ Risk Analysis in Food Regulation (Introduction, Chapters 4 & 7) (Chapter 7, p 24)

Much of the externally-focused risk communication involves a strategy which seeks to:

- identify the target audience
- · design messages for those audiences
- · use the most appropriate communication vehicles for interacting with those audiences.

Risk communication should aim to provide clear, accurate, relevant and easy to understand information to audiences at appropriate points in the risk analysis process.

It should give an honest appraisal of identified health risks, the uncertainties associated with that appraisal, and the steps being undertaken to address the identified risks.

Return to Developing communications in government frameworks



# Figure A2.8 EFSA (2019) Guidance on Communication of Uncertainty in Scientific Assessments (p 24)

Box 4: Guidance for communicating inconclusive assessments

	<ul> <li>Communicate clearly that EFSA is unable to give any conclusion on the quantity or question of interest to which this message refers. If the assessment is inconclusive, this implies that nothing further can be said and therefore the communication should avoid using language that might suggest otherwise.</li> <li>Indicate very briefly the sources of uncertainty that contribute most to this outcome (e.g. lack of data, poor quality or limited relevance of data).</li> </ul>
	Example:
	'EFSA's experts could not reach a conclusion on the risk for cattle, ducks, goats, horses, rabbits, mink and cats because of a lack of data'.
	(Based on the Zearalenone (ZEN) in feed example, EFSA CONTAM Panel, 2017.)
INFORMED LEVEL	<ul> <li>Describe the main sources of uncertainty in more detail, but concisely, following the guidance in Box 2.</li> </ul>
	<ul> <li>Inconclusive assessments are especially likely to include options or requirements for obtaining further data. Communicate these as instructed in Section 3.1.5 on 'Addressing the uncertainties'.</li> </ul>
	Example:
	'EFSA's experts could not reach a conclusion on the risk for cattle, ducks, goats, horses, rabbits, mink and cats due to limitations in available data on exposure and toxic effects of ZEN and itsmodified forms, for example ()'.
	(Based on the Zearalenone (ZEN) in feed example, EFSA CONTAM Panel, 2017.)
TECHNICAL LEVEL	<ul> <li>When explaining why the assessment is inconclusive, include a description of the key sources of uncertainty that are responsible for this.</li> </ul>
.1	<ul> <li>If the assessment is not totally uncertain, try to express what the science can say and quantify the uncertainty unless the risk manager/legislation requires that only unqualified conclusions be given.</li> </ul>

Return to Verbal risk in government frameworks or Communicating uncertainty in government frameworks or Conclusions and recommendations



# Figure A2.9 EFSA (2019) Guidance on Communication of Uncertainty in Scientific Assessments (p 13)

 Table 1:
 Mapping EFSA's target audiences for external communications (2015)

AUDIENCE CATEGORIES	COMMUNICATI	ON PRODUCTS	ASSUMPTIONS
<ul> <li>General news media</li> <li>Informed citizens</li> <li>Concerned citizens</li> </ul>	<ul> <li>Multimedia – disseminating results, explaining working practices, promoting opportunities.</li> <li>Multimedia – raising awareness, campaigning.</li> <li>Social media (e.g. Facebook)</li> </ul>	For all target audiences (i.e. may layer information to meet different audience needs) = News story = Feature = Topic (reference material) = Multimedia products (videos, infographics, data visualisation, interactives, etc.) can be aimed at technical	<ul> <li>Little or no familiarity with scientific assessment.</li> <li>Little or no knowledge of institutional processes and relationships.</li> <li>Little or no prior knowledge of EFSA</li> </ul>
<ul> <li>Political decision-makers</li> <li>NGOs and consumer organisations</li> <li>Specialised news media</li> </ul>	<ul> <li>Plain language summaries</li> <li>Fact sheets</li> <li>FAQs</li> <li>Social media (mainly Twitter, LinkedIn)</li> </ul>		<ul> <li>Thorough knowledge of institutional processes and relationships.</li> <li>Extensive understanding of EU system.</li> <li>Some or good understanding of scientific assessment but not advanced.</li> <li>Good knowledge of EU legislation.</li> <li>Knows EFSA very well</li> </ul>
<ul> <li>Assessors</li> <li>Scientist/acade mic</li> <li>Technical risk managers</li> <li>Industry representatives</li> </ul>	<ul> <li>EFSA Journal scientific publications</li> <li>Multimedia – providing tutorials and instructions, promoting opportunities</li> </ul>	and/or non- technical audiences	<ul> <li>Advanced understanding of scientific assessment, use of data, tools and methodologies.</li> <li>Knows in broad terms EFSA's role in EU risk assessment framework</li> </ul>

Return to Addressing different audiences in government frameworks or Conclusions and recommendations



# Figure A2.10 BfR (2018) BfR Risk Communication in Practice (p 7)

Sample risk profile of a BfR opinion on the topic of raw milk



# Return to Verbal risk in government frameworks



# Figure A2.11 USFDA (2011) 'Communicating Risks and Benefits: An Evidence-Based User's Guide' (p 137)

**5.** Use plain language writing and design strategies. There are many excellent sources of advice about creating easier-to-understand information. In addition to formal training, we recommend that readers use the tips, toolkits, and other resources cited in this chapter. Although comprehensive strategies are too detailed to present here, key advice includes:

Writing style tips:

- · Focus on what the reader needs to know, especially for actions to take
- Limit content to 1 to 3 main messages
- · Avoid medical jargon and use easier to understand terms
- · Use short sentences and short words
- · Use active voice and address the reader personally
- · Use positive rather than negative messages

Visual presentation tips:

- Use a font size of 12 (or 14 or 16 for groups with vision limitations)
- · Put text in chunks and use lots of white (clear) space around text
- · Avoid italics and words in all capital letters
- · Use colors that appeal to the intended audiences
- Use graphics to show fractions
- Avoid graphs and charts, when possible

Return to Verbal risk in government frameworks



# Figure A2.12 EUFIC (2017) How to talk about food risk? A handbook for professionals (p 11)

How does the culture influence the response of the audience to risk information?

Some cultures value an interactive style of communication with access to a wide range of information sources (e.g. helpdesks, online forums), while other cultures prefer oneway communication of factual, specific information from a recognised and trusted source (e.g. government, public institutions, and scientists). Some cultures tend to avoid uncertainty in risk information, preferring to receive precise information and details about the nature of the risk without any uncertainties. Others are more likely to accept that some level of uncertainty is inevitable. Keep in mind that you may be communicating to a single- or a multi-cultural population.

### EU countries by their relative uncertainty avoidance:

Higher: Greece, Portugal, Belgium, Poland, France

Medium: Spain, Hungary, Italy, Austria, Germany, Finland, Switzerland, Netherlands, Norway

Lower: Ireland, UK, Sweden, Denmark

Return to Communicating uncertainty in government frameworks

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### Figure A2.13 EUFIC (2017) How to talk about food risk? A handbook for professionals (p 6 & 7)

# 2. How to use this guide

This handbook will guide the reader through a sequential step-by-step process for developing and implementing a proper risk communication strategy, including tasks that should be carried out during pre- and post-communication stages.

#### Evaluate your situation

●<u></u>\_0\_\_0\_\_0\_\_0

Before communicating, it is important to decide whether, why, when, how and to whom risk communication should take place. Step 1 will guide you through a method for performing a systematic evaluation of the risk, the environment and a selfanalysis of yourself as a communicator and equip you with the information needed for the next steps.

### 2 Know your audience

0-0-0-0

Information on food risks is not universal and not all audiences are alike. Step 2 outlines a set of questions that will aid in defining who will be affected by the risk and how they can best be reached.

#### 

Step 3 focuses on developing key messages, tailoring the content and format of communications and choosing appropriate tools for reaching your audience.

#### 

Monitoring the response to communications can provide valuable insights into the effectiveness of your communications.

Step 4 describes several methods for collecting feedback that can be used to refine or improve your communications.

#### 

Step 5 outlines some of the benefits of collaboration with other stakeholders that are concerned with the same topics and provides tips on how to maximise the effectiveness and impact of your communications through collaboration.

### **Crisis communication**

For the purpose of this document, specific priorities to consider when communicating during food crises or urgent food safety incidents are highlighted at the end of the relevant chapters.

The handbook is supported by two case studies to illustrate real-life examples of successful and unsuccessful food risk communication. Finally, a series of four infographics are provided to highlight and explain common mistakes that are made in food risk communication.

# Return to Developing communications in government frameworks



# Figure A2.14 FAO (2016) **Risk communication applied to food safety handbook** (*p* 64)

### BOX 4.5

### **COMMUNICATING UNCERTAINTY**

When communicating about a food safety issue under conditions where risk information is associated with uncertainty, or where there are gaps in knowledge, it is important to:

- > acknowledge areas of uncertainty;
- > communicate about what is being done to reduce uncertainties;
- > communicate the implications of remaining uncertainties for food safety;
- > provide advice about what people can do to protect themselves.

In addition, it is important to:

- acknowledge that early messages may change as further information is gathered and/ or verified;
- > release and discuss more complete information when it becomes available, together with its implications and any revised course of action that may further increase food safety and prevent illness.

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# Figure A2.15 FAO (2016) **Risk communication applied to food safety handbook** (*p* 31)

#### BOX 2.6

#### STAKEHOLDER MAPPING

Food safety issues affect multiple stakeholders, including vulnerable populations, frontline health care workers, industry and primary producers, and government partners. It is challenging to identify all these stakeholders, particularly as some may not be close to the organization. The template below can help to identify these multiple stakeholders.



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# Figure A2.16 FAO (2016) **Risk communication applied to food safety handbook** (*p 58*)

#### BOX 4.2

#### HOW TO REACH VULNERABLE POPULATIONS

BA target audience may be a very specific subgroup of the population that, because of its characteristics or current situation, is particularly vulnerable to a food safety risk and/or is difficult to reach through more conventional communication methods.

It is important to consider whether a vulnerable group has very specific communication needs that can be addressed through existing or specifically developed networks. The following table lists some examples of the many ways to communicate with vulnerable populations.

Group	Examples of communication networks
Pregnant women	Health practitioners, social media, specialized media
Immunocompromised patients	Health practitioners, specialist nurses, patients' associations, caregivers, peer educators
Visually impaired people	Associations for the blind, schools for the blind, braille publications
People with speech and hearing disabilities	Associations, sign language interpreters
Elderly people	Community nurses, visiting services, large-print leaflets, media (local radio, publications for the elderly), community meetings
Rural or isolated communities	Community meetings, chiefs, community media, community opinion leaders
Isolated individuals	Social services
Children	Teachers, parents' organizations, television, social media
People with learning disabilities	Carers, teachers
Those living in poverty	Social services, food banks, missions, shelters, etc.

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# Figure A2.17 Health Canada (2008) Description of current risk communication documents for marketed health products for human use (*p* 8)

Urgency of Communication	Risk Communication Documents
High	Health Canada Public Warning (PW - document 1)
	Health Product Recall Notice (with Type I Health Hazard - document 8)
Medium	Health Canada Public Advisory (PA - document 2)
	<ul> <li>Health Canada Issued Health Professional Communication - Dear Health Care Professional Letter (HPC-DHCPL - document 3)</li> </ul>
	<ul> <li>Health Canada Issued Health Professional Communication - Notice to Hospitals (HPC-NtoH - document 4)</li> </ul>
	<ul> <li>Industry Issued Health Professional Communication - Dear Health Care Professional Letter (HPC-DHCPL - document 5)</li> </ul>
	<ul> <li>Industry Issued Health Professional Communication - Notice to Hospitals (HPC-NtoH - document 6)</li> </ul>
	<ul> <li>Industry Issued Public Communication (MAH-PC - document 7)</li> </ul>
	Health Product Recall Notice (with Type II Health Hazard - document 8)
	Health Canada Foreign Product Alert (FPA - document 9)
	Health Canada Information Update (IU - document 10)
Low	Canadian Adverse Reaction Newsletter (CARN - document 11)
	• It's Your Health (IYH - document 12)
	Fact Sheets and Backgrounders (document 13)

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Figure A2.18 Health Canada (2006) Strategic Risk Communication Framework (p 2-10)

Dialogue-based

Strategic Risk Communications Process



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## Figure A2.19 EFSA (2016) Best practice for crisis communicators: how to communicate during food or feed incidents (p 45)

It can be helpful to classify crisis audiences into four types, depending on the role they are likely to play in the situation. This is especially useful if you are dealing with a small number of audiences or some very clear sub-groups who are crucial in achieving a positive outcome. Once you have identified and classified audiences using this approach, perform a risk and opportunity assessment for each group. You can then agree on a strategy for each group.

- Helpers groups who will support your organisation, e.g. emergency services, trade associations, expert independent scientists, counterparts in other MS, EFSA etc.
- Victims groups likely to be negatively affected in a crisis, e.g. the public, suppliers / manufacturers of any product at the centre of the crisis.
- Bystanders groups not directly involved in the crisis, but likely to seek involvement or comment, e.g. NGOs, media.
- Resolvers groups who see it as their duty to intervene, e.g. regulators, technical experts, communicable disease advisers.



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Figure A2.20 EFSA (2016) Best practice for crisis communicators: how to communicate during food or feed incidents (p 10)



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