Improving health and wellbeing: A guide to using behavioural science in policy and practice

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World Health Organization Collaborating Centre on Investment for Health and Well-being

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Improving health and wellbeing: a guide to using behavioural science in policy and practice

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Behavioural Science Unit:

The Public Health Wales Behavioural Science Unit was launched in May 2022 to *provide specialist expertise on behavioural science, and develop the application of it, to improve health & wellbeing in Wales.* The Unit is part of the World Health Organisation (WHO) Collaborating Centre on Investment in Health and Wellbeing.

For further information, or support around the application of behavioural science to improve and protect health and wellbeing in Wales please get in touch.

Mae'r ddogfen hon ar gael yn Gymraeg / This document is available in Welsh

Some tools in this guide have been previously published, and are owned by others. Their content has been translated, with retention of some of the originally published language and design.

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1. Summary

Aims of the guide

This document aims to provide policy makers and practitioners in public health, healthcare and the wider Welsh public service with guidance on the use of behavioural science to help them reach their objectives. The guide focuses on behaviours in a range of policy areas, that directly or indirectly influence human health and wellbeing, including substance use, diet, physical exercise, injury prevention, behaviours that affect environmental sustainability, and antisocial behaviours and pro-social behaviours.

What is Behavioural Science?

Behavioural science is the scientific study of behaviour – what enables it, what prevents it, and how best to elicit and maintain it. It involves collecting and analysing data, synthesising evidence, building models and theories to predict behaviour, and developing and evaluating interventions to influence it.

Why use behavioural science?

Behavioural science is becoming widely applied in the public and commercial sectors. In the public sector it is being used to optimise policies, services, and communications. Relying on common sense to predict how people will react has led in the past to costly failures. There are now numerous examples of how behavioural science has led to effective policymaking, service development and communications.

Who should use behavioural science?

Most decisions in policy, service or communications development are made by people who are not behavioural science experts, and they do not need to be. The important thing is for these policymakers and practitioners to recognise when behavioural science might be deployed to add value to their efforts, and the first step to take in making that happen. To enable this, it is useful to have: an understanding of the basic principles of behavioural science, system-level enablement, and access to relevant tools, resources, and behavioural science expertise as required.

Basic principles of behavioural science

For someone to enact a particular behaviour at any given moment they must have the capability to do it (e.g., the knowledge and skills), the opportunity to do it (e.g., the time and resources and a conducive social environment), and they must be more motivated to do it than anything else they might be doing. This understanding is captured in the COM-B (Capability, Opportunity, Motivation, Behaviour) model which provides a unifying, transdisciplinary framework for other models and theories in behavioural science. It can be generalised to understand and predict the behaviour of groups, organisations and whole populations.

An important practical use of behavioural science is to develop effective behaviour change interventions. In doing so it is crucial not to jump in with such interventions prematurely, but to adopt a systematic method to arrive at ones that stand a good chance of meeting their objectives.

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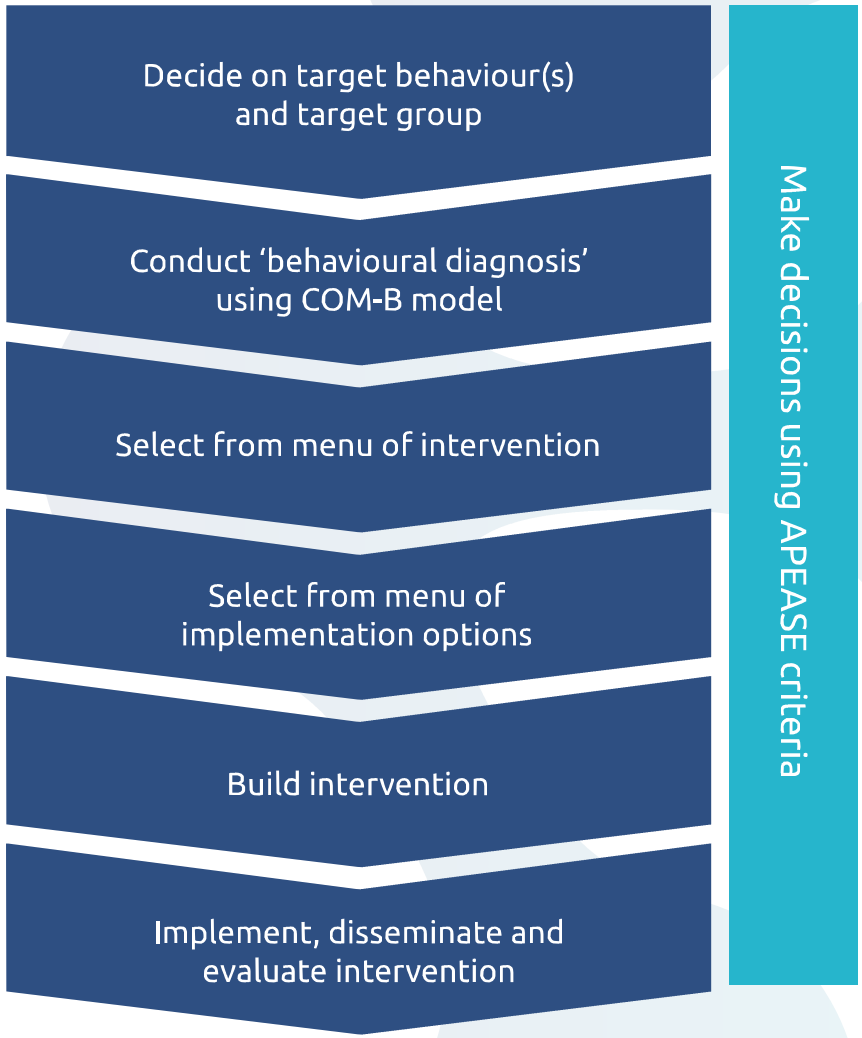
A first step in developing behaviour change interventions is to understand who needs to do what, when and for how long in order to achieve one's objectives: i.e., to decide on the target behaviour(s) and target group(s).

Then we need to understand how to ensure that a) each target group has the necessary abilities to perform the behaviour(s), that b) their physical and social environment supports the behaviour, and that c) they are more motivated to enact the desired behaviour than anything else. The process of developing this understanding is called behavioural diagnosis and it can be achieved using the Capability-Opportunity-Motivation-Behaviour (COM-B) Model. To achieve this, we draw (as far as time and resources permit) on literature reviews, primary research, evaluations of previous interventions, and stakeholder engagement.

Next, we must decide what the best approach to achieving this is, selecting one or more approaches from a menu of evidence-based options (intervention types): education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling or enablement. Each of these has strengths and limitations and is more appropriate in some situations than others.

We can then decide on how to implement these with a blend of policy options: providing a service or developing a product, mounting a communications or marketing campaign, legislating, producing regulations short of legislation, developing guidelines, using fiscal measures, and/or using environmental or social planning mechanisms. As with the intervention types, each implementation option will be more appropriate in some cases than others and usually more than one of them is needed.



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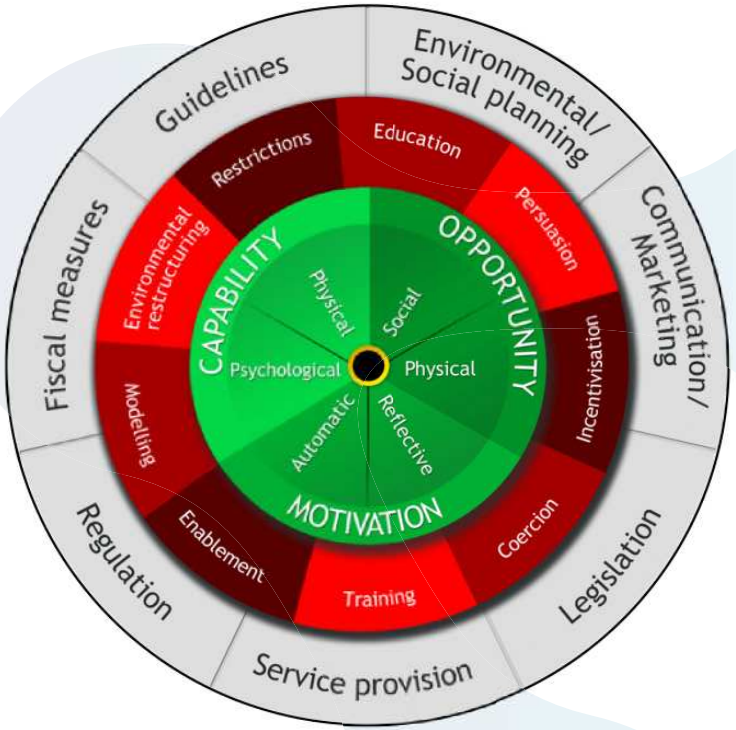
The behavioural diagnosis using the COM-B model, followed by selection of intervention types and then implementation options, is captured graphically in what is known as 'The Behaviour Change Wheel'. The wheel provides a simple visual reminder of the options available as one works out from the hub (in green) to the rim (in grey).

These steps create the overall vision of a behaviour change strategy. This is then used to build the intervention: i.e., to turn the vision into a concrete reality rather like engineers and builders translate an architect's vision into a functioning building. This includes selecting from a menu of specific Behaviour Change Techniques (BCTs) and deciding on appropriate modes of delivery, who should deliver the intervention (the intervention source) and the delivery schedule. Then the precise details of the intervention can be crafted.

Finally, the intervention needs to be implemented, disseminated, and evaluated. Throughout the development and implementation process, it is not enough just to consider whether in principle it will have the desired impact, particularly in the target-audience/population segment of concern. All the way through the process, from the initial ideas to the finished intervention, we must pay attention to a wide range of considerations, from the perspective of the target-audience/ population segment. These are set out in the APEASE criteria: acceptability, practicability, effectiveness, affordability, spill-over effects, and equity.
While the sequence set out above follows a logical order, it is usually necessary to revert to previous stages many times as we hit obstacles in the chosen approach or new data or opportunities become available.



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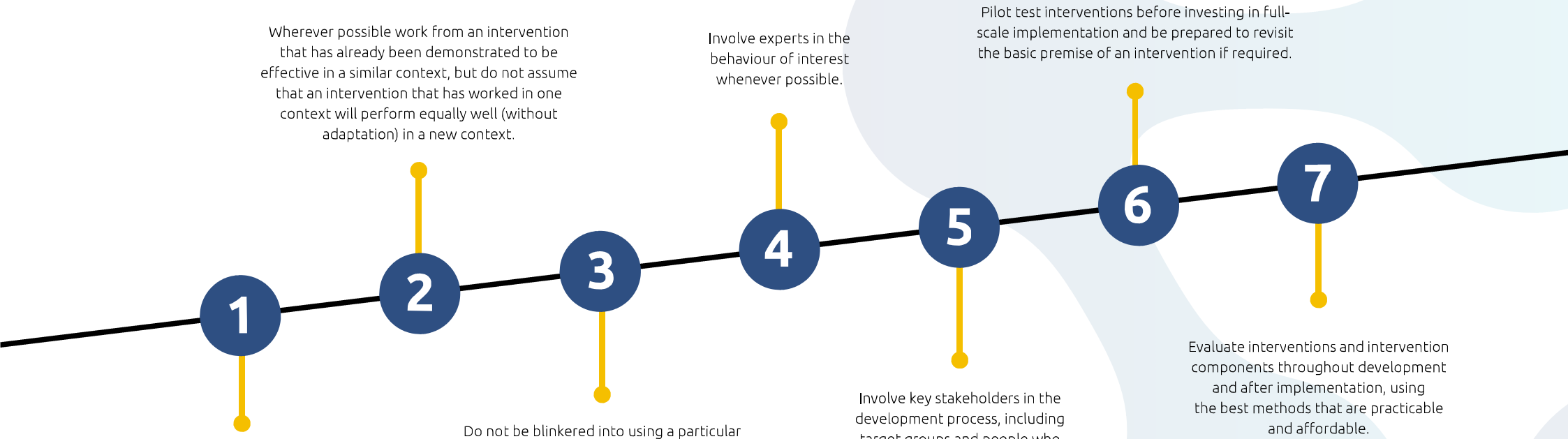
Intervention development scenarios

The above principles can be used in any intervention development scenario: building an intervention from scratch, applying an existing intervention to a new context, improving an existing intervention, or selecting from interventions that are being proposed. In every case the behavioural diagnosis and the APEASE criteria should inform the decisions being made about the options available.

Principles to apply during the development process

Applying the following principles will increase the chances of developing interventions that meet your objectives:



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2. Background

Governments, public health, healthcare and wider public service organisations develop and enact policies. They also directly commission, deliver and seek to improve services, and they engage in and commission communications.All these activities involve influencing the behaviour of people and organisations. They may target behaviour directly, as in policy activity to reduce excessive alcohol consumption; to attend a screening or vaccination appointment or to get more people to switch to active travel, or they may require changes in behaviour in order to work, as in tackling obesity or reducing Covid-19 infection rates.

Behavioural science applies scientific methods to understanding and influencing behaviour. It involves gathering data, developing models and theories, and using these to predict behaviours in specific contexts and population/workforce groups. The disciplines of psychology, sociology, anthropology, neuroscience, economics and many others all contribute to it. Its data collection methods include laboratory and field experiments, surveys, naturalistic observation, and interviews. It relies heavily on statistical analyses to detect patterns in the data and make inferences. It has contributed to significant advances in a wide range of areas, including transport safety, public health and clinical medicine, mental health, environmental protection, and law and order.

Influencing behaviour is often critically important, either directly or indirectly, to achieving goals to protect and improve health and wider wellbeing.

Behavioural science has become increasingly used across the board in government (national and local), public health, and healthcare. Many parts of the public and commercial sectors have set up behavioural science teams to advise them and, in some cases, to develop interventions to influence behaviours. However, we still have a long way to go in exploiting the potential of behavioural science to optimise health and wellbeing. This can be addressed by increasing understanding of behavioural science and its value in everyday decision-making, developing systems and processes, and by providing greater access to behavioural science expertise and resources.

Behavioural science uses rigorous methods to understand and predict behaviour.

The use of 'common-sense' assumptions about behaviour is prevalent but often leads to unsuccessful interventions. For example, it has been assumed that a major part of the reason newly qualified drivers have relatively high traffic accident rates is a lack of driving skills which has led to setting up post-licensing education courses. It turns out that motivational factors are probably dominant as causes of traffic accidents (1) and post-licensing driver education programmes focusing on improving driving ability have been found to be ineffective (2). In the Covid-19 pandemic the UK Government assumed that lack of motivation underlay the failure of people infected with Covid to self-isolate. This assumption led to threat of fines as a way to motivate self-isolation. However, it turned out that failure to self-isolate was in large part a matter of capability (not knowing the symptoms) and opportunity (not having the financial resources) (3) .

Behavioural Science Units are increasingly being set up in public sector organisations, but most decisions are still made using 'common sense' assumptions.These units provide expertise and resources; they also grow capability and broker engagement with topic experts.

Policymakers and practitioners experience several barriers to making effective use of behavioural science. One is that they may lack the basic understanding of behavioural science principles. Another is that decisions often have to be made quickly, without the time or resources needed for a full analysis of the problem and a carefully crafted solution. A third barrier can be overconfidence in their common sense understanding of behaviour. Fourthly, they often do not have ways of working or access to relevant behavioural science expertise to support the use of behavioural science

Jumping to decisions about interventions (policy, services and communications) without applying behavioural science can lead to costly mistakes and wasted effort.

Barriers to making effective use of behavioural science include lack of understanding of principles, the need for rapid decision-making, overconfidence in common sense, and lack of systems, and processes to access expert support.

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Wellbeing of Future Generations Act 'Way of Working'	Example of where behavioural science can contribute
Long term	• Identifying ways to combat the tendency for people to prioritise immediate perceived benefits over longer-term costs. • Identifying structural changes to social and physical environments that will sustain new behaviour patterns. • Supporting the development of new habits and routines
Prevention	• Identifying how to create a culture in all sectors of society that strongly values health and wellbeing. • Establishing optimum means of educating and empowering all sectors in society to behave in ways that maximise health and wellbeing. • Identifying key components of services that support the population in combating unhealthy behaviours.
Integration	• Supporting the development of 'systems maps' that show how the behaviours of different actors (organisations, individuals and groups) influence each other and important outcomes. • Identifying how behaviour change designed to achieved desired outcomes can have spill over effects, positive and negative, on to other outcomes. • Supporting decision making in complex interacting systems by providing tools and models that aid comprehension.
Collaboration	• Supporting identification and prioritisation of possible partnerships. • Identifying barriers and facilitators to effective collaboration. • Providing resources and evidence based principles to support effective collaboration within and across sectors.
Involvement	• Identifying and helping to engage key stakeholders. • Providing resources and insights to support effective co-production of policies, services and interventions. • Addressing concerns about, and possible counter movements to, beneficial policies and interventions.

Table 1: Examples of the contribution of behavioural science to the Wellbeing of Future Generations 'ways of working'

3. Scope

This guide focuses on behaviours that directly or indirectly influence human wellbeing and physical and mental health. These include behaviours that undermine health and wellbeing such as tobacco smoking, use of illicit drugs, excessive alcohol consumption, sexual harassment and violence. They also include behaviours that directly promote health and wellbeing such as physical activity, eating a balanced diet, getting vaccinated, and protecting ourselves and others against infection. Thirdly, they include behaviours that promote environmental sustainability such as reducing our use of fossil fuels and increasing our re-use and recycling of waste. Fourthly, we include behaviours of health, care and other practitioners and policy makers.

The Wellbeing of Future Generations (WBFG) (Wales) Act sets ambitious goals for improving wellbeing in Wales, as well as duties, mechanisms and 'ways of working' to achieve these goals (4). Achieving improvements in the social, economic, environmental and cultural wellbeing of Wales relies heavily on public and practitioner behaviours. Consequently behavioural science can play an increasingly important role in delivering the wellbeing goals. Table 1 provides examples of how behavioural science can contribute to each of the prescribed 'ways-of-working'.

Behavioural science can make a significant contribution to public sector bodies' ways of working to help achieve the goals of the Wellbeing of Future Generations Act.

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4. Aims

This guide aims to help policymakers and practitioners make effective use of behavioural science in their work – to optimise their efforts and increase the likelihood that policy objectives are realised – so we more often 'get what we aim for'.

It does this by providing:

1. **a framework for incorporating behavioural science in decision-making,**
2. **a basic understanding of the principles of behavioural science, and**
3. **a step-by-step guide to developing, adapting or selecting behaviour change interventions.**

It also includes tools and resources to help with intervention development and pointers to appropriate sources of behavioural science expertise.

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5. A framework for incorporating behavioural science into decision-making

Depending on the task at hand policymakers and practitioners can use behavioural science in several ways (Table 2). For most routine decisions, it is sufficient to have a basic grounding in the core principles. For more complex or important decisions/policies/services/communications, it is worthwhile taking a more structured approach using methods described in this guide. Decision-makers may need to go further and in addition to using a structured approach use tools and resources of the kind provided in this guide. There will also be occasions when decision-makers need to involve behavioural science experts. This may be on an ad-hoc basis using informal networks or established groups or teams, and may require commissioning specific pieces of work, including literature reviews and empirical research.

1	**Use personal understanding of behavioural science informally**
2	**Structure the problem using formal basic behavioural science principles**
3	**Use written behavioural science tools and resources such as templates and decision aids**
4	**Seek ad-hoc behavioural science advice from a standing group or team of experts**
5	**Commission behavioural science expertise to contribute to decision-making**
6	**Commission stand-alone behavioural science advice, reports or research**

Table 2: Ways of using behavioural science in decision-making

5.1 Making use of behavioural science expertise

The Public Health Wales Behavioural Science Unit (BSU) is a team established in 2022 with the mission of:
Providing specialist expertise on behavioural science, and developing the application of it, to improve health & wellbeing in Wales.

Public Health Wales Behavioural Science Unit

Website: phwwhocc.co.uk/teams/behavioural-science-unit

Email: PHW.BehaviourChange@wales.nhs.uk

Twitter: @BSU_PHW

The Unit provides:

1. rapid feedback on products (such as communication tools, letters, and scripts for service engagement),
2. technical assistance and advice to other parts of the organization and wider system,
3. advice to inform policy design,
4. engagement, advocacy and information to increase awareness of behavioural science (meetings, events, conferences, briefings, videos, public reports, peer-reviewed publications),
5. bespoke behaviour-change projects,
6. capacity-building among stakeholders in applying behavioural science (including readiness assessments, training delivery, webinars, workshops),
7. a developing network connecting policymakers and practitioners with external experts, and
8. assistance with commissioning projects.

The Unit is dedicated to maximising the use of behavioural science to benefit the public health and wellbeing, professional practice, and policy design.

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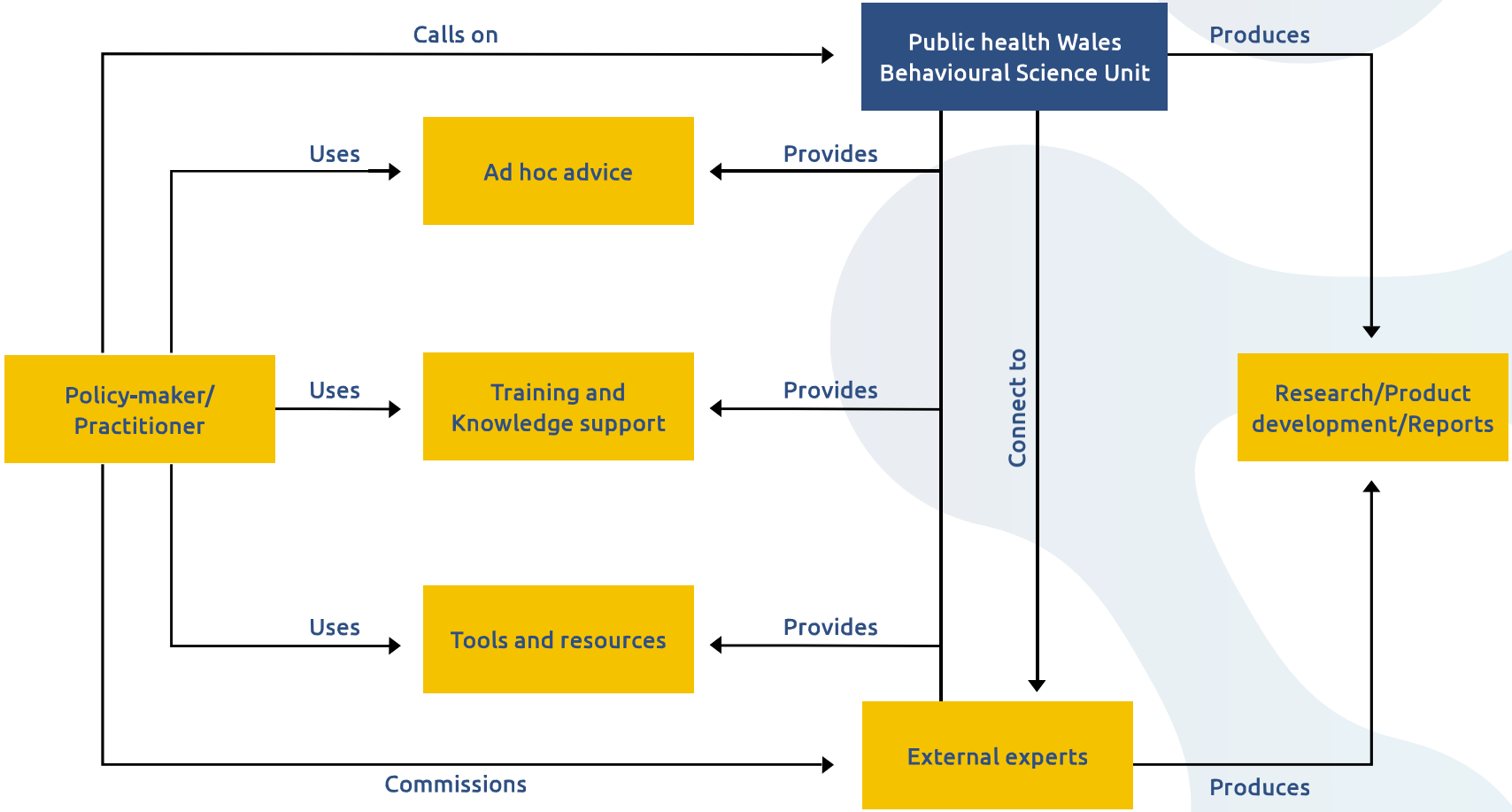
Figure 1: A framework for using behavioural science expertise



It is important to use behavioural science approaches and/or expertise as early in the process of intervention development as possible – so you get the change you aim for. Often expert help is brought in too late.

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6. Principles of behavioural science

A basic understanding of behaviour is helpful for developing effective behaviour change interventions. This section provides a brief overview of the principles which this guide will return to when it comes to explaining how to develop interventions.

6.1 Understanding behaviour: the COM-B Model

The starting point for developing interventions to influence behaviour (behaviour change interventions) is an understanding of the causes of behaviour. This guide uses a framework for understanding behaviour called the COM-B Model, whose initials stand for Capability, Opportunity, Motivation and Behaviour (5,6). The model aims to provide a framework for incorporating insights from all the behavioural science disciplines, including psychology, sociology, anthropology, economics and neuroscience. As such, it is interdisciplinary and was developed as a way of integrating the large number of models that have been proposed. It has become widely adopted in many sectors, including government, business and healthcare (7).

The COM-B Model captures the idea that three conditions must be met for any behaviour to occur on any given occasion. The core version of COM-B model focuses on an individual person at a given moment in time, but this can then be generalised to groups, organisations and whole populations over periods of time.

6.1.1 Capability

First, people must have the capability to perform the behaviour. Table 3 shows different aspects of capability. The COM-B model divides these into physical capability and psychological capability. For example, they must know how to do it and often they need to understand why they should do it. They must have the mental skills and resilience to achieve it, and they need the physique and physical skills to be able to do it.

When we are trying to influence the behaviour of groups of people or whole populations we want to maximise the capability of as many people as possible in that group. This may mean tailoring the intervention according to the pre-existing capabilities of members of that group (e.g., reading ability).

It will be necessary to focus on different capabilities depending on the behaviour, setting and target group. For example, when attempting to promote increased physical activity a focus on physical strength and stamina will most likely be more important in an aging population than a population of young adults.

Physical capability	Psychological capability
Having the physique needed for the behaviour	Awareness of the behaviour and how to perform it
Having the co-ordination, dexterity and physical skills needed for the behaviour	Understanding the consequences of the behaviour
Having the physical strength needed for the behaviour	Having the psychological skills and judgement (e.g., reasoning ability, memory capacity) needed to perform the behaviour
Having the sensory abilities needed for the behaviour	Having the mental resilience to perform the behaviour
Having the physical stamina needed for the behaviour	Having the self-regulatory abilities and techniques needed to perform the behaviour

Table 3: Aspects of capability to enact a behaviour

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6.1.2 Opportunity

In addition, the person must have the opportunity to perform the behaviour (Table 4). The COM-B Model divides opportunity into what it calls physical opportunity and social opportunity. Physical opportunity relates to time and the objects, materials and spaces in the world we inhabit. Social opportunity relates to the people, groups and organisations with whom we interact, directly or indirectly.

Physical opportunity	Social opportunity
Having enough time to enact the behaviour	Social support for the behaviour
Having access to the resources needed for the behaviour (e.g., money, equipment, materials, infrastructure, service provision)	Social norms and formal rules relating to the behaviour
Having access to spaces and locations needed for the behaviour	Social cues that prompt the behaviour
Having physical cues that prompt the behaviour	A linguistic and conceptual framework that is supportive of the behaviour

Table 4: Aspects of opportunity

It is all too easy to overlook the physical and social environment when trying to understand behaviour and to focus exclusively on the people whose behaviour we are trying to change. In social psychology there is a term for this undue focus on individuals: 'the fundamental attribution error'. It is a pervasive tendency when judging why people do things to assume that it is because of something special about them, rather than something in their environment. For example, we tend to overemphasise individual traits when trying to understand why people overeat or fail to exercise. This is not to say that individual traits are not important, but rather to point out that these are shaped by, and interact with, the person's environment; and often the best way to reshape the behaviour is to change the environment.

Social norms play a particularly important role in our behaviour. They set the boundaries within which we exercise our choices and they condition our perceptions and thinking. Norms may be explicit, for example embodied in a set of rules of conduct in an organisation or society. Very often they are implicit: tacitly accepted by members of a society or social group. Understanding the role of implicit social norms is crucial to understanding behaviour. For example, there are many occasions in which explicit rules say one thing (e.g., wearing protective clothing in a hazardous environment) but 'custom and practice' conflict with this. People in those settings will typically follow the implicit norms which then leads them to be personally blamed if things go wrong.

Table 4 has an entry for the 'linguistic and conceptual framework' which needs explaining. It is a recognition that the labels we give to things are extremely important in how we behave. For example, if we label 'addiction' as a disorder we behave differently in relation to it from how we would respond if we label it a 'lifestyle choice'. As social animals we recognise the importance of labels and spend a great deal of time and effort debating them. In the 'addiction' example, labelling it as a disorder provides an opportunity for those with the condition to be entitled to receive medical treatment and resources to be deployed in public health budgets to prevent it.

There are many examples of the benefits of focusing on opportunity to promote a desired behaviour when this is not the obvious thing to do. A good example in healthcare is providing GPs with 'post-it' pad for their desks to remind them to provide brief advice on stopping smoking to their patients. A randomised trial found that this increased the rate at which brief advice was offered to smokers without shifting their attitudes (8).

6.1.3 Motivation

Motivation is the third pillar of behaviour in the COM-B model. For any behaviour to be enacted people must be more motivated to perform that behaviour than any potentially competing behaviours (5). They must want or need to perform the behaviour more than anything else they might be doing at the time; or it must be such a strongly ingrained habit or instinct that it overpowers everything else.

Table 5 shows the different aspects of motivation. The COM-B Model divides motivation into reflective motivation and automatic motivation. Reflective motivation involves our conscious thought processes: planning, making evaluative judgement, and deciding what we should be doing. Automatic motivation involves our feelings of desire, our habits and our instincts.

Motivation is always about prioritisation. Sometimes this is obvious, as when a person is actively deciding whether to travel somewhere by car or on public transport. Other times it is not so obvious. For example, someone may not consciously decide each day to go to work by car or by train because they are following a set routine. But the possibility of the other option is still there and always has to be considered when understanding their behaviour. Thus, it may mean that to get someone to switch from car to train we have to bring the alternative option to the table, and encourage a reflective decision-making process, ultimately leading to using the train becoming the routine.

Reflective motivation	Automatic motivation
Forming, remembering and enacting plans	Emotions and drives
Making evaluative judgements	Feelings of desire (wants and needs)
Making conscious decisions	Habits and instincts

Table 5: Aspects of motivation

A second important insight when understanding motivation is that it must always be analysed 'in the moment'. For example, it does not matter what a person wanted a week ago, a day ago, an hour ago or even a minute ago. What matters is what they want 'now'. The reason this is so important is that many behaviour change interventions fail because they do not anticipate the situations the target population will be in that will drive their behaviour in the moment. For example, a person may decide as a New Year's resolution not to drink alcohol during the month of January. But if at 6.35pm on 3rd January that person is in a bar and offered a glass of wine and the desire to drink it is greater than the resolve not to drink alcohol, the offer will be accepted. At that moment a range of factors will be coming into play that were not present when the resolution was made: perhaps having had a stressful day at work, convivial company, or the enticing prospect of a particular favourite type of drink.

Behaviour change interventions must anticipate situations that the target group is likely to encounter and find ways of shaping their motivation at that precise moment.

A third important insight into motivation is that our reflective motivation does not have a direct influence on our behaviour; it has to work through our automatic motivation. Thus, it does not matter what we think we should do unless this leads us to feel that we want or need to do it; and it does not matter what we want or feel unless this creates an impulse to act or inhibits us from acting.

This is a principle that has been understood for centuries and is important to the development of effective behaviour change interventions. For example, an intervention may be highly effective at persuading a group of smokers that it would be better for them if they were to stop, but unless it led to them actually feeling that they wanted to stop it would not trigger a quit attempt (9). Then once they have started a quit attempt, their desire to stop would not be enough to keep them from relapsing if they experience an overwhelming impulse to smoke possibly compounded with a lowering of their inhibitions as a result of stress or alcohol (10).

This does not mean that conscious planning and decision making are unimportant, only that we cannot stop there when attempting to understand or predict behaviour. We have to understand how they lead to desires and then to impulses and inhibitory processes; and crucially we need to consider what other sources of desires and impulses they may be competing with. Figure 2 shows this schematically based on the PRIME Theory of motivation (5,11).

Plans are our self-conscious intentions to do things, perhaps in the immediate future or perhaps minutes, hours, days, weeks or even years ahead. We form plans as a result of evaluating a course of action as something worth doing. When the time comes to implement a plan we need something to trigger our memory of it – this might be an external stimulus or an internal cue.

Evaluations are our conscious beliefs about what is good or bad, right or wrong, useful for harmful, or ethical or unethical. They stem from what people tell us, what we work out for ourselves, our experiences, our desires, and our plans.

The influence of desires on evaluations ('wishful thinking') cannot be overstated; it is well established that people to a very large extent believe what we want or need to believe irrespective of the evidence. When attempting to influence behaviour, persuading people of uncomfortable truths is particularly difficult. It is natural to present what appear to be incontrovertible arguments and evidence, but this will typically only work if there is no strong emotional need pulling in the opposite direction. In those cases, a different route to behaviour change will often be needed.

Other important biases that affect our evaluations include 'confirmation bias' (a bias towards focusing on evidence that supports a pre-existing belief), overconfidence, 'loss versus gain framing' (a tendency to judge outcomes that are expressed as avoiding losses as more important than when the same outcomes are expressed as making gains), and 'egocentric bias' (a tendency to base judgements on one's own experience rather than more objective evidence) (12).

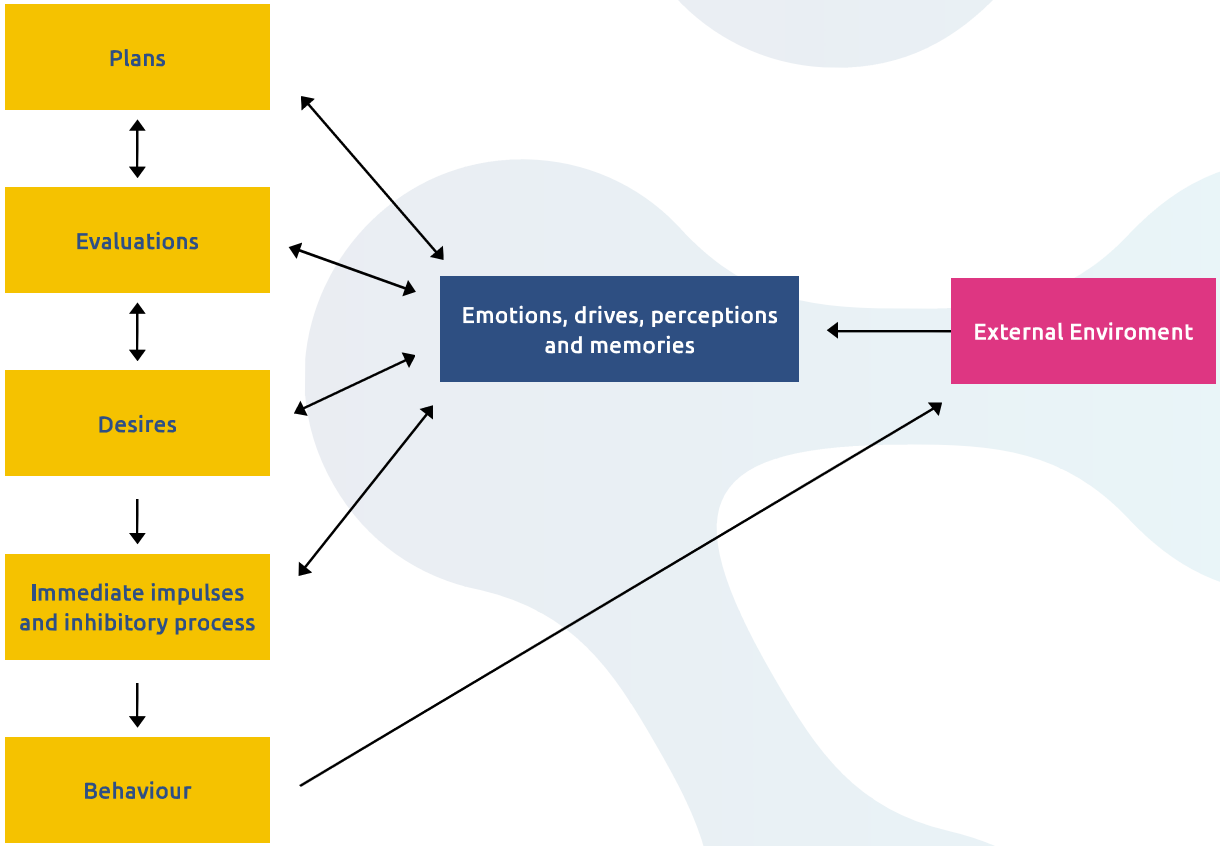

Figure 2: How parts of the human motivational system interact

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Desires are subjective feelings of wants and needs. They involve feelings of anticipated pleasure or satisfaction in the case of wants, and anticipated relief from, or avoidance of, mental or physical discomfort in the case of needs. For example, feeling uncomfortable and frustrated when travelling on a slow and crowded bus will lead us to feel a subjective need to avoid that mode of transport in the future. In contrast, the feeling of comfort, personal space, enjoying a good sound system, and prestige from driving an expensive car may lead us to wanting to use that mode of transport in the future. Desires can also stem from evaluations (wanting things that we have worked out seem like a good idea), drives states such as hunger, positive and negative sensations and emotions. They are an important source of impulses and inhibitory processes.

Our immediate impulses and inhibitory processes consist of the neural activity that ultimate control all our behaviour – not just what we call impulsive behaviour. They can stem from desires – for example, feeling that we need to smoke a cigarette will generate an impulse to smoke while a desire to remain abstinent will generate an inhibitory force against this. Impulses can also be generated directly by our environment, as happens with instinctive behaviours and habits. Ultimately our behaviours are determined by which of the impulses and inhibitory processes are the strongest at a given moment.

It is worth paying close attention to the many ways in which emotions can influence all the parts of this system. For example, a high level of fear can interfere with complex thought processes needed to arrive at sensible evaluations and plans. If you can create an intervention that directly influences immediate impulses or inhibitory processes, it has a much shorter route to behaviour than one that relies on someone forming a plan which then has to be remembered and still be thought to be a good idea and create a desire to enact it and then lease to impulses or inhibitory processes. This could be by training a habit or creating an environment that automatically triggers existing habits.

However, very often the only practicable way to change behaviour is through getting people to make conscious plans. Then we need to make them easily recalled and emotionally engaging so that they trigger strong desires and impulses or inhibitory processes when required, often in the face of strong motivations arising from the immediate environment. An obvious example is the case of trying to stop smoking. The 'plan' is not to smoke, and this has to generate a strong enough desire not to smoke and strong enough inhibitory processes to prevent smoking in the face of powerful urges.

This classic conflict between plans and desires and impulses stemming from the immediate environment is well studied in behavioural science and many techniques have been developed to address it. One of these is to give more emotional strength to plans by linking them to core aspects of a person's 'identity' (13). How we see ourselves can be an extremely powerful driver of behaviour, leading us to achieve great things or in some cases terrible things. To continue the example of smoking cessation, developing a positive self-image as a non-smoker can increase the chances of successful quitting (14). Similar process can be seen at work with diverse behaviours including sporting activities, active travel, careful driving and waste recycling.

6.1.4 How capability, opportunity, motivation and behaviour interact

Figure 3 shows how capability, opportunity and motivation influence behaviour and also how capability, opportunity and motivation influence each other. We can increase a person's motivation to do something by increasing their capability or their opportunity. For example, having a degree of skill in playing a sport will generally lead a person to be more motivated to play that sport. Increasing ease of access to recycling facilities will generally increase a person's motivation to recycle their waste.

Enacting a behaviour can change motivation to do it again or the capability or opportunity to do it. For example, repeating a behaviour can help develop a habit that strengthens motivation to enact it again. Enacting a behaviour can improve a person's capability. For example, practising cycling will generally increase cycling skill. Enacting a behaviour can also change the opportunity to enact it again. For example, exercising in a social group may help strengthen the group coherence thereby increasing the social opportunity to continue to exercise.

6.2 Behaviours are part of an interacting system

Behaviours do not occur in isolation. It is crucial to pay attention to how different behaviours compete with or facilitate each other by changing the capability, opportunity or motivation to engage in other behaviours (Figure 4). When trying to stop smoking, for example, using nicotine replacement therapy supports cessation by increasing the capability to stop and avoiding smoking cues can support smoking cessation by changing opportunity. Conversely, drinking alcohol can undermine smoking cessation by reducing capability and/or motivation.

Therefore, when planning an intervention to influence a behaviour it is important to assess what other behaviours the target group is engaging in and whether they are supportive of, or conflict with, the behaviour we are trying to promote. It is also important to think about what other behaviours can be added to the target group's repertoire to support the desired change and avoid adding ones that will be mutually undermining.

Appendix B provides a brief self-assessment quiz to confirm how well the principles set out in this section have been understood.

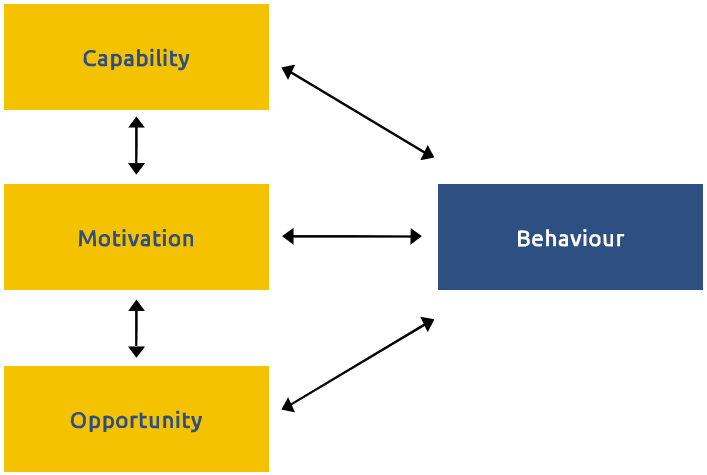

Figure 3: The COM-B Model

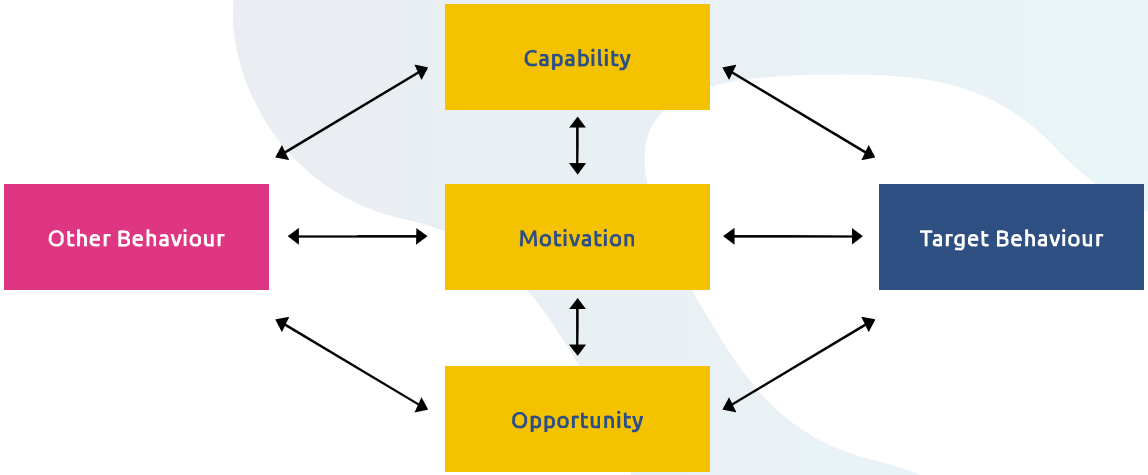

Figure 4: Influence of other behaviours on target behaviour – the extended COM-B Model

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7. Step-by-step guide to intervention development

There are numerous models and frameworks for managing projects and creating interventions of different kinds, not necessarily to do with behaviour. Figure 5 aims to distil the most relevant of these into a simple top level model. It notes that any project begins with a problem or opportunity. This leads to a project to develop or adapt an intervention, which in turn leads to implementation in some form, then should lead to some form of evaluation. The project may be abandoned during development or after implementation if it looks as though it is failing or it is judged that there is no further need. All stages of the project should be documented and reported in some way to key stakeholders and possibly the wider community. The evaluation of the project may lead to its continuation or lead to refinement or redevelopment and this process will often lead to a cycle of development.

In relation to the problem or opportunity a 'public health approach' can add value - early consideration of the epidemiology (the burden of disease, risks and trends) and/or purely the potential gain (quantification of the impact of the change in behaviour and the number of individuals being targeted) can help with prioritisation, scope and definition.

This guide focuses on the pink and yellow boxes: developing, implementing and evaluating behavioural interventions. Developing an intervention that aims to influence behaviour involves several stages. Figure 6 shows them as following a logical order but in many cases we need to go back to previous stages because we encounter obstacles to the path we have chosen or new information has come to light.

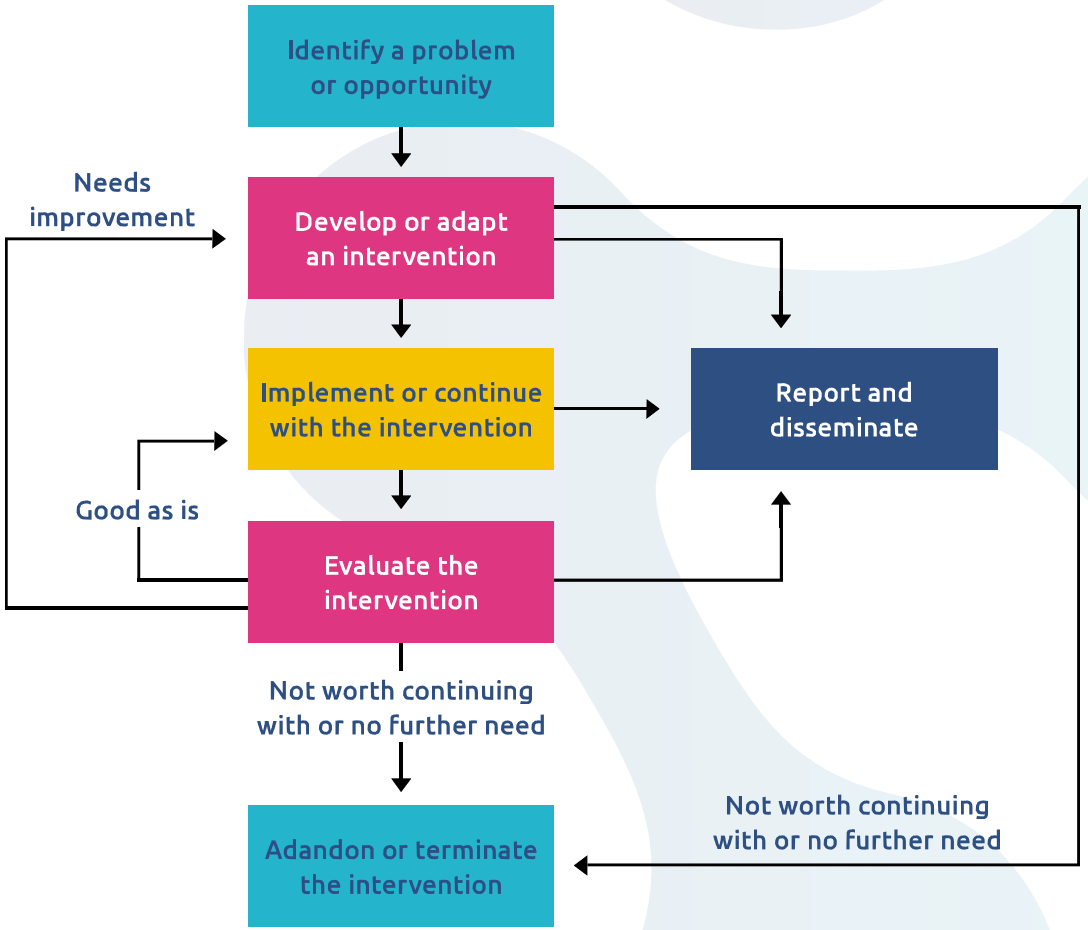

Figure 5: Overview of the process for developing interventions, not just behavioural interventions

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It is also often the case that we are not starting from scratch. Table 6 lists a range of starting points for intervention development that are commonly encountered. At the top is the case of starting with a blank sheet, where decisions have to be made about what behaviours in what target groups will be most useful to target. Then we have problems where the behaviour and target group have already been defined. After this we have cases where a decision has already been made about the kind of activity that the intervention will involve, for example where a communications team has been charged with developing a social marketing campaign. Then we have the task of deciding which of a range of proposals is best and finally how to improve or update an intervention that has already been running.

Whatever the starting point, it is worth applying all the stages in the development process, even if retrospectively. For example, even if it has been determined that a social marketing campaign should be run to improve blood donation, it is worth considering whether this is the right approach or whether such a campaign might be usefully supplemented by other approaches.

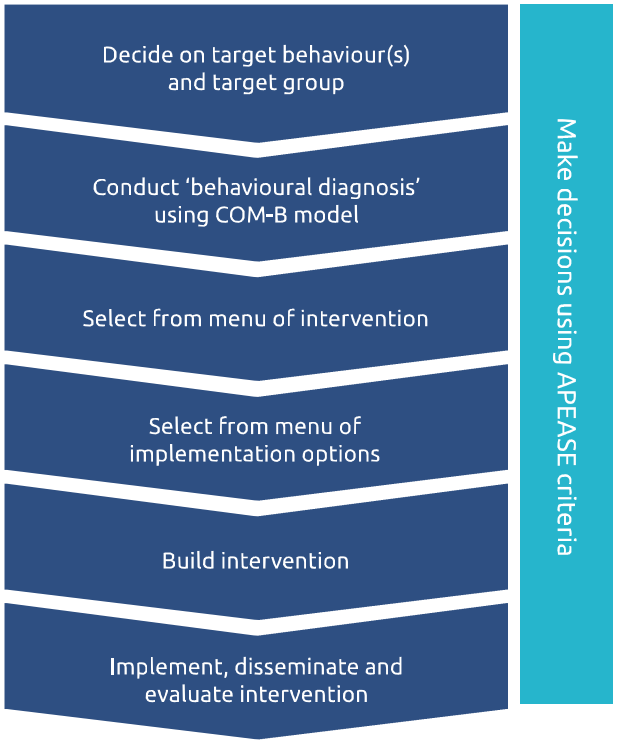

Figure 6: Stages in development of behaviour change interventions

Starting point	Examples
Developing an intervention from scratch to address a policy objective	• Developing a new weight management programme in secondary schools • Developing an intervention strategy to reduce carbon use at home
Intervening with a known behaviour and target group	• Reducing tobacco smoking prevalence in pregnant women • Increasing engagement with the bowel screening programme among those over 58.
Applying a pre-determined intervention strategy	• Development of a social marketing campaign to promote Covid-19 vaccination uptake • Development and dissemination of guidelines to reduce unnecessary antibiotic prescribing
Selecting from a range of proposed interventions	• Selecting from active travel interventions (i.e., relating to cycling (provision, skills, safety), or travel planning support, or active commuting. • Commissioning addiction treatment services
Updating an existing intervention	• Improving the effectiveness of driver training in teenagers • Improving letters encouraging people to donate blood

Table 6: Possible starting points for intervention development

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7.1 Using the APEASE criteria to make decisions

At every stage in the intervention development process, decisions have to be made. The APEASE criteria provide a framework for doing so, and thereby strengthening the intervention. Table 7 shows the criteria and examples of their use.

It is worth emphasising that APEASE can and should be applied whenever a decision has to be made at any stage in the intervention process, whether it is deciding whom to target, what behaviour(s) to target, whether it is better to focus on capability, opportunity or motivation, what intervention type(s) to adopt, what implementation option(s) to adopt or the details of the intervention.

APEASE can be applied informally in which case it there would be merit in using a simple checklist to ensure that all the criteria had been considered, or users can use it as the basis for a structured decision-making process as shown in **Appendix A.**

Criterion	Description	Example of use
Acceptability	How far is what is proposed acceptable to important stakeholders, e.g., the target group, those delivering the intervention, funders?	Legislation to completely ban the sale of tobacco may not be acceptable to most smokers.
Practicability	How far is what is proposed able to be implemented at the required scale, with the required quality for as long as will be required?	A mobile digital application to support dietary improvement may run into difficulties of data usage and access on the part of users and be difficult to maintain.
Effectiveness	How far will what is proposed achieve the policy objectives and provide value for money?	Will focusing on increasing physical activity achieve significant weight loss among school children?
Affordability	How far can what is proposed be achieved within an available budget?	Can a social marketing campaign to promote recycling in a local authority be undertaken within the budget of the communications department?
Spill over effects	What effects, good or bad, will what is proposed have beyond the target behaviour?	Will legislating to make Covid-19 vaccination compulsory for healthcare staff lead to staff shortages?
Equity	What impact will what is proposed have on health and social inequities?	Will focusing on promoting attempts to stop smoking increase health inequities given that people from more disadvantaged backgrounds find it harder to stop when they try?

Table 7: The APEASE criteria for decision making in intervention development

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7.2 Stage 1: Deciding on target population(s) and behaviour(s)

In order to decide whom to target and what behaviours to focus on, it is often useful to create what is known as a 'systems map'. Systems maps chart causal pathways in an interacting system. Figure 7 shows a systems map of causal pathways in preventing and responding to Covid-19 (15).

In this example, the nodes represent variables that can be increased or decreased in value and the arrows represent influences that can be either positive or negative between pairs of nodes. Public performance of protective behaviours, frequency and effectiveness of environmental cleaning and frequency of interpersonal contact are identified by the authors as potentially important behaviours to target. The map identifies in yellow what is called a 'causal loop' linking number of infectious people with risk of transmission per personal contact and transmission events. This lies at the heart of the systems map and provides a basis for identifying key behaviours to target.

The systems map should generate a list of potential target behaviours and actors (people or organisations) that can assessed using the APEASE criteria in order to decide which of these to focus on. This can usefully be accompanied by a brief description of the reasons for the choice structured according to the APEASE criteria (Appendix A).

It is essential to consider all the APEASE criteria. For example, evidence tells us that combining exercise and dietary

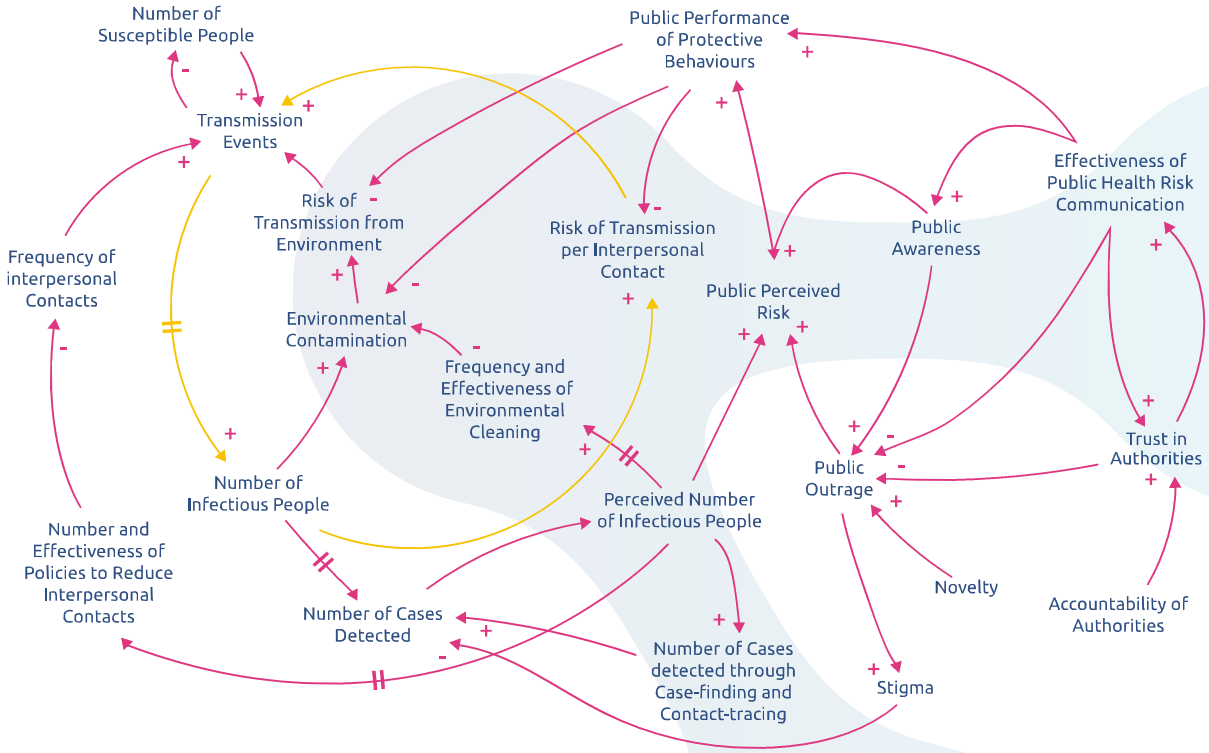

Figure 7: Systems map for preventing and responding to Covid-19 (15)

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behaviours in important in achieving weight loss (16) while exercise programmes are typically acceptable, affordable, practicable, equitable and have positive spill-over effects on mental and physical health. Improving equity is an important consideration that is often overlooked. It has been noted that advertising bans, smoking bans in workplaces, removing barriers to smoking cessation therapies, and increasing the cost of cigarettes all have the potential to reduce socioeconomic inequalities in smoking but many European countries are not adequately considering improving equity in their tobacco control policies (17).

Even when it appears to be obvious what behaviour(s) to focus on and whom to target, it is often worth pausing to consider whether this is indeed the case so we more often get what we aim for. For example, when trying to improve hand hygiene of clinical staff, there may be merit in widening the scope of the intervention to informing and empowering patients to monitor and check if they experience bad practice on the part of clinical staff (18).

7.3 Stage 2: Conducting a behavioural diagnosis

Once the target behaviour(s) and target group(s) have been identified comes the task of determining what changes in capability, opportunity and motivation to focus on. Table 8, expands COM-B into questions that can be used as a checklist to answer this question. In a sense, promoting behaviours is like opening a combination lock (which creates a natural pun with COM-Bination!) – everything must line up for the behaviour to occur.

COM-B targets	Questions
Capability	1. How aware are they of the behaviour and precisely what constitutes it? 2. How well do they know how to do it? 3. How well do they understand the benefits of doing it or costs of not doing it? 4. How confident are they that they can do it? 5. How far do they have the cognitive, perceptual and psychomotor skills to do it? 6. How far do they have ability to make judgements needed to do it? 7. How far do they have the self-regulatory capacity for it? 8. How far do they have the physical strength and stamina for it?
Opportunity	9. How far is it considered 'normal' within their social environment? 10. How far are there formal rules stipulating the behaviour? 11. How much support do they have in their social networks to do it? 12. How many prompts, cues and reminders for them to do it are they exposed to? 13. How well can they afford it? 14. How far do they have access to resources or equipment that facilitate or enable it? 15. How far do they have the time to do it? 16. How easily do they have access to places where they can do it?
Motivation	17. How worthwhile do they think it is? 18. How much enjoyment or satisfaction do they expect to get from it? 19. How far does is it provoked by an emotion or a drive state? 20. How far do they expect it to reduce any mental or physical discomfort? 21. How well does it fit with their self-identity? 22. How strong is their intention to do it? 23. How far is it a habit or routine? 24. How strong a priority is it over other things they could be doing?

Table 8: Questions that can be applied in order to arrive at a behavioural diagnosis

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Not all the questions will be relevant in all contexts. For example, many behaviours we wish to promote are not demanding in terms of physical or mental skills so we could take the answer to that question for granted. However, we must be careful before making these assumptions as the target audience might find this question highly relevant. For example, older people or people with disabilities may not have physical capabilities that we policy makers and practitioners may take for granted, and disabilities may be hidden.

Most people respond to their situations and environments in a way that makes sense to them, but not necessarily to us.

When we want to understand what factors underlie not engaging in a particular behaviour, we are looking for negative responses to the questions in Table 7; but in addition we may be looking for positive responses to questions that frame not doing something as a behaviour. For example, when it comes to stopping smoking as a behaviour, we can ask how far the target audience understand the benefits of stopping smoking and the self-regulatory capacity needed to do it?

The questions in Table 7 are expressed in very general terms. For a given behaviour it makes sense to convert them into more specific versions in order to identify potential COM-B targets. For example, if we trying to understand what would underlie successfully using public transport more often, we could translate Question 5 into something like: 'How far do they have the ability to avoid or resist the urge the jump-in-the-car?'.

Wherever the answer to a diagnostic question is broadly negative, we must decide whether to target the problem area directly or indirectly. For example, if our target group does not generally believe the behaviour to be worthwhile, we may be best focusing on getting them to understanding why it is important in terms that they can understand, and countering false information coming from other sources. Similarly, if they do not feel a strong enough desire to do it, it may be better to address the norms in their social environment than to try to tackle their lack of motivation directly.

The APEASE criteria are important in deciding what COM-B components to target. For example, when attempting to change a health behaviour such as calorie intake, shifting their self-identity to someone who cares deeply about their health could have positive spill-over effects for other behaviours. Thus, once a candidate list of COM-B targets has been identified it is worth taking each of these through the APEASE evaluation to decide which ones to focus on.

7.4 Stage 3: Selecting intervention types

Once we have decided what COM-B targets to focus on, we can begin to develop our intervention strategy. Very often the broad type of intervention we should adopt will follow naturally from the COM-B targets. Table 9 lists the broad intervention types available, and the COM-B targets they are generally suitable to addressing. They form the acronym EPICTREME, or rearranged the name, TIM-PREECE who was a famous English actor!

Intervention type	Description	Possible COM-B targets
Education	Informing, explaining and showing in order to increase knowledge and understanding.	Primarily influencing psychological capability, but also as a route to changing reflective motivation.
Persuasion	Highlighting, arguing, discussing, proposing, requesting, pleading or helping to imagine in order to influence attractiveness.	Influencing reflective or automatic motivation.
Incentivisation	Introducing payment, some other extrinsic reward, or an expectation of a desired outcome, for a behaviour.	Influencing reflective or automatic motivation.
Coercion	Introducing a cost or expected negative outcome to prevent a behaviour or to induce someone to enact a behaviour.	Influencing reflective and automatic motivation.
Training	Demonstrating, supervising, providing feedback and supporting practice in order to improve mental or physical skills, or build habits.	Increasing psychological capability or automatic motivation.
Restriction	Creating boundaries around what behaviours are and are not acceptable by setting rules.	Influencing social opportunity or indirectly influencing physical opportunity.
Environmental restructuring	Introducing, removing or altering objects in the physical environment or shaping the social environment to prompt, facilitate or prevent behaviours.	Shaping physical or social opportunity, and indirectly influencing both capability and motivation.
Modelling	Providing examples of behaviour for people to aspire to or imitate.	Shaping social opportunity.
Enablement	Providing or improving psychological, social or physical resources or treatments to support enactment of a behaviour.	Increasing psychological and physical capability, and indirectly increasing motivation.

Table 9: Intervention types matched to COM-B targets

There are often several ways of influencing a COM-B target, and as with other stages of intervention development it is useful to apply the APEASE criteria when choosing between them. A few basic principles are worth bearing in mind during this process.

First of all, it is generally wise to ensure that capability and opportunity are in place before targeting motivation directly. One reason for this is that there is no point in motivating people to do things they simply cannot do. A second reason is that it can often appear that motivation is the barrier to behaviour change when in fact it is secondary to a perception that the behaviour is difficult or impossible to achieve. This is captured in behavioural science by the concept of 'self-efficacy' (19). If we do not think we can succeed at something, we are less likely to try. Increasing the opportunity or capability to perform a behaviour can often also address the motivational barrier to do so.

Secondly, it is generally better to get people to do things because they want to rather than because they need to. However, if you cannot get someone to a position where/when they want to do something then you may have to get them to need to do it. This means that education and persuasion, and measures to make a behaviour easier for people are generally to be preferred than providing extrinsic incentives or using coercion. One reason for this is that when people are intrinsically motivated to do things they

do not require external monitoring to check that they are doing it, and they do not try to 'game the system' by doing enough to gain the reward or avoid the cost while not actually doing what is actually required, or not doing it well.

Having said that, sometimes extrinsic rewards can kick-start a behaviour which then becomes self-motivating. This has been found to be the case with getting children to eat healthy foods; if they can be induced to try the foods enough times, they can come to like them, and then want them. In addition, coercion is typically ineffective or counterproductive for a target group if most of the members of that group do not see it as legitimate. It can also help to provide clear boundaries around behaviours when norms and preferences may not be enough to do so.

7.5 Stage 4: Selecting policy options

Having decided on the broad types of intervention that are most likely to help achieve our objectives, the next step is to decide on policies to implement these. Sometimes this is obvious, or is dictated by resources available to us, but sometimes there is wide latitude and we need to think carefully about the pros and cons of different approaches.

Table 10 lists the policy options available to agencies, and interventions that they may be suitable for.

Policy option	Description	Intervention types
Creating and disseminating guidelines	Writing instructions and advice and mounting a campaign to get these accepted and put into practice.	Guidelines serve an education and persuasion role, but they can also help to set norms and provide an element of social coercion.
Using communications and marketing	Using print media, correspondence, broadcast media and social media to present text and images, and in some cases offering an opportunity for interaction.	Commonly used for education and persuasion, and to help shape social norms and inform about legislation.
Providing a service	Providing staff and resources such as mobile applications to support and enforce behaviour change.	Often used to enable behaviour change or support regulation. Can be involved in persuasion and education.
Using environmental and social planning	Using formal planning mechanisms to create supportive physical and social environments.	Most relevant to environmental restructuring.
Using fiscal measures	Using financial rules to provide incentives or disincentives.	Most relevant to incentivisation and coercion.
Enacting regulations	Creating and applying rules with sanctions for breaking them, short of legislation or by organisations that do not have the power to legislate.	Most relevant for restriction, but can involve creation of norms, incentivisation and coercion and serve an educational and persuasive function.
Enacting legislation	Enacting and enforcing laws.	Mostly used for coercion but can play a useful role in setting norms and sometimes in incentivising behaviours.

Table 10: Policy options and their uses

The policy options set out in Table 10 are relevant for all agencies/ entities that have authority to undertake communications and marketing, legislate, regulate, mount social media campaigns, influence (social and /or environmental) planning, write guidelines, raises taxes, set fines or provide/commission services.

As with the other stages in the intervention development process, it is helpful to apply the APEASE criteria to decisions about what policy options to use. For example, when going down the route of legislation we need to consider the practicability of enforcement and the extent to which this enforcement may increase inequalities. It may also have adverse spill-over effects, for example creating black-markets in goods, or resentment among large segments of the population.

A common mistake with the use of guidelines is to underinvest in their dissemination and promotion. Health professionals in particular are inundated by guidelines and it is extremely difficult to produce ones that will cut through. Often a highly targeted communications campaign is also required with key stakeholder to get engagement and ownership with guidelines. There also needs to be investment in maintaining the guidelines and ensuring that they remain salient and relevant. The behavioural diagnosis, choice of intervention types and of policy options have been captured in a graphic known as 'The Behaviour Change Wheel' (Figure 8). This lists identification of the capability, opportunity and motivation targets as the hub of a wheel, choice of interventions types as a middle layer and then of policy options as the rim. This is intended to provide an aide-memoire for intervention developers.

7.6 Stage 5: Building the intervention

Having decided on an intervention strategy involving the intervention type(s) (e.g., education and training) and the implementation option(s) (e.g., guidelines and service delivery), we now have to build the policy. There are many details to be worked out, and this will often involve a certain amount of pilot work and iterative testing.

If there are existing interventions to draw on that have proven successful in related behaviours and contexts it is best to start with these. There is a tendency to want to start afresh rather than build on or purchase something that has already been developed. But this is a mistake and can be very wasteful. For example, new mobile apps targeted at health-harming behaviours are still being developed when there are several already available that have been evaluated. It is better to adopt or improve on these than try to develop a new one – unless one has a highly innovative idea that one wishes to try, or responds directly to 'new' insight.

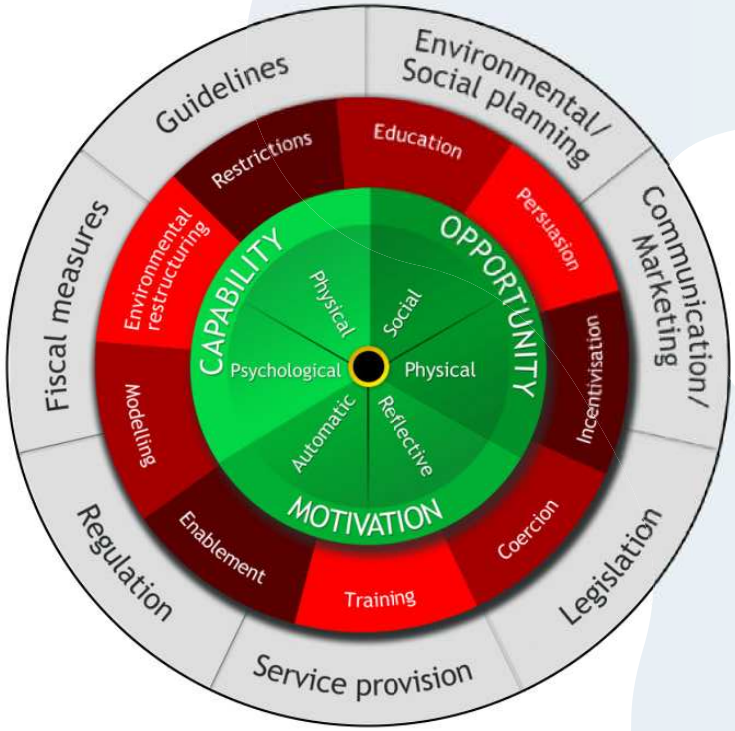

Figure 8: The Behaviour Change Wheel

If there is an intervention already in existence that will do the job, it is generally best to adapt and test that.

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7.6.1 Intervention content

Table 11 lists commonly used behaviour change techniques (BCTs) that can be deployed to enact each of the broad intervention types. BCTs can be thought of as the irreducible active ingredients of interventions.

This list is based on a published taxonomy but uses everyday language to describe the techniques (20). Each of these BCTs will need to be specified in further detail as the intervention is being built.

Intervention type	Behaviour change technique	Example
Education	Making people aware of a target behaviour that should be adopted	Telling people about local recycling rules and use of local facilities
	Informing people about the consequences of a target behaviour	Making people aware of previously unknown risks of cigarette smoking (e.g., increased risk of blindness)
	Equipping people with the background understanding needed for the target behaviour	Teaching novice drivers about minimum braking distances in dry and wet conditions
	Informing people how to enact a target behaviour	Explaining how to use face coverings for maximum protection
	Informing people about the circumstances when a target behaviour is appropriate	Notifying people about seasonal flu vaccines
	Providing feedback on the effects of a target behaviour	Showing people who are overweight the health benefits they are accruing by changing their diet and reducing their weight
Persuasion	Prompting commitment to a target behaviour	Getting people to make a verbal commitment to move to 'low or no' alcohol consumption
	Making the consequences of a target behaviour more salient	Showing graphic images of car crashes resulting from excessive speed to reduce speeding
	Creating associations between a target behaviour or an unwanted behaviour and stimuli that have emotional or significance	Pairing images of someone doing physical activity with images of an attractive lifestyle to promote an increase in physical activity
	Making social comparisons regarding a target behaviour	Showing people how their active commute compares with that of other people to promote active travel
	Making reference to an authority supporting a target behaviour	Referring to a report by a professional body to promote adoption of prescribing guidelines for GPs

Persuasion (cont...)	Linking enacting a target behaviour or not enacting an unwanted behaviour to a valued self-identity	Linking being regularly physically active with identity of being a good parent
	Making reference to an authority supporting a target behaviour	Referring to a report by a professional body to promote adoption of prescribing guidelines for GPs
	Highlighting how a target behaviour fits with other beliefs or how an unwanted behaviour conflicts with them	Highlighting how reducing meat consumption fits with beliefs about the desirability of reducing production of greenhouse gases
	Framing outcomes of a behaviour in a way that promotes a target behaviour or non enactment of an unwanted behaviour	Framing smoking cessation in terms of the number of hours of life lost from every day of continued smoking
	Asking someone to enact a target behaviour or not enact an unwanted behaviour	Respectfully asking users of a service to show respect for those providing the service
	Pleading with someone to enact a target behaviour or not enact an unwanted behaviour	Pleading with people to give money to an emergency appeal
	Advising someone to enact a target behaviour or not enact an unwanted behaviour	Advising someone, as someone with expertise or knowledge, not to prepare food for others when suffering with diarrhoea or vomiting
	Providing biofeedback to support a target behaviour or non enactment of an unwanted behaviour	Showing smokers their expired air carbon monoxide concentrations to help motivate smoking cessation
Incentivisation	Rewarding a target behaviour or non-enactment of an unwanted behaviour	Providing pregnant smokers with vouchers for stopping smoking
	Prompting self reward for a target behaviour	Prompting people to give themselves treats after meeting their alcohol reduction goals
Coercion	Punishing or threatening to punish an unwanted behaviour or non-enactment of a target behaviour	Criminal sanctions for selling illicit drugs
	Taking away, or threatening to take away, something sought after if an un-wanted behaviour is enacted or a target behaviour is not enacted	Removing access to grants for companies that fail to develop a green energy use policy
	Increasing the financial cost of an un-wanted behaviour	Introducing a charge for disposable plastic bags in shops

Training	Demonstrating a target behaviour	Showing people how to cleanse hands effectively
	Breaking down a target behaviour into components	Breaking down the actions required to enter and exit a road junction safely into the observation and action steps
	Prompting practice of a target behaviour	Getting community pharmacists to practice delivery of brief advice on reaching a healthy weight to improve their skill at doing this
	Providing feedback on performance of a target behaviour	Using dyes to provide feedback on effective hand cleansing by clinical staff, or children in school
	Prompting mental rehearsal of performance of a target behaviour	Encouraging commuters trying to reduce car use to mentally rehearse their responses when it is raining before they leave home
	Prompting or supporting repetition of a target behaviour to establish a routine or habit	Promote and give guidance on development of a daily physical activity routine
Restriction	Setting up a behavioural contract for a target behaviour or non-enactment of an unwanted behaviour	Getting agreement to codes of practice relating to health and safety in the workplace
	Setting up or promoting rules for a target behaviour or non-enactment of an unwanted behaviour	Co-producing rules for considering target behaviours when designing a new service
Environmental restructuring	Providing prompts or cues for a target behaviour or removing prompts or cues for an unwanted behaviour	Placing healthy food items in prominent places in supermarkets
	Providing material or financial resources for a target behaviour or removing them for an unwanted behaviour	Ensuring adequate financial support for those who need to self isolate because of communicable disease
	Increasing physical access to objects or spaces that enable a target behaviour or decreasing access for unwanted behaviours	Bringing vaccination facilities closer to people's homes
	Increasing the time available for a target behaviour or decrease it for an unwanted behaviour	Providing time off work to attend a stop smoking clinic, a screening or vaccination appointment
	Building a social norm around enactment of a target behaviour or non-enactment of an unwanted behaviour	Creating a movement around stopping smoking each October
	Increasing the time or effort needed to enact an unwanted behaviour	Reducing the density of alcohol outlets in areas with high rates of alcohol-related problems

Modelling	Showing an example of someone enacting a target behaviour to prompt imitation	Showing someone with whom a target group identifies getting vaccinated to promote vaccine uptake
	Relating an example of someone enacting a target behaviour to prompt imitation	Telling people in a target group that someone they admire and respect has reduced their meat consumption
Enablement	Building confidence in ability to enact a target behaviour or not enact an un-wanted behaviour	Getting people to remember previous occasions when they have managed 'low or no' alcohol consumption for an extended period
	Promoting effective use of medication to enable a target behaviour or to prevent enactment of an unwanted behaviour	Providing free and easy access to effective stop smoking medicines
	Prompting or aiding effective goal setting for a target behaviour or unwanted behaviour	Prompting parents who are interested in reducing carbon use to set a definite number of days/week when they will walk with their children to school
	Prompting or aiding enactment of another behaviour that supports a target behaviour or aids non-enactment of an unwanted behaviour	Providing a decision support tool and providing guidance on use of the tool to aid support effective diagnosis and treatment of lower back pain
	Providing instruction or support to address barriers for a target behaviour or create barriers for an unwanted behaviour	Instruct on how to approach an active commute, when the weather is inclement
	Prompting or aiding effective planning of a target behaviour	Supporting development of specific IF THEN plans to avoid drinking alcohol in high-risk situations
	Prompting or supporting self-monitoring of a target behaviour	Setting up an audit and feedback system for antibiotic prescribing in general practice to support appropriate use of antibiotics

Table 11: Commonly used behaviour change techniques

7.6.2 The NEAR-AFAR framework

It can be daunting to remember and understand how to apply the large number of behaviour change techniques available. A simple framework to help make a start on this is to note that behaviours are more likely to occur when they are: normal, easy, attractive and routine (NEAR). Conversely, behaviours are less likely to occur when they are: abnormal, fraught (in the sense of being difficult to do), aversive, and involving reflection (having to stop and think) (AFAR).

The NEAR framework can be mapped on to the COM-B model to provide a starting point for intervention design. Of course, the intervention developer still needs to translate the broad ideas into a practical intervention to test.

7.7 Intervention delivery

For many of the behaviour change techniques we have to make decisions about the 'mode of delivery' which is a medium through which the influence is to be achieved. Table 12 lists commonly used modes of delivery for intervention developers to choose from.

It is worth reviewing the list of options and applying APEASE criteria to decisions as to which of them to adopt rather than automatically going for the one that first springs to mind. Commonly, several behaviour change techniques and modes of delivery will be required. For example, signage is often very important in notifying people of restrictions that are in place.

Delivery medium	Mode of delivery	Example
Digital applications	Interactive websites, computer programs (apps), messaging applications	Mobile application to aid reduction in alcohol consumption
Pre-recorded dynamic content	Videos, blogs, TV, radio and online advertisements	TV advertisement to promote waste recycling
Live content	Lectures, seminars, support groups, meetings, interviews, counselling sessions, advice sessions, press conferences	One-to-one smoking cessation counselling
Print media	Newspaper advertisements, newspaper articles, books, manuals, leaflets, letters	Guide to promote effective use of behavioural science in policy making
Signage	Signs, markings, posters	Signs warning of slippery road surface
Object design	Package inserts, product or package labelling, package design, product design, product size, product shape	Terrain Awareness Warning System in aircraft to prevent 'controlled flight into terrain'
Infrastructure	Construction, destruction, placement	Construction of cycle lanes, oneway walkways, protective screens

Table 12: Commonly used modes of delivery of behaviour change interventions

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When considering modes of delivery we also have to making decisions about a range of attributes as listed in Table 13.

Mode of delivery feature	Examples
Sensory modality	• Combining visual and auditory information in video blogs • Providing haptic cues to warn of stalls in aircraft • Use of braille for visually impaired readers
Use of imagery	• Presenting graphs of infection rates • Graphic health warnings on cigarette packs • Using video footage to show the impact of global warming
Use of text and numbers	• Conveying speed limits • Identifying the alcohol content of beverages • Writing advertising copy
Interactivity	• Prompting questions after delivering brief advice on smoking • Tailoring app content to the needs and preferences of users • Prompting group interaction
Gamification	• Giving points for achieving milestones • Promoting competition with peers • Setting challenges
Complexity	• Ensuring that text conforms to a maximum reading age • Staging the presentation of information • Avoiding use of jargon

Table 13: Features of modes of delivery

For some BCTs we also have to consider who is delivering it: what we call the intervention source. Table 14 lists potentially important attributes of intervention sources.

Commonly used sources are health professionals, educators, members of a peer group and family members.

So building the intervention involves decisions about the behaviour change techniques and in many cases the modes of delivery and delivery source. This can still leave a lot of work to do in specifying and building the intervention but it should provide solid foundations for it. The final stage of specification and building requires specific expertise in the behaviour of interest. Human behaviour is highly complex and it is usually impossible to derive an intervention purely from first principles.

Source attribute	Description
Credibility	How far does the target group trust the source in terms of expertise and honesty?
Likeability	How far does the target group like the source?
Expertise	How far does the source have the knowledge and skills required to deliver the intervention?
Trainability	How far can the source be trained to deliver the intervention?
Motivation	How far is the source committed to delivering the intervention as specified?
Cost	How much does it cost to employ the source to deliver the intervention?
Availability	Is the type of source available in sufficient numbers and can the source be provided with sufficient time to deliver the intervention as required?

Table 14: Attributes of intervention sources

7.8 Implementing, disseminating and evaluating the intervention

Implementing behaviour change interventions can often be a behaviour-change intervention in itself! It requires a sound understanding of the capabilities, opportunities and motivations of key stakeholders who will be involved in supporting, delivering and promoting it.
Beyond implementation, dissemination is important for knowledge sharing. The more we can build on the experience and resources developed by others the more we can avoid re-inventing wheels and repeating potentially costly mistakes.

It is widely recognised that behaviour change interventions need to be evaluated, but usually the budget available for evaluation is often not sufficient for conclusions about effectiveness to be drawn with confidence.

However, evaluations need not be costly and often they can use routinely collected data. Table 15 lists commonly used evaluation methods and their strengths and limitations.
people of restrictions that are in place.

Table 15: Commonly used evaluation methods

Evaluation method	Description	Strengths and limitations
Randomised Controlled Trial (RCT)	Members of the target group are randomly assigned to receive or be offered one or more interventions and one or more comparators and outcomes are assessed and compared across the groups.	• Under ideal conditions can provide strong evidence that outcomes are due to an intervention. • These conditions almost never occur, for example, because of loss to follow up. • Expensive and time consuming • Only applicable to simple, usually binary, comparisons evaluating intervention packages. • Often of limited generalisability because of factors such as the need to obtain informed consent from participants.
Factorial experiment	Members of the target group are randomly assigned to receive one of a number of interventions that differ from each other in one of a number of features, and outcome assess in a way that allows the effects of features and their combinations to be compared.	• Can identify effects of specific intervention features or components or their combinations. • Can under certain conditions be an efficient way of testing intervention components with adequate statistical power. • Similar limitations to RCTs. • Complex interactions between features are often difficult to interpret.
Quasi experimental study	People or groups who experience an intervention, by choice or as a result of policy decisions, are compared in terms of outcome behaviours with those who do not or who experience a comparator.	• Can provide 'real world' evidence of intervention effectiveness, especially when using objective outcome data. • Cannot guarantee that outcomes are not due to factors outside of the intervention that happen to covary with the intervention. • Can obtain data from large representative samples relatively inexpensively.
Interrupted time series study	An extensive sequence of observations or data points taken at regular intervals (e.g., every week) starting well before the start of the intervention and continuing for a substantial period after it has started are used to estimate the impact of the intervention taking account of possible trends that might already be present.	• Useful for estimating 'real world' effectiveness and picking up effects that might be delayed or increase or decrease over time. • Use of multiple data points allows greater confidence that effects observed were not merely a continuation of preexisting trends. • Inclusion of covariates can provide a degree of confidence that the effects observed were not due to con-founding. • Multiple data points are often not available. • Cannot rule out influence of confounding factors.

Pre-post comparison study	Data on variables of interest are compared from before to after an intervention has been implemented or experienced by a target group.	• Can provide useful 'real world' evidence, especially when using objective outcome data. • Cannot guarantee that apparent effects are not due to something else that changed during the period of the intervention. • Can obtain data from large representative samples relatively inexpensively.
Post-intervention evaluation study	Data on a variable of interest are analysed followed implementation of an intervention.	• Only useful when outcomes can be evaluated against a predefined benchmark and therefore better for detecting when an intervention is not performing as hoped for than providing confidence that it is. • Cannot be used to assess effect size. • Attributing outcomes to the intervention relies on being able to make strong a priori assumptions about what would have happened in the absence of the intervention. • Can be very inexpensive, especially if using routinely collected data.
Process evaluation	Data are analysed that provide information about how well an intervention has been delivered or received, and how far it has had an impact on variables that are believed to be on the causal pathway to an outcome of interest.	• Can provide information on whether an intervention is likely to fail and how an intervention effect may come about. • Cannot provide information on intervention effectiveness. • Can interfere with the delivery of an intervention.
Opinion survey	Opinions are sought about an intervention and its effectiveness from samples that are aimed to be representative of a target populations or people who would have insight into the impact on a target population.	• Can provide useful information about other aspects of an intervention such as acceptability to the target group or those delivering the intervention. • Provides at best weak evidence of intervention effectiveness.
Interview study	People involved in an intervention, including the target population, are interviewed about their experiences.	• Can provide useful insights into how people are experiencing an intervention. • Can help to understand how an intervention may need to be changed to make it effective. • Unlikely to provide useful information on intervention effectiveness.

Table 15: Commonly used evaluation methods

8. Important principles in intervention development

The preceding sections have described stages to go through when developing behaviour change interventions. They have also alluded in places to important principles to adopt during this process. This section brings these principles together.

8.1 Do a literature review

Start with a review of the scientific literature to identify specific factors potentially influencing the behaviour(s) of interest and possible intervention approaches. Online databases (e.g., via NHS e-library); Google Scholar; or subject-specific journals, are great starting points for literature reviews and can reveal articles as well as books, book chapters and published reports. If time and resources permit, it is often worth undertaking a systematic review, but often there are already up-to-date systematic reviews available.

8.2 Do not re-invent the wheel

Wherever possible start with an intervention that has already been demonstrated to be effective in a similar context. There are so many factors to consider when developing an intervention the chances being able to work them all out from scratch in a given situation, and timely manner are remote. In the case of many of the behaviours of interest there will already have been a large number of interventions developed and in some cases these will have demonstrated effectiveness in a range of contexts. The task in those cases is to examine these closely, identify their active content and positive features of their modes of delivery and delivery sources and use a behavioural diagnoses and an APEASE evaluation to determine how they can be applied in the current context, or which of a number of options to adopt.

8.3 Be prepared to adapt

Do not assume that an intervention that has worked in one context will perform equally well without adaptation in a new context. Human behaviour is highly context dependent and so the principle described in 8.2 needs to be accompanied by a willingness to use behavioural science principles and pilot testing (see below) to determine what changes may need to be made for an intervention to achieve our objectives in the current setting.

8.4 Cast the net wide

Do not be blinkered into using a particular implementation option (e.g., a social marketing campaign) just because it is what is most readily available or the one that first springs to mind. For example, when we want to stop someone doing something, often the first thing people think about is to use coercion through legislation (e.g., fining people for breaking Covid rules). Even if coercion is ultimately what is required there may be better ways of achieving this, for example by creating strong social norms leading to social pressure.

8.5 Use topic-specific experts

Intervention development should always involve topic experts if possible. Human behaviour is complex and, while a general understanding of principles of behaviour change is helpful, there is no substitute for expertise in specific areas of interest. Even a thorough search of the research literature conducted by someone unfamiliar with a topic may not be sufficient. This is partly because familiarity with a topic is often necessary for effective search and interpretation of findings and partly because the research literature often does not fully capture nuances that need to be taken into account.

8.6 Involve key-stakeholders

The intervention development 'team' should, where possible, include people who will be involved in the delivery of the intervention and whom the intervention will target. The term often used for this is 'co-production'. There are two reasons for this.

One is that behavioural interventions often involve shaping choices and habits, and it is ethical to respect people's rights to make up their own minds about what to do. Sometimes

it will be necessary to intervene in ways that restrict choices or are unpopular with some of the people who will be affected, but it is an important ethical principle to ensure that we have fully taken their views and preferences into account.

Secondly, if we do not engage in co-production, we are likely to make mistakes. These stem from false assumptions about factors influencing people's behaviour and about what people find acceptable. We also deny ourselves an opportunity to glean insights into the situations people find themselves in, which could radically influence the choice of intervention strategy or its implementation.

8.7 Carry out pilot testing

We should always pilot test interventions or intervention components before investing in full-scale implementation, and we should be prepared to revisit the basic premise of an intervention if required. In any complex device or system it is essential to create prototypes and evaluate these before going into full scale production. It is simply not feasible to predict the influence of the multitude of factors that can influence success.

A common mistake is to undertake pilot testing but with a strong bias toward proceeding. Very often we hear of behaviour change interventions being described as 'promising' when an objective evaluation of the available data does not support such a view.

8.8 Always evaluate

We should evaluate interventions and intervention components throughout development and after implementation, using the best methods that are practicable and affordable, and with a clear focus on measuring the target behaviour in the target population (segment). Evaluation should be integral to all stages of intervention development and throughout the life of an intervention. Even once an intervention has been implemented and tested, it is important after a while to check that it is still delivering its objectives.

This evaluation is often challenging and it is common for intervention funders not to put enough resource into this. However, evaluations need not be costly. Often they can use routinely collected data. Table 15 lists commonly used evaluation methods and their strengths and limitations.

9. Conclusions

Effective policymaking and service delivery requires an understanding of behaviour that goes beyond common sense. Behavioural science is being increasingly used to help shape policies and develop interventions aimed at influencing behaviour.

This guide provides a brief introduction to key principles in behavioural science and a step-by-step process for developing behaviour change interventions using those principles. It is not a substitute for in-depth knowledge of a given topic but a framework for harnessing that knowledge and optimising the intervention, so we more often 'get what we aim for'.

Appendix C *provides a checklist to help ensure that all the key steps and principles in intervention development have been applied.*

It is intended that this guide be updated as required in the light of users' experiences and advances in behavioural science.

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Appendix A:
Formal process for applying reporting APEASE assessment

The APEASE criteria are used for assessing: 1) intervention options under consideration, 2) intervention components that have been developed, and 3) full interventions. They were identified from a review of the intervention evaluation literature.

The information used to make an APEASE assessment can vary, depending on the importance of the assessment, and the time and resources available. The main options are:

1. Informal analysis
2. Application of theories and models
3. Consultation with experts
4. Literature review
5. Stakeholder engagement
6. Primary research
    a. Interviews
    a. Focus-groups
    a. One-off cross-sectional surveys
    a. Repeated cross-sectional surveys
    a. Analysis of social media posts
    a. Analysis of routinely collected data
    a. Laboratory experiments
    a. Field experiments, including randomised controlled trials and A-B testing

Table A1 provides a template for recording the results of an APEASE assessment. It can be used for any important decision that has to be made and formal evaluation of the full intervention. The example in the table is hypothetical. Where feasible, it would be appropriate to cite relevant publications or reports that expand on and support the statements made in the details and justification section.

If an option being considered or an intervention component or full intervention is judged to be unsatisfactory on any of the criteria it may not be necessary to complete the assessment on other criteria. Alternatively, it may make sense to see whether what is being assessed can be reformulated or other action can be taken to remedy a deficit.

Option being considered	e.g., Using legislation to raise the age of sale for tobacco products from 18 to 21 in the UK to reduce tobacco smoking prevalence and improve population health	
Criterion	**Assessment***	**Details and justification (including data sources and relevant findings)**
Acceptability	4	E.g., High quality surveys show that this policy would be supported by a large majority of the population, including current smokers.
Practicability	3	E.g., Experience gained from raising the age of sale from 16 to 18 in the UK and from 18 to 21 in the US shows that this policy can be implemented and enforced with reasonable success.
Effectiveness	4	E.g., Evidence from relevant pre-post analyses and quasi experimental studies in several countries, including the UK, shows that this policy would be expected to reduce the number of smokers in the UK by approximately 2,000 to 7,000 per year, ultimately saving approximately 8,000 to 28,000 Disability Adjusted Life Years each year.
Affordability	4	E.g., Analysis of routinely collected data indicates that the cost of enacting the legislation and communicating the change to the public would be readily affordable and the cost of ongoing enforcement would be similar to existing legislation.
Spill-over effects	3	E.g., Analysis of routinely collected data, literature review and application of health economic models suggests that this policy would probably lead to improved productivity in the economy and reduce healthcare costs.
Equity	3	E.g., Literature review suggests that this would improve equity by differentially reducing the number of people from more disadvantaged backgrounds who take up smoking.
Overall	4	E.g., Evidence supports the view that the policy would have a positive impact on smoking and health, be practicable, acceptable to the public, affordable, have generally positive spill-over effects and improve equity.

*1=Unsatisfactory, 2=Satisfactory, 3=Good, 4=Excellent

Table A1: Template for recording the results of an APEASE assessment

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Appendix B:
Quiz on principles for developing behaviour change interventions

Question	Where to find the answer (page number in this guide!)
1. In the COM-B model, what are the three pillars of behaviour?	
2. In the Behaviour Change Wheel, what are the nine broad types of intervention that can be used to change behaviour?	
3. In the Behaviour Change Wheel, what are the seven policy options available to implement interventions to change behaviour?	
4. What is meant by the term 'Behaviour Change Technique'?	
5. In the NEAR-AFAR framework, what do the initials stand for?	
6. What aspects of a person's capability are potentially important for understanding human behaviour?	
7. What aspects of opportunity to perform a behaviour are potentially important for understand human behaviour?	
8. What components of human motivation are potentially important for understanding human behaviour?	
9. What are the main stages in development of a behaviour change intervention?	
10. What is a 'systems map' and how can it be used when developing behaviour change interventions?	
11. What is meant by the term 'mode of delivery' of a behaviour change intervention and what are some examples?	
12. What are the main criteria that should be used when making decisions during the development of a behaviour change intervention, and evaluating the intervention once it has been implemented?	

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Appendix C:
Intervention development quality checklist

Question	✔
1. Have the target audience(s) and behaviour(s) been clearly set out?	
2. Has a behavioural diagnosis been undertaken to identify key intervention target(s) in terms of capability, opportunity and motivation?	
3. Have intervention type(s) been chosen?	
4. Have policy option(s) chosen?	
5. Have the appropriate Behaviour Change Techniques been identified?	
6. Have the modes of delivery, delivery source and schedules been decided upon?	
7. Have the choices in 1 to 6 been made using a review and analysis of theory and evidence and the APEASE criteria?	
8. Have topic experts been involved in the intervention development?	
9. Have key stakeholders been fully involved in the intervention development?	
10. Has the intervention been pilot tested?	