
DEVELOPMENT OF THE FRAMEWORK FOR CONTROLS RELATING TO FOODS WHERE RISKS PER SERVING ARE SIGNIFICANT, AND ITS FURTHER APPLICATION TO BURGERS SERVED RARE¹ IN CATERING OUTLETS

Report by Steve Wearne

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1 SUMMARY

- 1.1 This paper reflects on the application by the FSA of its framework for “risky” foods to date, proposes further tools to support its consistent use in practice, and applies these to the issue of controls on burgers served rare in catering outlets with the aim of supporting the Board in reaching a definitive decision on these products.
- 1.2 The Board is asked to:
- **Agree:** that we should further formalise the framework it agreed in November 2014², by:
 - making clear that we will look to apply it to foods where the risk per serving is significant;
 - setting priorities for foods to which we should next apply the framework, based on a robust analysis of microbiological and other risks for different food types, with bivalve molluscs intended to be consumed raw a likely candidate for early consideration;
 - using, in each case, a published decision tree to guide and structure analysis and discussion.
 - **Agree:** that we should reiterate our advice to consumers that burgers should be cooked thoroughly until they are steaming hot throughout, the juices run clear and there are no pink bits inside.
 - **Agree:** that the risk from rare burgers served in catering establishments is not so unacceptable as to justify removing the adult consumer’s right to choose to eat it, provided a validated and verified food safety management is applied, including in each case controls set out at section 5.20.

¹ For the purposes of this paper, the term rare refers to burgers that would be considered to be deliberately less than “fully cooked” which includes cooking to preferences including rare and medium/rare.

² Board paper FSA 14/11/04 ‘Our Approach to “Risky” Foods’
<http://www.food.gov.uk/sites/default/files/fsa141104.pdf>

2 INTRODUCTION

- 2.1 The Board agreed a framework for the control of “risky” foods in November 2014, and applied this in its preliminary discussion in January 2015 of burgers served rare in catering establishments. The Board endorsed the framework and its application to rare burgers. The Board agreed that FSA advice against eating undercooked burgers remained unchanged, and that in the interim period until it agreed a definitive view, local authorities should focus their enforcement activity on businesses that lacked a validated and verified food safety management plan which delivered at least a 4-log reduction³ in total bacterial load on challenge testing and those which did not make consumers aware of the increased risks of consuming burgers other than well done.
- 2.2 The FSA reminded consumers about safe preparation of burgers at home on 17 March 2015,⁴ and issued advice to local authorities on 19 March 2015,⁵ putting the Board’s recommendations into action. The local authority advice has in general been well received and the clearer steer has been welcomed. Further clarification was sought by local authorities on what validated systems might include and on proportionate transition arrangement while food businesses get additional consumer labelling in place. At the time of writing, further FSA advice was due to be issued to local authorities on 27 August.
- 2.3 Local authorities continue to take action against those businesses who sell rare burgers but lack a validated and verified food safety management plan, and/or where practice diverges from the food safety management plan.
- 2.4 Several multi-site food businesses have introduced or are piloting consumer advisory statements and other chains are discussing with us the wording for statements that will appear on their menus. Examples of the texts are given in Annex 3. Although an industry-wide standard has not emerged, statements typically include reference to consumption of undercooked meat increasing the risk of foodborne illness, and the heightened risk to vulnerable consumers.

3 STRATEGIC AIMS

- 3.1 The paper on raw drinking milk considered by the Board at its July meeting rehearsed the strategic issues that are common to any consideration of “risky” foods:
- the focus of our strategy to 2020 on delivering against a broad range of consumer interests in relation to food, i.e. “food is safe and what it says it is, and we have access to an affordable healthy diet, and can make informed choices about what we eat, now and in the future”;
 - the right of consumers “to be protected from unacceptable risk”;

³ A 4-log₁₀ reduction is equivalent to killing 99.99% of the bacteria originally present.

⁴ *FSA reminds consumers about safe preparation of burgers at home*. Available at: www.food.gov.uk/news-updates/news/2015/13707/fsa-reminds/consumers-about-safe-preparation-of-burgers-at-home

⁵ *Update for Enforcement Officers following the FSA Board Discussion on Rare Burgers*. Letter ENF/E/15/004 and equivalents in the devolved administrations.

- the need for public risks to be not only assessed, but also managed, communicated and governed; and
- the statutory duty on the FSA to consider costs and benefits, as well as risks, when deciding whether and how to act.

3.2 Discussions at that meeting also focused on the need to reflect on the framework for the control of “risky” foods that the Board agreed in November 2014 in the light of its application to date to raw drinking milk and burgers served rare. This should also be informed by feedback from stakeholders on the framework.

4 EVIDENCE

4.1 Key microbiological hazards that can be associated with raw beef include *E. coli* O157, other Shiga-toxin producing strains of *E. coli* (STEC), and *Salmonella*. STEC is a particular concern because although uncommon, strains can have a low infectious dose, can cause serious illness and lead to death in some cases.

4.2 This paper takes as its starting point the conclusions of the 2007 Report on the Safe Cooking of Burgers from the Ad Hoc Group on Safe Cooking of Burgers to the Advisory Committee on the Microbiological Safety of Food (ACMSF).⁶ An ACMSF Ad Hoc Group on Raw, Rare and Low Temperature Cooked Foods was established in July 2012 and issued a report in June 2014 which reiterated the original advice which was for consumers to follow manufacturers’ instructions and that burgers should be cooked thoroughly until they are steaming hot throughout, the juices run clear and there are no pink bits inside. This continues to provide the basis for our advice to consumers about cooking of burgers and similar products in the domestic setting.

4.3 This paper has been informed by the following evidence:

- feedback from stakeholders on the framework agreed in November 2014, including that received from our scientific advisory committees, from environmental health practitioners, and from other stakeholders through social media channels;
- published, peer-reviewed journal articles on relative risks per serving of different foods;
- a commissioned study of quantitative risk assessment modelling, based on a model developed previously of STEC O157 in beef burgers (described in sections 5.6 to 5.10 of the January 2015 Board paper (FSA 15/01/05));⁷

⁶ <http://acmsf.food.gov.uk/sites/default/files/multimedia/pdfs/acmsfburgers0807.pdf>

⁷ Berriman, A.D.C., Kosmider, R.D. and Snary, E.L. (2014) *Risk to human health from consumption of VTEC O157 in beef burgers*.
<http://www.food.gov.uk/science/research/foodborneillness/ecoliresearch/fs101124>

- a commissioned study to refine a previously developed thermal inactivation model in order to model the risk to human health from STEC O157 in beef burgers;⁸ and
 - qualitative (citizens' forum) and quantitative (panel survey) research of consumers' understanding about rare burgers, what they believe constitutes an adequately informed decision around consumption of these foods, and what information would enable informed decisions, conducted by TNS-BMRB.
- 4.4 The studies commissioned from Animal and Plant Health Agency (APHA), RIVM and TNS-BMRB for this paper have been peer reviewed, and published in advance of the Board meeting. Parameters of the quantitative risk assessment and thermal inactivation modelling reports were each peer-reviewed by two assessors and their comments incorporated were appropriate into the final summary reports.

5 DISCUSSION

The framework

- 5.1 One of the most common observations by stakeholders, including General Advisory Committee on Science (GACS), related to the working title of the framework, which related to control of "risky" foods. Commentators pointed to existing and internationally recognised definitions of concepts such as risk and hazard, to which we should have due regard.
- 5.2 This links to the question raised by a Board member during the discussion on raw drinking milk: whether, in the application of the framework, we should focus on foods where hazards pose a significant risk at the population level, or those which pose a significant risk per serving. Foods where hazards with their existing controls pose a significant risk at the population level, either generally or to vulnerable groups, are identified and prioritised through our strategy and business planning processes – for example the microbiological risks associated with *Campylobacter* in chicken and *Listeria monocytogenes* in ready to eat foods, both of which are already priorities for action within our strategic plan. We should therefore aim to apply the framework to foods where the risk per serving is significant – raw drinking milk and burgers served rare, the two foods to which we have applied the framework to date, are both examples of these.
- 5.3 A revised working title for the framework might then be "**a framework for controls relating to foods where risks per serving are significant**".
- 5.4 If we are to then take a structured and systematic approach to the application of the framework, we first need a means of identifying and prioritising those

⁸ Swart, A.N., Berriman, A.D.C. and Kosmider, R.D. (2015) *Application of the thermal inactivation model to model risk to human health from consumption of VTEC O157 in beef burgers*. A summary report.

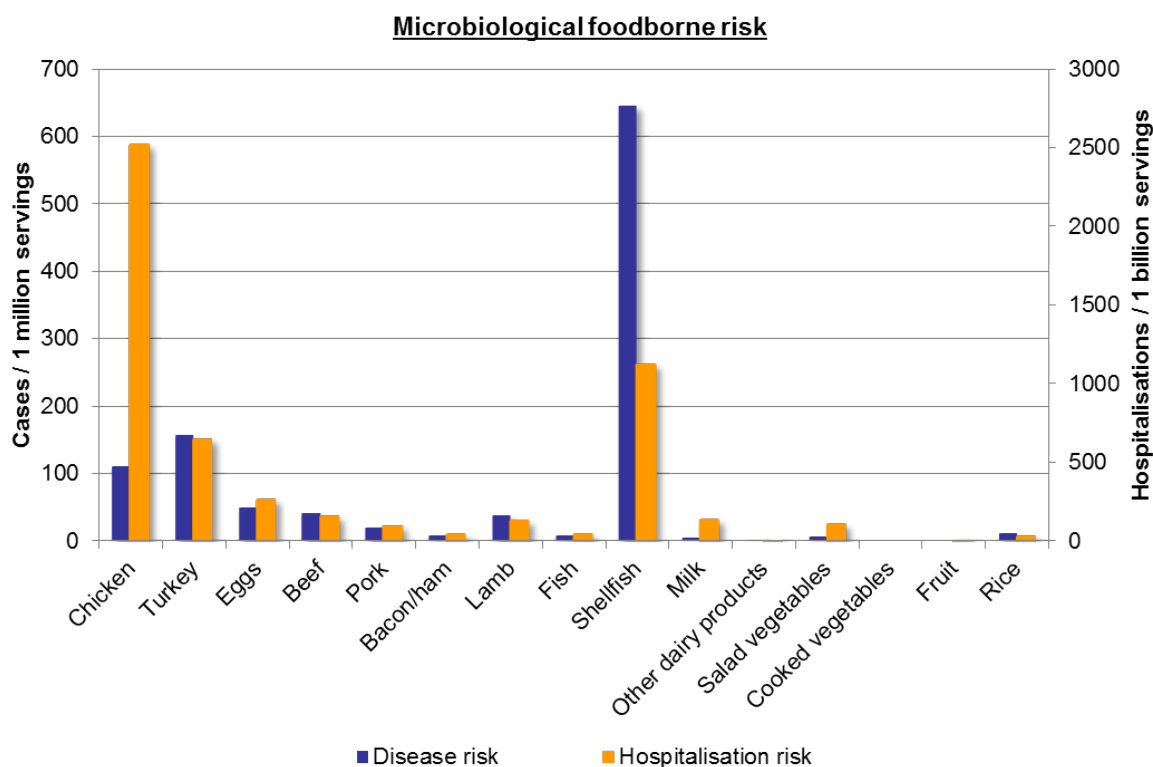
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combinations of hazards and foods that pose a significant risk per consumption event. This would provide transparency, and should help us to allay the fears of those who believed that the framework would provide an excuse for stigmatising niche food products.⁹

- 5.5 Analysis at the broad level of product categories suggests that, per serving, shellfish and poultry carry the greatest risk of foodborne disease and hospitalisation relative to other foodstuffs – see figure below.¹⁰ It is likely that the high disease risk (but proportionately lower risk of hospitalisation) for shellfish relates to Norovirus in bivalve molluscs consumed raw. While bivalve molluscs intended to be consumed raw are a likely candidate for consideration using the framework, further analysis is needed to assess risks for other individual food types, rather than the broad product categories in this initial analysis, and to broaden the scope beyond microbiological risks to include other risks associated with food.

⁹ Comments on the framework for the control of “risky” foods included: *“The choice of Risky Foods by the FSA seems entirely random, with many foods which contain a much higher degree of risk not being labeled, and other foods which have been produced and eaten for hundreds of years labeled “risky”* (Slow Food UK); and *“It seems the FSA is again set on demonising traditional foods which it perceives pose a greater level of risk... (The approach) is seriously flawed in being arbitrary, unhelpful and gratuitously damaging to the interests of artisan and small scale food producers.”* (Artisan Food Law).

¹⁰ Average annual rates for England and Wales. Based on Adak, G. K., Meakins, S. M., Yip, H., Lopman, B. A., & O’Brien, S. J. (2005). Disease risks from foods, England and Wales, 1996–2000. *Emerg Infect Dis*, 11(3), 365-72. This preliminary analysis should be interpreted with some caution: the confidence intervals around disease and hospitalisation risks for each of these foods are likely to be significant; data now relate to a primary study that took place 15-20 years ago; the risk from eggs, for example, is probably underestimated because of their association with complex foods which are not categorised.



5.6 We then need to formalise the steps of the framework, both so that we can assure ourselves that we are applying it consistently and to provide transparency about the process to interested stakeholders.

5.7 A key stage of the process, and one which has been a particular focus for Board discussions of raw drinking milk and rare burgers to date, is the judgement on a level of risk that is acceptable. The key concepts that relate to the tolerability of risk are analogous to those in other regulatory domains. The diagram at Annex 1, taken from risk management in health and safety, identifies some of these concepts. Describing the three regions of risk tolerability in terms of food risks:

- A nature and level of contamination or adulteration that while not affording zero risk is, on the basis of best available expert advice, considered to be **broadly acceptable** or “safe” within the usual meaning of the word,¹¹ provided that risks are adequately controlled through the application of good hygienic, manufacturing or agricultural practices as appropriate (the “green” zone in Annex 1);
- A nature and level of contamination or adulteration that leads to risks which would be **always unacceptable** for any consumer, whatever the benefits and even if accompanied by information on that risk. Action should be taken to protect consumers from foods giving rise to risks in this region, until or unless changes in production and processing can be made

¹¹ Whilst acknowledging that (i) there would be several difference scales on which to make the assessment of safety, for example for agents for which there is a ‘no effect’ threshold, for those with no threshold, and for those such as allergens with very different risks for different people; and (ii) acceptability and ability to make informed choices may vary by consumer and context.

that reduce the degree of risk so that it falls in one of the other regions (the “red” zone in Annex 1); and

- To the extent the above two levels do not coincide, a nature and level of contamination or adulteration that leads to risks that incrementally exceed the levels considered broadly acceptable, but which some consumers may tolerate for other benefits, such as choice. These levels of risk would be **unacceptable unless** the risks are properly assessed and control measures designed and implemented to maintain the residual risks at a level as low as reasonably practicable, consumers are provided with information to allow informed choice, and the risks and effectiveness of controls are regularly reviewed (the “amber” zone in Annex 1).

- 5.8 We propose that we should now develop the November framework, which consisted of a series of issues on which judgements needed to be made with some prompts for thinking in each, into a more formal decision tree incorporating these concepts, a working draft of which is included at Annex 2.

Application of the framework to burgers served rare in catering outlets

- 5.9 The standing advice of the Advisory Committee on Microbiological Safety of Food is that burgers should be cooked thoroughly – i.e. reaching a temperature of 70°C for two minutes, or equivalent which “delivers a significant pathogen reduction which is sufficient to minimise the risks posed by foodborne pathogens such as *E. coli* O157, *Salmonella* and *Listeria monocytogenes*”. Preparation of burgers in line with this advice, whether in the domestic or catering setting, will deliver a reduction in bacterial load of at least 6-log₁₀¹² and, in terms of the above framework, this practice is broadly acceptable provided adequate controls are in place.
- 5.10 The Board first considered in January 2015 the steadily increasing trend in the preparation and sale of rare gourmet burgers in catering establishments. The Board concluded at that time:
- there is no change to FSA advice, based on the risk assessment conducted by ACMSF, that burgers should be cooked thoroughly until they are steaming hot throughout, the juices run clear and there are no pink bits inside – and we should build and maintain a high level of consumer awareness of this advice; and
 - the preparation and sale of burgers without both a validated food safety management plan that delivers at least a 4-log₁₀ reduction in bacterial load, and a consumer advisory statement, is always unacceptable and should lead to proportionate enforcement action.
- 5.11 We are now asking the Board to consider the tolerability of risk relating to the preparation and sale of burgers with a validated food safety management plan that delivers at least a 4-log₁₀ reduction in bacterial load, and if this practice is not always unacceptable, the controls that should apply to ensure residual risks are maintained at a level as low as reasonably practicable.

¹² A 6-log₁₀ reduction is equivalent to killing 99.9999% of the bacteria originally present.

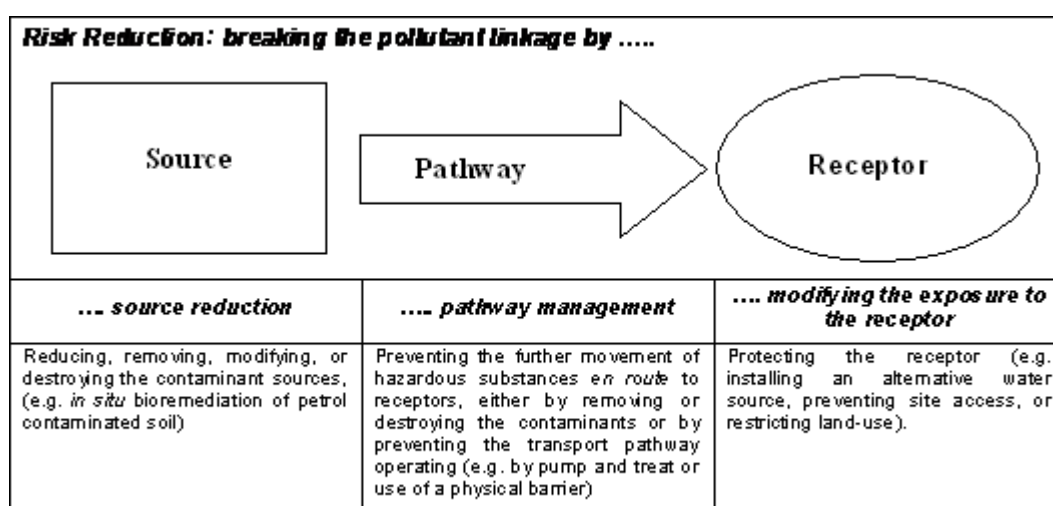
- 5.12 The studies conducted by APHA and RIVM on quantitative risk assessment modelling and thermal inactivation of STEC O157 in burgers, whilst not definitive, provide some further indication of reductions in bacterial load that may be achieved through cooking burgers until less than well-done and the increases in risk of foodborne disease relating to this one particular hazard that might result.
- 5.13 The results of the thermal inactivation modelling study were viewed by the peer reviewers as generally consistent with ACMSF advice on the efficacy of cooking burgers for two minutes at an internal temperature of 70°C. As inactivation of STEC O157 requires both temperature and duration of cooking, thicker burgers which require longer cooking for the core to reach a given temperature lead to a greater degree of STEC O157 inactivation for any given cooking preference (rare, medium or well-done). The model indicates that cooking to medium would accordingly lead to a 1.1-log₁₀ reduction in a 2.5cm-thick quarter-pound burger patty,¹³ but a 6.5-log₁₀ reduction in bacterial load in a 5cm-thick half-pound burger patty. Caution is needed in the interpretation of this study, particularly as considerable uncertainty exists in the values for two of the critical parameters relating to time and temperature in the model, but also because there will be considerable variation associated with commercial cooking equipment and protocols. However, the study suggests that reductions of bacterial load between 4- and 6-log₁₀ may be achieved through cooking thicker burger patties to a medium cooking preference in a commercial setting. We would expect any claim that any cooking style leads to a certain reduction in bacterial load to be verified by challenge testing, or by alternative validation.
- 5.14 The quantitative risk assessment paper models the level of foodborne disease risk from STEC O157 in burgers cooked to preference or to achieve a pre-set level of bacterial load reduction. A 6-log₁₀ reduction in bacterial load in a small or quarter-pound burger patty typical of those available at retail is modelled to lead to around 3 or 4 infections with STEC O157 per 100,000 servings, respectively. If we take that as a level of risk that, whilst not zero, is broadly acceptable we can then look at incremental increases in risk that are modelled to result from burgers cooked to different degrees. A 5cm-thick half pound burger patty cooked to medium is modelled to lead to around 6.1 infections with STEC O157 per 100,000 servings. A burger of the same size cooked to achieve a reduction in bacterial load of 4-log₁₀, which would equate to a cook between rare and medium, is modelled to lead to 18 infections with STEC O157 per 100,000 servings, whilst a 6-log₁₀ reduction would lead to 7 infections per 100,000 servings. For reference, the current incidence of STEC O157 infection in the UK is 1.9 cases per 100,000 people.¹⁴
- 5.15 Cooking is not the only control available, and the quantitative risk assessment model did not seek to model the reductions that would be achieved through other interventions in production or preparation of the burgers, or the impact of

¹³ The study modelled STEC O157 inactivation in three burger patty types: small (85g weight, 1cm thick), standard (113g weight, 2.5cm thick) and gourmet (227g weight, 5cm thick)

¹⁴ Data from PHE, HPS and PHA NI.

differential sourcing strategies that led to a lower initial bacterial load in the meat used to form the burger patties.

- 5.16 In order to take a broader view of the range of controls that may be applied – either individually or in combination – we can use an analogy of the source-pathway-control paradigm in contaminated land risk management in which risk can be reduced by intervention at each of these three stages (see figure below¹⁵). There are clear parallels in food safety risk management – “source control” would include steps that reduced the level of risk in primary processing; “pathway management” would include steps such as cooking; “receptor protection” would include information and advice provided to the consumer. It is then this combination of controls, relating to sourcing of meat, preparation and cooking of the burger, consumer information and the protection of vulnerable consumers that needs to be considered against the need to maintain risks at a level that is not unacceptable.



- 5.17 In terms of the supply of minced meat intended to be eaten raw, “source control” would include the existing requirements for the absence of *Salmonella*.¹⁶ There are no statutory criteria for STEC in foods, other than for sprouted seeds. The European Commission is working with Member States to develop guidance on the application of General Food Law to food contaminated with STEC which will support a harmonised approach to STEC-positive results in any food commodity. Discussions are ongoing but, there is general agreement that presence of STEC is unacceptable in a ready to eat food (i.e. one where steps such as thorough cooking are not intended to be used to eliminate the hazard). The FSA supports this position and this was accepted by stakeholders including the meat industry at a recent initial stakeholder meeting.¹⁷

¹⁵ From *EUGRIS: portal for soil and water management in Europe*. Available at <http://www.eugris.info/FurtherDescription.asp?Ca=2&Cy=0&T=Selection%20of%20remediation%20options&e=44>

¹⁶ Regulation (EC) No 2073/2005 on the microbiological criteria for foodstuffs requires an absence of *Salmonella* for the supply of minced meat intended to be eaten raw.

¹⁷ Stakeholder meeting on 16 June 2015 on the draft Commission guidance.

- 5.18 Microbiological criteria can be helpful in delivering public health benefits and improved public health protection. However, it is important to remember that it is the action that businesses take to meet the criteria that delivers the benefits rather than testing against the criteria themselves. Emphasis must therefore be on controls established within food safety management plans rather than microbiological testing. Microbiological testing has a role in validation and verification of controls but, due to the sporadic nature of microbiological contamination, non-uniform distribution and low infectious dose that can lead to illness, sampling and testing of every batch alone will not guarantee the safety of the batch. Time delays between sampling and availability of results also means positive release is often not practical.
- 5.19 The consumer research described at section 10 regarding the effectiveness of consumer advisory statements needs to be interpreted with caution, as it relates to reported (rather than observed) attitudes and behaviour. However, it suggests that appropriately designed consumer advisory statements on menus may have the potential to be effective in both causing some consumers to reflect (in line with our strategic aspiration to support consumers to stop, think and choose), and in influencing their future food choices.
- 5.20 The recommendation from the executive, in the light of the above, is that the risk from burgers served rare in catering establishments is not so unacceptable as to justify removing the adult consumer's right to choose to eat it, provided certain provisions are met. Using the terminology developed at section 5.7 above, this practice is **unacceptable unless**:
- a validated and verified food safety management plan is applied that combines:
 - “source control” through the sourcing of meat only from establishments approved under EU legislation for the supply of minced meat intended to be eaten raw or lightly cooked and whose sampling is carried out in accordance with microbiological criteria for mince to be consumed raw; and
 - specific identification of Salmonella and STEC, among other pathogens, as particular hazards within food safety management plans, with evidence that controls for these organisms have been validated and their effective application is verified. Sampling and testing regimes should be established within those plans to validate and verify controls, with specific corrective action in the event of adverse results; and
 - “pathway management”, in which any prior treatments in the catering establishment (such as steam treatment or searing), together with cooking lead to a combined reduction of at least 4- \log_{10} in the load of microbial flora (demonstrated by challenge testing or alternative validation); and
 - “receptor protection”, through the adoption of an appropriate consumer advisory statement at the point of ordering food, for example on menus, and the practice that children are only served

burgers that are well-done (already an established practice in at least one multiple).

- 5.21 Acknowledging the potential for continuing innovation in this sector, a consumer advisory statement would not be needed where prior treatments by the supplier and/or in the catering establishment together with cooking lead to a combined reduction of at least 6-log₁₀ in microbial load (demonstrated by challenge testing or alternative validation), as the product would then achieve a reduction in risk that is equivalent to the existing FSA advice.
- 5.22 Where the controls in section 5.19 are absent, or are not consistently and effectively applied, we would consider the resultant risks to be unacceptable and enforcement action at an appropriate level of the enforcement hierarchy should follow.
- 5.23 This does not change our view that, as these controls cannot all be assured for domestic supply and preparation of burgers, when cooking burgers and similar products at home or elsewhere (e.g. barbecues) consumers should ensure they observe good hygiene practices and that burgers are cooked so they are steaming hot all the way through, that none of the product is pink, and that any juices run clear.

6 IMPACT

- 6.1 Public health impacts relating to the preparation and sale of rare burgers in catering establishments are covered in sections 4.1-4.2 and 5.9-5.23 above.

7 CONSULTATION

- 7.1 An extensive programme of qualitative and quantitative consumer research was commissioned following the Board discussion in January 2015, detailed in section 10 below. The work described in this paper has drawn on a range of informal discussions with businesses involved in the preparation and sale of rare burgers and with local authority delivery partners, and from presentations and feedback to stakeholder audiences, including at the Chartered Institute for Environmental Annual Food Safety Conference on 23 June 2015.

8 LEGAL/RESOURCE/RISK/SUSTAINABILITY IMPLICATIONS

- 8.1 There is the potential for approaches such as industry guides and primary authority to reduce the resource requirement on local authorities and food businesses to implement and verify such controls as are agreed by the Board, in line with the objectives of our regulatory strategy.

9 DEVOLUTION IMPLICATIONS

- 9.1 The recommendations from the executive relate to controls in England, Wales and Northern Ireland.

10 CONSUMER ENGAGEMENT

- 10.1 Qualitative and quantitative consumer research was commissioned¹⁸. A quantitative panel online survey was applied to 2,708 consumers (2,008 in England, 500 in Wales and 200 in Northern Ireland) between 6 July and 19 July with results weighted by age, gender, region and socioeconomic group. Qualitative research was undertaken through eight online citizens' forums (three in London, two in Norwich and one each in Belfast, Cardiff and Oldham), with circa ten participants in each recruited to reflect a mix of gender, age, ethnicity, socioeconomic group and attitude to food risk. Findings below are based on reported attitude and behaviours.
- 10.2 73% of respondents in the quantitative panel online survey were concerned about food hygiene when eating out (11% unconcerned), with a similar level of concern about the risk of food poisoning from *Salmonella* or *E. coli*. Of those people who ate burgers:¹⁹
- 64% of people were “rejecters” (expressed preference for well-done burgers; would send back a burger that was still pink; higher concern about risk);
 - 24% of people were “accepters” (will accept what is served in a restaurant although they might have some concerns about risk); and
 - 12% are “advocates” (a strong preference for rare burgers; less likely to perceive it as a risk).
- 10.3 Rare burger eaters (either “accepters” or “advocates”) were more likely to be younger, male and from higher socioeconomic groups. The gender bias reflects various risk profile studies across government; the interesting difference here is that rare burgers are also seen to be aspirational and luxury items. A significant proportion of these consumers had prepared rare burgers themselves (41% of “accepters”, 84% of “advocates”) which stresses the need for a continuing focus in our advice to consumers on thorough cooking of burgers and similar products in the home.
- 10.4 In addition, 26 participants in the qualitative study who said they would consider eating a rare burger were asked to visit a restaurant that served burgers, were shown one of four risk messages on their mobile device immediately before ordering, recorded their response to the message on their device, uploaded pictures of the burger they ordered, and took part in a discussion forum over the following week. The messaging approaches had been developed on the basis of citizens forums, and refined using the quantitative panel. This innovative approach complemented the other evidence from the qualitative and quantitative consumer research. Taken

¹⁸ <http://www.food.gov.uk/sites/default/files/fsa-risk-rare-burgers.pdf>

¹⁹ Source: Q2. Do you ever eat burgers? If so, how do you prefer them to be served? Base: All respondents (2,708) Q3. If a burger was served to you rare or medium (with pink meat or pink or red juices) how would you be most likely to respond? Base: All who prefer well done or have no preference (1,986) Q4. And around how often do you eat burgers which are... Base: All who prefer or would eat a rare burgers if served (780)

together this gives us useful evidence on the factors we might consider in developing consumer messaging.

- 10.5 The message that scored most highly combined an explanation of the risk (“harmful bacteria can be carried on the surface of the cuts of meat”), addressed the misperception by some “accepters” and “advocates” that there is no difference between rare steak and rare mince, and sought to quantify the magnitude of the risk.²⁰ Within this, the information about the difference between a burger and a steak had the greatest impact:
- for “advocates”, clear articulation of why there was an increased risk in the case of burgers prompted reflection;
 - for “accepters”, this message triggered understanding for those harbouring vague fears and made them more likely to reconsider their choices;
 - for “rejecters”, as with other information about risk, it vindicated their choices.
- 10.6 The quantitative panel study indicated that messages also had an impact on stated future intentions, with 4 in 10 “advocates” and 6 in 10 “accepters” stating they might be less likely to eat a rare burger.
- 10.7 Seeing risk information in a restaurant setting caused some discomfort or questions about appropriateness, possibly as advisory statements of that kind are uncommon in the UK, although more common elsewhere for example in the USA. It may be that this discomfort, combined with the extent to which consumers rated messages as informative or surprising, indicates that the display of appropriately worded messages is sufficiently disruptive to cause people to move from automatic to reflective thinking – this hypothesis would be amenable to further study.
- 10.8 Information at point of purchase of raw ingredients for domestic food preparation was seen as least intrusive and most informative, and may provide a route for reinforcing and amplifying messages to consumers about thorough cooking of burgers prepared and cooked at home.

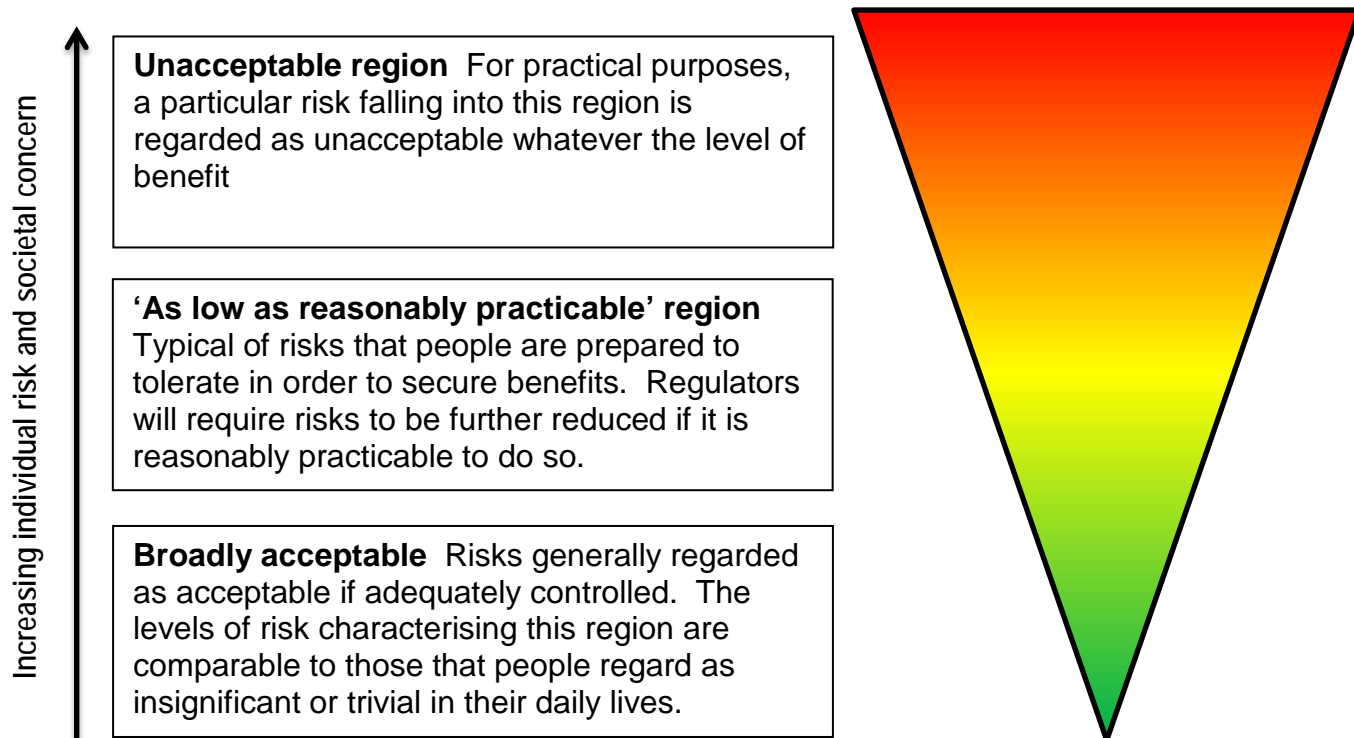
²⁰ The responses from those of the 26 participants in the mobile study that had seen this message showed that “advocates”, rather than dismissing the risk, responded with counter-arguments for how they mitigate the risk, relating to the quality of meat and hygiene standards at the establishments they trust; for “accepters”, the explanation of the cause of the risk appeared to cut through and triggers understanding. The messages were also tested on the quantitative panel, with 37% of respondents rating it as the most easy to understand of the four messages (compared to 10%-26% for other messages); 29% rating it as the most surprising (compared to 15%-24%); 50% rating it as most informative (compared to 9%-19%). *Base: All respondents (2,708)*

11 CONCLUSION AND RECOMMENDATIONS

11.1 The Board is asked to:

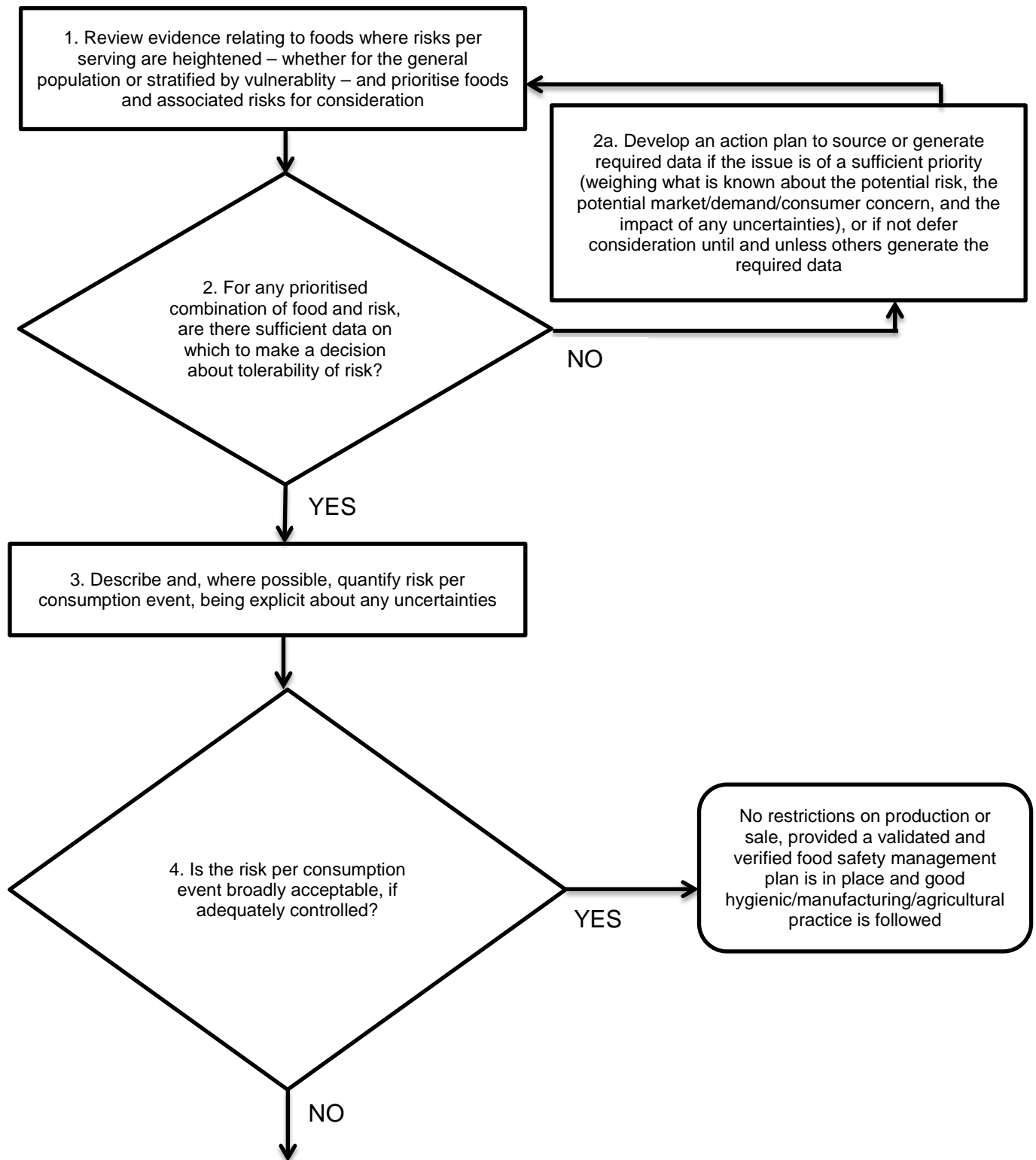
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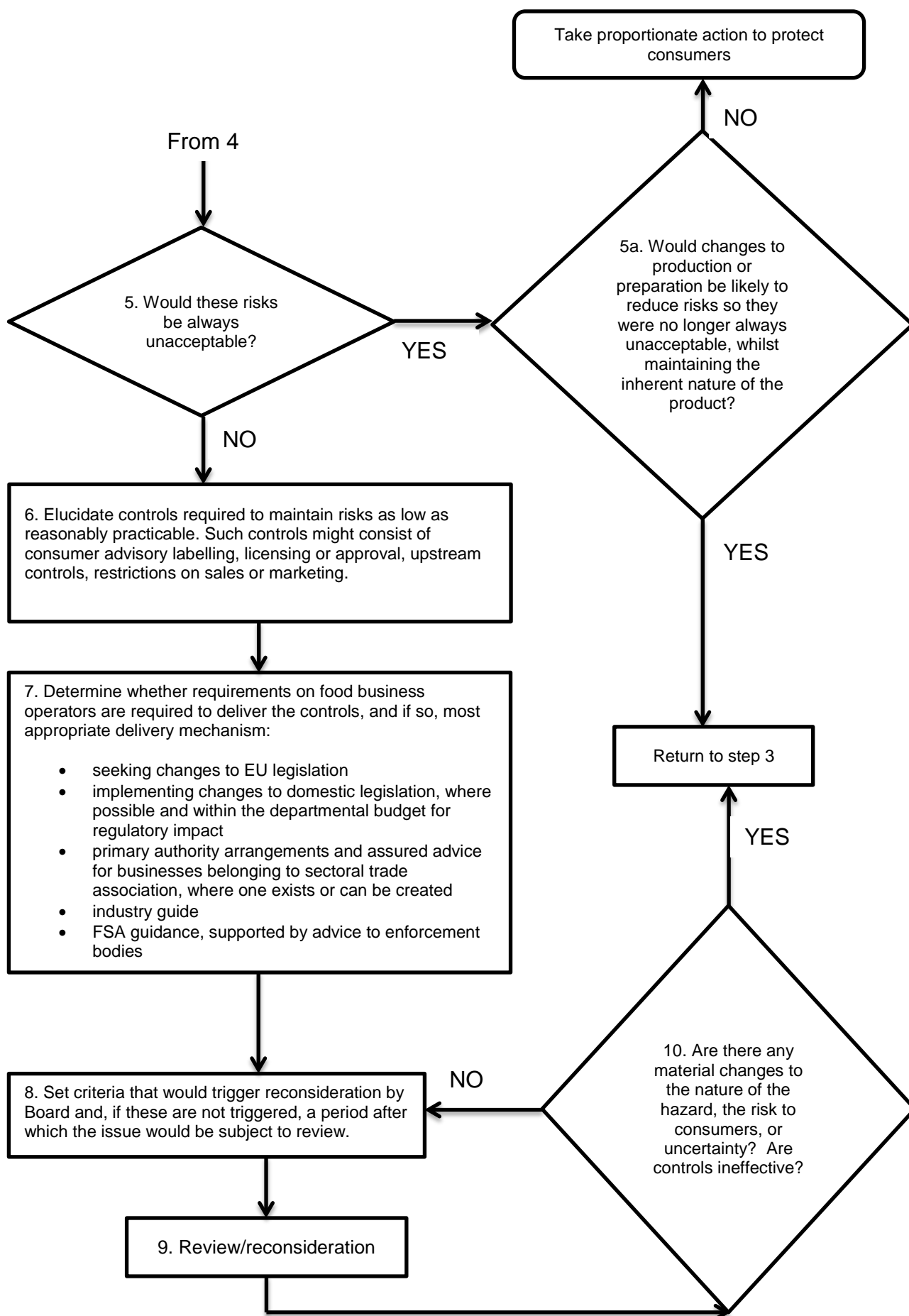
ANNEX 1 – HEALTH AND SAFETY EXECUTIVE FRAMEWORK FOR THE
TOLERABILITY OF RISK²¹



²¹ Adapted from: The Institute of Engineering and Technology (2015) *Determining the Acceptability of Risk*. Health & Safety Briefing No. 36. Available at: <http://www.theiet.org/factfiles/health/hsb36-page.cfm?type=pdf> Based on: Health & Safety Executive (2001) *Reducing risks, protecting people: HSE's decision-making process*. Available at: <http://www.hse.gov.uk/risk/theory/r2p2.pdf>

ANNEX 2 – FLOW CHART FOR APPLICATION OF THE FRAMEWORK FOR CONTROLS RELATING TO FOODS WHERE RISKS PER SERVING ARE SIGNIFICANT





ANNEX 3 – EXAMPLES OF CONSUMER ADVISORY STATEMENTS BEING DEVELOPED BY MULTI-SITE BUSINESSES

The following statement is already used on menus at all Davy's restaurants:

“The Food Standards Agency advises that the consumption of raw or lightly cooked animal products, such as meat, offal and shellfish may cause illness. This especially applies to children, the elderly and those with weakened immune systems.”

A statement has been developed by Burger & Lobster for display on signage at the entrance to its restaurants (see below). It has been deployed on a trial basis at two of its outlets, and will now be rolled out across its chains.

The following statement has been developed by Byron and is due to be deployed on menus from Autumn 2015:

“We want you to enjoy your hamburger just the way you like it. We prefer our hamburgers cooked pink but, of course, it should be up to you. However, the Food Standards Agency has asked us to point out that undercooked meat may increase the risk of foodborne illness, particularly for those who are very young, elderly, pregnant or suffering illness.”

The following statement will be used by one restaurant chain on menus at all its restaurants by this Autumn.

“Burgers are cooked to order. Consuming raw or undercooked meats, poultry, seafood, shellfish, or eggs may increase your risk of foodborne illness, particularly for children, the elderly and those with weakened immune systems.”

Example of signage used by Burger & Lobster:

