Achieving behaviour change

A guide for national government

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About the Centre for Behaviour Change

The Centre for Behaviour Change, based at University College London, brings together cutting-edge, cross-disciplinary academic expertise in behaviour change and translates it through research, consultancy, training and events to address key challenges facing society, including threats to human health and well-being, environmental sustainability and social cohesion.

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Executive summary

The goals of policy making across national government include maximising the health and wellbeing of the population, making sure that the country's resources are managed effectively and sustainably, and ensuring that citizens are treated equitably. The behaviour of citizens and organisations plays a pivotal role in achieving these objectives.

This guide provides a structured approach to achieving behaviour change in support of policy objectives. It is based on an interdisciplinary approach known as the Behaviour Change Wheel (BCW) that was developed by integrating 19 behavioural science frameworks from many disciplines and sectors. There is an equivalent guide focusing on local government policies and behaviour change: Achieving behaviour change: A guide for local government and partners. For many policy objectives, national and local policies need to be co-ordinated to have maximum impact.

The BCW can be used to help:

- develop behaviour change interventions from scratch
- build on or modify existing interventions
- choose from existing or planned interventions

The BCW includes a number of components which are:

- **assessment** – evaluating interventions and their components throughout the development process in terms of the 'APEASE' criteria of Acceptability, Practicability, Effectiveness, Affordability, Side-effects, and Equity (Section 5)
- **behaviour selection** – identifying the behaviours of relevant populations and groups to focus on in order to achieve policy objectives (Section 6)
- **COM-B diagnosis** – working out what will most likely bring about the desired behaviour in terms of changes in the target group's Capability, Opportunity and/or Motivation to engage in the Behaviour (Section 7)
- **selecting intervention types** – identifying the broad types of intervention best suited to influencing behaviour according to the COM-B diagnosis: Education, Persuasion, Incentivisation, Coercion, Restriction, Training, Environmental Restructuring, Modelling, and Enablement (Section 8)
- **formulating an implementation strategy** – identifying policy options that are best suited to delivering interventions, that is communications and marketing, guidelines, legislation, regulation, fiscal measures, service provision and/or environmental and social planning (Section 9)

- **constructing the intervention** – deciding the details of the intervention content and delivery (Section 10)

The guide introduces tools and provides case examples for each of these components that can be used all together or in various combinations are required. The guide also points to further reading and resources, including the full guide to using the BCW (Appendix 3: Additional Resources).

It is important to appreciate that the BCW is not a substitute for topic-specific knowledge; rather, it provides a way of using that knowledge to make judgements about the behaviour, context and target group that we are concerned with. Where expertise in the topic being addressed or in behavioural science more generally is lacking, it should be sought where possible.

This ABC Guide to Behaviour Change meets a need identified in the national Behavioural and Social Science Strategy for Health and Wellbeing: Improving people's health: Applying behavioural and social sciences to improve population health and wellbeing in England and internal user needs of the Cross-Government Behavioural Insights Network. There was a need to develop, optimise access to, and promote tools and methods to enable practitioners, policy makers and commissioners to use behavioural and social sciences.

Purpose of this guide

This guide is written for anyone working in national government or their partners whose role involves changing behaviour, or who need to consider the impact of policies on behaviour. The guide is based on the Behaviour Change Wheel (BCW)(1, 2) a method for developing interventions and policies to change behaviour. The guide can be used flexibly according to need and circumstance rather than necessarily following a fixed sequence of steps. The Behaviour Change Wheel is one approach to changing behaviour. Readers wishing to learn about other approaches can find out more by referring to Improving people's health: Applying behavioural and social sciences to improve population health and wellbeing in England.

Applying behavioural science to national policies

Behavioural science is concerned with understanding behaviour and developing effective interventions to influence it. Behaviour change interventions involve activities, policies, products and services designed to influence the way people act. This includes stopping people from engaging in risky or antisocial behaviours (for example smoking, violent crime, tax evasion) as well as promoting positive ones (for example physical activity, reducing calorie intake, getting immunised).

The science of behaviour change has advanced rapidly in the past decade. We now have a much better understanding of the kinds of interventions likely to be effective for specific behaviours, target populations and contexts.

Achieving large scale behaviour change often involves changes to practices, norms, and values of groups of people in organisations and communities. This may require targeting behaviours of key decision makers, service providers, service users and members of the public more generally.

Interventions will vary in scope, intensity and approach according to need. For example, they can be light touch, such as refining the wording of letters to improve attendance at appointments; they can be coercive, such as fining dog owners for not picking up their pets' fouling; they can be supportive, such as providing services to help people lose weight; or they can involve infrastructure changes, such as constructing speed humps to reduce traffic speed.

The Behaviour Change Wheel (BCW)

The BCW was developed from a systematic review of 19 behavioural science frameworks from many disciplines and sectors (1, 2), aiming to bring together their best

features. The approach provides a flexible method for developing, adapting or choosing between interventions.

Figure 1 shows the framework that lies at the heart of the method. The green inner hub represents the factors that influence any behaviour (Capability, Opportunity and Motivation); the red circle shows the range of types of intervention (Restrictions, Persuasion, Incentivisation, Environmental restructuring, Education, Coercion, Enablement, Modelling and Training); and the grey outer circle shows policy options that can be used to deliver interventions (Environmental/Social planning, Communication/marketing, Legislation, Service provision, Regulation, Fiscal measures and Guidelines).

Figure 1. The Behaviour Change Wheel
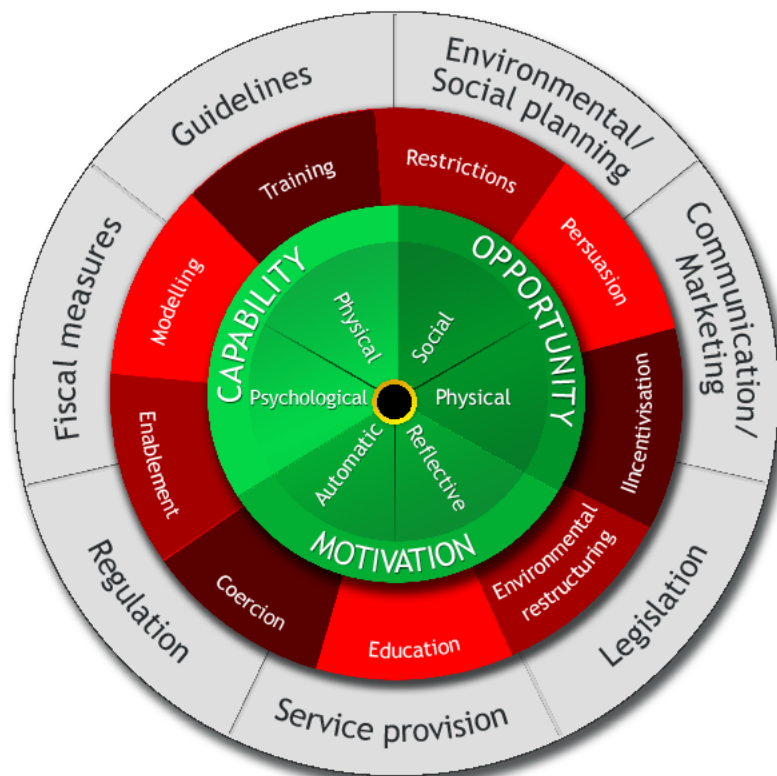
The BCW has been used to address a very wide range of issues: for example reducing domestic water use (3), increasing physical activity in school children (4), reducing sitting time in desk-based office workers (5), promoting independent living in older adults (6), supporting parents to reduce provision of unhealthy foods to children (7), and reducing workplace energy use (8).

More information about the Behaviour Change Wheel can be found at www.behaviourchangewheel.com. Section 14 of this guide provides information about resources to support the application of the Behaviour Change Wheel.

What is involved in developing an effective behaviour change intervention?

Figure 2 shows the main processes involved in developing effective behaviour change interventions. When developing an intervention from scratch people would normally start with 'Behaviour Selection' and work clockwise through to 'Constructing the Intervention'. After identifying behaviours to focus on to meet policy objectives ('Behaviour Selection'), the next step in the process is to identify which out of Capability, Opportunity and Motivation to target in order to change behaviour(s) ('COM-B diagnosis'). Following this, intervention types that will most effectively change the behaviour (e.g. education, persuasion) should be identified ('Selecting Intervention Types'). The penultimate step in the process is to identify policy options that will best deliver the intervention type ('Formulating an Implementation Strategy') before fully specifying the intervention in terms of its content and delivery ('Constructing the Intervention').

It is common to cycle back to earlier processes as new information becomes available about issues such as effectiveness or practicability. These processes can be used all together or independently as required during the development process. Assessment is located at the hub of the diagram because it is involved in all the other processes, from deciding which behaviours to target to evaluating a fully developed intervention.

Figure 2. Processes involved in developing effective behaviour change interventions

Fully specify the intervention in terms of its content and delivery

Constructing the Intervention

Identify policy options that will best deliver the intervention type (e.g. providing a service, legislating)

Formulating an Implementation Strategy

Behaviour Selection

Identify behaviours to focus on to meet policy objectives

Assessment

Identify intervention types that will most effectively change the behaviour (e.g. education, persuasion)

Selecting Intervention Types

COM-B Diagnosis

Identify which out of Capability, Opportunity and Motivation to target in order to change behaviour(s)

Applies to

Assessment

As stated above, assessment applies to every part of the process of developing, selecting and implementing interventions. The BCW lists criteria to apply when making these judgements under the acronym, APEASE: Acceptability, Practicability, Effectiveness, Affordability, Side-effects, and Equity.

For example, when devising a set of policies to improve the academic performance of 'low-attaining' schools, the APEASE criteria should be applied to behavioural selection (what behaviours of teachers, parents, and/or children), COM-B diagnosis (how far to target aspects of capability, opportunity and/or motivation), selection of intervention types (how far to focus on education, persuasion, coercion etc), selection of policy options (how far to use to development of guidelines, regulation, legislation etc) and construction of the intervention (which behaviour change techniques to use and how to deliver them). All the APEASE criteria are also important when evaluating the intervention once it has been finalised and begun to the implemented.

Behaviour selection

This includes identifying behaviours to target as well as the groups or populations being targeted. In some cases, the target behaviours are readily identified (for example registering to vote). However, in many cases we have to identify one or more target behaviours and target groups that will most likely achieve the desired goal (for example active transport to achieve reduction in air pollution and/or improved health).

For example, if our goal is to reduce childhood obesity we have to decide whether to focus on children, carers, head teachers and/or school meal providers. If we decide to target the children, the next question is what specific dietary and physical activity behaviours to focus on.

It may be important in some cases to go further and specify precisely the way in which the behaviour should be enacted; for example, appropriate use of face masks during the COVID-19 pandemic, which would involve specifying the type of mask to be used, when they should be used, how they should be used, and how they should be disposed of or disinfected.

COM-B diagnosis

This is represented by the central green hub of the BCW. If we are clear about what and whose behaviour needs to change, we have to then work out what is required to achieve the desired behaviour in terms of one or more of:

- capability – having the physical and mental ability to engage in the behaviour (for example knowledge, physical and mental skills, mobility, and strength)
- opportunity – being in a physical and social environment that supports the behaviour or makes it possible
- motivation – being more motivated to do the target behaviour than other behaviours we might do instead

Identifying which capabilities, opportunities and motivational influences need to change is called the COM-B diagnosis (also referred to as Behavioural Diagnosis).

For example, if we are trying to increase physical activity in the general population, we need to decide whether to try to get individuals to want to do this (for example increasing motivation through mass media campaigns) and/or make it easier, for example by improving cycle routes (increasing opportunity by regulations around safe cycling) and/or increasing knowledge and understanding of the benefits of walking for short journeys (increasing capability through education programmes in schools and colleges (see Section 7).

Selecting intervention types

This is represented by the middle red ring of the BCW. It involves systematically considering the options available for bringing about change to the capability, opportunity or motivational influences identified in the COM-B diagnosis and choosing the best option or options.

Some types of intervention work mostly on capability, some on opportunity and some on motivation. The BCW approach matches the choice of intervention strategy to behavioural influences identified in the COM-B diagnosis (see above). The BCW covers the full range of available intervention types: Education, Persuasion, Incentivisation, Coercion, Training, Restriction, Environment restructuring, Modelling, and Enablement (see Table 6). Note that these are referred to as 'Intervention Functions' in the original publication and in the full version of the Behaviour Change Wheel guide (1).

For example, if it is decided that increasing opportunity in the form of greater access to affordable housing was an important factor in addressing teacher shortages, this could in theory be addressed by environmental restructuring in which a proportion of new builds are offered at affordable prices to teachers.

Formulating an implementation strategy: This is represented by the outer grey layer of the wheel. There are often several ways that a given intervention approach can be delivered. The BCW describes 7 broad options: Guidelines, Legislation, Service provision, Fiscal policies, Environmental Planning, Communications and Marketing, and Regulation. Note that these are referred to as 'Policy Categories' in the original publication and in the Behaviour Change Wheel guide (1).

For example, to get GPs to agree to prescribe stop-smoking medicines to support their patients to stop smoking we may decide that we wish to increase their motivation by persuading them of the importance of such prescribing (Intervention types: Persuasion, Education). We may try to achieve this by preparing guidelines that they should follow (Policy option: Guidelines) and/or we may go further and try to set up regulations around what is expected with targets and audit processes (Policy option: Regulation) (see Section 9).

Constructing the intervention

Once the broad content of the intervention strategy is decided, the full intervention needs to be specified in terms of a) its component 'Behaviour Change Techniques' (BCTs) or 'content', and b) the methods by which the BCTs are delivered. Examples of BCTs include: 'goal setting', 'action planning', and 'social support'. Delivery of interventions involves the 'mode of delivery' (for example face-to-face, online etc.), the

'source' of the intervention (the people or organisations delivering it) and the schedule (the timing of the intervention and its components).

For example, if we are designing a media campaign to increase recycling, we may wish to create messaging that will be motivational as well as educating people about what can and cannot be recycled in their locality (the content). We have to ensure that the messaging is seen as coming from a trusted source (source); we have to decide how far to rely on different forms of traditional and social media (mode of delivery); and we have to decide when to run the campaign and how to time individual presentations (schedule) (see Section 10).

How to use this guide

Scenarios covered by this guide

There are 3 main scenarios that this guide is designed to cover which are:

- developing a behaviour change intervention from scratch
- adapting an intervention that is already in use
- choosing between interventions that have been proposed or implemented

Whatever the scenario, the task is to find the most promising path from the policy goals to the intervention that will best achieve them. This means being confident that we are focusing on the right behaviours in the right people, that we have correctly diagnosed what influences on behaviour (capability, opportunity and/or motivation) we need to target, that we have chosen the right mix of intervention types, and that our implementation strategy is likely to deliver the interventions optimally.

Developing interventions from scratch

In this kind of scenario, it is worth going through the key parts of the process in order, starting with identifying what behaviours need to change in whom and ending up with decisions about implementation strategy. The process will need to be flexible, so that we may keep a number of options on the table and cycle back to earlier processes if promising options do not stand up to scrutiny. It is important to be aware of other interventions being implemented, possibly by other agencies, that will need to be co-ordinated in national strategies.

Adapting interventions

When we are starting with an existing intervention, we are usually concerned that it is not working as well as intended or is failing on one of the other APEASE criteria; for example, it is no longer affordable or practicable or we have identified important adverse spill-over effects; or it may be that we believe we can do better; or else we may want to adapt an existing intervention for a different population, setting or behaviour.

In this kind of scenario, we would evaluate the existing intervention strategy to establish where it could be improved. This could involve: checking that we have the right behaviours and target group; considering whether our COM-B diagnosis needs revision; checking that we have the right intervention types; considering how our implementation strategy can be improved; and/or redesigning the intervention content or its delivery. We would also want to review how it aligns with other interventions.

Choosing between interventions

In this scenario, we have one or more ready-made interventions on offer or already implemented and the task is to decide whether to (continue to) adopt any of them or which of them to adopt. This kind of scenario may arise, for example, when evaluating tenders for services.

How much time and resource to put into the BCW process?

Many decisions in government or its partners have to be made quickly and with limited information and data. The BCW can be used whatever the level of information available. For example, it can be used to structure discussion in a policy meeting. Alternatively, it can help determine what additional information needs to be gathered to inform a decision. It can also be used in discussions with key stakeholders to help ensure that all the relevant options and APEASE criteria are properly considered.

Where resources and time permit, the BCW can be used in its entirety to structure the whole development, adaptation or choice process.

Assessment

At any point where assessment of proposed or existing aspects of interventions is required, the APEASE criteria can be used to guide this. APEASE can be applied to anything from a general concept to a detailed plan for a proposed intervention, or a formal evaluation of an intervention that has already been implemented. Assessment here does not refer only to formal evaluations involving data gathering. For example, it could take the form of a structured discussion to inform decision making in a meeting.

What are the APEASE criteria?

Table 1 explains each of the APEASE criteria.

Table 1: The APEASE criteria for assessing interventions, intervention components and ideas

Acceptability	How far is it acceptable to key stakeholders? This includes the target group, potential funders, practitioners delivering the interventions and relevant community and commercial groups.
Practicability	Can it be implemented at scale in the intended context, with available material and human resources? What would need to be done to ensure that the resources and personnel were in place, and is the intervention sustainable?
Effectiveness	How effective is it (likely to be) in achieving the policy objective(s)? How far will it reach the intended target group and how large an effect will it have on those who are reached?
Affordability	How far can it be afforded when delivered at the scale intended? Can the necessary budget be found for it? Will it provide a good return on investment?
Spill-over effects (Side-effects)	What extraneous adverse (or beneficial) outcomes might it lead to? How important are they and what is the likelihood that they will occur?
Equity	How far will it, or is it likely to, increase or decrease differences between advantaged and disadvantaged sectors of society?

Making APEASE judgements

Applying APEASE criteria will always involve an element of judgement, however much evidence there may be. Thus, even when there is a large body of high-quality evidence on effectiveness, there is no guarantee that this will directly apply to the specific context and target group. In many cases we may have little by way of direct evidence to use as a guide and therefore need to rely on judgement and development of a plausible model as to how the intervention will work.

A suggested approach is the following:

1. Find whatever scientific literature and case reports exist for similar interventions.
2. Set up a working group to review available evidence and form a collective judgement and ensure that the process is transparently captured.
3. Many interventions benefit from co-production with stakeholders such as residents, businesses and community groups. In that case, consultations will need to be set up to achieve this and/or members of these groups will need to be included in the core development team.
4. Where needed, and where resources and time permit, commission additional data collection to address important areas of uncertainty.
5. Drop or amend any interventions or intervention concepts that fall down on any one of the criteria. For example, it does not matter how effective an intervention might be if it is not practicable or acceptable to key stakeholders.
6. Use some form of weighted rating system to compare remaining options.

Using the APEASE grid

Table 2 shows an example of a grid that can be used to record APEASE judgements for an intervention, intervention component or idea. When using the grid, it is important to recognise that there may be more than one policy objective being served and so the ratings will need to reflect the priorities given to different objectives.

There are many ways of completing the grid. The entries could be numerical ratings on any desired scale (for example 0-10) or semi-quantitative judgements (for example low, medium, high). Question marks could be used to indicate that there is not enough information to make a judgement or put next to a rating to indicate low confidence in the judgement.

If numerical ratings are used, a group of experts can be convened to provide these independently and to calculate the average and the range. Each contributor making each rating should provide arguments or source material to back up the judgement. The average ratings can provide an indication as to whether any given intervention or intervention component stands out as particularly strong or weak and the range can be

used to assess the level of agreement. Then a group discussion can be used to resolve discrepancies and reach agreement.

Another approach is to gather together all the relevant information available and ask an expert group to complete the grid together, discussing the judgements as they go.

Table 2: Illustration of the use of the APEASE grid to assess options for reducing prevalence of harmful alcohol consumption nationally[1]

a. Option descriptions

Option	Description
Introducing minimum unit pricing	Legislating to ensure that alcoholic beverages cannot be retailed at less than a designated price per unit of alcohol.
Additional £20M in funding for alcohol dependence treatment services	Providing national agencies, Local Authorities or service providers with an additional £20M in funding, targeted at areas with high prevalence of alcohol dependence, subject to a set of evidence-based criteria concerning the content and structuring of the service and performance criteria for throughput and effectiveness.
Spending £10M on mass media campaigns	Providing funding to national agencies or charities to run mass media campaigns about the harms of alcohol combined with promotion of evidence-based digital applications to support reduction in alcohol use.

b. Ratings

Option	Acceptability (0 to 10)	Practicability (0 to 10)	Effectiveness (0 to 10)	Affordability (0 to 10)	Spill-over effects (-5 to +5)	Equity (-5 to +5)
Introducing minimum unit pricing	4	7	6	8	2	+6
Additional £20M in funding for alcohol dependence treatment services	8	6	2	3	0	+2
Spending £10M on mass media campaigns	7	8	1	4	0	-2

[1] Does not represent official government analysis or policy

c. Sources and justification

Option	Justification
Introducing minimum unit pricing	There is evidence that this can meet all the APEASE criteria to varying degrees soon after implementation but the longer-term effects are not yet clear.
Additional £20M in funding for alcohol dependence treatment services	There is evidence that these are acceptable to key stakeholders and widely used when available. Practicability depends on the precise implementation framework and it would be necessary to ensure complementarity with existing service provision and links with mental health services. The services can be effective, but it is essential to ensure that they are run using evidence-based principles. Affordability is a matter of political will. There is no reason to suspect adverse consequences and they should improve equity somewhat.
Spending £10M on mass media campaigns	Mass media campaigns are widely accepted in the UK for this purpose and systems are in place to mount them. There is little evidence for effectiveness though. Affordability is a matter of political will. There is no reason to suspect adverse effects, but they may decrease equity if wealthier drinkers are more responsive.

In the above example, the grid is being used to evaluate broad strategies, but it could be used to evaluate and compare interventions and their components at any level of detail, for example choosing between different types of weight management services or assessing varying levels of spending on campaigns.

Case study: Choosing interventions to include in a city-wide smoking cessation programme

The London Smoking Cessation Transformation Programme was established in 2017 to increase smoking cessation rates in the UK's capital. It was funded by 30 Local Authorities covering the city.

The first year focused on use of communications and marketing campaigns to promote an online portal to stop-smoking support that was available together with a bespoke telephone helpline for smokers who were not eligible for, or did not wish to access, specialist face-to-face support.

Towards the end of the first year, a review was commissioned to decide on priorities for improving the programme in subsequent years. Twenty-three options were put before a group of experts whose task was to establish priorities to take forward for further development.

An APEASE spreadsheet was developed as a basis for evaluating the options. Six members of the expert group independently rated each of the options from 1 to 4. The ratings of the members were averaged to identify options that were clearly strong candidates and others that were clearly non-starters. The degree of variation in the ratings was also assessed indicating the degree of agreement. It turned out that there was a moderate to strong consensus on the ratings. There was a facility for weighting the criteria differently to reflect their differing importance but in the event, this was not used.

The ratings formed a basis for discussion in which 3 options were selected for further consideration. These were:

- maintaining an up-to-date database of facilities offered by specialist stop-smoking services in each locality
- creating stronger direct referral to specialist stop-smoking services from the online portal
- adding app-like functionality to the portal to support smokers who did not wish to access specialist services

These options were not the ones that had the greatest potential impact; but they were practicable and affordable.

Case study: APEASE grid of evaluation criteria for options to increase general social distancing to reduce Covid-19 transmission in the UK

This case study describes application of the APEASE criteria to the options set out in an evaluation of options for improving public adherence to social distancing and shielding recommendations early in the COVID-19 pandemic, before the UK had gone into lock down. This evaluation was provided with the specification of the options in order to help policy makers judge their strengths and limitations (9).

	Acceptability	Practicability	Effectiveness
Provide clear, precise, credible guidance about specific behaviours	HIGH	HIGH	HIGH IF ACCOMPANIED BY OTHER OPTIONS
Use media to increase sense of personal threat	HIGH	HIGH	HIGH IF ACCOMPANIED BY OTHER OPTIONS
Use media to increase sense of responsibility to others	HIGH	HIGH	HIGH IF ACCOMPANIED BY OTHER OPTIONS
Use media to promote positive messaging around actions	HIGH	HIGH	HIGH IF ACCOMPANIED BY OTHER OPTIONS
Tailor messaging	HIGH	HIGH	HIGH IF ACCOMPANIED BY OTHER OPTIONS
Use and promote social approval for desired behaviours	HIGH	HIGH	COULD BE HIGH
Consider enacting legislation to compel required behaviours	COULD BE HIGH IF EQUITY ISSUES ADDRESSED	DEPENDS ON TIMESCALE	COULD BE HIGH IF ACCEPTABLE AND ENFORCED
Consider use of social disapproval for failure to comply	UNCERTAIN	HIGH	COULD BE HIGH IF ACCOMPANIED BY OTHER MEASURES
Develop and mobilise adequately resources community infrastructure	HIGH	VARIABLE	HIGH
Provide financial and material resources to mitigate effects of measures on equity	HIGH	VARIABLE	HIGH

	Affordability	Spill-over effects	Equity
1. Provide clear, precise, credible guidance about specific behaviours	HIGH	POSITIVE	UNCERTAIN
2. Use media to increase sense of personal threat	HIGH	COULD BE NEGATIVE	UNCERTAIN
3. Use media to increase sense of responsibility to others	HIGH	POSITIVE	UNCERTAIN
4. Use media to promote positive messaging around actions	HIGH	POSITIVE	UNCERTAIN
5. Tailor messaging	HIGH	UNCERTAIN	UNCERTAIN
6. Use and promote social approval for desired behaviours	HIGH	POSITIVE	UNCERTAIN

7.	Consider enacting legislation to compel required behaviours	UNCERTAIN DEPENDING ON LEVEL OF ENFORCMENT	COULD BE NEGATIVE	COULD BE NEGATIVE
8.	Consider use of social disapproval for failure to comply	HIGH	COULD BE NEGATIVE	COULD BE NEGATIVE
9.	Develop and mobilise adequately resources community infrastructure	MODERATE	POSITIVE	POSITIVE
10.	Provide financial and material resources to mitigate effects of measures on equity	UNCERTAIN	POSITIVE	POSITIVE

Behaviour selection

Identifying the behaviour(s) we wish to change

Sometimes the behaviours to be changed are included in the problem definition: for example switching from paper to online tax returns. The target may be to stop or start a behaviour, increase or decrease its frequency, duration and/or intensity or change its form. The behaviour should be defined precisely in its context – what needs to change in whom, where, when and for how long?

At other times, the behaviours that need to change are not apparent and so defining the problem in behavioural terms is a crucial first step. For example, if the goal is to gather more of the tax that is owed by small traders, it is important to assess how far this can be achieved by changing the behaviour of traders themselves or clients or both, and precisely what behaviours one needs to focus on.

Identifying other relevant behaviours

The behaviour that we wish to change may not be able to be changed directly. For example, if we are seeking to reduce children's calorie consumption we are likely to get better results by seeking to alter the behaviour of carers in the type of packed lunches they provide and/or the behaviour of school catering managers to change the menus they offer than by targeting children directly.

It is also necessary to consider how any given change may result in other unwanted behaviours (for example children buying more sweets after school to make up for restrictions in choice of foods at school).

We therefore need to establish:

- who needs to do what differently (including when and how?) for example, members of the workforce, community leaders, service commissioners, planners, policy-makers, industry decision-makers
- what other behaviours are involved in supporting or preventing this change, or mitigating potential adverse spill-over effects

Behavioural systems mapping

Having identified key behaviours, it is useful to identify influences between the behaviours, both within and between people. This can include specification of places where behaviours occur.

Identifying relationships between behaviours can be complicated. It can be helpful to draw a 'systems map' of 1) the key actors in a scenario and their behaviours (using circles or squares) and 2) how these behaviours relate to each other (using arrows to identify relationships between behaviours both within and between people). This can form part of a larger systems map that includes other potential influences. Such maps are commonly used in policy development. There are many online tools available for this (for example https://vensim.com/; https://ncase.me/loopy/).

This exercise can, as far as resources permit, be informed by a range of information that may be available or may be sought. These include surveys, observation, informal or formal interviews, workshops and published articles, depending on available opportunities and resources. Including a variety of stakeholder perspectives helps to bring about a common understanding of the problem and is likely to produce a more accurate picture.

Identifying the entry point

Having mapped out a system of interacting behaviours, the next step is to choose where in this system to intervene. This requires making a judgement about which behaviour(s) of which people are likely to be the most productive to target.

Identifying the 'entry point' is helped by applying the APEASE criteria (see Table 1). Common mistakes in choosing target behaviours are:

- mistaking outcomes for behaviours (for example weight loss rather than reducing calorie intake or increasing physical activity)
- choosing ones that are attractive to stakeholders but have little or no impact on the problem
- failing to account for other changes that might work against the desired outcome
- setting behavioural goals that are unachievable rather than building on small but achievable steps
- focusing exclusively on the people whose behaviour we ultimately want to help to change and not considering other key people in the behavioural system

Case study: Using Behavioural Systems Mapping to understand influences on retrofit behaviour in the Welsh housing system

The UK Committee on Climate Change recommended that the UK Parliament legislate to reduce domestic greenhouse gas emissions to net zero by 2050. In Wales a quarter of a million homes are responsible for 27% of all energy consumed and 15% of all domestic greenhouse gas emissions. The Welsh government is embarking upon an ambitious project to retrofit its housing stock to zero carbon standards by encouraging homeowners and private landlords to modify their houses with energy efficient technology (retrofitting). Behavioural Systems Mapping was used to describe the influences on the retrofit behaviour of house owners.

1. Defining the problem

The Welsh Assembly convened an Advisory Group on the Decarbonisation of Existing Housing which was tasked with identifying and synthesising the evidence on factors influencing retrofit behaviour. To encourage a whole-systems approach the advisory group consisted of 6 subgroups representing different sectors within the larger housing system (technical, finance, governance, infrastructure, consumer and community).

2. Generating a list of influences

Advisory Group members participated in a workshop to generate a list of actors, behaviours and influences that might influence the retrofit behaviours of home owners, based on the evidence synthesis carried out in Step One. They were also asked to identify how the different actors, behaviours and influences related to one another, and to create maps that illustrated how behaviours and influences in one sector impacted those in others sectors (for example how the behaviour of those in the financial sector offering products might influence home owners to apply for a loan to fund retrofit).

3. Developing the Behavioural Systems Map

The maps produced by Advisory Group members were synthesised by behavioural scientists at CBC into a larger map that illustrated the wider housing system. This initial Behavioural Systems Map then went through multiple stages of stakeholder consultation and refinement with members of the DAG until the group agreed that the map was an accurate representation of all relevant actors, behaviours and influences on decarbonisation within the housing system. Figure 3 presents the key actors, behaviours and influences involved at play in the Welsh housing system in the form of a behavioural systems map, illustrating the interplay between local and national government, supply chain and financial services. The map was used by advisory group members to draw up the recommendations for a 30-year housing policy submitted to

Ministers in the Welsh Assembly (https://gov.wales/sites/default/files/publications/2019-07/independent-review-on-decarbonising-welsh-homes-report.pdf).

Figure 3: Behavioural Systems Map of the Influences on Retrofit Behaviour of Home Owners in Wales

Please download and use a pdf viewer to enlarge different areas of the map to see the detail: www.ucl.ac.uk/behaviour-change/sites/behaviour-change/files/influences_on_decarbonisation_-_abc_guide_image.pdf
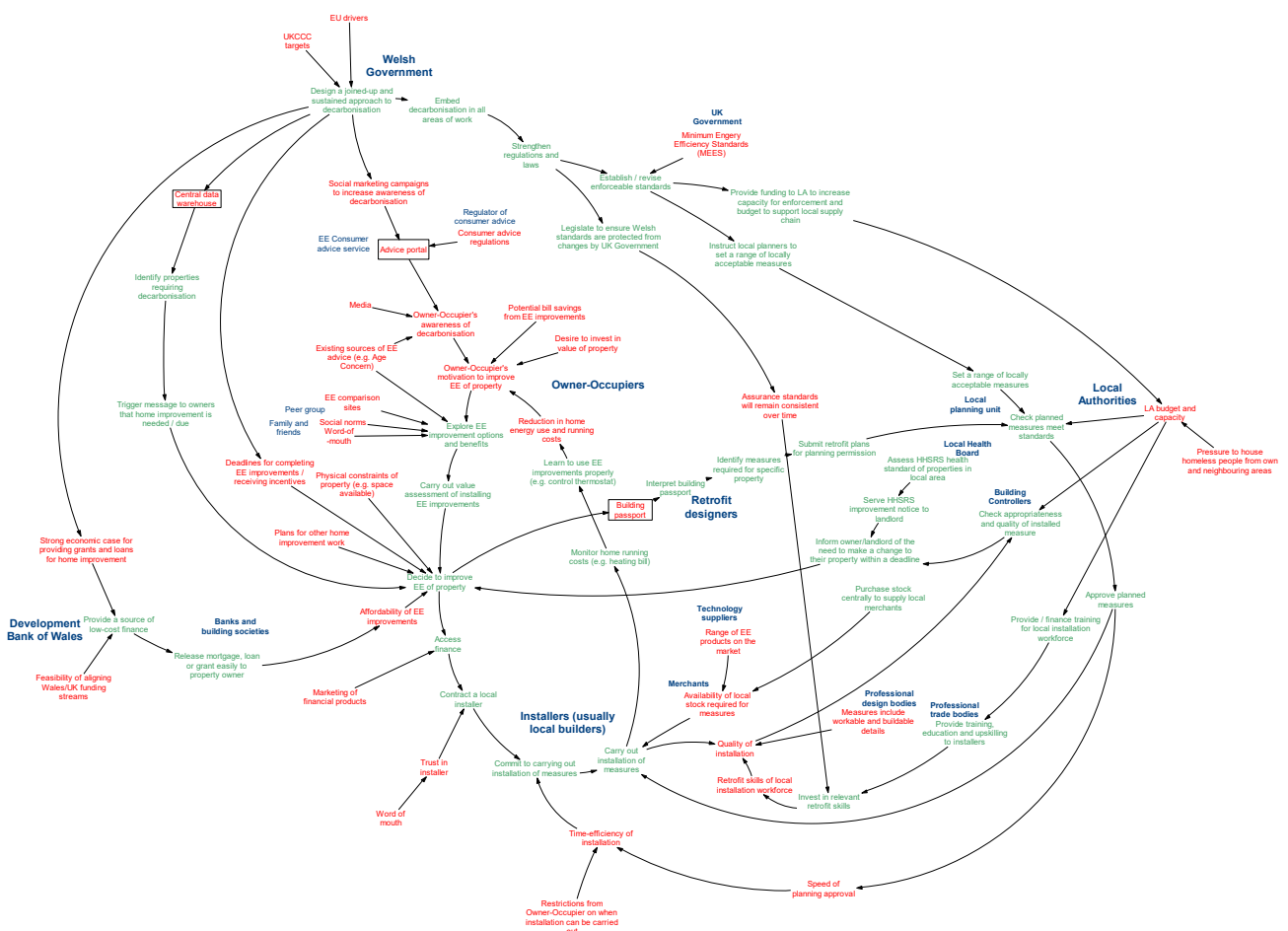
COM-B diagnosis

Having decided what and whose behaviour(s) we want to change, we need to consider how this can be achieved. Just as we expect doctors to make a diagnosis of the nature of a medical complaint before recommending or implementing a treatment, so behavioural intervention designers should make a diagnosis of what underlies the behavioural problem in order to determine the best approach to dealing with it.

This 'COM-B diagnosis' involves identifying the attributes of the target population or their environment that we need to focus on in order to achieve behaviour change. At its heart is the 'COM-B model' (Figure 4).

The COM-B model

The COM-B model recognises that for any behaviour to be enacted people must have the capability, and the opportunity, and they must be more motivated to do that behaviour than anything else that is in competition with it.

Thus, achieving behaviour change can be thought of as like opening a COMBination lock: all relevant enablers need to be in place. If just one of these is not in place, then the desired change will not occur.

Capability refers to people's psychological abilities (for example knowledge and mental skills) and physical abilities (for example dexterity and strength).

Opportunity refers to the environment with which people interact, whether it be the physical environment (for example objects and time constraints), or the social environment (for example social cues and cultural norms).

Motivation refers to mental processes that energise and direct behaviour. These include reflective processes (for example conscious decision making and inference), and automatic processes (for example feelings and habits).

Figure 4: The COM-B model of behaviour
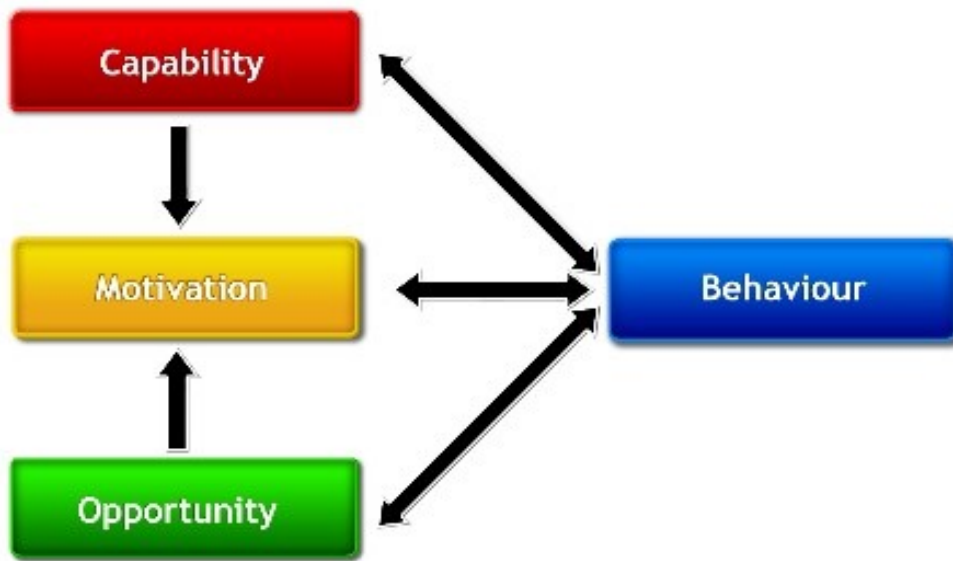
As shown in Figure 4, capability, opportunity, motivation and behaviour influence each other. For example, making something easier by increasing capability or opportunity can increase motivation to do it. Motivating people to try a behaviour can increase their capability.

COM-B targets

A behavioural diagnosis involves finding out what aspects of capability, opportunity or motivation can usefully be targeted to achieve the desired behaviour change.

Capability targets include: understanding why and how to make the change, and having the self-regulatory capacity and skills needed to sustain the change.

Opportunity targets include: having the financial and material resources, having sufficient time; exposure to social or other prompts; and having a supportive culture, family and social network.

Motivational targets include: truly wanting or needing to engage in the behaviour, habits and routines, and possessing values and identity that embrace the behaviour.

Making a COM-B diagnosis

Making a COM-B diagnosis involves trying to ensure that the target group possesses all 3 of Capability, Opportunity and Motivation supporting the behaviour change. The following questions can be used as a starting point for this.

Where the answers to the questions are 'no', 'to a limited degree' or 'don't know', this provides a basis for deciding what needs to change in order to achieve the behaviour. The process for answering these questions can take many different forms, including surveys, observation of behaviour, discussion groups and interviews. Appendix 1 of this guide provides a more extensive list of possible questions.

Capability

1. Do they know what the desired behaviour is?
2. Are they physically capable of doing it?
3. Do they have the mental or physical skills required?
4. Do they understand why it is important for them to do it and how to do it?
5. Do they have the self-control required to do it and keep doing it if necessary?

Opportunity

1. Do they have the time, financial or material resources to do the desired behaviour?
2. Do they have the social support required?
3. Is it seen as normal in their social environment?

Motivation

1. Do they find it genuinely more attractive than competing behaviours?
2. Is it an established part of their routine?

A simple 6-item questionnaire that can also be used to assess influences on behaviour according to COM-B is included as Appendix 2.

The Theoretical Domains Framework

A widely-used framework that provides additional granularity to COM-B in identifying some of the personal and environmental factors that could promote behaviour change is the Theoretical Domains Framework. This is particularly useful when wishing to take a more fine-grained approach to assessing motivation. We do not elaborate on this here but for more information see Appendix 3: Additional Resources and the Behaviour Change Wheel guide.

Case study: Using existing information to identify influences on literacy-promoting behaviours in the home learning environment

The Department for Education's (DfE) Behavioural Insights Unit conducted a COM-B analysis to identify the key influences on parents engaging in activities to support the learning activity of their children in the early years. The team identified 15 relevant evidence sources, including published peer-reviewed research and materials from the National Literary Trust and synthesised these into key barriers (Table 3).

Table 3: Summary of influences on parental engagement with home learning activities

COM-B Domain	Barriers to engagement with home learning activities
Capability	Parents often feel that they do not possess the right level of knowledge or skills to make a meaningful difference to their children's early learning.
	Parents can find it difficult to think of home learning activities to engage in.
Motivation	Some parents think that it is the responsibility of the education system to teach their child literacy skills, and do not think they have a role to play before school age.
	Parents with negative experiences of schooling often experience negative emotions such as anxiety. This is often linked to parents' own abilities.
	Parents report feeling silly or embarrassed when engaging in home learning activities such as singing.
Opportunity	Parents report being time poor due to the demands of work and other commitments
	Parents cannot always afford educational visits, toys or books to stimulate and support literacy activities.

The list of influences described in Table 3 suggests that low levels of skills and knowledge of what constitutes a good home learning activity (a 'capability' factor) contributes to low confidence and enjoyment of home learning activities (a 'motivational' factor) which means that parents are less likely to prioritise home learning activities over the other commitments they have in their busy lives (an 'opportunity' factor). It could be that all these need to be addressed.

Case study: Using surveys to understand prescribing behaviours related to antimicrobial stewardship in GPs

The Innovation Lab, Public Health Agency and the Health and Social Care Board of Ireland used COM-B to understand influences on inappropriate prescribing of antibiotics by GPs in Northern Ireland (10). COM-B was used to construct a survey which was distributed to a range of stakeholders in the NI healthcare system. A sample of questions from this survey are presented in Table 4.

Table 4: Sample of survey questions based on COM-B to explore reasons for inappropriate prescribing of antibiotics by GPs in Northern Ireland

COM-B	Examples of survey questions
Capability	Please rate your level of agreement with the following statement: I have an effective 'form of words' to use when I suspect a viral infection and don't want to prescribe an antibiotic*
Opportunity	How often do you feel patient expectation of receiving an antibiotic influences your decision to prescribe one?
	In general, how much patient information about appropriate prescribing of antibiotics is visible in your consultation room?
Motivation	How important do you think appropriate prescribing of antibiotics is in the context of other competing priorities?
	To what extent does fear of patients coming to harm influence your decision not to prescribe an antibiotic play in your prescribing practice?*

*Items adapted from the source material

Case study: Using COM-B to inform focus group question development

The Department of Health and Social Care Community Pharmacy Contractual Framework 2019-24 outlines the ways in which community pharmacies can contribute to public health. Community pharmacists can play an important role in antimicrobial stewardship by educating patients on effective self-care treatments, and the negative consequences of using antibiotics, such as side effects and resistance. Researchers in the Primary Care Unit, Public Health England (11) conducted focus groups and interviews informed by COM-B and the Theoretical Domains Framework to inform a behavioural diagnosis of factors influencing adoption of behaviours associated with antimicrobial stewardship (for example advising on self-care). A selection of questions from the interview guide to explore one such activity (giving self-care advice) are presented in Table 5, alongside the COM-B domains they are designed to elicit.

Table 5: Interview and focus group questions based on COM-B to investigate influences on community pharmacists giving self-care advice

COM-B Domain	Question
Capability (psychological)	What skills are required for giving advice about common infections in community pharmacy?
Opportunity (social)	What kind of attitudes have you encountered when giving self-care advice?
Opportunity (physical)	Are you using or have you used any type of resource to assist you in providing self-care advice to patients?
Motivation (reflective)	To what extent do you think managing common infections in community pharmacy can slow antimicrobial resistance?
Motivation (automatic)	Can you tell me about situations where you felt uncomfortable about giving self-care advice?*

*Items adapted from the source material

Selecting intervention types

Having a clear idea of the factors underpinning the behaviour (that is the COM-B Diagnosis; see Section 7) provides a basis for identifying the types of intervention that are likely to be effective.

The BCW identifies 9 broad types of intervention that can be used. Each of these targets particular mixtures of capability, opportunity and/or motivation to engage in the behaviour. These are listed in Table 6.

Table 6. Intervention types

Education	Increasing knowledge and understanding by informing, explaining, showing and providing feedback
Persuasion	Using words and images to change the way people feel about a behaviour to make it more or less attractive
Incentivisation	Changing the attractiveness of a behaviour by creating the expectation of a desired outcome or avoidance of an undesired one
Coercion	Changing the attractiveness of a behaviour by creating the expectation of an undesired outcome or denial of a desired one
Training	Increasing the skills needed for a behaviour by repeated practice and feedback
Restriction	Constraining performance of a behaviour by setting rules
Environmental restructuring	Constraining or promoting behaviour by shaping the physical or social environment
Modelling	Showing examples of the behaviour for people to imitate
Enablement	Providing support to improve ability to change in a variety of ways not covered by other intervention types

Choosing intervention types according to COM-B target

Some intervention types are better suited to some COM-B targets than others. Table 7 provides an indicative mapping of intervention types to COM-B targets. It does not necessarily cover all eventualities and is provided to give an initial idea.

Table 7: Indicative mapping of intervention types to COM-B targets

	Capability	Opportunity	Motivation
Education	✓		✓
Persuasion			✓
Incentives			✓
Coercion			✓
Training	✓	✓	✓
Restriction		✓	
Environmental restructuring		✓	✓
Modelling		✓	✓
Enablement	✓	✓	✓

For example:

Education can be an important starting point for ensuring that people serving in small newsagents understand why it is important not to sell cigarettes to people under 18 and the law about such sales.

Persuasion, incentivisation, and coercion could be used to motivate some newsagents to take the issue more seriously.

Training may help to improve their social skills at refusing underage customers' requests for cigarettes.

Restriction could involve a tobacconist licensing scheme that would provide a basis for potentially refusing a licence to newsagents who were caught breaking the law, thus reducing their opportunity for underage sales.

Environmental restructuring could involve the introduction of a display ban that would reduce the opportunity for underage sales.

Modelling could be used to create a social environment through outreach and use of local networks to reduce the social norms around underage cigarette sales.

Enablement might involve providing newsagents with material resources so that they can equip their staff with the motivation, skills and opportunity to refuse to serve consumers who cannot prove they are over 18.

Case study: Reducing Covid-19 transmission in the UK: identifying options for increasing adherence to social distancing

This case study shows how the Behaviour Change Wheel (BCW) framework was used to provide a very rapid response (3 days) to a UK Government policy question in the context of reducing Covid-19 transmission. It used expertise in behaviour change theory and practice to arrive at a set of options classified according to the 9 intervention types of the BCW based on a rapid behavioural diagnosis (9).The specific recommendations were then evaluated using APEASE as summarised in the case study on page 22.

The question

The following question was asked in March 2020, prior to social distancing legislation being implemented: 'What are the options for increasing adherence to social distancing (staying at home except for essential journeys and work)?'

The response

As a starting point, the guidance being provided by the UK government at the time was reviewed. Then a rapid behavioural diagnosis was undertaken using a combination of brainstorming and literature search. This suggested that improving adherence would require changes to psychological capability (primarily in terms of understanding precisely what to do and why), reflective motivation (getting people on board with the fact that they should behave in certain ways), automatic motivation (getting people to feel emotionally engaged with behaving in certain ways and this becoming more habitual), physical opportunity (ensuring that people have the resources and support needed) and social opportunity (creating strong social norms). Then the mapping given in Table 7 was used to identify relevant intervention types. These were then fleshed out into 10 options that were then refined through discussion:

Education (tackling psychological capability and reflective motivation)

1. Specificity. It was important to be clearer and more specific with regards to recommended behaviours. Guidance needed to be reformulated to be behaviourally specific: who needs to do what (precisely) and why (explain the rationale) and communicated through channels that provide personalised advice and account for individual circumstances including SMS messaging and an interactive website.

Persuasion (tackling reflective and automatic motivation)

2. Perceived threat. The perceived level of personal threat needed to be increased among those who are complacent, using hard-hitting emotional messaging based on

accurate information about risk. To be effective this must also empower people by making clear the actions they can take to reduce the threat.

3. Responsibility to others. This was judged to be important where there was insufficient concern about, or feelings of responsibility to, other people. This may have resulted in part from messaging around the low level of risk to most people and talk of the desirability of building 'herd immunity'. Messaging needed to emphasise and explain the duty to protect others.

4. Positive messaging around self-protective actions. People needed to see self-protective actions in positive terms and feel confident that they would be effective. They also needed to understand that the survival of the severely ill would be increased by the capacity of the health care system, which in turn would be increased by reducing the rise in infections. Messaging about actions needed to be framed positively in terms of protecting oneself and the community and increase confidence that they will be effective.

5. Tailoring. It was recognised that some people would be more persuaded by appeals to adhere to government instructions, some by duty to the community, and some to personal risk. Different approaches would have needed to take account of this and of the realities of the different lives of people, including their material and social circumstances and their individual needs. Messaging needed to take account of the different motivational levers and circumstances of different people, informed by the findings from surveys and focus groups.

Incentivisation (tackling reflective and automatic motivation)

6. Social approval. It was recognised that social approval can be a powerful source of reward. Not only could this be provided directly by highlighting examples of adherence to guidelines and providing strong social encouragement and approval in communications; members of the community could be encouraged to provide it to each other. This could have a beneficial spill-over effect of promoting social cohesion, although negative unintended consequences such as social shaming and stigma should be avoided. Communication strategies should provide social approval for desired behaviours and promote social approval within the community.

Coercion (tackling reflective and automatic motivation)

7. Compulsion. It was noted that experience with UK enforcement legislation such as compulsory seat belt use suggests that, with adequate preparation, rapid change can be achieved where some parts of the population do not initially accept this(12, 13)(12, 13)(12, 13)(12, 13)(11, 12). Some other countries had introduced mandatory social distancing without evidence of major public unrest and the large majority of the UK's population appeared to be supportive of more coercive measures. In addition, communities needed to be engaged to minimise risk of negative effects.

Consideration should be given to enacting legislation, with community involvement, to compel key social distancing measures.

8. Social disapproval. It was noted that social disapproval from one's community can play an important role in preventing anti-social behaviour or discouraging failure to enact pro-social behaviour(14)(14)(14)(14)(13). However, this needs to be carefully managed to avoid victimisation, scapegoating and misdirected criticism, and also to minimise erosion of social cohesion and collective efficacy, and minimise the visibility of non-adherence which may then undermine adherence. It needs to be accompanied by clear messaging and promotion of strong collective identity. Consideration should be given to use of social disapproval but with a strong caveat around unwanted negative consequences.

Environmental restructuring (tackling physical and social opportunity)

9. Community resourcing. People were being asked to give up valued activities and access to resources for an extended period. To make these privations acceptable, people needed to be compensated by ensuring that people have access to opportunities for social contact and rewarding activities that can be undertaken in the home. To make them feasible, people needed to be enabled through resources such as sufficient income, employment rights and food. Adequately resourced community infrastructure and mobilisation needed to be developed rapidly and with coverage across all communities.

10. Reducing inequity. Adherence to these measures was judged to be likely to be undermined by perceived inequity in their impact on different sections of the population, especially those who were already disadvantaged, for example those in rented accommodation, self-employed and those working in precarious employment. Reducing costs of phone calls, data downloads etc. by 'responsibility deals' or government subsidies should be considered. Sections of the population who are particularly adversely affected needed to be identified and steps taken to mitigate the adverse impact on their lives.

Applying the APEASE criteria

The mapping of intervention types to COM-B targets can provide a broad indication as to the likely effectiveness of interventions. If there is an obvious mismatch, this suggests that the intervention is unlikely to be effective. For example, if it is wrongly assumed that dangerous road-crossing behaviour by children is caused by lack of road-crossing skills then training to improve those skills will not improve road safety. This kind of mistake can all too easily be made where policy makers do not have access to topic specific expertise or a behavioural scientist who can provide an expert review of the literature.

Interventions can vary in terms of their acceptability to the public, policy makers and practitioners. Those that involve individual choice tend to be seen as more acceptable.

However, there is greater acceptability of coercive and restrictive interventions to change behaviours that are judged to be immoral or harmful to oneself or others.

Frequently asked questions about intervention types

Below are answers to some common questions about intervention types:

Can a single intervention involve more than one intervention type?
Yes. For example, the offer of support with stopping smoking by a general practitioner can be educational and persuasive as well as providing enablement.

What is covered by coercion?
It does not only mean forcing people to do or not do things. It includes anything that involves unattractive outcomes, including social disapproval and increasing price.

How should 'nudges' be classified?
Nudges are interventions that lead people to do things without it being obvious to them that their behaviour is being shaped. As such they can involve relatively small environmental restructuring or subtle use of language in persuasion (for example, placing healthier food options at eye level on shelves in shops or describing the benefits of immunisation in terms of deaths prevented (loss framing) instead of lives saved (gain framing)).

What is covered by enablement?
This covers anything that increases capability or opportunity not already covered by other intervention types. It is a heterogeneous category including pharmacotherapy, surgery, social support and prostheses.

Where do social norms and cultural change fit in?
Changing social norms and cultural change can involve many different kinds of activity that need to be more precisely described. Thus, they may involve, for example: a) modelling - providing examples that people will imitate, b) coercion – social disapproval of behaviours, c) persuasion – getting people to find certain behaviour attractive or unattractive, or d) environmental restructuring – shaping the social world that people inhabit.

How should the use of 'defaults' be classified as an intervention strategy?
Defaults are situations in which the desired 'behaviour' occurs unless people actively choose another option. These represent an example of environmental restructuring.

Generating recommendations for new policy interventions

Policy makers sometimes need to create recommendations for entirely new types of services (for example digital versions of health checks) or apply behavioural science to areas where it has not been applied before (for example compliance with cyber security protocols). In such cases it will be necessary to design new interventions that did not exist before. The connections between intervention types and COM-B can be used to generate ideas about how to bring about change. There are a number of methods to generate ideas, from informal processes such as brainstorming with a small group of stakeholders, to more formal processes involving consensus decision making.

Identifying opportunities to enhance existing policies

Government policy is regularly updated to reflect emerging evidence, or in response to new threats (for example antimicrobial resistance) and/or new opportunities for service delivery (for example advances in technology). The connections between intervention types and COM-B influences can be used to identify new opportunities to influence behaviour by modifying existing policy initiatives.[2] The steps involved in doing this are:

1. **COM-B diagnosis.** Develop a COM-B diagnosis for the key behaviours using the most appropriate combination of primary and secondary data.
2. **Describe existing intervention content.** Use the intervention types to describe how the content of current policy recommendations bring about change. For example, do current recommendations attempt to change behaviour though education, training, or persuasion?
3. **Gap analysis.** Use the relationships between COM-B and intervention types illustrated in Table 7 to identify whether there are any gaps between the influences identified in the COM-B diagnosis and the content of existing policies. For example, if opportunity has been identified as a key barrier, does current policy make use of all the potential intervention types known to influence opportunity? Or are there some intervention types that are not being used? It may also be useful to consider whether existing intervention types are being used optimally. For example, are current interventions based on education making best use of the latest research and practice in the field of pedagogy?
4. **Generate new ideas for intervention.** Use any identified gaps in the use of intervention types to generate ideas for influencing COM-B influences. For example, if restriction is not currently being used to bring about change in an opportunity influence then consider possible ways in which it could be applied. Policy makers need not restrict themselves to

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[2] The use of the BCW to analyse and enhance existing policy is known as Strategic Behavioural Analysis and has been developed by academics within the Centre for Behaviour Change in collaboration with colleagues from Public Health England's Behavioural Insights Team. This method was first described in Atkins et al. (11).

generating ideas for previously unused intervention types, they can also elaborate on how existing intervention types can be used in different ways.

Case study: Using the Behaviour Change Wheel to optimise policies to reduce catheter-acquired urinary tract Infections

Reducing the need for antibiotics is crucial in addressing the global health threat of antimicrobial resistance. Catheter-acquired urinary tract infection (CAUTI) is a common hospital-acquired infection. Despite numerous policy initiatives to reduce CAUTI rates, prevalence remains high. PHE's Behavioural Insights Team, in collaboration with UCL Centre for Behaviour Change, used the Behaviour Change Wheel to characterise existing policy initiatives and identify opportunities for optimising these.

COM-B diagnosis

A review of the published literature was conducted on factors influencing behaviours related to CAUTI (for example insertion, removal, maintenance of catheters). Identified influences were classified using COM-B.

Describe existing intervention content

Stakeholders were consulted to identify interventions/strategies for reducing CAUTI that had been implemented at scale in England. Materials and descriptions of these strategies were sourced, and the content was described using the intervention types of the Behaviour Change Wheel.

Gap analysis

Nearly all existing strategies to reduce CAUTI focused on increasing knowledge about ways of avoiding infections, with the most frequently identified intervention type being *education*. However, while this did appear to have a small influence on CAUTI behaviours, the most frequently reported and important influences were related to the COM-B domains of motivation (for example beliefs around adverse consequences, perceived risk, convenience, colleague and patient pressure) and opportunity (for example lack of time, access to alternatives and required resources).

Generating new ideas for intervention

The gap analysis suggested that current interventions/strategies in this area were not targeting key influences on the behaviours of interest and could be optimised by incorporating additional types of interventions that addressed motivation and opportunity (for example 'Persuasion,' 'Modelling,' 'Environmental Restructuring'). For more information, see: Atkins et al. (15).

Combining intervention types

Most interventions to change behaviour require policy makers to combine intervention types. For example, mass media interventions such as public health campaigns will most likely use a combination of Education, Modelling and Persuasion, and interventions to change health professional behaviour are likely to use a combination of Education, Environmental Restructuring and Training.

Case study: Combining intervention types to develop a training course for community pharmacy

Intervention Types can be used to develop the content of professional training programmes. Jones et al (11) described how staff in community pharmacies would benefit from additional training to support their ability to deliver self-care advice as part of their role. Based on the behavioural diagnosis outlined in Jones et al the following illustrates how the Intervention Types from the Behaviour Change Wheel can be used to support the development of a training course. Capability to give self-care advice can be improved by making pharmacy staff aware of the situations in which it would be appropriate to give self-care advice (education), giving them the interpersonal skills to deliver that advice effectively (training), and providing them with a tool to help them deliver the right advice in specific situations (enablement). A module on developing interpersonal skills within this course might comprise information about effective communication strategies (education), videos of good practice to emulate (modelling) and the opportunity to role play with feedback (training).

Formulating an implementation strategy

Many evidence-based policy recommendations fail to deliver on their policy objectives because the wrong approach has been adopted to delivering intervention types. For example, when a behaviour is deemed damaging to society and coercion is believed to be an important way to reduce the behaviour, there can be a tendency to jump to use of legislation and the criminal justice system. However, this may be impracticable or even counter-productive. Conversely, when seeking to increase the frequency of a behaviour through reward, it can seem attractive to use fiscal policies such as tax rebates to achieve this; but this may not be the most effective way to do it and may lead to 'gaming' of the system. The BCW provides policy makers with a menu of options to consider when designing the implementation strategy.

Policy options

There are 7 broad options for policies identified in the BCW. These are shown in Table 8.

Table 8: Policy Options listed in the BCW

Policy option	Typically characterised by …	Use
Guidelines	The development and dissemination of documents that make evidence-based recommendations for action in response to defined situations	These are most useful when there is a need to educate people about what needs to be done and why, and there is little or no resistance. Case studies can model good practice.
Environmental and social planning	Architecture, urban and rural planning, object and location design, and planning for housing, social care,	These are a very broad range of policies that affect our macro-environment and how we live our lives, as well as making changes to our 'micro-environment', such as

	employment, equality, benefits, security and education	placing of items on supermarket shelves or the shape of beer glasses. They are relevant when the focus is not so much on changing people but changing the physical and social environment they inhabit.
Communications and marketing	Mass media campaigns, digital marketing campaigns, and correspondence	These policies are most relevant when there is a need to educate people about what to do or why change is important, or to persuade them of its importance and to trigger action.
Legislation	Use of laws, bylaws and similar legislative instruments to set the boundaries for acceptable behaviour with penalties for infringement	These policies are typically reserved for behaviours that are fundamental to security, safety, the wellbeing of society as a whole and the protection of rights. They generally use threat of punishment. Even if they cannot be universally enforced, they can set standards that influence behaviour.
Service provision	Provision of services, materials and/or social resource and aids, whether	These are most relevant when the task is to improve people's ability to change their behaviour. A major

	they be structured or ad hoc, financed or unpaid	challenge is designing and delivering services that are easy to engage with by all those who could benefit.
Regulation	Development and implementation of rules regarding behaviour that instruct the behaviour and possibly provide rewards and punishments for conforming	For governmental institutions these policies lie in the space between guidelines and legislation. For groups, communities and organisations they are one of the key forms of control, creating social norms and using rewards and punishments to shape behaviour of members.
Fiscal measures	Use of taxation, tax relief and financial incentives	The aim here is to incentivise and disincentivise behaviours where there is authority to levy taxes and give monetary rewards or their equivalent. This approach can conflict with the revenue-raising objectives of taxation but sometimes reducing tax rates to encourage a behaviour can result in an overall increase in revenue as a result of the behaviour change.

APEASE and choice of policy options

Choice of policy options will often depend on practical, structural and resource constraints. Often the task for intervention designers is to start with a particular policy option (for example development of digital marketing campaigns or producing guidelines) and to devise the best intervention using that option.

Combining policy options is often the best strategy for a large or complex behaviour change task. For example, in promoting smoking cessation, a social marketing campaign can be used to encourage quitting (Communications and Marketing) and its impact amplified by the offer of free behavioural support (Service Provision).

Table 9 shows policy options that are appropriate for supporting different intervention types. As with Table 7, it is not intended to cover all eventualities but is provided to give an initial idea.

Table 9: Indicative mapping of policy options to intervention types

	Guidelines	Environmental and social planning	Communications and marketing	Legislation	Service provision	Regulation	Fiscal measures
Education	✓		✓	✓	✓	✓	
Persuasion	✓		✓	✓	✓	✓	
Incentives	✓		✓	✓	✓	✓	✓
Coercion	✓		✓	✓	✓	✓	✓
Training	✓			✓	✓	✓	✓
Restriction	✓			✓		✓	
Environmental restructuring	✓	✓		✓		✓	✓
Modelling			✓		✓		
Enablement	✓	✓		✓	✓	✓	✓

Case study: Using policy options to embed or reinforce new interventions to change behaviour of community pharmacists

A case study presented earlier (p29) described how intervention types could be used to develop the content of a training programme for community pharmacists to increase their delivery of self-care advice as part of a wider strategy to improve antimicrobial stewardship. Nevertheless, such a course may have limited impact without wider initiatives to encourage pharmacists to change their business model so that it includes delivery of self-care advice. Policy options can be used to increase the impact of the course. Changes to guidance and regulation may be required to shape the knowledge

and skills competencies required of staff working in community pharmacy to firmly establish the giving of self-care advice as a core part of their professional role. The impact of the course may also be limited by a lack of public acceptance of pharmacist's role in giving self-care. The policy option of communications and marketing could be applied to develop a public health campaign that uses education and persuasion to increase public awareness and acceptance of this new role for community pharmacists.

Case study: Using the BCW to analyse national policy coverage

The NIHR Obesity Policy Research Unit examined the degree to which current policy initiatives addressed the key behavioural drivers of a positive energy balance leading to excessive weight gain in the early years (pregnancy to 5 years old (16)). One hundred and fifteen policy actions were identified from a variety of policy documents from across government and coded using the Policy Options of the Behaviour Change Wheel. Figure 5 shows the frequency of different policy options. 'Guidelines' was the most frequently identified policy option (n=87), followed by 'Service provision' (n=42), 'Communication' (n=28), 'Regulation' (n=26), 'Environmental/social planning' (n=21), 'Legislation' (n=12) and 'Fiscal measures' (n=1).

Figure 5: Early years policy actions related to child obesity by 'policy option'
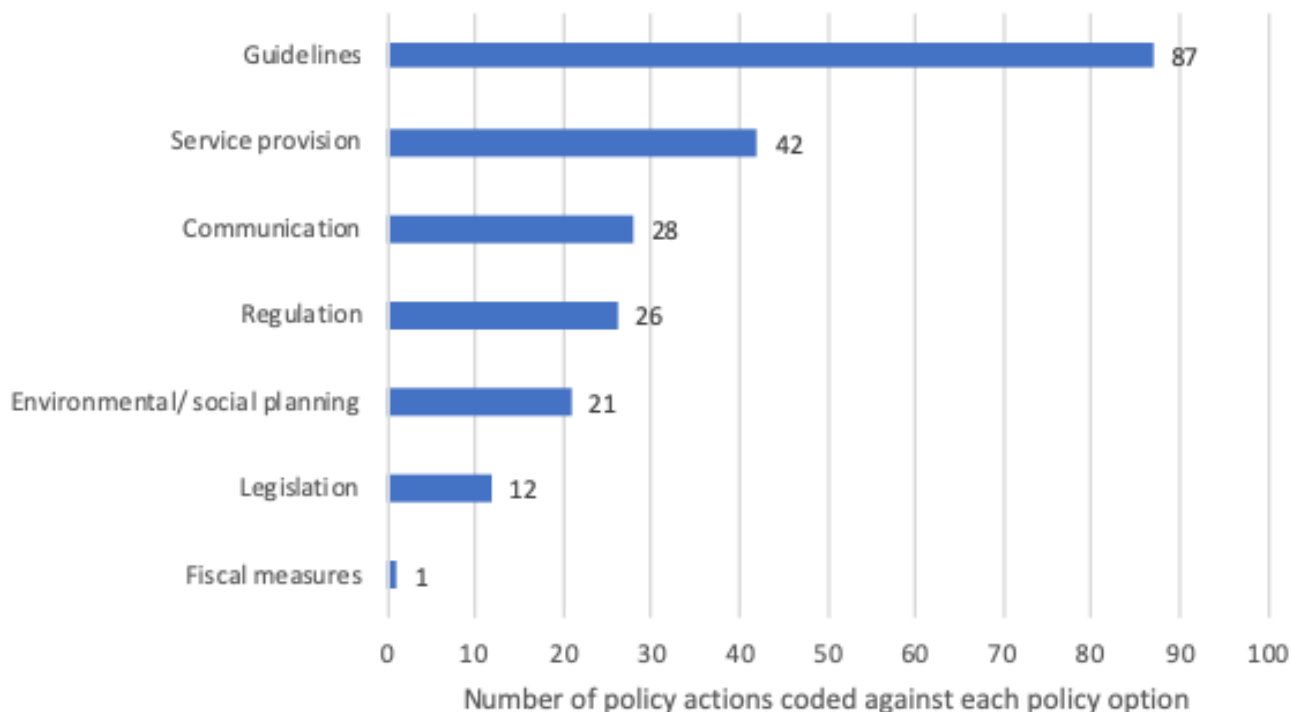
Results indicated that whilst there was good coverage of policies to tackle many of the behavioural influences on excessive weight gain in early childhood, analysis of the content of the most frequently used policies suggested that they exert their influence by

addressing capability and motivation of families to make healthier choices. Policy recommendations which targeted the influence of the external environment on behaviour (for example legislation and fiscal measures) were much less frequently represented. Since children from lower SES backgrounds are far more likely to be obese and often live in the most obesogenic environments the analysis highlights the importance of increasing policy initiatives which directly tackle the opportunities of families to make healthier choices – that is to create environments in which the healthiest choice is also the easiest choice.

Constructing the intervention

Determining the type of intervention and choice of policy options sets the scene for constructing the detail of the intervention. This involves deciding on 1) the specific 'Behaviour Change Techniques' (see below) and 2) how these are delivered.

Behaviour Change Techniques (BCTs)

BCTs are the active ingredients of interventions. A comprehensive list of the available techniques has been developed detailing 93 of them, covering the different ways in which we can educate, persuade, incentivise, coerce, train etc. the target group (17).

Describing all of these is beyond the scope of this guide but full details are provided in the BCW guide (1). The BCW guide describes how to identify BCTs from the COM-B diagnosis and to link them with Intervention Types (page 151). A free smartphone app is also available to make it easy to find the BCTs (http://bit.ly/BCTsappGoogle (Google Play) and http://bit.ly/BCTsappApple (iOS)). Free online tools have been developed to train people in how to:

- identify BCTs (www.bct-taxonomy.com) in interventions
- link BCTs to their mechanisms of action in designing theory-based interventions (https://theoryandtechniquetool.humanbehaviourchange.org/)

NEAR

In the absence of a detailed knowledge of BCTs and what each can be used for, a simple guide to developing intervention content is captured by the acronym NEAR. This recognises that behaviours will generally be more likely to occur if they are Normal, Easy, Attractive, and Routine.[3]

When considering what to include in interventions it may be helpful to bear these broad principles in mind. Table 10 provides examples of BCTs that may be used in constructing interventions (17).

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[3] The Behavioural Insights Team has developed a somewhat similar framework called EAST (Easy, Attractive, Timely, and Social). This provides valuable pointers as to what may make interventions effective, but it is not linked to any framework such as COM-B or the BCTv1 taxonomy and the 'Social' and 'Timely' components relate to selected aspects of the delivery of interventions rather than the content.

Table 10: NEAR as a framework for constructing behaviour change interventions

NEAR	Intervention Types and example BCTs1
Normal: We are more likely to do things that we see being done and approved of by people with whom we identify.	This relates to Intervention Types: Education, Persuasion, Incentivisation, Coercion, Restriction, Environmental restructuring, and Modelling. Example BCTs are: • providing information about others' approval • social comparison Reversing these can also be used to make the behaviour less normal.
Easy: We are more likely to do things if they are simple, within our capabilities and require little by way of resources, time or effort	This relates to Intervention Types: Education, Training, Environmental restructuring and Enablement. Example BCTs are: • adding objects to the environment • action planning We can make it easier not to do behaviours through: • behavioural substitution • distraction
Attractive: We are more likely to do things if we think they will be enjoyable, serve a purpose or avoid something bad happening	This relates to Intervention Types: Education, Persuasion, Incentivisation, Coercion and Modelling. Example BCTs are: • material reward • feedback on behaviour We can make behaviours less attractive through: • punishment • threat
Routine: We are more likely to do things if they are part of our routine,	This relates to Intervention Types: Training, Environmental restructuring and Enablement.

so we don't have to think about them	Example BCTs are: • behavioural practice/rehearsal • feedback on the behaviour We can disrupt routines through: • rehearsing alternative behaviours ('Habit reversal') • avoiding/reducing exposure to cues for the behaviour

[1] The BCT labels in this column are taken from the BCTv1 taxonomy. For definitions see www.bct-taxonomy.com

Delivering the intervention

The effectiveness of an intervention can be affected as much by the way it is delivered as by its content. Three aspects of delivery are important and are:

• the 'source of the intervention
• the 'mode of delivery'
• the schedule

The source of an intervention is the individual or organisation that is delivering it. For example, advice to promote a healthy diet may be more or less effective depending on who is giving it. It is worth paying attention to whether sources are trusted and considered as authoritative.

The mode of delivery can be thought of as the vehicle by which the intervention is delivered. For example, advice about healthy eating could be delivered through face-to-face sessions, printed materials or via a website. Different modes of delivery will be better suited to some intervention content than others and to some target groups. In many cases, we might wish to use more than one mode of delivery or adapt this to the needs and preferences of the target group (for example targeting young adults with messages through social media).

The schedule of delivery refers to the timing of the intervention and its components. There are many aspects to this. For example, do we want to start the intervention before the point when behaviour change is supposed to occur, to prepare the target group for making the change? We may need to decide how frequently we want any contacts with the target group to occur and whether these should be more frequent early on.

Topic-specific knowledge

Decisions about source, mode of delivery and schedule should always be made with regard to what we are trying to achieve as set out in the rest of the BCW process using topic-specific knowledge: that is a detailed and accurate understanding of factors underlying a given behaviour and the evidence about evaluations of interventions designed to change it.

The BCW is not a substitute for topic-specific knowledge; rather it provides a structured way of using that knowledge to make judgements about the specific behaviour, context and target group that we are concerned with.

Case study: Selecting behaviour change techniques to increase physical activity

In a study to develop an intervention to increase regular walking in adolescent girls and their mothers a behavioural diagnosis was conducted through evidence synthesis and engagement with the target population through a COM-B questionnaire and interviews (18). The following intervention types were selected to address the influences on behaviour identified in the COM-B analysis; Education, Persuasion, Incentivisation, Training, Modelling and Enablement.

To choose which BCTs would be optimal for the context to deliver these types, the intervention designers used a mapping matrix which describes the most frequently used BCTs for each Intervention Function, alongside the APEASE criteria and consideration of the full range of delivery modes to and identified 18 appropriate BCTs. Examples of the selected BCTs and how they were translated into intervention components are shown in Table 11.

Table 11: Examples of the BCTs selected to deliver intervention types

Intervention type (in bold) and BCT label and definition	How the BCT will be delivered in the intervention
Education	
Information about health consequences (provide information (for example written, verbal, visual) about health consequences of performing the behaviour)	Explain benefits of regular participation in PA (physical & mental health, academic achievement etc.) for daughters and mothers.
Information about social and environmental consequences (provide information (for example written, verbal, visual) about social and environmental consequences of performing the behaviour)	Inform participants of social benefits of regular PA participation by presenting research evidence in user-friendly format.
Information about emotional consequences (provide information (for example written, verbal, visual) about emotional consequences of performing the behaviour)	Explain verbally that regular exercise increases endorphins, happiness, positive life outlook and so forth. Provide this information also in written material.
Persuasion	
Credible source (present verbal or visual communication from a	Present videos of health professionals explaining key benefits of regular PA for physical, mental health and academic achievement. Show mothers persuasive video clip of other parents talking of

credible source in favour of or against the behaviour)	benefits of parenting for PA for health, communication, cohesion and so forth within family unit.
Verbal persuasion about capability (tell the person that they can successfully perform the wanted behaviour, arguing against self-doubts and asserting that they can and will succeed)	Tell participants that they can successfully increase their participation in physical activity, despite current fitness levels.
Identification of self as role model (inform that one's own behaviour may be an example to others)	Present the research demonstrating that mothers who regularly exercise set a good example for their children.
Incentivisation	
Social reward (arrange verbal or non-verbal reward, if and only if there has been effort and/or progress in performing the behaviour (includes 'positive reinforcement')	Congratulate participants for each session of walking they complete. Congratulate mothers for implementing strategies to encourage their daughters' participation in PA.
Training and modelling	
Instruction on how to perform the behaviour (advise or agree on how to perform the behaviour (includes 'skills training'))	Advise all participants how to effectively walk for exercise by explaining cadence (steps/min monitoring with pedometer; music tracks at set beats per minutes), exercise intensity (RPE, heart rate monitoring) and walking routes (linked to smartphone apps) and so forth. Advise mothers how to parent for PA (practical strategies/parenting styles etc.)
Demonstration of the behaviour	Demonstrate to all participants how to walk for exercise by showing how to

(provide an observable sample of the performance of the behaviour, directly in person or indirectly for example via film, pictures, for the person to aspire to or imitate)	consider cadence (steps/min monitored by pedometer; walking to a music track with specific beats per minutes), exercise intensity (RPE, heart rate monitoring), walking routes (for distance/speed/terrain).
Enablement	
Goal setting (behaviour) (set or agree on a goal defined in terms of the behaviour to be achieved)	We will agree daily/weekly walking goals with all participants. Individualized and graduated goals will be developed to encourage participants to increase their average daily step count each week until they reach an average of 11,000 steps/day for adolescents and 10,000 steps/day for mothers on at least 5 days of the week. Mother and daughters will be encouraged to set a goal for walking together on at least one day per week initially. Daughters will also be asked to plan at least one walk per week with their friends.
Action planning (prompt detailed planning of performance of the behaviour (must include at least one of context, frequency, duration and intensity). Context may be environmental (physical or social) or internal (physical, emotional or cognitive; includes 'Implementation Intentions')	All participants will be asked to plan walking at a particular time of the day, on certain days of the week by making a written action plan. Mothers will be asked to plan how they will support this daughters' PA by scheduling specific actions throughout each week.
Problem solving (analyse, or prompt the person to analyse, factors	Mother & daughters will be prompted to identify barriers (including time) preventing them from exercising regularly and engaging in physical activity with

influencing the behaviour and generate or select strategies that include overcoming barriers and/or increasing facilitators)	each other. Participants will then discuss ways in which they could overcome these barriers. In addition, mothers will be promoted to consider barriers preventing them from encouraging their child's PA and discuss ways in which they could overcome them.

Conclusions

Developing behaviour changing interventions that meet policy objectives in national government can be challenging. To maximise the chances of success, it is important to use a systematic approach. This guide explains how the Behaviour Change Wheel (BCW) can inform that approach. It is not a substitute for topic-specific expertise, but rather a way to harness that expertise, where it exists.

The BCW can be used in many ways, whether it be developing interventions from scratch, adapting existing interventions, or choosing between a number that are on offer.

The APEASE evaluation criteria (Acceptability, Practicability, Effectiveness, Affordability, Side-effects, Equity) can be applied to any part of the process to ensure that:

- interventions address the behaviours that are most likely to achieve the policy objectives
- it is clear what it is about people or their environment (Capability, Opportunity, Motivation) that needs to change for the behaviour(s) to change
- the full range of intervention types (Education, Persuasion, Incentivisation, Coercion, Training, Restriction, Environmental Restructuring, Modelling, Enablement) are canvassed and selected based on the COM-B diagnosis
- thought is given to the choice of policy options for delivering the intervention (Guidelines, Environmental and Social Planning, Communications and Marketing, Regulation, Service Provision, Legislation, Fiscal Measures)
- the specific content and delivery of interventions is fit for purpose using appropriate Behaviour Change Techniques (BCTs)

Glossary

Term	Definition
APEASE criteria	A set of assessment criteria for use in development of an intervention, a part of an intervention or to evaluate an intervention or intervention part that has already been developed. The criteria are: acceptability, practicability, effectiveness, affordability, spill-over effects, and equity.
Assessment	A process involving evaluation of something with reference to a set of criteria.
Behaviour change intervention	A process in which an agent, which may be a person or organisation, attempts to influence the behaviour of a person, group or population.
Behaviour change practitioner	A role that focuses on influencing the behaviour of other people, groups or populations.
Behaviour Change Technique	A part of a behaviour change intervention that is intended to be causally active in changing the outcome behaviour.
Behaviour Change Wheel (BCW)	A method for developing and evaluating behaviour change interventions. It involves: identifying populations and behaviours to target to achieve a desired outcome; using the COM-B model to undertake a behavioural diagnosis; identifying intervention types that are likely to influence the types of capability, opportunity and motivation identified in the behavioural diagnosis; identifying policy options that are best suited to delivering the intervention types; constructing the detailed plan for the intervention using behaviour change techniques; and throughout the process assessing options under consideration using the APEASE criteria.

Behaviour selection	A part of the development of a behaviour change intervention that involves identifying the behaviour to be changed and the relevant population
Behavioural diagnosis	Also called COM-B diagnosis. A process in which an intervention developer attempts to identify which one or more out of capability and opportunity and motivation should be influenced in order to achieve a desired behavioural outcome. It also includes identifying specifically what types of capability, opportunity and motivation to target.
Behavioural systems map	A causal model of people and organisations, their behaviours, and chains of causal influence linking these behaviours to outcomes of interest.
COM-B model	A model of behaviour that stipulates that for a given behaviour to be enacted by a person at a given moment, the person must have the physical and psychological capability to undertake the behaviour, the physical and social opportunity to enact the behaviour and have a stronger motivation to enact the behaviour than any other potentially competing behaviour. Capability is influenced by past behaviour and motivation. Opportunity is influenced by past behaviour. Motivation is influenced by past behaviour, capability and opportunity.
Entry point for an intervention	A part of a causal system that is suitable as a target for potential influence in an intervention.
Gap analysis	A process in knowledge acquisition that involves identifying where in a domain of interest information is missing, unclear or conflicting.
Intervention type	Functions that interventions perform to change behaviour. In the Behaviour Change Wheel these are: Education, Persuasion, Incentivisation, Coercion,

	Training, Restriction, Environmental restructuring, Modelling and Enablement. Also called Intervention Function.
NEAR framework	A classification of attributes of behaviours that can be used to judge their likelihood of occurrence and form a basis for developing a behaviour change intervention. It was developed to form a simple heuristic for linking a behavioural diagnosis to choice of intervention functions and behaviour change techniques. The attributes are: normal, easy, attractive, and routine.
Policy option	Policies that can be used to provide intervention functions put in place by organisations or agencies. In the Behaviour Change Wheel these are: Communication and marketing, Regulation, Guidelines, Fiscal measures, Service provision, Legislation, and Environmental and social planning. Also called policy category.
Theoretical Domains Framework	A classification system of things about people or their environment that can usefully form the target of an intervention in order to change behaviour. It contains 15 categories that are a mixture of personal attributes (Identity, beliefs about capabilities, optimism, intentions, goals, beliefs about consequences, knowledge, cognitive and interpersonal skills, and physical skills), mental processes (reinforcement, emotion, memory, attention and decision processes, and behavioural regulation), environmental attributes (environmental context and resources), and social processes (social influences).
Topic-specific knowledge	Also called domain-specific knowledge. Knowledge about a topic that is detailed and comprehensive and includes information that is specific to that topic.

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Appendix 1: Sample questions for making a COM-B diagnosis

Below are sample questions to be selected and adapted according to behaviour, context and method (for example interview, focus group, questionnaire, brainstorming/work-shopping). Note that not all questions will be relevant. For example, in many cases it will not be necessary to check that people have the physical capability to do the behaviour.

In every case it is important to specify the context of the target behaviour.

These example questions are all framed in terms of doing a behaviour, but they can be adapted to address stopping a behaviour, or changing the frequency, duration or intensity of the behaviour.

Note that in the COM-B model, the C, O and M components interact so that, if a problem is identified in one area (for example insufficient control over their behaviour), it can be addressed by targeting another (for example restricting opportunity).

Capability: Psychological
1. Do they know that the behaviour needs to change?
2. Do they know what achieving this requires?
3. Do they understand why it is important?
4. Do they understand what will happen if they do (or don't do) the behaviour?
5. Do they know how to do it?
6. Do they have the required ability to focus their attention on the task?
7. Do they have the required memory ability for the behaviour?
8. Do they have the mental skills and understanding needed for the behaviour?
9. Do they have the mental strength and stamina for the behaviour?

Capability: Physical
1. Do they have the physique and anatomy required for the behaviour?
2. Do they have the sensory capacity required for the behaviour?
3. Do they have the physical skills and dexterity needed for the behaviour?
4. Do they have the physical strength and stamina needed for the behaviour?
5. Are they able to overcome any physical limitations they might have?

Opportunity: Physical
1. Do they have the time to do the behaviour given competing demands?
2. Do they have the material resources required to perform the behaviour?
3. Do they have appropriate prompts and reminders for the behaviour?

4. Do they have the financial resources to do the behaviour?

Opportunity: Social
1. Do informal and formal rules in their environment promote the behaviour?
2. Do their interactions with people in their environment promote the behaviour?
3. Do they have formal or informal social support for the behaviour?
4. Are people in their environment performing the behaviour?
5. Are there social cues to trigger the behaviour?

Motivation: Reflective
1. Do they judge that the benefits of enacting the behaviour outweigh the costs?
2. Are they willing to prioritise the behaviour over other behaviours if necessary?
3. Do they judge the behaviour to be normal?
4. Do they have effective plans for enacting the behaviour?
5. Are they confident that they can perform the behaviour?

Motivation: Automatic
1. Do they feel that they want or need to enact the behaviour?
2. Do they expect to feel good about doing the behaviour or bad if they do not do it?
3. Will their emotional responses get in the way of enacting the behaviour?
4. Can the behaviour become habitual: something they can do without thinking about it?

Appendix 2: A brief measure of capabilities, opportunities, and motivations (COM-B)

https://onlinelibrary.wiley.com/doi/full/10.1111/bjhp.12417

1. I have the PHYSICAL opportunity to *change my behaviour to improve my health*.

What is PHYSICAL opportunity?

The environment provides the opportunity to engage in the activity concerned.

(e.g. sufficient time, the necessary materials, reminders)

Please rate

	Strongly disagree										Strongly Agree
	0	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2. I have the SOCIAL opportunity *to change my behaviour to improve my health*.

What is SOCIAL opportunity?

Interpersonal influences, social cues and cultural norms provide the opportunity to engage in the activity concerned

(e.g., support from friends and family)

Please rate

	Strongly disagree										Strongly Agree
	0	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

3. I am motivated to *change my behaviour to improve my health*.

What is motivation?

Conscious planning and evaluations (beliefs about what is good and bad)

(e.g. I have the desire to, I feel the need to)

Please rate

	Strongly disagree										Strongly Agree
	0	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

4. *Changing my behaviour to improve my health* is something that I do automatically.

> **Automatic motivation** involves doing something without thinking or having to consciously remember
> (e.g. 'is something I do before I realise I'm doing it')

Please rate

	Strongly disagree										Strongly Agree
	0	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

5. I am PHYSICALLY able to *change my behaviour to improve my health*.

> **What is PHYSICAL capability?**
>
> Having the physical skill, strength or stamina to engage in the activity concerned.
>
> (e.g. I have sufficient physical stamina, I can overcome disability, I have sufficient physical skills)

Please rate

	Strongly disagree										Strongly Agree
	0	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

6. I am PSYCHOLOGICALLY able to *change my behaviour to improve my health*.

> **What is PSYCHOLOGICAL capability?**
>
> Knowledge and/or psychological skills, strength or stamina to engage in the necessary thought processes for the activity concerned.
>
> (e.g. having the knowledge, cognitive and interpersonal skills, having the ability to engage in appropriate memory, attention and decision making processes).

Please rate

	Strongly disagree										Strongly Agree
	0	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Questionnaire items (used in main study)

Appendix 3: Additional resources

Consultancy
- Advice and mentoring on use of the BCW is available from UCL's Centre for Behaviour Change www.ucl.ac.uk/behaviour-change

Training
- Behaviour Change Summer School at UCL - a five-day programme introducing the principles of behaviour change and how these can be applied to a range of practical problems. www.ucl.ac.uk/behaviour-change/training/summer-school
- Behaviour Change Techniques Taxonomy online training www.bct-taxonomy.com

Publications

General
- The Behaviour Change Wheel, A guide to designing interventions (Michie, Atkins & West, 2014) Silverback Publishing. www.behaviourchangewheel.com
- The behaviour change wheel: A new method for characterising and designing behaviour change interventions (Michie et al. 2011, *Implementation Science*, https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-6-42)
- Unlocking Behaviour Change Briefings https://www.unlockingbehaviourchange.com/pdf

Behaviour Change Techniques
- The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behaviour change interventions (Michie et al. 2013, *Annals of Behavioral Medicine*, https://link.springer.com/article/10.1007/s12160-013-9486-6)
- A database of published interventions coded by Behaviour Change Technique www.bct-taxonomy.com/interventions
- A smartphone apps of Behaviour Change Techniques and their definitions http://bit.ly/BCTsappGoogle (Google Play) and http://bit.ly/BCTsappApple (iOS).
- A free online tool to train people in how to identify BCTs (www.bct-taxonomy.com).

Theoretical Domains Framework

- Making psychological theory useful for implementing evidence based practice: a consensus approach (Michie et al. 2005, *BMJ Quality & Safety*, https://qualitysafety.bmj.com/content/14/1/26)
- Validation of the Theoretical Domains Framework for use in behaviour change and implementation research (Cane et al. 2012, *Implementation Science*, https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-7-37)
- A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems (Atkins et al. 2017, *Implementation Science*, https://implementationscience.biomedcentral.com/articles/10.1186/s13012-017-0605-9)

Teaching

- MSc Behaviour Change - Available full- or part-time, this programme offers the opportunity to learn about cutting-edge research and the principles behind successfully changing behaviour. https://www.ucl.ac.uk/behaviour-change/study/msc-behavior-change

Videos

- 2019 International Convention on Psychological Science - Professor Susan Michie (click link 'Changing behaviours throughout society') https://www.unlockingbehaviourchange.com/video
- Finnish Prime Minister's Office's & Psychological Society – Professor Susan Michie https://www.youtube.com/watch?v=-RwIYQaz_Tg
- "Designing effective behaviour change interventions" 10th Duodecim International Symposium 2018 - Professor Susan Michie https://vimeopro.com/user39826906/10th-duodecim-international-symposium-2018/video/276001199

Other online resources

Linking Theoretical Domains Framework to Behaviour Change Techniques

- Theory and Techniques Tool for linking Behaviour Change Techniques and Mechanisms of Action https://theoryandtechniquetool.humanbehaviourchange.org (also see https://www.youtube.com/watch?v=V3xpnm0s8jw for an introduction to this tool)

Appendix 4: Worksheets

This Appendix provides worksheets that may be helpful for each of the processes involved in developing or selecting behaviour change interventions.

Behaviour selection

State your policy objective(s) (for example reducing outdoor air pollution)

List all relevant behaviours and in each case specify the relevant people and how they relate directly or indirectly to the policy objective(s)

Behaviour[1]	Person	Relationship to policy objective

[1]Repeat rows as needed

For each behaviour listed above, rate it as a potential target using APEASE criteria

Behaviour[1]	Acceptability as a target (high, medium, low)	Practicability of changing it (high, medium, low)	Effectiveness in reaching policy objective (high, medium, low)	Is it likely that interventions to change it will be affordable? (yes, no)	Will changing it have spillover effects? (positive, none, negative)	Will trying to change it increase or decrease equity? (increase, none, decrease)

[1]Repeat rows as needed

Considering how the behaviours may interact, prioritise ones to target using the above criteria

1	
2	
3	
4	
5	

[1]Repeat rows as needed

COM-B diagnosis

For each behaviour that is being targeted, identify what attributes of the person or their environment will provide the most promising route to change

Behaviour	Capability[1]	Opportunity[2]	Motivation[3]

[1]Increase knowledge or understanding, mental or physical skills, strength or stamina
[2]Make time, provide financial or material resources, provide social support, make it normative
[3]When trying to increase a behaviour: make it more attractive, attempt to make it routine or habitual. When trying to reduce a behaviour: make it less attractive, attempt to break habits or routines, find alternatives

Selecting interventions types

For each behaviour being targeted, use Table 7 and the APEASE criteria to select the most promising intervention types.

Behaviour:	
Intervention type	**Whether or not to use and why or why not**
Education	
Persuasion	
Incentives	
Coercion	
Restriction	
Environmental restructuring	
Modelling	
Enablement	

Formulating an intervention strategy

Considering all the behaviours to be targeted, identify which policy options are likely to deliver what is required using the APEASE criteria and Table 9 to make your judgement.

Policy option	Whether or not to use and why or why not
Produce guidelines	
Use environmental or social planning	
Use communications or marketing	
Use legislation	
Develop and provide a service	
Use regulations	
Use fiscal measures	

Constructing the intervention

Constructing the intervention involves reviewing the outcomes of the other processes involved in developing or selecting the intervention and then either 1) adapting an existing intervention, or 2) building a new intervention.

Summarise the policy goal(s)

List the behaviour(s) that have been chosen to target to achieve those goals, including whose behaviour and the nature and extent of the desired change.

Behaviour[1]	Person	Details of the desired change

[1]Repeat rows as required

For each behaviour, list the COM-B targets that will best achieve the desired behaviour change.

Behaviour[1]	COM-B target(s)[2]

[1]Repeat rows as required

[2]Capability: Increase knowledge or understanding, mental or physical skills, strength or stamina; Opportunity: Make time, provide financial or material resources, provide social support, make it normative; Motivation: When trying to increase a behaviour: make it more attractive, attempt to make it routine or habitual. When trying to reduce a behaviour: make it less attractive, attempt to break habits or routines, find alternatives

Summarise what will be required in terms intervention types and why

Behaviour[1]	Intervention types[2]	Justification[3]

[1]Repeat rows as required

[2]Education, Persuasion, Incentives, Coercion, Training, Restriction, Environmental Restructuring, Modelling, Enablement

[3]Summarise link to COM-B targets and how they score on APEASE criteria

Summarise the implementation strategy and its justification

Policy option to be used[1]	Justification[2]

[1]Guidelines, Environmental or social planning, communications/marketing, legislation, providing a service, regulation, fiscal measures

[2]Justification in terms of APEASE criteria

Draw together in narrative form (with a diagram if it would help) the 'logic model' underpinning the intervention, setting out how it will influence the behaviour(s) through the COM-B targets and meet the APEASE criteria

Draft an initial specification of the content and delivery of the intervention, linking each component with the logic model, and providing justification for its inclusion according to APEASE criteria citing available evidence or theory if possible.

If the component is intended to act in concert with another component as part of the logic model, provide details.

Try to classify each component in terms of the specific Behaviour Change Technique(s) or at least the NEAR elements that it uses.

Component label	
Content	
Delivery	
Behaviour(s) targeted	
Link to COM-B	
BCT or NEAR element(s)	
Other components involved	
Justification	

Repeat for each component.