NHS Review: Evidence Package 2

Improving food hygiene compliance using behavioural science

Information request

This paper has been produced in response to an information request on how to improve food hygiene compliance using behavioural science. We have conducted a short review of key literature, an initial short examination of the relevant behaviours, and recommendations for next steps has been provided. A fuller literature review and research would fill some of the noted evidence gaps.

Literature on improving food hygiene compliance using behavioural science

Introduction to behavioural science

Behavioural insights have helped us better understand what drives behaviours by drawing on behavioural economics and psychology. Behavioural science explains how deviations from 'traditionally explained rational' behaviour are the result of adaptive forms of reasoning such as mental shortcuts, as context and biases can influence decision making.

A few examples are in this table, and more examples of behaviour change insights and techniques are in the Annex.

Aspect	What rationality says	What BI shows	Example
Attention	People should focus on what is most important in light of their knowledge and preferences.	People's attention is limited and easily distracted.	Forgetting an appointment.
Belief formation	People should form their beliefs according to the rules of logic and probability.	People rely on mental shortcuts or intuitive judgments and often over/underestimate outcomes and probabilities.	Underestimating how long a task will take.

Aspect	What rationality says	What BI shows	Example
Choice	People should choose so as to maximise their expected utility.	People are influenced by the framing and the social as well as situational context of choices.	Being influenced by what our social circle thinks is the right thing to do rather than choosing the rational option.
Determination	Provided that one decides to pursue certain long-term goals, one should stick to the plan.	People's willpower is limited and subject to psychological biases.	Failing to quit smoking.

By integrating behavioural insights into policy making, governments can better anticipate the behavioural consequences of a policy and, ultimately, design and deliver more effective ones. Much work in this area builds on the body of knowledge generated by testing behavioural insights in a healthcare setting, including by PHE and the NHS.

Food hygiene behavioural interventions

Food hygiene behavioural interventions have tended to focus on the behavioural practice of **handwashing** and the behavioural levers of **education and training**.

A systematic review of hand hygiene improvement strategies (2012) found that addressing only determinants such as knowledge, awareness, action control, and facilitation is **not enough to change hand hygiene behaviour**. Addressing combinations of different determinants showed better results. It recommended more creative application of alternative improvement activities addressing determinants such as social influence, attitude, self-efficacy, and intention – for example, senior team members modelling and championing good handwashing behaviours to reset the norm, coupled with strategically planned reminders reinforcing expectations, and continued feedback to change behaviour in the longer term.

A systematic review and meta-analysis of psychosocial and organizational determinants of safe food handling (2019) was conducted where the most commonly investigated target group was food handler employees (89%), and the most commonly investigated food premise types were restaurants (40%) and healthcare institutions (24%). It found that the most commonly investigated behavioural determinant category was **knowledge** (82%), and that increased knowledge was consistently associated with safe food handing behaviours. However, **other**

behavioural determinant categories were also consistently associated with various food safety behaviour outcomes: environmental context and resources; social influences; attitudes and risk perceptions; behavioural intentions; beliefs about capabilities; professional role and identity; and reinforcement. Therefore they **should also be accounted for** to explain food handlers' behaviours.

A systematic review and meta-analysis of effectiveness of food handler training and education interventions (2019) found that food safety training and education interventions improve food handlers' food safety knowledge, but there is low confidence that these interventions improve other food safety outcomes such as food handler **attitudes, behaviours, and premise inspection scores**.

As highlighted by these sources, on order for behavioural interventions to be effective, **sources of behaviour must be correctly identified, then matched with the correct intervention functions**. For example, if a source of noncompliant food safety behaviour is lack of physical opportunity, then enablement and restructuring of the physical environment will be needed. Education and training interventions will only be effective if knowledge and skills are the barriers to and enablers of best practice.

A good example of how behavioural insights have increased compliance with food hygiene standards is **FHRS display**. Food Hygiene Rating Scheme scores have long been available to find online, but 'scores on the doors' have used salience to attract attention as they are colourful and placed at eye level, and opportune timing to prompt people when they are most likely to be receptive as they are about to make their decision. FHRS display has helped consumers choose to eat in places with higher ratings, which has in turn has pushed food businesses to drive up hygiene standards. Similar schemes have increased compliance with food hygiene law in Denmark and California. In a hospital setting, where customers have little choice about where to eat, publicly displaying FHRS ratings may encourage caterers to maintain higher standards due to visibility to customers and hospital management.

Hospital behavioural interventions

Although hospital food standards literature has tended to focus on **nutrition** rather than food hygiene, behavioural science has helped improve **compliance with best practice in hospitals**, e.g. surgical checklists have increased compliance with surgical processes in hospitals, and simple changes to prescription charts used in NHS hospitals have reduced prescribing errors. Other successful behavioural interventions in the NHS include how SMS reminders stating costs to the NHS have reduced missed medical appointments, and letters using social norm feedback have reduced over-prescription of antibiotics. This approach might be applied to educating

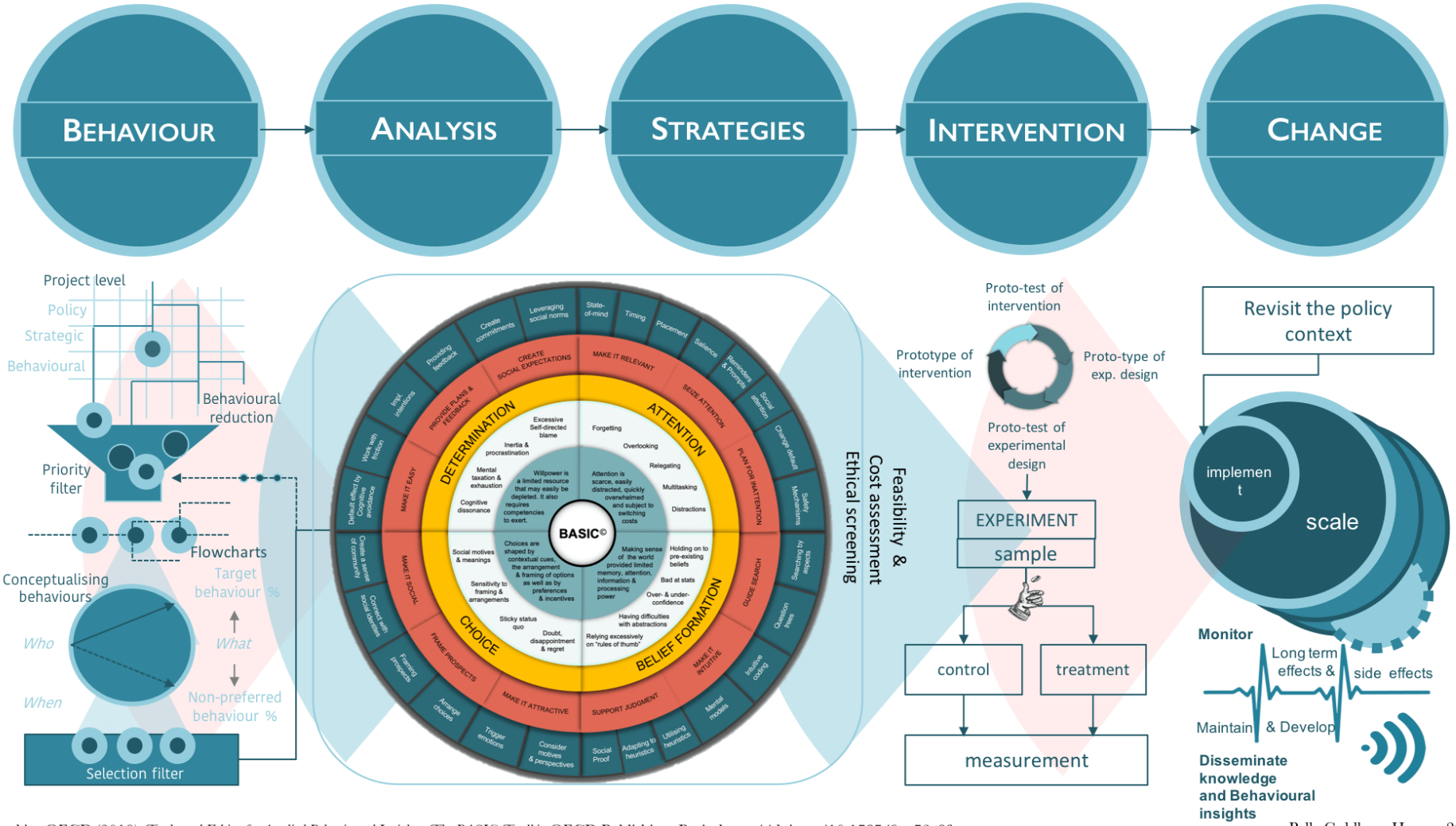
patient visitors, for example, about bringing in food for patients which poses a health risk.

Behaviours relevant to Listeria in hospitals

The BASIC Toolkit is one of several frameworks (see Annex A) to support the application of behavioural insights to public policy.

- **Behaviour** Identify and better understand your policy problem.
- **Analysis** Review the available evidence to identify the behavioural drivers of the problem.
- **Strategy** Translate the analysis to behaviourally informed strategies.
- **Intervention** Design and implement an intervention to test which strategy best addresses the problem.
- **Change** Develop plans to scale and sustain behaviour.

Diagram: The BASIC Toolkit



Published in: OECD (2019), *Tools and Ethics for Applied Behavioural Insights: The BASIC Toolkit*, OECD Publishing, Paris, https://doi.org/10.1787/9ea76a8f-en.

Stage 1: Behaviour

1a. Identify the behaviours driving the policy issue – behavioural reduction

The best practice **behaviours for reducing *Listeria* in hospitals** are listed in Guidance on reducing the risk of vulnerable groups contracting listeriosis under: Personal hygiene; Cleaning and disinfection; Washing fruit and external surfaces; Kitchen access; Shelf life controls; Cold chain; Time/temperature control. In response to the questions (i) Which poor practices carry the greatest risk of *Listeria* per occurrence? (ii) Which poor practices relevant to *Listeria* are most frequent and/or widespread? FSA Microbiological Risk Assessment answered that temperature abuse and shelf life controls are the major risk factors for *Listeria* and are often thought to be the key points of failing. Therefore the most important behaviours for reducing *Listeria* are listed under Shelf life controls and Time/temperature control. **The behaviours listed below, taken from the Guidance, would need to be narrowed down using process mapping (step 1d).**

Behaviours for shelf life controls

- Order/purchase as close to the date of consumption as practicable
- Take care not to over order foods
- Carefully check use-by dates upon delivery/purchase
- Organise working practices so that chilled RTE food prepared on site is used on day of production wherever possible
- Ensure a maximum chilled shelf life of the day of production plus 2 days is applied
- Ensure bought in pre-packed sandwiches, whether provided by the organisation or by visitor/ patient, are consumed as soon as possible
- Ensure stock is rotated, for example, using a 'first in, first out' principle

Behaviours for time/temperature control

- Time/temperature control during food preparation
    - Prepare food in small batches
    - Pre-chill ingredients such as canned tuna, mayonnaise and bread
    - Pre-chill crockery, for example chill plates prior to plating salads/sandwiches
    - Provide sufficient refrigerators close to preparation areas so that foods can be removed, used and put back promptly
    - Cold holding wells provided close to preparation areas will enable fillings to remain chilled during preparation
    - Only remove from refrigeration the amount of ingredients for foods such as salads and sandwiches, being prepared at that time
    - Refrigerate chilled RTE foods immediately following preparation

    - Where chilled preparation rooms are in operation it is good practice to apply time controls, as chilled preparation rooms generally operate above 5°C
- Maintain the cold chain of chilled RTE food at 5°C or below from delivery through to service
    - Use chilled display cabinets where RTE foods, requiring chill control, are presented for sale at retail in restaurants, shops, cafes etc
    - Pre-chill equipment used for keeping foods cold, such as display cabinets, chilled trolleys etc
    - Minimise holding times that chilled RTE foods are kept at ambient
        - Set maximum times that food can spend out of the cold chain, as part of the HACCP based FSMS (see section 4.1)
        - Monitor this to check times are not exceeded
        - Ensure chilled RTE foods are not stored next to or on top of ward trolleys designed to keep foods hot

Good practice –

- Time/temperature control during distribution to service points
- Maintain the cold chain at 5°C or below
- Where possible containers and equipment used for transportation of food should be pre-chilled to below 5°C
- Remove chilled RTE food from refrigerated storage and place into transportation equipment promptly, and as close to the transportation time as possible
- Transport chilled RTE food as soon as possible after loading into equipment
- Hold chilled RTE foods transported to the service point in chilled equipment at 5°C or less or transfer to appropriate refrigeration at ward/pantry

Good practice –

- Time/temperature control during food service to the patient/resident
- Keep chilled RTE foods in chilled storage until they are ready to be served
- Ensure chilled RTE foods are eaten as soon as possible after serving
- Keep service times as short as possible
- Chilled RTE foods should not be left at room temperature if the patient/resident is not available or ready at mealtime (label the food with patients/residents name and place in refrigeration)
- Dispose of chilled RTE food held out of chilled storage during service at the end of mealtimes
- Patients/residents should be discouraged from storing chilled RTE food at their bedside/ in beside cabinets for consumption at a later time
- Protected mealtimes are recommended to avoid interruptions during mealtimes and to allow staff to concentrate on food service

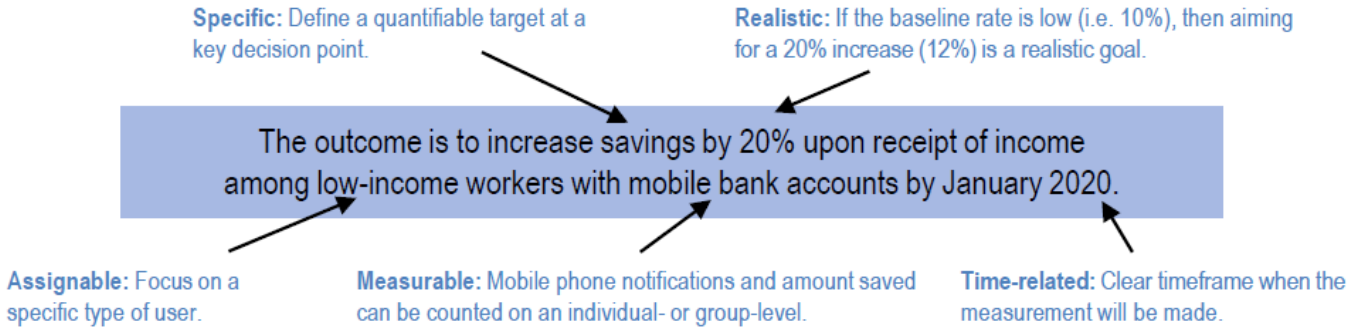
- Where ice-cream is served ensure this is kept frozen and is not defrosted before service. Ice-cream that has defrosted must be thrown away. Do not re-use or re-freeze
- When using oral supplements (sip-feeds) make sure the manufacturer's instructions are followed for use and storage, once opened

1b. Prioritise which behaviour(s) to target for a behavioural insights project with stakeholders – priority filter

Importance: Is a change in behaviour an institutional priority?
Ethics: Are there any potential risks or unintended consequences when pursuing the desired behaviour? Are there uneven risks (i.e. positive for the majority but harmful risks for minority groups)?
Impact: Will changing the target individual behaviour translate to a significant societal impact?
Feasibility: Is it politically feasible? Are resources available? Is it controversial?
Data access: Is baseline data readily available? Can you collect individual or group-level prospective data?
Frequency: Does the behaviour occur frequently? Is there a reasonable base rate for the preferred behaviour?

1c. Define the desired policy outcome – SMART target

Specific to the target behaviour.
Measurable to assess and quantify results.
Assignable to a specific group of individuals.
Realistic given the time, budget and resources available for the project.
Timebound to ensure outcomes are achieved within a specified time period.



1d. Understand the context shaping target behaviours – process map

Evidence Package 1 Risk Profile Table 2 usefully provides Microbiological risk pathways for hypothetical "off-site" and "on-site" production of ready-to-eat (RTE) sandwiches and salads used in a hospital setting for distribution to in-patients on a

ward, and highlights the possible risks associated with different stages of food production and consumption.

Next, a complementary process map should reflect **how people "actually" behave rather than how they should behave**. Speaking to or surveying relevant stakeholders and target individuals can generate helpful insights. Observations can expose new insights because people may not provide honest answers, not remember past behaviour or not be consciously aware of their own behaviours or biases.

Process mapping behaviours relevant to *Listeria* and sandwiches/salads in hospital settings would help answer: who is doing what now, when are where this happens. E.g. It should help **identify at which points in the process noncompliance with temperature controls and shelf life controls is occurring**, then identify the points which would be most effective to target for intervention.

Conclusions

The literature highlights behavioural interventions which have improved food hygiene compliance, such as FHRS and handwashing, and successful behavioural interventions in the NHS which have improved healthcare compliance, such as prescribing best practice.

The literature shows knowledge alone is not enough to change behaviour. This is equally true of hand hygiene behaviour, as food safety education and training have improved knowledge but have been less successful in improving food hygiene compliance. Other important influences on food safety behaviours include: environmental context and resources; social influences; attitudes and risk perceptions; behavioural intentions; beliefs about capabilities; reinforcement; and professional role and identity. Sociodemographic characteristics of food handlers also influence food safety behaviours.

This initial investigation highlights how organisations have used behavioural insights to reduce the risk of *Listeria* in hospitals by improving compliance with food hygiene best practice. It indicates how to target the riskiest behaviours for *Listeria* under Shelf life controls and Time/temperature control.

Uncertainties and evidence gaps

Confounding variables: sociodemographic factors also influence behavioural determinants and food safety behaviours. These are related to the food handler (e.g. age, gender, education level, ethnicity, food safety training status, worker roles) and

food premise (e.g. type of premise, chain versus independent ownership, number of customers served).

Replicating what works for one target group or audience does not guarantee success for other target groups. There has been more research to understand barriers and facilitators to safe food handling among consumers than to understand hospital staff food safety behaviour. An exception was found on hospital nursing staff in Italy where over 80% had not attended any educational course on food hygiene and they had inconsistent food hygiene knowledge and practices.

Replicating what works in one context does not guarantee success in another context. Literature on food standards in hospitals has tended to focus on nutrition rather than food safety practices. Literature has tended to focus on food safety behaviours at home and in food businesses rather than in hospitals except for handwashing.

Food safety behavioural interventions have tended to focus on handwashing, rather than on other relevant practices such as shelf life controls and temperature controls. There are different safe food handling behaviours, but many studies report them as combined, so there was a lack of available literature to help understand barriers to and enablers of shelf life control and temperature control behaviours specifically.

Food safety social science and behavioural insights research to understand the barriers to and enablers of compliance with best practice has been conducted focused on *Norovirus* for example, but not on *Listeria*.

Food safety behavioural interventions have tended to focus on the behavioural levers of education and training, rather than other relevant levers such as restructuring the social and physical environment, and role modelling behaviour, which may be more effective in changing behaviour.

Annex

Stage 2: ANALYSIS

Alongside the BASIC framework, other frameworks include MINDSPACE and the BCW or behaviour change wheel, which incorporates the BCT Behaviour Change Taxonomy of behaviour change techniques. MINDSPACE condenses a few well-evidenced practical behavioural insights, and the BCT provides a comprehensive list of 93 behaviour change techniques clustered into 16 categories.

MINDSPACE
Messenger we are heavily influenced by who communicates information
Incentives our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
Norms we are strongly influenced by what others do
Defaults we "go with the flow" of pre-set options
Salience our attention is drawn to what is novel and seems relevant to us
Priming our acts are often influenced by sub-conscious cues
Affect our emotional associations can powerfully shape our actions
Commitments we seek to be consistent with our public promises, and reciprocate acts
Ego we act in ways that make us feel better about ourselves

BCT: Behaviour Change Taxonomy
16 categories of behaviour change techniques:
1. Goals and planning
2. Feedback and monitoring
3. Social support
4. Shaping knowledge
5. Natural consequences
6. Comparison of behaviour
7. Associations
8. Repetition and substitution
9. Comparison of outcomes
10. Reward and threat
11. Regulation (psychological)
12. Antecedents
13. Identity
14. Scheduled consequences
15. Self-belief
16. Covert learning