Conclusions

In this guide

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Artificial intelligence is advancing at a pace that few other technologies have matched, with potential to reshape food safety and assurance into more predictive, transparent, and efficient systems. The case studies explored in this report illustrate both the promise and the complexity of this transformation. AI could allow hazards to be detected earlier, inspections to be scaled more effectively, and regulatory oversight to be enhanced by continuous monitoring of diverse data sources. It could enable more resilient, data-driven systems that support consumer protection while improving business efficiency.

At the same time, the case studies revealed that AI adoption in the food system is still at an early stage, with most applications tested only in pilots or controlled trials. This creates significant uncertainty about how tools will perform in real-world operations, where unintended consequences might emerge. Workshop participants raised concerns about issues such as performance drift, false

assurance, over-reliance by users, and outputs that appear credible but lack traceable and explainable evidence. These concerns are not reasons to delay innovation, but they emphasise that vigilance, validation and human oversight are essential if AI is to strengthen, rather than weaken, assurance processes.

A consistent theme across the study was that AI should be treated as a decision-support tool, not a replacement for human accountability. Food business operators remain responsible for ensuring food safety and regulatory compliance and AI tools must be designed and governed in ways that make outputs explainable, auditable, and challengeable. Without these safeguards, the due diligence defences on which food law depends could be undermined. There remains significant uncertainty about how human behaviour will evolve in response to the growing use of AI in food safety and assurance contexts. New behavioural risks may emerge, including overreliance on AI outputs, reduced vigilance, or shifts in professional responsibility, all of which could introduce unintended impacts.

Another central finding is the importance of high-quality, harmonised data. AI cannot accomplish its tasks, or avoid bias, without access to diverse, representative, and trusted datasets. This is especially clear in contexts such as ports of entry and complex supply chains, where without shared and standardised records AI systems would be unable to function. Similarly, validation of AI in abattoirs depends on rich training datasets to capture rare or emergent pathologies. These examples highlight that data governance will be decisive in shaping the safe and fair use of AI.

Finally, the FSA cannot act in isolation. The rapid evolution of AI, including new forms such as large language models and emerging agentic AI systems, means that governance must be coordinated with wider policy and regulatory initiatives. Other sectors, from financial services to healthcare, are grappling with parallel questions of explainability, accountability and liability. Collaboration will ensure coherence across domains, avoid duplication of effort and help the FSA remain aligned with international best practice. The challenge ahead is not only technical, but social and ethical: embedding AI into food safety in a way that augments, rather than displaces, the human responsibility that underpins consumer protection and confidence in food law.

In closing, this report finds **no evidence at present that new food safety regulation is required** to address the use of AI. Existing frameworks should be sufficiently robust to encompass the application of currently known AI tools, provided human accountability remains central. However, this position is

contingent on vigilance: AI adoption will continue to accelerate and evolve and, with it, new risks and opportunities will emerge. The FSA must therefore remain alert, adaptive, and proactive, maintaining ongoing surveillance, promoting trusted data standards, supporting validation and codes of practice, and engaging with wider regulatory debates.

AI has the potential to enhance the safety and regulatory compliance of the UK food system, but only if introduced carefully and responsibly. By adopting the recommendations set out here, the FSA can ensure that innovation is harnessed to protect consumers and strengthen public trust, while avoiding the risks of over-reliance, hype, or premature adoption.