Section A: CPHE to complete	
Name:	Robert West
Job title:	Professor of Health Psychology
Address:	Health Behaviour Research Centre Department of Epidemiology and Public Health University College London
Guidance title:	Behaviour change
Committee:	Programme Development Group
Subject of expert testimony:	Behaviour change and addiction
Evidence gaps or uncertainties:	
Provide the PDG with an overview of your work in the area of addiction and behaviour change, including:	
- Characteristics of effective interventions for behaviour change in relation to addiction	
- Links between theoretic approaches to behaviour change and effective interventions inc synthetic theory	
- Transferability of characteristics of behaviour change interventions across different health related behaviours	
Section B: Expert to complete	
Summary testimony:	

The testimony aimed to show how an overarching model of behaviour, the 'Synthetic Model' (1), can help to understand addictive behaviours and develop effective intervention strategies for combating these, and to draw lessons from this to development of more effective interventions for behaviour change more generally. It reviewed the 'synthetic model' of behaviour (COM-B+PRIME) and a framework for describing behaviour change interventions (the Behaviour Change Wheel - BCW). It provided an overview, using the BCW framework, of what has worked and what has not in combating addictive behaviours. It drew lessons for developing interventions to combat addictive behaviours and lessons for behaviour change more generally. The slides are attached as an Annexe. Key points are summarised below.

The COM-B model starts by recognising that for any behaviour to occur, the individual or group must have the physical and psychological capability, the physical and social opportunity, and be more motivated to do it at the relevant time than anything else.(2) These elements interact so that influencing one can change another. For example, increasing opportunity can increase motivation, and through behaviour can increase capability. To take a simple example, giving one's teenage child money for driving lessons can motivate him or her to learn to drive and taking the lessons then helps with acquisition of the necessary skills.

For many health-related behaviours, including addictive behaviours, the central

issue is motivation in its broadest sense – not just reasons for doing things but all those brain processes that energise and direct behaviour.(3) PRIME Theory focuses specifically on motivation. It was developed to bring together into a common framework diverse aspects of motivation from analytical choice and evaluation to drives, instincts and habits. It contains several laws:

The first is that at every moment we act in pursuit of our strongest motives (wants or needs) at that moment. Wants involve feelings of anticipated pleasure or satisfaction while needs involve anticipated relief from, or avoidance of, mental or physical discomfort. Understanding momentary wants and needs and the competition between them lies at the heart of understanding most health-related behaviour. For example, wanting to 'spend more time in the gym' will not influence behaviour unless it translates into wanting or needing to do this more than wanting or needing to do something else on occasions when the opportunity presents itself, or unless it is strong enough to create the opportunity and then use it.

The second law is that evaluations (beliefs about what is good and bad) and plans (self-conscious intentions to do or not do things) are important in controlling our actions, but only if they create motives at the appropriate moments that are stronger than competing motives coming from other sources. For example, believing that stopping smoking is a good thing will have no effect on behaviour unless at some point in time it makes the individual want or need to stop more than he or she wants or needs to carry on. Translating 'ought' into 'want' or 'need' is a key target for behaviour change interventions.

The third law is that self-control (acting in accordance with plans despite opposing motivations) requires mental energy (sometimes called 'ego strength'). Stress, tiredness, having had to exercise self-control for a while, and drugs such as alcohol can all deplete ego strength. For example, trying to make several difficult life changes requiring self-control can undermine ability to achieve any of them.

The fourth law is that our identities (thoughts, images and feelings and feelings about ourselves) can be a source of very strong motives. These include labels (the categories we think we belong to), attributes (the features we ascribe to ourselves) and personal rules (imperatives about what we do and do not do). Identity plays an important role in health related behaviours – both in promoting risky behaviours and in protecting against these. It can also play an important role in promoting or preventing behaviour change. For example, wishing no longer to be an 'addict' and all this entails is one of the factors than can promote attempts at recovery from addiction. Adopting, and feeling attached to, a new identity as a non-smoker, an ex-addict, a 'health nut', 'a careful driver' etc. can all help to maintain new behaviour patterns in a way that more specific beliefs about the benefits of the new patterns may not.

The fifth law states that motives influence actions by creating impulses and inhibitions, which are also generated by habitual (learned) and instinctive (unlearned) associations; behaviour is controlled by the strongest momentary impulses and inhibition. The moment to moment competition between impulses and inhibition represent the final common pathway to behaviour. Some of these are 'hard wired' as responses to particular kinds of stimuli, some arise from learned associations through conditioning. Much behaviour, including health

related behaviour involves a strong habitual element although very little is entirely habitual in this sense. Thus tooth-brushing and exercising are often referred to as habits but it is more accurate to regard them as 'routines' – initiated and terminated by motives (we do not find ourselves exercising unconsciously) but with elements strongly reinforced by habit processes.

With these fundamental principles in mind, one can bring together a diverse range of observations about behaviour in general and addiction in particular. Addiction can usefully be defined as 'repeated powerful motivation to engage in a purposeful behaviour that has no survival value, acquired as a result of engaging in that behaviour with significant potential for unintended harm.' (1)

It so happens that certain psychoactive drugs can generate this powerful motivation, and the multiple mechanisms underlying this are quite well understood.(4) For example the effect of these drugs on dopamine release or re-uptake in the nucleus accumbens appears to play a central role. When dopamine attaches to neural receptors in the nucleus accumbens, the brain treats this as a 'teaching signal' so that the animal/human experiences an impulse to enact the behaviour that immediately preceded this when it encounters a similar situation. This is a natural reward mechanism that is usurped by addictive drugs.

Behaviours become addictive primarily to the extent that they create powerful wants, needs or impulses to engage in them, or undermine motivation or capability to resist these. There are many ways in which this can occur. For example, alcohol can provide short-term relief from dysphoria and a certain amount of pleasure or release but mood may rebound later making the need for alcohol all the greater. With very heavy drinking, more severe unpleasant abstinence symptoms may emerge that alcohol consumption resolves. It is important to recognise that the learned association between drinking and pleasure or relief from dysphoria can create a strong want or need to drink in response to drinking cues that long outlast any abstinence syndrome.

An important implication of this analysis is that addictive behaviours are not qualitatively distinct from other behaviours. This in turn means that a) the range of interventions that influence other behaviours (see below) will also influence addictive behaviours, and b) it is helpful, when attempting to change other behaviours, to take account of features that they share in common with addictive behaviours

An analysis of 'what it would take' to achieve the desired behaviour in terms of the COM-B model and PRIME Theory is the first step in developing an intervention strategy. The next step is to use this analysis to identify relevant intervention functions from among all those available. A systematic review of behaviour change intervention frameworks has yielded nine such functions: education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling and enablement.(2) The same systematic review also identified seven types of policy that can be used to implement those intervention functions: legislation, regulation, guidelines development, service provision, environmental planning, communication/marketing, and fiscal measures.

There may be many different intervention strategies and policy options that would achieve the desired effect, but generally only a small subset of these will have other essential features, namely: affordability, practicability, and acceptability

(including absence of adverse side-effects). Thus, in theory one could legislate to coerce people to stop smoking through threat of summary execution, backed up by putting vast resources into detection (through saliva assays for the nicotine metabolite, cotinine). This would no doubt reduce smoking prevalence considerably and probably save tens of thousands of lives – but would not be acceptable. In general, when it comes to health-related behaviour western societies prefer to focus on policy options and interventions that maximise people's sense of choice – except in the case of addictive drugs that do not have large commercial interests supporting them where legislation and threat of punishment are the primary mechanism for control.

References (if applicable):

1. WEST, R. (2013) Models of Addiction (Lisbon, EMCDDA).

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

3. WEST, R. (2006) Theory of addiction (Wiley-Blackwell).

4. WEST, R. (2009) The Multiple Facets of Cigarette Addiction and What They Mean for Encouraging and Helping Smokers to Stop, COPD-Journal of Chronic Obstructive Pulmonary Disease, 6, 277-283.