Public Health England

Protecting and improving the nation's health

Achieving behaviour change

A guide for local government and partners

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, research, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

OGL

Corporate member of
Plain English Campaign
Committed to clearer
communication
339

SUSTAINABLE DEVELOPMENT GOALS

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.

About the authors

Professor Robert West is Professor of Health Psychology at UCL and a world expert on smoking cessation and addiction, with a focus on the role of motivation in behaviour change.

Professor Susan Michie is Director of the Centre for Behaviour Change and Professor of Health Psychology, with research focused on understanding behaviour change theoretically and developing methods for designing interventions to address real-world complex problems.

Dr Lou Atkins is Senior Teaching Fellow and Director of the CBC's Australasian Hub, providing research, training and consultancy in behaviour change intervention design and evaluation.

Dr Paul Chadwick is Associate Professor and Deputy Director of the Centre for Behaviour Change, with expertise in organisational change, physical activity and diabetes management.

Dr Fabiana Lorencatto is Research Lead at the Centre for Behaviour Change with a primary research interest in designing behaviour change interventions aimed at changing the behaviours of healthcare professionals to improve clinical practice.

UCL Centre for Behaviour Change
Room 504, Alexandra House
17-19 Queen Square
London WC1N 3AZ
Tel: 020 7679 5497
www.ucl.ac.uk/behaviour-change
Twitter: @UCLBehaveChange
Facebook: www.facebook.com/UCLBehaviourChange

Contents

Executive summary

Local government and partners such as the NHS, emergency services, and third sector often need to achieve changes in the behaviour of those living or working in a local place in order to meet their goals: for example, improving health, reducing air pollution, household waste and energy usage, and regenerating high streets.

This guide provides a structured approach to achieving behaviour change. It is based on a framework known as the Behaviour Change Wheel (BCW). An equivalent guide focusing on national government policies and behaviour change is also being developed. For many policy objectives, local and national policies need to be co-ordinated to have maximum impact.

The BCW can be used to help 1) develop behaviour change interventions from scratch, 2) build on or modify existing interventions, and 3) choose from existing or planned interventions.

The BCW involves a number of processes to achieve this, which are:

Assessment
Evaluating the appropriateness of existing or proposed interventions in terms of the 'APEASE' criteria: Acceptability, Practicability, Effectiveness, Affordability, Side-effects, and Equity (see Section 5).

Behaviour selection
Identifying and selecting key behaviours to focus on in order to achieve policy objectives (see 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 (see Section 7).

Selecting intervention types
Identifying the broad types of intervention matched to the COM-B diagnosis: Education, Persuasion, Incentivisation, Coercion, Training, Environmental restructuring, Modelling, and Enablement (see Section 8).

Formulating an implementation strategy
Choosing how to deliver interventions using: Guidelines, Legislation, Service Provision, Fiscal Measures, Environmental/social Planning, Communications and Marketing, Restriction and Regulation (see Section 9).

Constructing the intervention
Deciding the details of the intervention content and delivery (see Section 10).

The guide introduces tools and provides case examples for each of these processes that can be used all together or as required during the development process. The guide also points to further reading and resources, including the full guide to using the BCW (see Appendix 2: Additional Resources).

It is important to note at the outset that 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 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.

Purpose of this guide

This guide is written for anyone working in local government or partners whose remit involves changing behaviour. The guide is based on the Behaviour Change Wheel (BCW) (1, 2), a framework for understanding behaviour in its context and 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 of a range of models and frameworks for using behavioural science. 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 local decision making

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 make a difference to the way people act. This includes stopping people from engaging in risky or antisocial behaviours (e.g. smoking, littering) as well as increasing positive ones (e.g. physical activity, recycling).

Achieving large scale behaviour change often involves 'cultural' change among groups of people within a range of organisations and communities. This can require simultaneously targeting behaviours amongst, for example, policy-makers, commissioners, planners, service providers and users, as well as the general public. Interventions vary widely 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, such as introducing speed humps to reduce traffic speed.
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.

The Behaviour Change Wheel (BCW)

The BCW was developed from an extensive review of behavioural science frameworks from many disciplines and sectors (1, 2), bringing together their best features. The framework provides a flexible method for developing, adapting or choosing between interventions.

Figure 1 shows the Behaviour Change Wheel with the green inner hub representing the major influences on behaviour, the red circle showing the range of types of intervention, and the grey outer circle showing policy options that can deliver those interventions.

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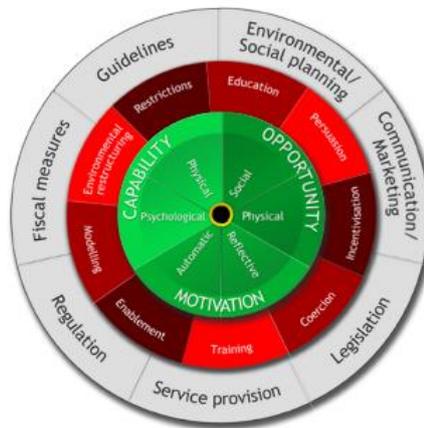
The BCW has been used to address issues such as: domestic water use (3), physical activity in school children (4), reducing sitting time in desk-based office workers (5), promoting independent living in older adults (6), supporting parents to reduce provision of unhealthy foods to children (7), and reducing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

More details of the Behaviour Change Wheel can be found at www.behaviourchangewheel.com. Further resources to support the application of the Behaviour Change Wheel can be found in Section 14 of this guide. Local Authorities using this approach may wish to seek out further help from one or more of the listed resources.

What is involved in developing an effective behaviour change intervention?

Figure 2 shows the key 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'.

Figure 2. Processes involved in developing effective behaviour change interventions
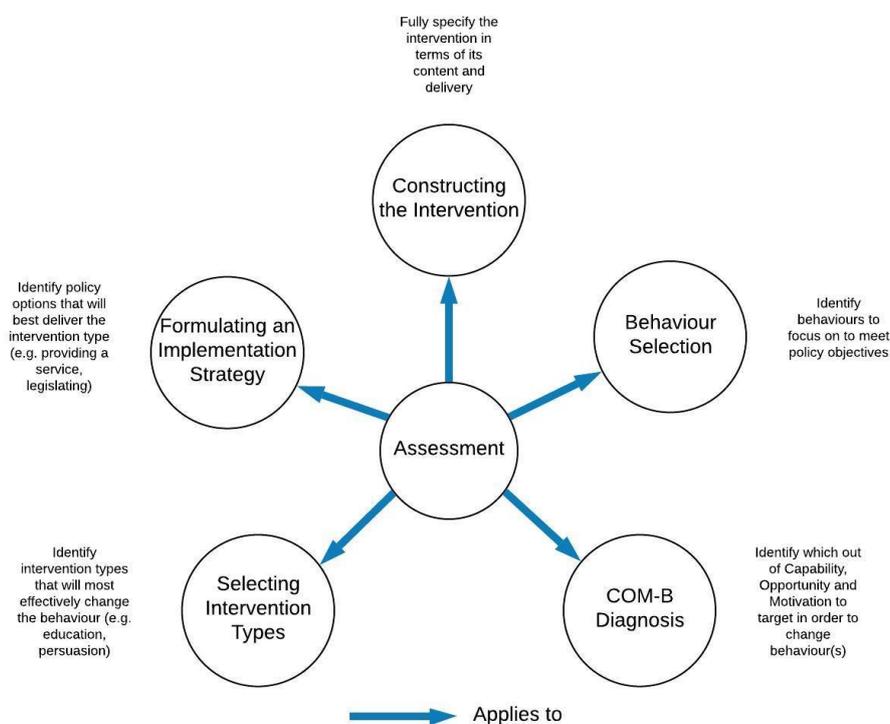
Assessment: Assessment applies to every part of the process of developing, selecting and implementing interventions. The BCW lists criteria to apply when making these judgements under the acronym, APEASE: Acceptability, Practicability, Effectiveness, Affordability, Side-effects, and Equity.

For example, if we focus on reducing smoking prevalence, working with other local authorities regionally to commission/run a mass media campaign to support motivation to quit brings economies of scale and fulfils most of the APEASE criteria. But this could adversely affect equity, in that smokers from more deprived areas/populations may be less able to quit when motivated to try. Embedding a local specialist stop-smoking service in areas with the greatest needs can help offset this potential inequity.

Behaviour selection: This includes identifying behaviour to target as well as the group or groups of people being targeted. In some cases, the target behaviours are readily identified (e.g. fly tipping). However, in many cases we have to identify one or more target behaviours and target groups that will most likely achieve the desired goal (e.g. 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 behaviours to focus on – eating patterns, physical activity or both. Then we have to drill down into what kind of changes in eating and/or physical activity to focus on.

COM-B diagnosis: If we are clear about what and whose behaviour needs to change we have to 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 (e.g. 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

For example, if we are trying to increase physical activity, we need to decide whether to try to get them to want to do this (motivation) and/or make it easier, for example by improving cycle routes or access to gym facilities (opportunity) or providing cycling proficiency training (capability) (see Section 7).

Selecting Intervention Types: 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 intervention types: Education, Persuasion, Incentivisation, Coercion, Training, Restriction, Environment restructuring, Modelling, and Enablement (see Table 4). 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, to get people walking or cycling to work more often instead of driving we could work on their motivation by trying to convince them of the benefits (Persuasion) and/or making it more expensive to park (Coercion); or we could restrict their opportunity by removing parking spaces (Environmental Restructuring) and increase their opportunity to cycle by a cycle loan scheme (Enablement) (see Section 8).

Formulating an Implementation Strategy: There are often a number of ways that a given intervention approach can be delivered. The BCW describes the range of 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: The full intervention needs to be described in terms of a) its component 'Behaviour Change Techniques' (BCTs) or 'content', and b) the way that these are delivered. Examples of BCTs include: 'goal setting', 'action planning', and 'social support'. Delivery of interventions involves the 'source' of the intervention (the people or organisations delivering it), the 'mode of delivery' (e.g. face-to-face, online etc.), and the schedule (the timing of the intervention and its components).

For example, if we are designing a media campaign to promote increased recycling, we may wish to create messaging that will be motivational as well as educating people about what can and cannot be recycled (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 (the schedule) (see Section 10).

How to use this guide

Scenarios covered by this guide

There are 3 main scenarios in which this guide will be helpful. These 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

Wherever we are starting from in the process, 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, 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 work as we want it to.

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. In doing so, it is likely that we will keep a number of options on the table and possibly cycle back in the process if promising options do not stand up to further scrutiny. It is important to be aware of other interventions, across organisations that will need to be co-ordinated in local 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 falling down on one of the other APEASE criteria; for example, it is no longer affordable or practicable or we have identified important adverse unintended consequences. 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 and the task is to decide whether 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 local government or 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 structure this process. 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: 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 within the intended context, 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 the intervention 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?
Side-effects	What are the chances that it will lead to unintended adverse or beneficial outcomes?
Equity	How far will it increase or decrease differences between advantaged and disadvantaged sectors of society?

Making APEASE judgements

APEASE judgements will always involve a subjective element. Even when there is a large body of high-quality evidence on effectiveness, there is no guarantee that it will directly apply to the specific context and with the specific 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 analysis and development of a plausible model as to how the intervention will work. This can be done in a formalised way using the APEASE grid which is discussed later.

A suggested approach is to:

- find whatever scientific literature and case reports exist for similar interventions
- set up a working group to review available evidence and form a collective judgement and ensure that the process is transparently captured
- set up consultations with stakeholders such as residents, businesses and community groups to benefit interventions from co-production and/or include members of these groups in the core development team
- commission additional data collection to address important areas of uncertainty where needed, and where resources and time permit
- drop or amend any interventions 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

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 (e.g. 0-10) or semi-quantitative judgements (e.g. 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, we could ask a group of experts 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 that we can and ask an expert group to complete the grid together, discussing the judgements as they go.

Table 2: Example of use of the APEASE grid to assess options for reducing adult obesity in a local authority

Ratings

Option	Acceptability (0 to 10)	Practicability (0 to 10)	Effectiveness (0 to 10)	Affordability (0 to 10)	Side-effects (-5 to +5)	Equity (-5 to +5)
Weight management service	7	7	3	5	0	+2
Subsidised gym membership	3	6	1	4	+1	+2
Healthy meals media campaign	7	8	2	3	0	+2

Option descriptions

Option	Description
Weight management service	A service funded by the Local Authority for people with a BMI of 30 or greater involving referral by GPs to a commercial provider for 12 weekly sessions.
Subsidised gym membership	Providing free or half-price gym membership, depending on their income, for 6 months to people with a BMI of 30 or greater who are referred by their GP.
Healthy meals media campaign	Mounting ongoing local campaigns using paid and unpaid media targeting low socioeconomic groups focusing on empowerment to prepare cheap meals that are easy to prepare and nutritious.

Sources and justification

Option	Justification
Weight management service	There is good evidence from studies that this can work and acceptability is likely to be high. The amount of weight loss is typically relatively small though and there is no direct evidence on health gains. It would be relatively easy to implement. A budget could be found for this. It would be likely to improve equity because obesity has a strong social gradient. There are no reasons to believe it would have adverse or beneficial unintended consequences.
Subsidised gym membership	Increasing physical activity is important for health but this is highly unlikely to make any impact on weight for the vast majority of people referred. Evidence suggests that there is also likely to be low acceptability on the part of the target group. Once the trial period is over evidence tells us that continued gym use is low.
Healthy meals media campaign	Many people do not know how to prepare cheap healthy meals and a well-conducted campaign could start a movement in the local area. It is not clear how much effects this would have on weight because snacking may increase so this is a shot in the dark. It could be affordable, particularly if LAs combine resources with others in the region.

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. 23 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. 6 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 to be considered further. 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, and adding app-like functionality to the portal to support smokers who did not wish to access specialist services. These were not the options that were judged to have the greatest potential effect but they were judged to have some effects and were both practicable and affordable.

Behaviour selection

Identifying the behaviour(s) we wish to change

Sometimes the behaviours to be changed are included in the problem definition: for example use of leisure services or engagement in recycling. 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 less obvious but defining the problem in behavioural terms is a crucial first step. For example, if the goal is to reduce prevalence of obesity among children in a school, it is important to assess how far this can be achieved by promoting a change in eating and/or an increase in physical activity.

Identifying other relevant behaviours

The behaviour that we wish to change may not be the appropriate or the only target. Every behaviour is influenced by other behaviours both of the people we are targeting but also behaviours of other people. For example, if we are seeking to reduce children's calorie consumption we might do this directly by changing their choice of food types and/or reducing snacking. Alternatively (or in addition), we may seek 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.

It is also necessary to consider how any given change may result in other unwanted behaviours (e.g. 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?

We can then seek to identify influences between the behaviours, both within and between people. This can include specification of places where behaviours occur.

Identifying relationships between behaviour can be complicated. It can be helpful to draw a 'map' of 1) the key people or groups and their behaviours (using circles or squares) and 2) how these behaviours relate to each other (using arrows).

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 this system of interacting behaviours, the next step is to choose where in this system to intervene. This requires making a judgment 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 (e.g. weight loss rather than reducing calorie intake or increasing physical activity)
- choosing ones that are attractive to stakeholders but have little impact on the problem
- failing to account for other changes that might work against the desired outcome
- setting unachievable behavioural goals rather than building on small 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: selecting behaviours to increase physical activity in a local authority

Active Blaby is a physical activity referral programme which helps local residents understand their barriers to an active lifestyle and suggests effective ways of overcoming these barriers using the Behaviour Change Wheel. Participants complete a 21-item questionnaire which identifies the COM areas which the participants believe pose the greatest barriers to behaviour change and delve deeper into those areas.

Items are answered in the format of "How much do you agree with the following" on a scale of 1-10. If a participant responds with a 7 or higher, it gets flagged as a behaviour that needs modifying.

The participants are then given 2 routes of support: 1) links to webpages designed to aid the participant in overcoming their barriers; 2) offer of community physical activity programmes based on their ability, health conditions, age and social circumstances.

COM-B diagnosis

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 finding what it is about the people in question or their environment that we need to focus on in order to achieve behaviour change. At its heart is the 'COM-B model' (Figure 3).

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.

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 and physical abilities (e.g. knowledge, physical and mental skills, mobility, and strength).

Opportunity refers to the environment with which people interact, whether it be the physical environment of objects, events and time, or the social environment of culture, and norms.

Motivation relates to the following influences that energise and direct behaviour: intentions and evaluations (collectively known as 'reflective' motivation), and desires, emotions and habits (collectively known as 'automatic' motivation).

Figure 3: The COM-B model of behaviour
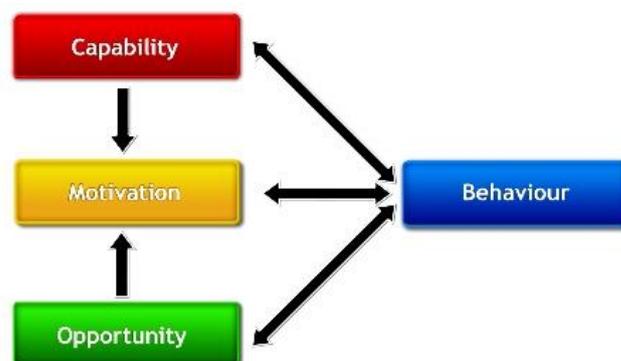
As shown in Figure 3, capability, opportunity, motivation and behaviour influence each other. For example, making something easier by increasing capability or opportunity can increase motivation to do it. Motivating people to try a behaviour can increase their capability.

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, having habits and routines, and 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, discussion groups and interviews. Appendix 1 of this guide provides a more extensive list of possible questions.

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

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

Motivation
- Do they find it genuinely more attractive than competing behaviours?
- Is it an established part of their routine?

The Theoretical Domains Framework

A framework that elaborates COM-B in identifying 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 2: Additional Resources and the Behaviour Change Wheel guide.

Case study: using COM-B to identify influences on inactivity in adults

Active Herts is a Hertfordshire-based physical activity programme for inactive adults, who may have additional cardiovascular disease risk factors and/or mental health issue (9).

The intervention designers (researchers from the Universities of Hertfordshire and Bedfordshire) surveyed adults using questionnaire items mapped to the COM-B model, designed to identify factors that would promote their engagement in moderate-to-vigorous physical activity (10). The team also sought to identify the factors that were currently preventing inactive adults from engaging in physical activity and breaking up sitting time. Key stakeholders, including the target population, were also consulted to produce a COM-B diagnosis (see Table 3).

Table 3: Summary of factors that would need to change to promote physical activity in the Active Herts project

Capability	Opportunity	Motivation
Unaware of guidelines in relation to own behaviour	Needs someone to answer to/support them	Doesn't feel comfortable in gym clothes
Lack of 'headspace'	No-one to go with	Lack of confidence
Forgetting to exercise	Not enough money for gym	Doesn't see the point
Low stamina/energy	Unsupportive physical environment	Anxious about exercising

In 2 localities this involved a booklet, face-to-face consultations, a phone call, text messages, and signposting to 12 weeks of exercise classes. In 2 further areas, it also involved 12 weeks of free exercise classes and the option to have exercise 'buddies'.

Selecting intervention types

Having a clear idea of the factors underpinning the behaviour (i.e. 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 4.

Table 4. 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 5 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 5: 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.

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 in 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

Can an intervention involve more than one intervention type?
Yes. For example, the offer of support with stopping smoking 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 we classify 'nudges'?
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.

What is covered by enablement?
This covers anything that increases capability or opportunity not already covered by other intervention types.

Where do social norms and cultural change fit in?
Changing social norms and cultural change can involve many 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 we classify use of 'defaults' as an intervention strategy?
(Defaults are situations in which the desired 'behaviour' occurs unless people actively choose another option.) This is an example of environmental restructuring.

Case study: selecting intervention types to increase physical activity in adolescent girls

Intervention designers from Ireland, US and Australia developed an intervention to increase regular walking in adolescent girls through engagement with their mothers (11). The target behaviours were aspects of parenting that promoted their daughters' regular walking.

Data from published evidence and from questionnaires, interviews and focus groups with adolescent girls and mothers of adolescent girls were used to arrive at a COM-B diagnosis (Table 6).

Table 6: influences on target behaviours according to COM-B influences

Influences on behaviour according to COM-B component	Behaviour of adolescent girls	Parenting behaviour of mothers	Example of Intervention type
Physical capability	Need the stamina to walk and ability to deal with tiredness.	Need the stamina to deal with full schedule associated with juggling family commitments.	Training; for example skills training for mothers and adolescent girls to pace physical activity to avoid fatigue.
Psychological capability	Need knowledge of both short- and long-term health benefits of walking and how to reduce mental obstacles to exercising.	Need knowledge of how best to promote PA in their adolescent daughters, that is appropriate parenting practices.	Education; for example provide adolescent girls with information on the health benefits of walking.
Physical opportunity	Time to walk was perceived to be a barrier. Need access to safe road and spaces to walk.	Mothers find ways to overcome time and financial barriers. Need access to safe spaces to walk.	Enablement; for example encourage mothers and adolescent girls to generate strategies to ensure time is set aside for walking.
Social opportunity	Teenagers need social support from friends and family to exercise. Need the opportunity to interact with friends during exercise.	Mothers need to act as role models (parental encouragement crucial). Encourage daughters to participate in social groups.	Modelling; for example mothers incorporate walking into other daily activities such as walking to the shops or friends.

Reflective motivation	Need to develop a plan to promote walking for exercise	Need to develop plans for exercise and develop a habit of participation	Incentivisation; for example inform mothers and adolescent girls they will receive a reward for developing a walking plan.
Automatic motivation	Need to feel that they want walk for exercise—that there may be a sense of pleasure or satisfaction from participation	Women feel a sense of responsibility to set a good example for their families and may be driven by the willingness to achieve the best for their child.	Persuasion; for example suggest mothers and adolescent girls view walking as an opportunity to have time for themselves rather than an exercise chore.

From this analysis, all intervention types were judged to be potentially effective but after applying the full set of APEASE criteria, the intervention designers decided to exclude 3 intervention types which are:

- coercion did not meet the criteria of being practicable, acceptable or equitable
- restriction was considered not acceptable to adolescents and their mothers
- environmental restructuring was judged to be not practicable on large scale

Thus, the intervention designers selected the intervention types: Education, Persuasion, Incentivisation, Training, Modelling and Enablement.

Formulating an implementation strategy

Policy options

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

Table 7: 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, employment, equality, benefits, security and education	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 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 they be structured or ad hoc, financed or unpaid	These are most relevant when the task is to improve people's ability to change their behaviour. A major 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 intervention designers start with a particular policy option (e.g. development of digital marketing campaigns or producing guidelines) and their task is 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 8 shows policy options that are appropriate for supporting different intervention types. As with Table 5, it is not intended to cover all eventualities but is provided to give an initial idea.

Table 8: Indicative mapping of policy options to intervention types

	Guidelines	Environ-mental and social planning	Communications and marketing	Legislation	Service provision	Regulation	Fiscal measures
Education	✓		✓	✓	✓	✓	
Persuasion	✓		✓	✓	✓	✓	
Incentives	✓		✓	✓	✓	✓	✓
Coercion	✓		✓	✓	✓	✓	✓
Training	✓			✓	✓	✓	✓
Restriction	✓			✓		✓	

Environ-mental restructuring	✓	✓		✓		✓	✓
Modelling			✓		✓		
Enablement	✓	✓		✓	✓	✓	✓

Case study: formulating an intervention strategy to increase physical activity in adolescent girls

Building on the case study in Section 8 (increasing regular walking in adolescent girls) all policy options were judged to be potentially effective in delivering the intervention. However, the intervention designers were judged to be unlikely to have access to all policy options, for example Fiscal measures or Legislation. To inform the selection of policy options, the designers reviewed available evidence and gathered opinions from adolescent girls and their mothers.

Reviewing evidence from similar interventions, the designers judged that the policy option of 'Service Provision' in the form of a face-to-face delivery of a group programme supported by text-messaging was likely to be most practicable. Based on opinions gathered from adolescent girls, 'Communications and Marketing' in the form of posters at school and on social media was judged to be the best option to engage the adolescent girls. Service provision in the form of incentives such as healthy food/snacks also selected as to work with the other policy options in achieving the objectives.

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 (12).

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)). A free online tool has been developed to train people in how to identify BCTs (www.bct-taxonomy.com) in interventions.

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.[1]

When considering what to include in interventions it may be helpful to bear these broad principles in mind. Table 9 provides examples of BCTs that may be used in constructing interventions (12).

Table 9: NEAR as a framework for constructing behaviour change interventions

NEAR	Intervention Types and example BCTs[1]
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.

---

[1] 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.

	Example BCTs are: 1) Providing information about others' approval, and 2) 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: 1) Adding objects to the environment, and 2) Action planning. We can make it easier *not* to do behaviours through: 1) Behavioural substitution, and 2) 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: 1) Material reward, and 2) Feedback on behaviour. We can make behaviours less attractive through: 1) Punishment, and 2) Threat.
Routine: We are more likely to do things if they are part of our routine so we don't have to think about them	This relates to Intervention Types: Training, Environmental restructuring and Enablement.
	Example BCTs are: 1) Behavioural practice/rehearsal, and 2) Feedback on the behaviour. We can disrupt routines through: 1) Rehearsing alternative behaviours ('Habit reversal'), and 2) 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. 3 aspects of delivery are important: 1) the 'source of the intervention, 2) the 'mode of delivery', and 3) 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 (e.g., 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 the case study in Section 8, intervention types, Education, Persuasion, Incentivisation, Training, Modelling and Enablement were selected for an intervention to increase regular walking in adolescent girls and behaviours to support this in their mothers.

To choose which BCTs would be optimal for the context to deliver these types, the intervention designers applied the APEASE criteria to the list of 93 techniques (see Section 10.1) and selected 18 BCTs. Examples of the BCTs selected are shown in Table 10.

Table 10: 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 (e.g. 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	Inform participants of social benefits of regular PA participation by presenting research evidence in user-friendly format.

(provide information (e.g. written, verbal, visual) about social and environmental consequences of performing the behaviour)	
Information about emotional consequences (provide information (e.g. 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 credible source in favour of or against the behaviour)	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 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 & 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 (provide an observable sample of the performance of the behaviour,	Demonstrate to all participants how to walk for exercise by showing how to consider cadence (steps/min monitored by pedometer; walking to a music track with specific beats per minutes),

directly in person or indirectly for example via film, pictures, for the person to aspire to or imitate)	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 influencing the behaviour and generate or select strategies that include overcoming barriers and/or increasing facilitators)	Mother & daughters will be prompted to identify barriers (including time) preventing them from exercising regularly and engaging in physical activity with 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 local government and partners such as the NHS, emergency services and third sector can be challenging. To maximise the chances of success, it is important to adopt 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)

References

(1)   MICHIE S., ATKINS L., WEST R. The behaviour change wheel, A guide to designing interventions 1st ed Great Britain: Silverback Publishing 2014: 1003-1010.

(2)   MICHIE S., VAN STRALEN M. M., WEST R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions, Implementation science 2011: 6: 42.

(3)   ADDO I. B., THOMS M. C., PARSONS M. Household Water Use and Conservation Behavior: A Meta-Analysis, Water Resources Research 2018: 54: 8381-8400.

(4)   MARTIN R., MURTAGH E. M. An intervention to improve the physical activity levels of children: design and rationale of the 'Active Classrooms' cluster randomised controlled trial, Contemporary clinical trials 2015: 41: 180-191.

(5)   O'CONNELL S., JACKSON B., EDWARDSON C. L., YATES T., BIDDLE S. J., DAVIES M. J. et al. Providing NHS staff with height-adjustable workstations and behaviour change strategies to reduce workplace sitting time: protocol for the Stand More AT (SMArT) Work cluster randomised controlled trial, BMC Public Health 2015: 15: 1219.

(6)   DIREITO A., MICHIE S., LEFEVRE C. E., COLLINS E. I. Application of the behaviour change wheel framework to the development of interventions within the City4Age project. 2017 25th International Conference on Software, Telecommunications and Computer Networks (SoftCOM): IEEE; 2017, p. 1-6.

(7)   JOHNSON B., ZARNOWIECKI D., HENDRIE G., MAUCH C., GOLLEY R. How to reduce parental provision of unhealthy foods to 3-to 8-year-old children in the home environment? A systematic review utilizing the Behaviour Change Wheel framework, Obesity Reviews 2018: 19: 1359-1370.

(8)   STADDON S. C., CYCIL C., GOULDEN M., LEYGUE C., SPENCE A. Intervening to change behaviour and save energy in the workplace: A systematic review of available evidence, Energy Research & Social Science 2016: 17: 30-51.

(9)   HOWLETT N., JONES A., BAIN L., CHATER A. How effective is community physical activity promotion in areas of deprivation for inactive adults with cardiovascular disease risk and/or mental health concerns? Study protocol for a pragmatic observational evaluation of the'Active Herts' physical activity programme, BMJ open 2017: 7: e017783.

(10)   HOWLETT N., SCHULZ J., TRIVEDI D., TROOP N., CHATER A. A prospective study exploring the construct and predictive validity of the COM-B model for physical activity, Journal of health psychology 2017: 1359105317739098.

(11)   GAINFORTH H. L., SHEALS K., ATKINS L., JACKSON R., MICHIE S. Developing interventions to change recycling behaviors: A case study of applying behavioral science, Applied Environmental Education & Communication 2016: 15: 325-339.

(12)   Michie S., Richardson M., Johnston M., Abraham C., Francis J., Hardeman W. et al. The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions, Annals of behavioral medicine : a publication of the Society of Behavioral Medicine 2013: 46: 81-95.

Acknowledgments

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 (e.g. 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 (e.g. insufficient control over their behaviour), it can be addressed by targeting another (e.g. 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 fully understand why it is important? for example Do they understand the benefits of increasing physical activity?
4. Do they fully understand what will happen if they do (or don't do) the behaviour?
5. Do they know how to do it? for example Do they understand effective ways to lose weight?
6. How easy or difficult do they find performing the behaviour?
7. Will they have to pay attention to doing the behaviour?
8. Are they likely to remember to do the behaviour?
9. Do they have sufficient control over their behaviour?
10. Do they have the mental skills needed for the behaviour? for example Can they understand what is required?
11. Do they have the mental strength and stamina? for example Can they maintain their concentration for long enough?

Capability: physical

1. Do they have the physical capacity and skills needed for the behaviour? for example Do they have the balance or dexterity?
2. Do they have the physical strength and stamina? for example Do they have muscle development required for demanding physical work?
3. Are they able to overcome any physical limitations they might have?

Opportunity: physical

1. Do they have the time to do the behaviour?
2. Do they have the financial resources to do the behaviour?
3. Do they have the material support required? for example Do they have the required equipment or facilities?
4. Do they have easy access to necessary resources and support?
5. Are there procedures or ways of working that encourage the behaviour?
6. Are there competing tasks and time constraints?
7. Do they have triggers to prompt them for example have reminders at strategic times?

Opportunity: social

1. Are social influences likely to facilitate or hinder the behaviour (e.g. peers, social/group norms, managers, other professional groups, service users, carers, relatives)?
2. Do they have the social support required? for example Do they have family or friends behind them?
3. Do they have people around them doing it? for example Are they part of a 'crowd' who are doing it?
4. Do they have social triggers to prompt them? for example Do they have someone to remind them to do it?

Motivation: reflective

1. Do they consider that the benefits of doing the behaviour outweigh the costs?
2. Do they feel that they want to do it enough? for example Do they feel a sense of pleasure or satisfaction from doing it?
3. Do they feel that they need to do it enough? for example Do they care about the negative consequences of not doing it?
4. Does doing the behaviour conflict with other behaviours?
5. Are there other things they want to do or achieve that might interfere with the behaviour?
6. Are they willing to prioritise the behaviour?

7. Do they believe that it would be a good thing to do? for example Do they have a strong sense that they should do it?
8. Are there incentives to do the behaviour?
9. Do they see the behaviour as normal and commonplace?
10. Do they have effective plans for doing it? for example Do they have clear and well developed plans for achieving it?
11. Are they confident that performing the behaviour will achieve the desired benefits/outcome?
12. Is doing the behaviour compatible or in conflict with the person's identity?

Motivation: automatic

1. Is doing the behaviour likely to evoke an emotional response? If so, what?
2. Are they likely to feel bad or good if they do or don't do the behaviour?
3. To what extent are emotional factors likely to facilitate or hinder the behaviour?
4. Can they be led develop a habit of doing it (e.g. have a pattern of doing it without having to think)?
5. Do they need to find a way of avoiding or coping with cravings and urges?

Appendix 2: 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 5-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 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 3: 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) (e.g. reducing outdoor air pollution in the local area)

| |
| |

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 spill over 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 5 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 8 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.