Behaviour change: technology-based interventions

Consultation on draft scope
Stakeholder comments table

26/06/2018 to 24/07/2018

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Action on Smoking and Health	General	General	**Poor evidence base for technology-based behaviour interventions** The current evidence does suggest that tech-based interventions can have a positive effect on quit attempts. For example, a Cochrane review of telephone support for stopping smoking concluded that "telephone quit lines provide an important route of access to support for smokers".[i] [ix] The Cochrane Collaboration, Telephone counselling for smoking cessation (Review). 2009. http://www.ncsct.co.uk/publication_telephone-counselling-for-smoking-cessation-review.php However, the evidence base for the use of technology-based interventions is poor, compared to other support models. Another study examining the use of technology-based interventions for disadvantaged groups found that although text-messaging, computer and website delivered quit support showed promise, "few methodologically rigorous studies were identified" and that "further research is needed to address the role technology-based interventions have on overcoming health inequalities to meet the needs of disadvantaged groups."[ii] Similarly, an investigation into the use of digital interventions for smoking cessation in pregnancy reported that whilst behavioural support for smoking cessation in pregnancy can be effective, "there is limited evidence of the effectiveness of digital interventions for smoking cessation in pregnancy." There is therefore a pressing need for further research in this area. [x] Boland et al. The methodological quality and effectiveness of technology-based smoking cessation interventions for disadvantaged groups: a systematic review and meta-analysis. 2016. https://www.ncbi.nlm.nih.gov/pubmed/28034998	Thank you for your comment. The guideline committee will use all available evidence during the review process to make recommendations on which interventions utilise effective behaviour change components or techniques and consider evidence on other factors which may influence or moderate their effectiveness. We will also provide the links you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence. NICE has several guidance on tobacco dependency including NG92 'stop smoking interventions and services' and PH45 'smoking: harm reduction'. NICE also has a Tobacco update in development which is expected to be published in January 2020 (NG10086).

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			Given the comparative lack of evidence supporting the efficacy of these interventions, ASH is therefore concerned about any advocating for tech-based interventions **instead** of conventional behavioural and pharmacological support, which has a far stronger evidence base. Further research and development will be necessary before this can be justified. If these interventions are rolled out, they ought to be integrated into the existing cessation framework in a way that supports the work currently carried out by stop smoking services. For example, technology-based behavioural interventions could be used to enable remote conversations with stop smoking advisers, building on the existing evidence base.	
Action on Smoking and Health	General	General	**Current evidence base for effective treatment for tobacco dependency** Smokers experience withdrawal symptoms following cessation. Typical physical symptoms following cessation or reduction of smoking include urge to smoke, irritability, anxiety, difficulty concentrating, restlessness, sleep disturbances, decreased heart rate, and increased appetite or weight gain.[iii] [xi] Smokefree: Frequently asked questions [Internet]. Nhs.uk. 2018 [cited 1 March 2018]. Available from: https://www.nhs.uk/smokefree/frequentlyasked-questions These symptoms can all be alleviated by using Nicotine Replacement Therapy (NRT), which provides smokers with the nicotine they need to deal with withdrawal. NRT is available in many forms (including gum, patch, nasal spray and lozenges, and consumer products such as e-cigarettes). Other medications such as varenicline or bupropion, which are not NRT and deal with the addiction in different ways, are also available.	Thank you for your comment. This guideline is specifically about the components of digital and mobile health technologies which enable behaviour change and not on the specifics of smoking cessation. NICE has several guidance on tobacco dependency including NG92 'stop smoking interventions and services' and PH45 'smoking: harm reduction'. NICE also has a Tobacco update in development which is expected to be published in January 2020 (NG10086). The guideline committee will use all available evidence relating to behaviour change interventions during the review process to make recommendations on which interventions utilise effective behaviour change components or techniques and consider evidence on other factors that may influence or moderate their effectiveness. We will also provide the links you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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			[xii] U.S. Department of Health and Human Services. The health consequences of smoking: Fifty years of progress. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. 2014. Using NRT can roughly double a person's chances of successfully stopping smoking compared to someone trying to quit unaided.[iv] However, the most effective way to successfully quit smoking is to receive behavioural support as well as pharmacotherapy, as is provided by stop smoking services. Any tech-based intervention would therefore need to consider the availability of medication to reduce withdrawal symptoms for people trying to quit. Since their introduction in 2000, stop smoking services have supported an estimated 1 million smokers to quit for good.[v] These services offer a package of support including face-to-face group support with pharmacotherapy, face-to-face individual support with pharmacotherapy, supported use of pharmacotherapy, telephone support, text message support, online support and support through mobile digital applications. [vi] Of these interventions, face-to-face group support with pharmacotherapy has the strongest evidence base for effectiveness. Public Health England found that for mobile digital applications, in contrast, "There are a few mobile applications that appear to follow good practice but none that has been proved effective, so these should not be used **instead** of the strongly evidence-based programmes (behavioural support and pharmacotherapy)".[vii] Similarly, in its recent report, 'Hiding in Plain Sight',[viii] the Royal College of Physicians (RCP) found that smoking cessation interventions are highly effective and cost-effective in treating	

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			tobacco dependence, and that the most effective interventions combine behavioural therapy with pharmacotherapy.[ix] However, despite this, stop smoking services are being cut. Spending on stop smoking services by local authorities in England was approximately £111 million in 2015/2016, £105 in 2016/17 and £89 million in 2017/18.[x] In 2017, 50% of local authorities cut their budgets for stop smoking services. [xi] In this context, it would be inappropriate for (already limited) funding to be diverted away from highly effective tobacco dependence treatment to behaviour change technology-based interventions which lack the same evidence base. This is especially relevant in terms of cost saving, since we know that existing tobacco dependence treatment is extremely cost-effective, whilst we currently lack the evidence to draw the same conclusion about behaviour change technology-based interventions.	
Action on Smoking and Health	1	23	**Characterisation of smoking as an 'established lifestyle behaviour'** The characterisation of smoking as an 'established lifestyle behaviour' does not sufficiently capture the extent to which smoking is an addiction. The Royal College of Physicians' 2000 report on nicotine addiction states that "it is reasonable to conclude that nicotine delivered through tobacco smoke should be regarded as an addictive drug, and tobacco use as the means of self-administration." It concludes that: "Cigarettes are highly efficient nicotine delivery devices and are as addictive as drugs such as heroin or cocaine."[xii] [1] Childhood smoking statistics by sex and UK region [Internet]. Cancer Research UK. 2018 [cited 1 March 2018]. Available from: http://www.cancerresearchuk.org/health-professional/cancer-statistics/risk/childhood-smoking#heading-One That smoking is an addiction is demonstrated by the	Thank you for your comment. We have now changed the characterisation of smoking as an established lifestyle behaviour to 'tobacco dependence' throughout the scope. This is in line with the terminology used in previous NICE guidance on smoking cessation.

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			discrepancy between the desire to quit and quitting success rates. Surveys consistently show that a majority of smokers want to stop smoking yet the successful quit rate remains low.[xiii] A smoker will typically make several failed quit attempts before they manage to quit smoking successfully.[xiv] For example, English data from the Smoking Toolkit Study has shown that in 2017, 34.3% of people had attempted to quit within the previous 12 months, while only 17.8% of those who attempted to quit had succeeded.[xv] [ii] Office for National Statistics. General Lifestyle Survey, 2010. 2012 [iii] Chaiton M, Diemert L, Cohen J, Bondy S, Selby P, Philipneri A et al. Estimating the number of quit attempts it takes to quit smoking successfully in a longitudinal cohort of smokers. BMJ Open. 2016;6(6):e011045 [iv] Smoking Toolkit Study. Top line findings from STS.2018. Furthermore, the fact that smokers are unable to stop smoking even after undergoing surgery for smoking-related illnesses suggests 'lifestyle behaviour' is an inappropriate term for tobacco dependence. One study has found that around 40% of those who had laryngectomy resumed smoking shortly after surgery, while about 50% of lung cancer patients resumed smoking after undergoing surgery.[xvi] Among smokers who have had a heart attack, as many as 70% take up smoking again within a year.[xvii] More recent studies confirm the difficulties faced by smokers in quitting even following the diagnosis of a life-threatening illness.[xviii] [xix] [v] Stolerman I, Jarvis M. The scientific case that nicotine is addictive. Psychopharmacology. 1995;117(1):2-10. [vi] Stapleton J. Cigarette smoking prevalence, cessation and relapse. Stat Meth Med Re. 1998;7:187-203.vii [vii] Cooley ME, Sarna L, Kotlerman J et al. Smoking cessation is challenging even for patients recovering from lung cancer surgery with curative intent. Lung Cancer. 2009;66(2):218-225. [viii] Zmeskal M et al. Continued smoking in lung transplant	

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			patients: A cross sectional survey. Slovenian J Pub Health. 2016;55(1)29-35. ASH therefore recommends that any reference made to smoking as a 'lifestyle behaviour' be rectified to 'tobacco addiction', better reflecting the evidence base. Failure to do so risks misconstruing the best opportunities that exist for supporting smokers to quit (see below).	
Breaking Free Group	General	General	Please refer to the list of references below for examples of how digital interventions are delivered in real-world clinical settings. Specifically, these studies demonstrate how digital interventions are used to augment practitioners skills by providing them with tools to enhance their abilities to deliver evidence-based interventions: Alkhaldi, G., Hamilton, F. L., Lau, R., Webster, R., Michie, S., & Murray, E. (2016). The effectiveness of prompts to promote engagement with digital interventions: a systematic review. *Journal of medical Internet research, 18*(1). Chaudoir, S. R., Dugan, A. G., & Barr, C. H. (2013). Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. *Implementation Science, 8*, e1-e20. Donkin, L., Christensen, H., Naismith, L. S., Neal, B., Hickie, B. I., & Glozier, N. (2011). A Systematic Review of the Impact of Adherence on the Effectiveness of e-Therapies. *Journal of medical Internet research, 13*(3), e52. doi:10.2196/jmir.1772 Elison, S., Jones, A., Ward, J., Dugdale, S., & Davies, G. (2017). Examining effectiveness of tailorable computer-assisted therapy programmes for substance misuse: Programme usage and clinical outcomes data from Breaking Free Online. *Addictive Behaviors, 74*, 140-	Thank you for your comment. Any evidence for digital or m-health behaviour change interventions will be identified during the evidence reviews. We will also pass on the list to our information specialist colleagues to include for consideration.

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			147. Elison, S., Ward, J., Williams, C., Espie, C., Davies, G., Dugdale, S., . . . Smith, K. (2017). An outcomes evaluation of the implementation of 'Living Life to the Full Interactive', 'Sleepio' and 'Breaking Free Online' at an innovative eTherapy service, 'Self-Help Services'. *BMJ Open, 7*(7), 1-10. Kelders, S. M., Kok, R. N., Ossebaard, H. C., & Van Gemert-Pijnen, J. E. (2012). Persuasive system design does matter: a systematic review of adherence to web-based interventions. *Journal of medical Internet research, 14*(6). Mair, F. S., May, C., O'Donnell, C., Finch, T., Sullivan, F., & Murray, E. (2012). Factors that promote or inhibit the implementation of e-health systems: an explanatory systematic review. *Bulletin of the World Health Organization, 90*(5), 357-364. May, C. R., Eton, D. T., Boehmer, K., Gallacher, K., Hunt, K., MacDonald, S., . . . Shippee, N. (2014). Rethinking the patient: using Burden of Treatment Theory to understand the changing dynamics of illness. *BMC Health Services Research, 14*(1), 281. doi:10.1186/1472-6963-14-281 Michie, S., Yardley, L., West, R., Patrick, K., & Greaves, F. (2017). Developing and Evaluating Digital Interventions to Promote Behavior Change in Health and Health Care: Recommendations Resulting From an International Workshop. *Journal of medical Internet research, 19*(6), e232. doi:10.2196/jmir.7126 Mohr, D. C., Cuijpers, P., & Lehman, K. (2011). Supportive accountability: a model for providing human support to enhance adherence to eHealth interventions. *Journal of medical Internet research, 13*(1), e30. doi:10.2196/jmir.1602 Ramsey, A., Lord, S., Torrey, J., Marsch, L., & Lardiere, M.	

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			(2016). Paving the Way to Successful Implementation: Identifying Key Barriers to Use of Technology-Based Therapeutic Tools for Behavioral Health Care. *The Journal of Behavioral Health Services & Research, 43*(1), 54-70. doi:10.1007/s11414-014-9436-5 Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: a systematic review and meta-analysis. *Clinical psychology review, 32*(4), 329-342. Sieverink, F., Kelders, M. S., & van Gemert-Pijnen, E. W. C. J. (2017). Clarifying the Concept of Adherence to eHealth Technology: Systematic Review on When Usage Becomes Adherence. *J Med Internet Res, 19*(12), e402. doi:10.2196/jmir.8578 van der Vaart, R., Witting, M., Riper, H., Kooistra, L., Bohlmeijer, E. T., & van Gemert-Pijnen, L. J. (2014). Blending online therapy into regular face-to-face therapy for depression: content, ratio and preconditions according to patients and therapists using a Delphi study. *BMC Psychiatry, 14*(1), 1-10. doi:10.1186/s12888-014-0355-z Vis, C., Mol, M., Kleiboer, A., Bührmann, L., Finch, T., Smit, J., & Riper, H. (2018). Improving Implementation of eMental Health for Mood Disorders in Routine Practice: Systematic Review of Barriers and Facilitating Factors. *JMIR Ment Health, 5*(1), e20. doi:10.2196/mental.9769 Ward, J., Davies, G., Dugdale, S., Elison, S., & Bijral, P. (2017). Achieving digital health sustainability: Breaking Free and CGL. *International Journal of Health Governance, 22*(2), 72-82. Yardley, L., Spring, B. J., Riper, H., Morrison, L. G., Crane, D. H., Curtis, K., . . . Blandford, A. (2016). Understanding and promoting effective engagement with digital behavior change interventions. *American journal of preventive medicine, 51*(5),	

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			833-842.	
Breaking Free Group	5	13 - 16	Currently the statement included here reads; "Technology-based behaviour change interventions. That is interventions that – after any initial referral or orientation with the technology – are delivered without direct or ongoing interaction with, or intervention by, a practitioner or health care professional". - This may be difficult to enforce as most practitioners working with digital interventions would provide ongoing support to patients and service users – it is unlikely they would not have an ongoing duty of care to service users and patients following initial orientation. - Additionally, implementation research demonstrates that ongoing contact with a practitioner, even if this is provided at distance (e.g. weekly telephone check-ins etc), can enhance engagement with digital interventions and subsequently can optimise effectiveness and clinical outcomes for patients and service users. - Please refer to the reference list provided in line 3 for examples of this implementation research. - What the distinction here really relates to is that it must be the digital intervention that provides the evidence-based, clinical content and behavioural change techniques, rather than the practitioner. - This does not exclude the possibility that the practitioner can still provide ongoing social support and practical advice about how the patient or service user can derive the most benefit from the digital intervention. - Therefore, this statement could be reworded to say the following: "Technology-based behaviour change interventions. That is, evidence-based interventions that deliver core clinical content and behaviour change techniques via a digital platform. After	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.

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			initial referral or orientation with the technology by a practitioner or health care professional, ongoing support may be provided to enhance engagement. However, it should be the technology that is responsible for delivering the core clinical content and behaviour change techniques of the intervention, rather than the practitioner".	
British Dietetic Association	Q1	n/a	Advisable forms of practices that may result in cost saving include 1) ensuring evaluation occurs at every stage of a digital behaviour change intervention including concept development and 2) separately evaluating societal, personal, and health care cost-effectiveness1. 1.Michie S, Yardley L, West R, Patrick K, Greaves F. Developing and evaluating digital interventions to promote behavior change in health and health care: recommendations resulting from an international workshop. J Med Internet Res. 2017 Jun 29;19(6):e232. doi: 10.2196/jmir.7126.	Thank you for your comment, the committee will consider resource impact concerns throughout the development of the guidance and recommendations.
British Dietetic Association - Obesity Group	Q1	n/a	Any intervention or practice that supports people with behaviour change, raising their awareness of unhealthy behaviours and prompting them to take action, and enabling them to self-monitor is likely to result in cost savings. Many personal health tools e.g. apps or fitness monitors raise awareness (e.g. prompting movement if an individual has been sedentary for a specific length of time), or giving information (e.g. calories, fat, sugar content and portion sizes of foods and drinks). Many are based on psychology encouraging competition between people (e.g. activity levels, weight lost) and encourage and enable self-monitoring which has been identified as a key skill in weight loss maintenance (e.g. National Weight Control Registry data). By encouraging healthier lifestyles and allowing individuals to take control they should reduce the burden on healthcare services. However not everyone will be willing or able to access such technology, and their cost may make them prohibitive for some. In addition a	Thank you for your comment. The equality assessment (EIA) form aims to assess the impact on equality the guidance may have. This considers potential equality issues which have been identified by stakeholders during development of the draft scope. Thus the details you have raised have been added to this form. The committee are required to consider addressing health inequalities, particularly those pointed out in the EIA during the development of the evidence reviews and subsequent recommendations. Within section 3.5 of the scope 'key issues and draft questions' we have asked a specific question on what socio-demographic factors of the target audience may moderate the effectiveness of digital or m-health behaviour change interventions (such as age, gender, socioeconomic group, ethnicity and digital literacy). This question will be incorporated in to the evidence

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			certain level of I.T. skill may be needed, as well as literacy and numeracy skills (e.g. dietary apps).	review protocols.
British Dietetic Association	Q2	n/a	We appreciate the potential rationale for including only behaviour change interventions in which any active feedback is delivered by the technology-based intervention itself, and to exclude any interventions in which the involvement of a practitioner goes beyond the initial stage of induction or orientation. Despite this, HeLP-Diabetes, a theoretically-informed, web-based intervention demonstrates the added value of providing both face-to-face and online self-management interventions as one way to reach both men and women participants1,2. The overall goals of HeLP-Diabetes were to improve health outcomes and reduce diabetes-related distress. 1. Li J, Parrott S, Sweeting M, Farmer A, Ross J, Dack C, Pal K, Yardley L, Barnard M, Hudda M, Alkhaldi G, Murray E. Cost-Effectiveness of Facilitated Access to a Self-Management Website, Compared to Usual Care, for Patients With Type 2 Diabetes (HeLP-Diabetes): Randomized Controlled Trial. J Med Internet Res 2018;20(6):e201 2. Kennedy A, Reeves D, Bower P, Lee V, Middleton E, Richardson G, et al. The effectiveness and cost effectiveness of a national lay-led self care support programme for patients with long-term conditions: a pragmatic randomised controlled trial. J Epidemiol Community Health 2007;61(3):254-261.	Thank you for your comment. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'. However clinical interventions to help with the diagnosis, treatment or management of a chronic physical or long-term mental health condition are not included in the scope of this guidance. Please see the section of the scope titled 'Areas that will not be covered'.
British Dietetic Association - Obesity Group	Q2	n/a	We agree that this seems to be a sensible approach. However even with personal devices and apps that are not reliant on healthcare professional input, ongoing monitoring of long-term conditions will be required. It may be that some devices may be supplied by healthcare practitioners to their patients particularly those who may benefit but cannot afford them personally (e.g. previously pedometers were loaned to patients by healthcare practitioners, who then followed up progress of patients over time), and in that case the healthcare practitioner would be	Thank you for your comment. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital

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			involved in monitoring progress.	interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
British Dietetic Association	Q3	n/a	We wonder whether it would be worthwhile to also include augmented reality (AR) and virtual reality (VR) in the guideline as an option for care that may be important for people affected by the guideline?1 The reason for this is the added value provided by AR and VR in supporting behaviour change2. Games, gamification and games-based learning are additional options that can be used to create a (learning) experience that has the potential to effectively trigger and sustain behaviour change3. 1. Calle-Bustos M, Juan MC, García-García I, Abad F. An augmented reality game to support therapeutic education for children with diabetes. PLoS One, 12 (9) (2017) e0184645. 2. Riva G, Baños RM, Botella C, Mantovani F, Gaggioli A. Front. Psychiatry 2016; 7: 164. 3. Berger V and Schrader U. Fostering sustainable nutrition behavior through gamification. Sustainability (Switzerland) 2016; 8(1): 1–15.	Thank you for your comment. We will include augmented reality and virtual reality as examples of technologies that may incorporate behaviour change techniques in the review protocols. We will also provide the references you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
British Dietetic Association - Obesity Group	Q3	n/a	We are not aware of anything in this area.	Thank you for your comment.
British Dietetic Association	1	22	The draft scope indicates the guideline will cover technology-based interventions for the individual. We suggest attention is also given to technology-based interventions that are designed for groups of individuals. The reason for this is that an understanding of the dynamic social interactions between groups is important for improving effective interventions and also for people affected by the guideline [1]. 1. Sniehotta FF, Araújo-Soares V, Brown J, Kelly MP, Michie S, West R. Complex systems and individual-level approaches to population health: A false	Thank you for your comment. We will consider interventions targeted at groups of individuals as a comparator within the evidence reviews. We will also send the reference you have provided to our information specialist colleagues to include for consideration.

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			dichotomy? The Lancet Public Health 2017, 2 (9):e396-e397.	
British Dietetic Association	1	26/27	Will the guideline cover both primary and secondary prevention, if so, this is a wide scope? We wonder whether it would be useful for specific guidelines/apps for primary versus secondary prevention for some conditions e.g. cancer	Thank you for your comment. The guidance will cover primary versus secondary prevention of conditions. For example we will include evidence where someone has a risk behaviour but does not have an associated condition. We will also include evidence where someone has a risk behaviour and does have a condition that would benefit from changing the risk behaviour. However this will not include clinical interventions, but only interventions for which managing established lifestyle behaviours may benefit health outcomes for those with a condition.
British Dietetic Association	2	15	Considering public engagement with digital technology in the draft scope, it is also perhaps worth mentioning that those responsible for developing, implementing and evaluating digital health solutions need to comply with regulatory, ethical, and security requirements. The reason for mentioning this is that the public will lose confidence and the potential benefits of digital behaviour change interventions will not be achieved if this is not emphasised. Additionally, there is potential for developers to make fraudulent claims, or dispense inaccurate information or advice which if believed, could result in service users experiencing harm. An instance worth highlighting is an app claiming the capability to test safe levels of alcohol intake to drive when in reality the app did not have this capability[1]. 1. Alva ML, Gray A, Mihaylova B, Leal J, Holman RR. The impact of diabetes-related complications on healthcare costs: new results from the UKPDS (UKPDS 84) Diabet Med. 2015 Apr;32(4):459–466.	Thank you for your comment. This guideline is specifically about the components of digital and mobile health technologies which enable behaviour change and not on the digital technologies themselves, thus NICE will only make recommendations in relation to this. It is not within the remit of NICE to ensure information on apps is GDPR compliant and it is the responsibility of the app developers to ensure compliance with legislation. NICE have had some involvement in developing The Digital Self-Assessment Questions (DAQ), which are a set of technical standards that app developers can self-assess against. These standards ensure that digital services comply with safety, privacy and consent standards. Some apps on the NHS apps site have now undergone assessment against these DAQ technical standards.
British Dietetic Association	2	18	The NHS apps library includes apps that have both ongoing contact with healthcare professionals e.g. the Oviva app and also those that are just tracking information. This does not	Thank you for your comment. We have noted that the NHS apps library includes apps that go beyond the remit of the guideline scope such as those that consider just tracking

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			comply with later elements of the document i.e. that the apps to be looked at will involve no ongoing input from a healthcare professional.	information We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
British Dietetic Association	2	20	The draft scope explains how app developers are provided with guidance on areas for consideration when developing apps. We would also advise that recommendations should be included that explain how app developers consult in a collaborative manner with experts in particular behavioural domains. As a case in point, for dietary behaviours impacting clinical outcomes, collaboration with dietitians should be undertaken. The reason for this is that such collaboration may be one way to improve the confidence of practitioners recommending apps may that are effective, acceptable or tolerable to people using dietetic services[1]. This will also serve	Thank you for your comment. This will be taken in to consideration during the development of the guideline and recommendations.

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			to expand the set of NHS-accredited health apps for patient use and ensure the guideline fits with recent Forward View and PHC2020 policies[2,3]. 1. Chen J, Lieffers J, Bauman A, Hanning R, Allman-Farinelli M. Designing health apps to support dietetic professional practice and their patients: qualitative results from an international survey. JMIR Mhealth Uhealth 2017, 5:e40. 2. NHS England 2016d. General practice forward view. London: NHS England. Available at: www.england.nhs.uk/ourwork/gpfv/ (accessed on 16 July 2018). 3. National Information Board 2014. Personalised health and care 2020. Using data and technology to transform outcomes for patients and citizens: a framework for action. London: Department of Health and National Information Board. Available at: www.gov.uk/government/publications/personalised-health-and-care-2020 (accessed on 16 July 2018).	
British Dietetic Association	2	6	Being more physically active, managing weight, quitting smoking or reducing alcohol intake are considered health goals within the draft scope. Healthy dietary patterns should also be taken into account as a health goal because of the known relationships between dietary patterns and health outcomes[1]. 1. Tapsell LC. Dietary behaviour changes to improve nutritional quality and health outcomes. *Chronic Dis Transl Med* 2017; 3: 154–8.	Thank you for your comment. We have included 'unhealthy eating patterns' within section 3.3 'key areas that will be covered'. We will also pass on the reference provided to our information specialist colleagues to include for consideration.
British Dietetic Association	2	7	In the draft scope, perhaps discussion of self-monitoring needs to be more explicit about whether self-monitoring behaviour or self-monitoring of outcome or both are being discussed. We have reasons to believe these are two distinct behaviour	Thank you for your comment. We agree that both self-monitoring of a behaviour and self-monitoring of an outcome could be applicable and have different impacts. We will be clear within the review protocols that this would be captured

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			change techniques that have been demonstrated in previous systematic reviews and meta-analyses to produce differential effects on behaviour change[1,2]. 1. Garnett C, Crane D, Brown J, Kaner E, Beyer F, Muirhead C et al. Behaviour change techniques used in digital behaviour change interventions to reduce excessive alcohol consumption: a meta-regression. Ann Behav Med. 2018. 2. Edwards EA, Lumsden J, Rivas C, et al. Gamification for health promotion: systematic review of behaviour change techniques in smartphone apps. *BMJ Open*. 2016;6(10):e012447.	separately and considered within the analysis as such.
British Dietetic Association	3	8	The draft scope mentions artificial intelligence (AI). It is important with regards to AI that we do not let potential hype exceed expectations. The reason for mentioning this is that clinicians and people affected by the guideline may be susceptible to predatory "AI" fraudsters within the context of potential hype. We would advise that consideration be given to implementing an explicit clinical safety approach for clinician and patient reassurance to mitigate this potential adverse unintended consequence[1]. We trust this has already been considered. Despite this, we think reinforcing such a point is important. 1. Fogel, A.L., Kvedar, J.C. Artificial intelligence powers digital medicine. npj Digital Medicine. 2018;1: 5.	Thank you for your comment. Artificial intelligence is an area of importance yet lacks technological advancement within the area of personal behaviour change interventions. We have therefore excluded it from the scope of this guidance. However we will pass this information on the surveillance team for their consideration during the future guideline update.
British Dietetic Association	4	20	Perhaps additional specific consideration could be given in the draft scope to long-term conditions requiring self-management that are particularly impacted by dietary behaviours[1]. The reason for this is that tailoring of digital behaviour change interventions to specific behaviours increases effectiveness[1]. The specific long-term conditions in this case may include conditions such as;	Thank you for your comment. During the development of the guidance specific consideration will be given to people with the following conditions: • Hypertension and cardiovascular disease (including, stroke and coronary heart disease) • Overweight or obesity • Respiratory diseases (asthma, chronic obstructive pulmonary

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			1. Coeliac Disease 2. Chronic Obstructive Pulmonary Disease 3. Chronic Kidney Disease 4. Type 1 and type 2 diabetes mellitus 5. Cystic Fibrosis 1. Sadasivam RS, Cutrona SL, Kinney RL, Marlin BM, Mazor KM, Lemon SC, et al. Collective-Intelligence recommender systems: Advancing computer tailoring for health behavior change into the 21st century. J Med Internet Res. 2016;18(3):e42.	disease) • diabetes • musculoskeletal conditions • mental health conditions (including anxiety, depression and dementia for which managing established lifestyle behaviours may improve health outcomes) • cancers for which managing established lifestyle behaviours may improve health outcomes (for example, lung cancer and stopping smoking). Other conditions were not included in the list due to having a lower prevalence. However the committee may consider during the development of the guidance if data found on these conditions can be extrapolated to other populations or conditions where there are similar behaviours of relevance or similarities in aetiology. For example those with PCOS may be much more likely to suffer from diabetes, which are linked primarily with weight and hyperinsulinemia, both which are affected by diet and physical activity.
British Dietetic Association - Obesity Group	4	23-28	Excess weight (both overweight and obesity) should be included in the scope as a chronic physical or long-term mental health condition. Obesity is recognised as a disease in its own right by many (e.g. WHO, USA, Canada), and excess weight also increases the risk of many of the conditions specified in the scope (e.g. hypertension, cardiovascular disease, some cancers, respiratory disease, musculoskeletal conditions) (for example PHE (2017) Health Matters and the food environment). In addition obesity is associated with poor mental health (e.g. NOO, Obesity and mental health, 2011).	Thank you for your comment. Overweight and obesity has now been added as condition that will be given specific consideration who may benefit from managing and established lifestyle behaviour (such as eating patterns or physical activity) because it affects their health or mental wellbeing.
British Dietetic Association	5	14-16	The comment *"delivered without direct or ongoing interaction with, or intervention by, a practitioner or health care professional1"* needs clarification. The NHS approved apps includes some that have ongoing	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or

Organisation name	Page no.	Line no.	Comments Please insert each new comment in a new row	Developer's response Please respond to each comment
			interaction/intervention with a healthcare professional e.g. Oviva which includes personalised support from a specialist dietitian	professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
British Dietetic Association	5	17	We wonder whether it would be worthwhile in the draft scope to also include augmented reality (AR) and virtual reality (VR) as an option for care that may be important for people affected by the guideline?[1] The reason for this is the added value provided by AR and VR in supporting behaviour change[2]. 1. Calle-Bustos M, Juan MC, García-García I, Abad F. An augmented reality game to support therapeutic education for children with diabetes. PLoS One 2017; 12(9): e0184645. 2. Riva G, Baños RM, Botella C, Mantovani F, Gaggioli A. Front. Psychiatry 2016;7:164	Thank you for your comment. Augmented reality and virtual reality will be included as examples of technologies that may incorporate behaviour change techniques in the review protocols.
British Dietetic	5	23	Sedentary behaviour should be specifically included in addition	Thank you for your comment. We have now included

Organisation name	Page no.	Line no.	Comments Please insert each new comment in a new row	Developer's response Please respond to each comment
Association - Obesity Group			to lack of physical activity. Sedentary behaviour is now recognised as a risk factor for poor health, independent from low levels of physical activity (e.g. Thorp et al (2011) Am J Prev Med 41(2):207–215).	'sedentary behaviour' alongside 'a lack of physical activity' within the key areas that will be covered.
British Dietetic Association	5	25	We would suggest "Poor weight management" mentioned in the draft scope is not a lifestyle behaviour but rather an outcome of a behaviour such as eating or physical activity behaviours[1]. 1. Greaves C, Poltawski L, Garside R, Briscoe S. Understanding the challenge of weight loss maintenance: a systematic review and synthesis of qualitative research on weight loss maintenance. Health Psychol Rev 2017; 11: 145–163.	Thank you for your comment. We agree that poor weight management is not a behaviour but a physiological outcome of eating or physical activity behaviours. We have now removed this from the list of behaviours and specified 'unhealthy eating patterns' and 'a lack of physical activity or sedentary behaviour' within the list of key areas that will be covered. We have now also added 'overweight or obesity' to this list of conditions that will be given specific consideration. This is to ensure we do not miss evidence which considers interventions that are targeted at this population.
British Dietetic Association	8	29	We agree with the questions outlined and commend the draft scope for comprehensive coverage of pertinent areas. Additional key questions we would suggest including would be as follows; 1. How will tailoring of digital behaviour change interventions be supported over time?[1] The reason for including this question stems from the need to mitigate against the risk of exacerbating disparities or health inequalities[1]. 2. Does targeting behaviours simultaneously or sequentially influence the effectiveness of technology-based behaviour change interventions?[2] The reason for this question is the evidence gap about the relative effectiveness of sequential and simultaneous approaches[2].	Thank you for your comment. There will be a level of a tailoring within interventions due to the general interactive approach of behaviour change interventions. The equality assessment (EIA) form aims to assess the impact on equality the guidance may have. This considers potential equality issues which have been identified by stakeholders during development of the draft scope. The committee are required to consider addressing health inequalities, particularly those pointed out in the EIA during the development of the evidence reviews and subsequent recommendations. Within section 3.5 of the scope 'key issues and draft questions' we have also asked a specific question on what socio-demographic factors of the target audience may moderate the effectiveness of digital or m-health behaviour change interventions (such as age, gender, socioeconomic group, ethnicity and digital literacy). This question will be incorporated in to the evidence review protocols.

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			1. Latulippe K, Hamel C, Giroux D. Social health inequalities and eHealth: a literature review with qualitative synthesis of theoretical and empirical studies. J Med Internet Res. 2017 Apr 27;19(4):e136. doi: 10.2196/jmir.6731. 2. James E, Freund M, Booth A, et al. Comparative efficacy of simultaneous versus sequential multiple health behavior change interventions among adults: a systematic review of randomised trials. Prev. Med 2016; 89: 211-223.	Interventions that target multiple behaviours will be included within the evidence reviews and any evidence which reports how these behaviours interact will be considered. The references provided will also be passed on to our information specialist colleagues for their consideration.
British Dietetic Association	9	7	We would suggest sustained changes in behaviour should be explicitly defined in the draft scope in terms of duration[1]. 1. Ory MG, Smith ML, Mier N, Wernicke M. The science of sustaining health behavior change: the Health Maintenance Consortium. Am J Health Behav. 2010;34(6):647–659.	Thank you for your comment. Sustained changes in behaviour will be explicitly defined in the evidence review protocols.
British Psychological Society			**References** Anderson, P., Edwards, S. and Goodnight, J. (2016). Virtual Reality and Exposure Group Therapy for Social Anxiety Disorder: Results from a 4–6 Year Follow-Up. *Cognitive Therapy and Research*, 41(2), pp.230-236. Baglioni, C., Battagliese, G., Feige, B., Spiegelhalder, K., Nissen, C., Voderholzer, U., Riemann, D. (2011). Insomnia as a predictor of depression: A meta-analytic evaluation of longitudinal epidemiological studies. *Journal of Affective Disorders*, *135*(1), 10–19. Berkell Zager, D., Wehmeyer, M. and Simpson, R. (2012). *Educating students with autism spectrum disorders*. London: Routledge. cbt4kids.com.au. (2018). *CBT4Kids ToolboxiPad App for*	Thank you for your comment. Any evidence for digital or m-health behaviour change interventions will be identified during the evidence reviews. We will also pass on the list to our information specialist colleagues to include for consideration.

Organisation name	Page no.	Line no.	Comments Please insert each new comment in a new row	Developer's response Please respond to each comment
			Cognitive Behavioural Therapy. [online] Available at: https://cbt4kids.com.au/ [Accessed 13 Jul. 2018]. Carroll, J., Bradley, L., Crawford, H., Hannant, P., Johnson, H., & Thompson, A. (2017). *SEN support: A rapid evidence assessment*. UK Government (Home Office). Espie, C. A., Kyle, S. D., Williams, C., Ong, J. C., Douglas, N. J., Hames, P., & Brown, J. S. L. (2012). A Randomized, Placebo-Controlled Trial of Online Cognitive Behavioral Therapy for Chronic Insomnia Disorder Delivered via an Automated Media-Rich Web Application. *Sleep*, *35*(6), 769–781 Erren, T. C., Morfeld, P., Foster, R. G., Reiter, R. J., Groß, J. V., & Westermann, I. K. (2016). Sleep and cancer: Synthesis of experimental data and meta-analyses of cancer incidence among some 1,500,000 study individuals in 13 countries. *Chronobiology International*, *33*(4), 325–350. Hillman, D., Mitchell, S., Streatfeild, J., Burns, C., Bruck, D., Pezzullo, L. (2018). The economic cost of inadequate sleep. *Sleep, in press,* https://doi.org/10.1093/sleep/zsy083 Hipp, D., Gerhardstein, P., Zimmerman, L., Moser, A., Taylor, G. and Barr, R. (2017). The Dimensional Divide: Learning from TV and Touchscreens During Early Childhood. In: R. Barr and D. Nichols Linebarger, ed., *Media Exposure During Infancy and Early Childhood: The Effects of Content and Context on Learning and Development*. Springer International Publishing. Irish, L. A., Kline, C. E., Gunn, H. E., Buysse, D. J., & Hall, M. H. (2015). The Role of Sleep Hygiene in Promoting Public Health: A Review of Empirical Evidence. *Sleep Medicine Reviews*, *22*, 23–36. Léger, D., Massuel, M.-A., & Metlaine, A. (2006). Professional	

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			Correlates of Insomnia. *Sleep*, *29*(2), 171–178. Liu, Y. (2016). Prevalence of Healthy Sleep Duration among Adults — United States, 2014. *MMWR. Morbidity and Mortality Weekly Report*, *65*. Opriş, D., Pintea, S., García-Palacios, A., Botella, C., Szamosközi, Ş. and David, D. (2011). Virtual reality exposure therapy in anxiety disorders: a quantitative meta-analysis. *Depression and Anxiety*, 29(2), pp.85-93. Özen, A. (2015). Effectiveness of Siblings-Delivered iPad Game Activities in Teaching Social Interaction Skills to Children with Autism Spectrum Disorders. *Educational Sciences: Theory & Practice*, 15(5). Paciga, K. and Donohue, C. (2017). *Technology and interactive media for young children*. Fred Rogers Center. Spence Cochran, K. and Cynthia, P. (2011) 'Assistive Technology to Support People with Autism Spectrum Disorders', in Zager, D., Wehmeyer, M.L., and Simpson, R.L. (eds.) *Educating students with autism spectrum disorders: Research-based principles and practices*. New York: Routledge, pp. 295–311. Zosh, J., Hirsh-Pasek, K., GolinKoff, R. and Parish-Morris, J. (2016). *Learning in the Digital Age: Putting Education Back in Educational Apps for Young Children*. [online] www.child-encyclopedia.com. Available at: http://www.child-encyclopedia.com/sites/default/files/textes-experts/en/4738/learning-in-the-digital-age-putting-education-back-in-educational-apps-for-young-children.pdf [Accessed 13 Jul. 2018].	

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British Psychological Society	General	General	Those who create third party apps are often not large companies and are often do not have criminal records checks. The Society believes that there is a need to make sure the information on apps is GDPR compliant and to check who will have access to potentially very confidential data. Even if apps are GDPR compliant there is also a need to be aware that information may be harvested by other unrelated apps on a device (e.g. screen recordings, and keyboard logs) if appropriate privacy settings are not used. Where family sharing is set up other family members may be able to see what apps are being accessed.	Thank you for your comment. This guideline is specifically about the components of digital and mobile health technologies which enable behaviour change and not on the digital technologies themselves, thus NICE will only make recommendations in relation to this. It is not within the remit of NICE to ensure information on apps is GDPR compliant and it is the responsibility of the app developers to ensure compliance with legislation. NICE have had some involvement in developing The Digital Self-Assessment Questions (DAQ), which are a set of technical standards that app developers can self-assess against. These standards ensure that digital services comply with safety, privacy and consent standards. Some apps on the NHS apps site have now undergone assessment against these DAQ technical standards.
British Psychological Society	Q3	Q3	Many people can access Virtual Reality by either placing a smart phone in a cheap Google Cardboard type headset or through video game consoles. There are research findings which support Virtual Reality as an intervention for: • Safe exposures and fade responses for people with phobias such as agoraphobia (Castro et al 2013) and social anxiety (Page et al 2017) • The treatment of general anxiety (Opris et al 2012)	Thank you for your comment. We will include augmented reality and virtual reality as examples of technologies that may incorporate behaviour change techniques in the review protocols. We will also provide the links you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
British Psychological Society	1	24	The Society believes that poor sleep should be added to this list alongside diet and exercise here as insufficient sleep is a major public health problem with a large percentage of the population (1 in 3) getting insufficient sleep (Liu et al, 2014). There is increasing evidence this is predictive of serious consequences. People with insomnia are twice as likely to develop depression as those without (Baglioni et al, 2011). Poor sleep has been linked with increased risk of cancer (Erren et al, 2016). Poor sleepers have increased risk of serious accidents (Leger et al, 2006). Numerous studies now put the	Thank you for your comment. Improving sleep is included as an example of a strategy that may be included in digital or m-health based behaviour change interventions for improving mental wellbeing.

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			full economic cost to society from poor sleep in the tens of billions (Hillman et al, 2018).	
British Psychological Society	4	7	In order to use technology those users may need to be assessed and supported with: • Changing the settings on their device • Being provided with specialist switches/keyboards • Programmes or apps which are appropriate for their general levels of literacy and learning • Being provided with access to apps in their first language if they are not fluent English speakers. •	Thank you for your comment. The equality assessment (EIA) form aims to assess the impact on equality the guidance may have. This considers potential equality issues which have been identified by stakeholders during development of the draft scope. Thus the details you have raised have been added to this form. The committee are required to consider addressing health inequalities, particularly those pointed out in the EIA during the development of the evidence reviews and subsequent recommendations. Within section 3.5 of the scope 'key issues and draft questions' we have asked a specific question on what socio-demographic factors of the target audience may moderate the effectiveness of digital or m-health behaviour change interventions (such as age, gender, socioeconomic group, ethnicity and digital literacy). This question will be incorporated in to the evidence review protocols.
British Psychological Society	4	7	The Society believes that people using apps/programmes should be given clear written/step by step demonstrations or videos on how to use the equipment, depending on the user's age and ability. We would recommend a support phone line or drop ins for those who may struggle with digital literacy	Thank you for your comment. The committee will consider equality issues throughout the development of the guideline, including those listed within the Equality Impact Assessment (EIA) form such as digital literacy. There may be a resource impact related to a support phone line or drop ins for those who may struggle with digital literacy and is something we will flag to the resource impact team.
British Psychological Society	4	7	People on low incomes may not have access to the following: • Broadband at home • A computer or mobile phone • A prepaid plan with enough data to access the apps/programmes.	Thank you for your comment. The equality assessment (EIA) form aims to assess the impact on equality the guidance may have. This considers potential equality issues which have been identified by stakeholders during development of the draft scope. Thus the details you have raised have been added to this form.

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			Because of the nature of these interventions it may not always be appropriate for adults and young people to try and use these apps in public spaces where free broadband is available e.g. libraries. Even if they do have broadband at home there maybe problems with having access to a private space to use them.	The committee are required to consider addressing health inequalities, particularly those pointed out in the EIA during the development of the evidence reviews and subsequent recommendations. Within section 3.5 of the scope 'key issues and draft questions' we have asked a specific question on what socio-demographic factors of the target audience may moderate the effectiveness of digital or m-health behaviour change interventions (such as age, gender, socioeconomic group, ethnicity and digital literacy). This question will be incorporated in to the evidence review protocols.
British Psychological Society	4	16	Children using internet connected devices will need different levels of supervision and safeguarding than adults. Parents will need training about setting up parental controls and privacy settings to make sure children are only accessing the programme they should be and when, where and how long for children should be using devices for. Younger children will need a higher level of supervision. For teenagers there should be some thought about how to balance their needs for confidentiality against the need to keep them safe when using internet connected devices.	Thank you for your comment. This guideline is specifically about the components of digital and mobile health technologies which enable behaviour change and not on the digital technologies themselves, thus NICE will only make recommendations in relation to this. It is not within the remit of NICE to ensure information on apps is GDPR compliant and it is the responsibility of the app developers to ensure compliance with legislation. NICE have had some involvement in developing The Digital Self-Assessment Questions (DAQ), which are a set of technical standards that app developers can self-assess against. These standards ensure that digital services comply with safety, privacy and consent standards. Some apps on the NHS apps site have now undergone assessment against these DAQ technical standards.
British Psychological Society	4	28	While apps and programmes may be a helpful tool they cannot replace face to face therapeutic support and assessment. They may however support practitioners with less training in delivering some mental health interventions. An example of this would be the iPad app CBT4Kids. In this app there are links to videos which model sessions for practitioners, there are scripts provided for practitioners, as well as CBT exercises for	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the

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			children to complete within the app.	technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
British Psychological Society	5	4	There is a growing body of evidence that ICT is a particularly effective tool for helping pupils with ASD learn communication, language, emotional and social skills. (O'Mally/ Lewis, 2013, Bosseler & Massaro, 2003, Mancil et al 2009, Moore et aJ, 2005, Golan and Baron-Cohen 2006, Ozaen 2015) Computer programmes present very controlled environments and are consistent and reliable (Moore Cheng, McOreih). There is decreased demand for social interaction and behavioural expectations (Spence Cochran and Cynthia (2011). It caters to the strengths of many ASD pupils to respond to visual cues and information (Quill 1997, Shah and Firth 1983). *As cited in Spence Cochran, K. and Cynthia, P. (2011) 'Assistive Technology to Support People with Autism Spectrum Disorders', in Zager, D., Wehmeyer, M.L., and Simpson, R.L.*	Thank you for your comment. ICT will be included as an example of technology that may incorporate behaviour change techniques in the evidence review protocols. We have also passed the reference provided to our information specialist colleagues for them to consider.

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			(eds.) Educating students with autism spectrum disorders: Research-based principles and practices. New York: Routledge, pp. 295–311.	
British Psychological Society	5	23	The Society believes that poor sleep should be represented in this list due to the centrality of sleep in maintaining health both mentally and physically (Liu et al, 2014). Sleep has been shown to benefit from technology-based behaviour change interventions much like diet, exercise and mental health conditions (Espie et al, 2012)	Thank you for your comment. We have now added 'improving sleep and sleep hygiene' as examples of interventions that focus on digital or m-health strategies to improve mental wellbeing.
British Psychological Society	6	2	Reference here is made to 'sleep hygiene' but this would be better reading as just 'sleep'. Sleep hygiene alone has an equivocal evidence base in public health (Irish et al, 2015). Existing self-guided digital interventions for improving sleep already go well beyond sleep hygiene, incorporating techniques from cognitive behavioural therapy (Espie et al, 2012).	Thank you for your comment. We have now added 'improving sleep and sleep hygiene' as examples of interventions that focus on digital or m-health strategies to improve mental wellbeing.
British Psychological Society	8	15	From a recent Rapid Evidence Review by the Department of Education (Carroll et al 2017): • Apps such as the I-connect self monitoring app and the MotivAider device are suitable for older students and help self monitor and increase on task behaviour at school. They may therefore be helpful for young people identified as having concentration difficulties. • A review of computer-based CBT interventions found that, in young people aged between 12 to 25 years with a risk of diagnosed anxiety or depression, computerised CBT had small, but significant, positive effects (Ebert et al., 2015). In a wider population without risk of diagnosed anxiety or depression there were also small positive effects. For children aged between 5 to 11 years there was uncertainty regarding the effectiveness of such interventions (Pennant et al.,	Thank you for your comment. This reference will be passed on to our information specialist colleagues for their consideration.

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			2015). The benefits were it was accessible for students in a wide range of locations and situations, the intervention was cost effective and did not require specialist training for teachers	
British Psychological Society	8	17	The Society believes that children benefit from apps which adapt to their performance and where they can redo problems that they solved incorrectly the first time. When they are given the opportunity to try again with hints and feedback this can increase the likehood they will learn from their mistakes. (Hipp et al 2017)	Thank you for your comment. Key issues and draft review questions are discussed in section 3.5 of the scope. Question 1 aims to address what behaviour change components or techniques used in digital or m-health technologies effectively change established lifestyle behaviours. All target populations of interest will be included when looking for evidence within this area, including young people and children under 16.
British Psychological Society	8	17	The Society believes that children learn better if when they have to use active comprehension and mental manipulation rather than just tapping and swiping. Learning must occur in contexts which is meaningful to children's lives. (Zosh et al 2016)	Thank you for your comment. Key issues and draft review questions are discussed in section 3.5 of the scope. Question 1 aims to address what behaviour change components or techniques used in digital or m-health technologies effectively change established lifestyle behaviours. All target populations of interest will be included when looking for evidence within this area, including young people and children under 16.
British Psychological Society	8	23	Young children learn better from apps or videos if they are supported by adults. Being asked questions about what they are doing and being asked to recall information about what they have done helps them to learn skills and remember information. S Parish Morris et al 2015 & Nikolayev 2016 as cited by (Pacigia & Donahue 2017)	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with

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				usual care or other active interventions, (such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional). We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
Department of Health & Social Care	-	-	Thank you for the opportunity to comment on the draft for the above guideline. I wish to confirm that the Department of Health and Social Care has no substantive comments to make, regarding this consultation.	Thank you
Diabetes UK	3	17	We welcome that technology-based interventions are recognised in the guideline, including for promoting behavioural change among individuals with diabetes and individuals at risk of developing diabetes. Due to variation in access to technology-based interventions for people with diabetes, we recommend that this guidance also sets out clear guidelines for local policy makers and commissioners to ensure that there is consistency in the availability of technology based interventions offered to people with diabetes.	Thank you for your comment. Within section 2 of the scope 'who the guideline is for' we have listed local policy makers and commissioners as a target audience of this guidance. Thus, the committee will consider this while reviewing the evidence and drafting the recommendations.
Diabetes UK	General	General	We recommend that this scope includes that healthcare professionals should assess whether technology-based interventions are appropriate on an individual basis. We also think that the scope should consider factors that are likely to affect the progressive use of technology-based behaviour change interventions such as lifestyle, culture, health literacy, and knowledge of how to use technology-based interventions effectively.	Thank you for your comment. Within section 3.5 of the draft scope titled 'key issues and draft questions' we have identified the following key area: sociodemographic factors of the target audience that may moderate the effectiveness of digital or m-health based behaviour change interventions. This has been formulated in to a question that will be utilised in the evidence reviews (question 3). The list of examples within this question is not intended to be exhaustive and may include other factors such as culture and lifestyle. This data will be extracted from the available evidence and incorporated in to the evidence reviews.

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Drinkaware	1	26	The draft mentions that addressing lifestyle behaviours can help to reduce the risk of a number of health conditions, however it would be helpful if explicit mention would here be made of the important ways in which multiple unhealthy lifestyle behaviours present in individuals may lead to increased overall health risk. This is an important consideration, as it means that risky lifestyle behaviours even at moderate levels, when combined, may result in significant risk overall. It is of particular interest for the implementation of technology-based interventions as these are likely to be attractive for a wide range of the population who may not be engaging in the risky behaviours at the most risky levels. References: Buck, D. and F. Frosini, *Clustering of unhealthy behaviours over time.* London: The Kings Fund, 2012: p. 1-24. Watts, P., et al., *Clustering of lifestyle risk behaviours among residents of forty deprived neighbourhoods in London: lessons for targeting public health interventions.* Journal of Public Health, 2016. **38**(2): p. 308-315.	Thank you for your comment. We recognise that multiple unhealthy lifestyle behaviours may lead to an increased overall health risk. We will consider evidence on digital and mobile interventions which target multiple behaviours within the evidence reviews. Any evidence for digital or m-health behaviour change interventions will be identified during the review process. We will pass on the list of references provided to our information specialist colleagues to include for consideration.
Drinkaware	2	14-15	The draft mentions that digital developments can be an innovative way to engage the public. What is not mentioned here is the importance of how such digital tools/ resources are designed and presented in order to effectively engage the target audiences. The technology is in itself just a type of medium for delivery of the behaviour change messages and support, and in order for it to be effective it must not only be based on relevant behaviour change techniques but also be presented in a way that is attractive to the end users. Furthermore, different user groups may have different preferences in respect to messaging and style, which means that a tool/resource must be developed with a particular user group in mind.	Thank you for your comment. We will look at evidence within specific areas that have been identified within section 3.5 of the scope 'key issues and draft questions'. For example we have drafted an overarching effectiveness question about the techniques/components utilised in digital technologies that effectively change established lifestyle behaviours, but also other sub questions about how the effectiveness of these may be moderated by sociodemographic factors (question 3), medium of delivery (question 4) or the way they are selected delivered and designed (question 5). We have also asked a question on how the extent of engagement with digital or m-health interventions influence their effectiveness as a means of behaviour change (question 8).

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			It is suggested that the draft should explicitly acknowledge that co-creation with relevant end-user groups as well as significant investment in audience testing research must inform the development of effective digital behaviour change tools. Inspiration may be taken from good practice in co-production for service design (e.g. SCIE) as well as audience testing research used in marketing development (e.g. MRS).	These questions will provide a basis for the development of the review protocols and subsequent evidence analysis.
Drinkaware	2	4-11	The draft mentions the potential for digital interventions to support behaviour change. Many studies in this field have taken place with individuals who were recruited into a trial, however it may be worth noting that a recent mixed-method evaluation study of a UK drink moderation app using routinely collected data from close to 120,000 users, adding to the ecological validity of the findings of reductions in alcohol consumption observed after one week, and sustained at 12-week follow-up. Reference: Attwood, S., et al., *Using a mobile health application to reduce alcohol consumption: a mixed-methods evaluation of the drinkaware track & calculate units application.* BMC Public Health, 2017. **17**(1): p. 394.	Thank you for your comment. Any evidence for digital or m-health behaviour change interventions will be identified during the evidence reviews. We will also pass on the reference provided to our information specialist colleagues to include for consideration.
Drinkaware	8	20-31	The draft mentions in the points 3-6 here how different factors related to the user sociodemographics, digital medium, intervention delivery and level of engagement may impact on the effectiveness of technology-based behaviour change interventions. It is suggested that an additional point related to the specific target audience perception and preference is added as a key factor to consider, reflecting the points made above (our comment number 3). It is a principle of effective communication and engagement that messages must be formulated in a way that is felt to be	Thank you for your comment. This will be covered within the question on engagement.

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			relevant and meaningful to the target audiences, and that different population groups may respond in different ways to particular messages and information. Similarly, it is increasingly recognised that effective public health interventions must acknowledge the 'lay epidemiology' of different populations when seeking to engage them effectively and motivate behaviour change. Reference: Lovatt, M., et al., *Lay epidemiology and the interpretation of low-risk drinking guidelines by adults in the United Kingdom.* Addiction, 2015. **110**(12): p. 1912-1919.	
NHS England	3	25	It would be useful to include general practitioners and their wider teams as individuals or service providers who may benefit from such guidelines	Thank you for your comment. Trained staff working in health and social care services who have contact with the general public have been included as a group in section 2 'who the guideline is for'.
NHS England	3	26	It may be useful to consider health seeking behaviour and health anxiety as a potential behaviour to include in the development of such an initiative, particularly to help address high use of antibiotics.	Thank you for your comment. Clinical interventions to help with the diagnosis, treatment or management of a chronic physical or long-term mental health condition are out of scope for this referral, as the guideline is centred on behaviour change interventions. This has now been made clearer in the section titled 'areas that will not be covered'.
NHS England	4	26	In addition to people suffering from diabetes, there are other people who may benefit from behaviour changes such as those suffering from Polycystic Ovarian Syndrome and Obesity.	Thank you for your comment. Other conditions were not included in the list of specific considerations due to having a lower prevalence. However the committee may consider during the development of the guidance if data found on these conditions can be extrapolated to other populations or conditions where there are similar behaviours of relevance or similarities in aetiology. For example those with PCOS may be much more likely to suffer from diabetes, which are linked primarily with weight and hyperinsulinemia, both which are affected by diet and physical activity.

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NHS England	4	28	Mental health conditions may include stress management	Thank you for your comment. Stress management has now been added as an example of managing an established lifestyle behaviour in order to improve mental wellbeing
NHS England	5	3	Additional conditions that could be included in the focus for the guidelines are Gastro-oesophageal reflux, constipation, migraine/headaches and unsafe sexual behaviour.	Thank you for your comment. Other conditions were not included in the list of specific considerations due to having a lower prevalence and not being key areas of concern. However the committee may consider during the development of the guidance if data found on these conditions can be extrapolated to other populations or conditions where there are similar behaviours of relevance or similarities in aetiology.
NHS England	8	11	There is a typo/grammar error	Thank you for your comment.
NHS England	9	5	One of the outcomes that would be useful to include is impact on use of health services and change in health seeking behaviour.	Thank you for your comment. Specific outcomes will be explicitly defined in the evidence review protocols.
Paths for All	General	General	**Walking and physical activity** Walking is the most accessible and practical way to achieve recommended levels of physical activity and offers a huge opportunity for preventative spending. We champion everyday walking as the way to a happier, healthier Scotland. In recent years, people in Scotland have become more active, with participation rising to 75 per cent in 2011 and again to 79 per cent in 2016. Participation in all physical activity and sport had remained relatively constant between 2007 and 2010 at around 72 per cent. This increase is in part driven by the growing popularity of recreational walking, with walking participation having risen from 57% in 2011 to 67% in 2016. (Scottish Household Survey 2016) Our work has included several interventions using technology to support people becoming more active. We have included information on these below as this may assist in informing the recommendations. The level and type of evidence of behaviour	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise behaviour change components or techniques according to the scope and evidence review protocols. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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			change is variable depending on the design of the projects. The evidence of short term behaviour change tends, perhaps inevitably, to be stronger than that for sustained change. We would be pleased to provide more information if that would be of help. https://www.pathsforall.org.uk/pfa-home	
Paths for All	General	General	**Step Count Challenge** Paths for All has been delivering a web-based workplace pedometer challenge since 2011. The Step Count Challenge aims to increase levels of physical activity to support participants to attain or maintain the government's recommendations of 150 minutes of moderate physical activity per week and to reduce sitting time. This is delivered by providing participants with structured step goal-setting, activity tracking, practical advice on how to increase walking through active travel, tips on how to walk more during the working day (e.g. walking meetings) and motivational activities and challenges. Social media and blog posts are used to share stories, participant content and updates on progress. www.stepcount.org.uk Participants enter the challenge in teams of five. Each team member creates a user account on the challenge website where they record their steps, track their team's progress on a leader board, get virtual rewards and share comments with their teammates. Participants can record their steps using their own pedometer, activity tracker or app. The user logs into their profile and records their steps. Cycling, running and swimming activities can also be recorded, and these are converted to steps. To date Paths for All has delivered 12 Scotland wide	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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			challenges and 24 bespoke challenges for individual workplaces. 18.5 billion steps have been recorded with 37,128 participations in the challenge to date. Paths for All has worked with the University of Edinburgh's Physical Activity for Health Research Centre to carry out research on the Step Count Challenge. The study looked at the impact of the Step Count Challenge on participants' physical activity levels and their motivation to walk more as a result of taking part in the challenge. It found that at follow-up (in the weeks after the challenge had finished) participants walked on average 109 minutes more for active travel, 55 minutes more in their personal time and that they were also sitting 368 minutes less over the course of a week. On average, the quality and amount of participants' motivation for walking for health increased and participants became more confident about walking for health. The most reported benefits included feelings of improved physical health, team morale and enjoyment. The research paper can be downloaded here: https://stepcount.org.uk/2015/02/step-count-challenge-research-results/	
Paths for All	General	General	A qualitative study carried out by an MSc student from the University of Edinburgh's Physical Activity for Health Research Centre looked at the experiences of 10 participants. Participants reported physical health benefits that included body changes, improved sleep, increased endurance and improvements to existing health conditions. The largest category of perceived findings related to mental health benefits and included social benefits, increased motivation, improved mood, decreased stress and enhanced quality of life. With regards to motivation, one participant stated that she liked the goal setting: "'I like how you always have those targets and you're always pushing yourself to try and meet them." With	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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			regards to improved mood, another woman discussed how walking during the working day helped her feel better: 'Just (felt) glad to be out, away from your desk, and just stretching out, and then when I'm back I just feel more positive'. The women also discussed how participating in the Step Count Challenge helped them to realise their capabilities and realise that they could prioritise walking. The study can be downloaded here: https://stepcount.org.uk/2016/01/what-are-the-benefits-of-taking-part-in-the-step-count-challenge-a-qualitative-study-of-participants-experiences /	
Paths for All	General	General	**SMS Text Messaging** Paths for All has supported walking groups to use SMS text messaging services to provide information to walkers about local walking activities and the benefits of a more active lifestyle. A pdf resource with background information and case studies has been created: https://www.pathsforall.org.uk/component/option,com_docman/Itemid,166/gid,1860/task,doc_download/	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
Paths for All	General	General	**Beat the Street** Paths for All delivers Scotland's Smarter Choices, Smarter Places (SCSP) programme to encourage behaviour change that increases active and sustainable travel. It funds local authorities to deliver activities that are appropriate to local need. In the three years 2015 to 2018 Dumfries and Galloway Council used SCSP funds to deliver the Beat the Street project. Beat the Street motivates people to come together as a community to be more active. People scan a card or key fob onto 'Beat Box' scanners located around the area to show they	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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			have walked or cycled between the boxes. Each journey accrues points. The project has been successful in changing behaviour. In 2017 the project took place in Stranraer. Nearly 40% of the town's population participated, with 35 workplace teams, 22 schools and many individuals signing up to play. The game generated an array of positive outcomes, including an increase in the proportion of participants meeting the Department of Health's physical activity target for adults, which rose from 62% to 82%. In addition, nine out of ten surveyed participants agreed the event helped them feel healthier and more than half said the event had helped them travel less by car. In 2018 the programme ran in Dumfries. It reported a 9% increase in cycling levels six months after the game and a 7% decrease in those reporting only 0-30min physical activity per week after six months. A video outlining the project is available at: https://www.pathsforall.org.uk/pfa/news/dumfries-has-beat-the-street.html Beat the Street is delivered by Intelligent Health. http://www.intelligenthealth.co.uk/	
Paths for All	General	General	**Walk Once a Week** Paths for All is a funding partner in the Living Streets Scotland WoW programme. This uses smartboards - pupils record how they get to school on the WOW Travel Tracker and those who walk once per week for a month are rewarded with a themed badge. This has seen a 23% increase in pupils' walking rates in the first five weeks. https://www.livingstreets.org.uk/what-we-do/walk-to-school/walk-to-school-in-scotland	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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Paths for All	General	General	**Medal Routes** Paths for All supported the development of the Medal Routes project and mobile app. Medal Routes are three short circular walking routes that start and finish at the same location. These routes are designed to take approximately 15, 30 and 60 minutes. The starting/finishing point is called a Hub – usually a café, sports centre, library, or health. Medal Routes are available in every local authority area across Scotland and there are over 700 walking routes to choose from. Half of the people that use Medal Routes say that they are now walking more often as a direct result of the project. http://www.ramblers.org.uk/go-walking/routes-and-places-to-walk/medal-routes.aspx	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
Paths for All	General	General	**World Walking** The World Walking app allows you to use the distances you walk in the real world to complete imaginary (virtual) walks ranging from city tours to worldwide journeys. There are over 160 virtual walks to choose from. https://worldwalking.org/about	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
Paths for All	General	General	**Wearable devices and apps** We have also looked at some of the walking related apps that are available. https://www.pathsforall.org.uk/pfa/health-walks/walking-apps.html	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this

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				when searching for the evidence.
Paths for All	General	General	**Macmillan Pedometer Platform** All Move More projects have access to a Move More Get Active Pedometer Platform; this pedometer platform builds on the existing use of our pedometer packs. The pedometer packs and platform support and encourage people to make small changes to their daily lifestyle, helping cancer patients reduce the amount of time spent sitting down and gradually building up their levels of activity. Incorporating walking into daily routine will encourage long term behaviour change. For participants who have access to IT, Move More staff can register their clients on this platform as a pedometer user and participants can log their individual daily or weekly step count totals. The Macmillan Development Officers can log in and view all their Move More pedometer users at a dashboard level and offer support as and when required. This platform allows Paths for All and Macmillan to capture data on individual physical activity levels and step count alongside monitoring the use of pedometer packs, producing detailed quarterly and annual reports. The link to our case studies page can be found here, where a Move More Participant talks about the online Pedometer Platform: https://www.pathsforall.org.uk/pfa/health-walks/move-more-case-studies.html	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
Paths for All	General	General	**Pedometers: Friend or Foe?** Our Workplace Step Count Challenge and our Community Pedometer Packs have shown the difference having a visual	Thank you for your comment. Digital and m-health behaviour change interventions on improving physical activity are covered by the guideline scope. The guideline committee will use all available evidence to make recommendations on which

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			aid and a tangible goal can be in increasing activity levels. https://www.pathsforall.org.uk/pfa/news/pedometers-friend-or-foe.html https://www.pathsforall.org.uk/pfa/pedometers/pedometers.html	interventions utilise effective behaviour change components or techniques. We will also provide the link you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.
Public Health England	general	general	**1. Which interventions or forms of practice might result in cost saving recommendations if included in the guideline?** The question of what 'might result' is difficult to answer as we have to recognise that many of these technologies are in the very early days of development. Three points are key here: 1. Many popular remote digital interventions have very little evidence of effectiveness and the National Institute for Health and Care Excellence (NICE) have started to review interventions in this area (e.g. anxiety and depression[1]) 2. There are likely differences in effectiveness of channels as shown by Buller et al on smoking cessation (SMS vs app)[2] 3. Susan Michie and colleagues have developed a taxonomy of 'modes of delivery'. It would be appropriate to use their digital 'top-level' category to identify the types (i.e. use sub-level two) of modes of delivery that should be considered in this review of behaviour change interventions[3] Of two interventions that are designed to have similar outcomes, one may be cost saving, but not necessarily more cost-effective or even more effective. And this says nothing of inequality – or impact. The focus should remain on cost-effectiveness. A key concern about digital apps for personal behaviour change is that they are replacing face-to-face services – and saving money – but may have little or no effect /	Thank you for your comment and advice. The behaviour change techniques or components utilised in digital interventions will be identified and coded using the behaviour change taxonomy checklist described by Michie et al 2013. This information has now been added to the scope for clarity within section 3.5 'key issues and draft questions'. We will also pass on the reference to our information specialist colleagues to include for consideration.

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			cost-effectiveness. [1] https://www.nice.org.uk/news/article/new-programme-will-assess-how-digital-therapies-can-help-treat-anxiety-and-depression [2] David B. Buller, Ron Borland, Erwin P. Bettinghaus, James H. Shane, and Donald E. Zimmerman. Randomized Trial of a Smartphone Mobile Application Compared to Text Messaging to Support Smoking Cessation. Telemedicine and e-Health.Mar 2014. Volume: 20 Issue 3: February 27, 2014 [3] http://ehps.net/ehp/index.php/contents/article/view/2687	
Public Health England	general	general	Following the publication of the 'Childhood obesity: a plan for action'[4] Public Health England (PHE) has begun to develop digital approaches that can meet the needs of children with overweight and obesity and their families, and support a family along a journey to healthy weight. This approach aligns with PHE's digital strategy to take a 'digital first' approach to protecting and improving the nation's health and wellbeing, and contribute towards engaging those families in the most deprived areas, and those not engaged with traditional weight management approaches. [4]HM Government (2016). Childhood Obesity a Plan for Action. Available from https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action	Thank you for your comment. Any evidence for digital or m-health behaviour change interventions will be identified during the evidence reviews. We will also pass on the link to our information specialist colleagues to include for consideration.
Public Health England	general	general	1. **Which interventions or forms of practice might result in cost saving recommendations if included in the guideline?** To date there is a gap in the evidence concerning guidance on a feasible cost-effective approach regarding e-health weight management interventions for families. A recent scoping review highlighted a general lack in reported cost-effectiveness	Thank you for your comment. The NICE reference case specifies the methods that should be used to evaluate the cost effectiveness of interventions. For interventions funded by the public sector with health and non-health outcomes, the base case should be a cost–utility analysis using a cost per QALY (quality-adjusted life year) where possible.

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			analysis in available trials[1]. Most studies suggest that e-health is a feasible approach with the potential to be cost saving when compared to traditional more labour intensive face to face approaches. However, economic evaluations need to be conducted and reported consistently, which provides scope for future research and inclusion in guidance for reporting health intervention trials [1]. PHE recommends using a quality-adjusted life year (QALY) approach in alignment with NICE guidelines[2]. [1] Ells, L.J., O'Malley, C., Coulton, V., Blackshaw, J. & Perkins, C. (2017). A rapid systematic scoping review of e-health interventions for the treatment of overweight and obesity in children aged 4-11 years. *Unpublished Manuscript.* (However we are happy to share this review with NICE if it would be helpful for the evidence synthesis. NB this review was the foundation for a Cochrane review protocol which has just been submitted for editorial approval on stand alone e-health interventions for the prevention and treatment of excess weight in children and adolescents.) [2]NICE (2012). Assessing Cost Effectiveness. Available from https://www.nice.org.uk/process/pmg6/chapter/assessing-cost-effectiveness	
Public Health England	general	general	**2. It is NICE's intention to include only behaviour change interventions in which any active feedback is delivered by the technology-based intervention itself, and to exclude any interventions in which the involvement of a practitioner goes beyond the initial stage of induction or orientation. Is this a sensible approach or are there other interventions that we should be aware of?**	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or

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			A key finding that should emerge from this review is whether there is currently sufficient evidence to determine whether the involvement of a practitioner in the way expressed in the question has a meaningful increase (or decrease) in the effect of a digital intervention, which is similar across a variety of broad behavioural topics (e.g. smoking , diet, alcohol consumption. It is also important to know whether assisted-digital is less cost-effective than unassisted products due to the human labour cost or whether the additional cost in human labour increases the effectiveness to such an extent that it is comparable but better (an example that studies this is Lucy Yardley's trial[1]). 1 Laura Dennison et a. Does Brief Telephone Support Improve Engagement With a Web-Based Weight Management Intervention? Randomized Controlled Trial. J Med Internet Res. 2014 Mar; 16(3): e95. In the field of diet and obesity, there is evidence to suggest that stand-alone interventions may be less effective than those that are solely delivered through e-health without the involvement of a practitioner. For example, a systematic review examining e-health weight management in adults suggests that direct human contact (e.g. face to face group or individual sessions or telephone counselling) may help enhance the effect of e-health technologies. Therefore, further research to determine the most appropriate dose of e-health vs non-e-health technologies to achieve meaningful health outcomes is warranted[2]. [2] Hutchesson, M. J., Rollo, M. E., Krukowski, R., Ells, L., Harvey, J., Morgan, P. J., ... & Collins, C. E. (2015). eHealth interventions for the prevention and treatment of overweight and obesity in adults: a systematic review with meta-analysis. *Obesity reviews, 16*(5), 376-392. Available from https://onlinelibrary.wiley.com/doi/pdf/10.1111/obr.12268	process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions (such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional). We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.

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			Given the continuously rising levels of digital literacy for young people and adults in the United Kingdom (UK) [3], the general population will be familiar with such a format to deliver this type of intervention. Moreover, digital services provide opportunity for users to control the nature and extent of shared private information in an anonymous space. Research has shown that people are more willing to convey uncomfortable or emotional information via lean media (i.e. text communication) than they are in a face to face scenario. This could be harnessed to facilitate discussion of sensitive topics that may provoke emotional responses or require inclusion of personal information.[4] [3] ONS (2018). Internet Users in the UK. Available from https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2018 [4] Mohr, D. C., Cuijpers, P., & Lehman, K. (2011). Supportive accountability: a model for providing human support to enhance adherence to eHealth interventions. *Journal of medical Internet research*, *13*(1). Thus despite the benefits the use of technology provides, the complementary use of human interaction remains important to engage users as it has been linked to augmented clinical efficacy and adherence in the context of health interventions. Social presence (e.g. in the form of health coaches) has been linked to increased accountability and user engagement, which are particularly important mechanisms for maintaining behaviours[4,5].Moreover, certain behaviour change techniques may require supplementary human face to face support, for example the provision of social support. Hence, solely relying on digital approaches may limit the positive effect of otherwise	

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			impactful strategies in this area[6]. [5] Yardley, L., Spring, B. J., Riper, H., Morrison, L. G., Crane, D. H., Curtis, K., ... & Blandford, A. (2016). Understanding and promoting effective engagement with digital behavior change interventions. *American journal of preventive medicine*, *51*(5), 833-842. [6] Chang, T., Chopra, V., Zhang, C., & Woolford, S. J. (2013). The role of social media in online weight management: systematic review. *Journal of medical Internet research*, *15*(11).	
Public Health England	general	general	**3. Are there any new innovations such as artificial intelligence technology-based behaviour change interventions available that should be considered in this guideline?** E-health interventions should make use of the latest available technology where appropriate. As above, please refer to the taxonomy of modes of delivery of behaviour change interventions[1] – particularly the "Cross-Cutting Mode of Delivery Features" for categories of features that will influence the likelihood of behaviour change. Artificial Intelligence (considered as true machine learning rather than sophisticated algorithms) is similarly important although not yet available in personal behaviour change interventions (and therefore no evidence yet available). Algorithm-based interventions such as voice-activated coaching could be important and protocols are being developed in this area[2]. More research is especially required to assess the effectiveness of these technologies that also include social media, chat bots, apps, serious gaming, augmented reality and interactive story telling[1]. 1 http://ehps.net/ehp/index.php/contents/article/view/2687	Thank you for your comment. The behaviour change techniques or components utilised in digital interventions will be identified and coded using the behaviour change taxonomy checklist described by Michie et al 2013. This information has now been added to the scope for clarity within section 3.5 'key issues and draft questions'. Artificial intelligence will be excluded within the scope of the guidance. As suggested within your comment, this is an area of importance yet lacks technological advancement within the area of personal behaviour change interventions. Social media, apps, gaming, augmented and virtual reality will be included as examples of technologies that may incorporate behaviour change techniques in the review protocols. We will also provide the references you have provided to our information specialist colleagues so that they can utilise this when searching for the evidence.

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			Some examples of novel Artificial Intelligence mechanisms that are currently in development exist for chat bots targeted at healthy lifestyle behaviours. The provision of such interventions may lower common usability barriers as they require less learning effort by users by prompting and providing healthy recommendations at a time and place when food choices are made, and providing personalised and prompt feedback. Key issues to consider in this area are whether and how appropriate Artificial Intelligence is to support complex behaviours, such as dietary adherence[2]. In particular instances researchers have been exploring the inclusion of sentiment analyses into the machine algorithm. This approach could be a way to address emotional and motivational barriers that affect people's ability to stick to behavioural changes such as healthy eating[2,3] [2] Hassoon et al. Increasing Physical Activity Amongst Overweight and Obese Cancer Survivors Using an Alexa-Based Intelligent Agent for Patient Coaching: Protocol for the Physical Activity by Technology Help (PATH) Trial. JMIR Res Protoc. 2018 Feb; 7(2): e27. [3] Ells, L.J., O'Malley, C., Coulton, V., Blackshaw, J. & Perkins, C. (2017). A rapid systematic scoping review of e-health interventions for the treatment of overweight and obesity in children aged 4-11 years. *Unpublished Manuscript.* (However we are happy to share this review with NICE if it would be helpful for the evidence synthesis. NB this review was the foundation for a Cochrane review protocol which has just been submitted for editorial approval on stand alone e-health interventions for the prevention and treatment of excess weight in children and adolescents.) Given the rapid increase in technology use and development, it is important that designers of behaviour change interventions,	

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			such as weight management programmes, use a multidisciplinary way of working by involving service users and providers to embrace these developments, whilst ensuring they remain evidence-based and are comprehensively evaluated. The scope also needs to consider how digital products are developed by adopting a user-centred agile design[1]. However given the cost implications of emerging new technology, it is important that cost- effectiveness and access equity are comprehensively assessed to ensure new approaches are not widening current health inequities. [4] Fadhil, A., & Gabrielli, S. (2017, May). Addressing challenges in promoting healthy lifestyles: the al-chatbot approach. In *Proceedings of the 11th EAI International Conference on Pervasive Computing Technologies for Healthcare* (pp. 261-265). ACM. [5] Rework (2017). Could an AI bot solve emotional weight gain? Available online at https://www.re-work.co/blog/could-an-ai-bot-solve-emotional-weight-gain	
Public Health England	6	22-24	There is opportunity for the use of inexpensive and scalable eHealth interventions in primary prevention, given the possibility of reaching wide populations who are exposed to risk factors, such as an obesogenic environment. Particularly young people can likely benefit from these approaches, considering how embedded technology is in their everyday lives[1]. There are promising trends showing that digitalised health promotion may be effective in various lifestyle-related conditions, including overweight and obesity, human immunodeficiency virus, and diabetes[1,2,3,4]. Therefore, there may be a missed opportunity by not including digitalised health prevention in the scope of this work, and PHE	Thank you for your comment the guideline will only focus on technologies to help manage established unhealthy behaviours, as the focus is on individual level interventions and changing established behaviours, rather than preventing the uptake of behaviours on a population basis. Information is given within point 7 in the section titled 'areas that will not be covered' which highlights that interventions that aim to prevent the uptake of unhealthy behaviours will not be included within the scope of this guidance. However the guidance will cover primary versus secondary prevention of conditions. For example we will include evidence

Organisation name	Page no.	Line no.	Comments Please insert each new comment in a new row	Developer's response Please respond to each comment
			recommends exploring this opportunity in the context of different health behaviours in high risk populations with regards to effectiveness on relevant health outcomes. [1]Partridge, S. R., Juan, S. H., McGeechan, K., Bauman, A., & Allman-Farinelli, M. (2015). Poor quality of external validity reporting limits generalizability of overweight and/or obesity lifestyle prevention interventions in young adults: a systematic review. *Obesity reviews*, *16*(1), 13-31. [2]Schnall, R., Travers, J., Rojas, M., & Carballo-Diéguez, A. (2014). eHealth interventions for HIV prevention in high-risk men who have sex with men: a systematic review. *Journal of medical Internet research*, *16*(5). [3]Hutchesson, M. J., Rollo, M. E., Krukowski, R., Ells, L., Harvey, J., Morgan, P. J., ... & Collins, C. E. (2015). eH ealth interventions for the prevention and treatment of overweight and obesity in adults: a systematic review with meta-analysis. *Obesity reviews*, *16*(5), 376-392. [4]Joiner, K. L., Nam, S., & Whittemore, R. (2017). Lifestyle interventions based on the diabetes prevention program delivered via eHealth: a systematic review and meta-analysis. *Preventive medicine*, *100*, 194-207.	where someone has a risk behaviour but does not have an associated condition. We will also include evidence where someone has a risk behaviour and does have a condition that would benefit from changing the risk behaviour. However this will not include clinical interventions, but only interventions for which managing established lifestyle behaviours may benefit health outcomes for those with a condition.
Royal College of General Practitioners	General	General	The use of digital technology has the potential to help a considerable number of the population particularly with unhealthy lifestyles and behavioral modification. It is likely that some of these applications will have commercial sponsorship and the aims may include co-selling products or additional services as well as collecting data. If there is no fee for the application and that app is not resourced by the government it is likely that the consumer will be the product.	Thank you for your comment. This guideline is specifically about the components of digital and mobile health technologies which enable behaviour change and not on the digital technologies themselves, thus NICE will only make recommendations in relation to this. It is not within the remit of NICE to ensure information on apps is GDPR compliant and it is the responsibility of the app developers to ensure compliance with legislation. NICE have

Organisation name	Page no.	Line no.	Comments Please insert each new comment in a new row	Developer's response Please respond to each comment
			Consideration needs to be given to the standards and regulations set to monitor these products. There are various models that could be adopted either using devices or drug regulation methods. A standard data compendium sheet on all applications similar to that used by all drug manufacturers would a considerable help as well as a way of potentially monitoring any issues and harms caused by the interventions. It is particularly important to establish if artificial intelligence is used within the intervention.	had some involvement in developing The Digital Self-Assessment Questions (DAQ), which are a set of technical standards that app developers can self-assess against. These standards ensure that digital services comply with safety, privacy and consent standards. Some apps on the NHS apps site have now undergone assessment against these DAQ technical standards.
Royal College of General Practitioners	5	13-25	The interventions can also be used for monitoring sleep behaviour and reducing use of social media and phones particularly for children and young people. The interventions need to be targeted for age.	Thank you for your comment. Digital interventions for improving sleep and sleep hygiene are included within the scope of the guidance. This is stated within section 3.3 of the scope 'Key areas that will be covered'. Everyone, including children and young people under 16 (and their families or carers), who would benefit from changing from an established lifestyle behaviour will also be included.
Royal College of Nursing	-	-	This is just to inform you that the feedback I have received from nurses working in this area of health suggests that there are no comments to submit on behalf of the Royal College of Nursing to inform on the consultation of the draft scope of Behaviour change: technology-based interventions.	Thank you for your comment and positive support.
Royal College of Occupational Therapists	General	General	Given that technology is changing so rapidly, how will NICE ensure this guideline will still hold relevance in 2 years?	Thank you for your comment. The process allows for update searches just before publication for consultation. We will also flat to the surveillance team that this is a rapidly changing field and should be prioritised for early surveillance.
Royal College of Occupational Therapists	General	General	There also needs to be awareness and acknowledgement of the potential negative affect technology can have on behaviour change, especially in the area of mental health and addiction. The impact of this might have the converse effect of adding rather than reducing costs. How will this be addressed in the guideline? Discussion points from "The Future of Well-Being in a Tech-Saturated World" are worth reviewing.	Thank you for your comment. We have now added this as a separate question within the scope. Please see question 7 within section 3.5 'key issues and draft questions'.

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			http://www.pewinternet.org/2018/04/17/the-future-of-well-being-in-a-tech-saturated-world/	
Royal College of Occupational Therapists	3	20-21	Partnering and learning from companies/people who create technologies (apps, websites, connected devices etc) seems to be a logical alliance. Learning how their work has shaped behaviour change as a result of technology use would be helpful to inform this guideline.	Thank you for your comment and advice. We will consider this information during the development of the guidance and recommendations. We may look for expert witness testimony within this area.
Royal College of Occupational Therapists	4	10-12	Health literacy is referred to in the scope but what will the guidance do to address digital literacy? As highlighted in the NHS Digital Inclusion work, there are those mostly likely to benefit from digital services that are excluded due to lack of skills or access. https://digital.nhs.uk/about-nhs-digital/our-work/digital-inclusion/digital-inclusion-guide---introduction. Interventions and practice that addresses inclusion would be a logical inclusion that appears to be missing from this scope.	Thank you for your comment. The equality assessment (EIA) form aims to assess the impact on equality the guidance may have. This considers potential equality issues which have been identified by stakeholders during development of the draft scope. The details you have raised on digital literacy have been added to this form. The committee are required to consider addressing health inequalities, particularly those pointed out in the EIA during the development of the evidence reviews and subsequent recommendations. Within section 3.5 of the scope 'key issues and draft questions' we have asked a specific question on what socio-demographic factors of the target audience may moderate the effectiveness of digital or m-health behaviour change interventions (such as age, gender, socioeconomic group, ethnicity and digital literacy). This question will be incorporated in to the evidence review protocols.
Royal College of Occupational Therapists	4	16-18	The scope ranging from children and young people to adult is very broad and as such the way technology is used would be very different. Will this be acknowledged?	Thank you for your comment. If the evidence suggests that the way the technology is used ranges within different populations then this will be acknowledged. Within the section of the scope titled 'Key issues and draft questions' we have asked a specific question on what sociodemographic factors of the target audience (such as age) moderate the effectiveness of digital or m-health behaviour change interventions. These questions will be used to formulate the evidence reviews.
Royal College	4	23-28	The scope appears to omit the inclusion of neurological	Thank you for your comment. During the development of the

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of Occupational Therapists			conditions such as stroke, Parkinson's, MS, etc. For example: - The Emma watch to support Parkinson's symptoms; https://www.windowscentral.com/microsofts-emma-watch-and-project-emma-help-people-parkinsons-disease - How technology helps me deal with my MS - https://www.mssociety.org.uk/care-and-support/online-community/community-blog/how-technology-helps-me-deal-with-my-ms#	guidance specific consideration will be given to people with the following conditions: • Hypertension and cardiovascular disease (including, stroke and coronary heart disease) • Overweight or obesity • Respiratory diseases (asthma, chronic obstructive pulmonary disease) • diabetes • musculoskeletal conditions • mental health conditions (including anxiety, depression and dementia for which managing established lifestyle behaviours may improve health outcomes) • cancers for which managing established lifestyle behaviours may improve health outcomes (for example, lung cancer and stopping smoking). Other conditions were not included in the list due to having a lower prevalence. However the committee may consider during the development of the guidance if data found on these conditions can be extrapolated to other populations or conditions where there are similar behaviours of relevance or similarities in aetiology. For example those with PCOS may be much more likely to suffer from diabetes, which are linked primarily with weight and hyperinsulinemia, both which are affected by diet and physical activity.
Royal College of Occupational Therapists	5	13-19	In technology interventions, will the role that social media can play on behaviour change be included?	Thank you for your comment. Social media will be included as an example of a digital technology that may incorporate behaviour change techniques in the evidence review protocols.
Royal College of Occupational Therapists	5	14	Being clear on what parameters are on 'induction or orientation' is important. Some may require more intensive support and/or changes of technologies over a prolonged period to ensure the right fit. There may also be a need to have carers supporting people's use of technology after initial work. Will this be	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they

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			examined in the guideline?	may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'. Everyone, including children and young people under 16 (and their families or carers), who would benefit from changing an established unhealthy behaviours will be included as populations of interest within the guideline.
Royal College of Occupational Therapists	6	19-21	The scope states that the guideline will not be covering interventions that change behaviour change in professionals, yet there is a clear argument that technology is only of value if there is a clear case that it is useful and useable in someone's life. An area the occupational therapist is key in addressing during their initial assessment and in into intervention.	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This

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				information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
Royal College of Occupational Therapists	6	5	New innovations could include AI, virtual reality, voice activated devices, smart watches and in general the Internet of things (IoT) related devices.	Thank you for your comment. Artificial intelligence will be excluded within the scope of the guidance. This is an area of importance yet lacks technological advancement within the area of personal behaviour change interventions. Social media, apps, wearable devices, gaming, augmented and virtual reality will be included as examples of technologies that may incorporate behaviour change techniques in the review protocols.
Royal College of Occupational Therapists	8	8	Will NICE be suggesting how to monitor the impact technologies have on behaviour change when there might be other interventions and factors involved in influencing a person's change of behaviour?	Thank you for your comment. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with *usual care* or *other active interventions*, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We will consider any other factors involved in influencing a person's change of behaviour when assessing the available evidence. For instance we will consider specific sub-questions

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				on what sociodemographic factors of the target audience may moderate the effectiveness of digital interventions, as well as factors relating to the medium or way through which an intervention is delivered, selected or designed. We will also consider how the extent of engagement with digital interventions may influence their effectiveness as a means of behaviour change. Please see the section of the scope titled 'Key issues and draft questions' for further information.
Royal College of Occupational Therapists	8	8	Will consideration be given as to how data is going to be used appropriately to inform and develop practice?	Thank you for your comment. In line with the NICE guidelines manual we will use evidence to develop recommendations and subsequently inform practise. Please see the link for further information on the process and methods for developing NICE guidelines: https://www.nice.org.uk/process/pmg20/chapter/introduction-and-overview
Royal College of Paediatrics and Child Health	General	-	Could include technologies that can be used to enhance the diagnostic process - e.g. The Pirate Adventure Autism Assessment App, or the QB test for attention deficit hyperactivity disorder (ADHD)	Thank you for your comment. Digital technologies that are used to enhance the diagnostic process are not within the scope of this guidance. This has now been made clearer in the section of the scope 'areas that will not be covered'.
Royal College of Paediatrics and Child Health	General	-	Use of gaming/digital physical therapies for neurodisability e.g. Wii fit, Xbox Kinect for cerebral palsy, and other more bespoke systems	Thank you for your comment. We will include augmented reality, virtual reality and gaming as examples of technologies that may incorporate behaviour change techniques in the evidence review protocols.
Royal College of Paediatrics and Child Health	General	-	Digitally enhanced therapies for anxiety phobias etc. in neurodevelopmental disorders such as autism spectrum disorder (ASD), ADHD e.g. Blue room - this should cover children, not just the current remit for adults.	Thank you for your comment. Digital and m-health based behaviour change interventions for improving mental wellbeing are included within the scope of the guideline. Everyone, including children and young people under 16 (and their families or carers), who would benefit from changing established lifestyle behaviours are also included within the scope. However clinical or psychiatric interventions to help with the diagnosis, treatment or management of a chronic physical or long-term mental health condition, or as part of the therapeutic

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				process, would be outside of the scope of the guidance as the remit is to focus on changing established behaviours rather than clinical or therapeutic uses of technology. This information has now been made clearer in the section of the scope 'areas that will not be covered'.
Royal College of Paediatrics and Child Health	General	-	Need to consider data protection issues and emphasise the need for good quality research to underpin the use of digital technology; unfortunately, it is felt that NHS England leave the decision with the CCGs on whether to introduce specific technologies. The Wiihabilitation study is the biggest undertaken so far but only had n=30, most studies appear to have benefits but there needs to be a definitive randomised control trial with a large sample to confirm this.	Thank you for your comment. This guideline is specifically about the components of digital and mobile health technologies which enable behaviour change and not on the digital technologies themselves, thus NICE will only make recommendations in relation to this. It is not within the remit of NICE to ensure information on apps is GDPR compliant and it is the responsibility of the app developers to ensure compliance with legislation. NICE have had some involvement in developing The Digital Self-Assessment Questions (DAQ), which are a set of technical standards that app developers can self-assess against. These standards ensure that digital services comply with safety, privacy and consent standards. Some apps on the NHS apps site have now undergone assessment against these DAQ technical standards. We have also added an additional question on the potential adverse events or contraindications of digital behaviour change technologies. Please see question 7 within section 3.5 'Key issues and draft questions'.
Royal College of Paediatrics and Child Health	-	Point 2 above	Disagree - should include interventions that have ongoing therapist input e.g. digitally enhanced Cognitive Behavioural Therapy for children with ASD such as the blue room approach	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or

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				process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'. However clinical or psychiatric interventions to help with the diagnosis, treatment or management of a chronic physical or long-term mental health condition, or as part of the therapeutic process, would be outside of the scope of the guidance as the remit is to focus on changing established behaviours rather than clinical or therapeutic uses of technology. This information has now been made clearer in the section of the scope 'areas that will not be covered'.
Royal College of Paediatrics and Child Health	5	4	The draft scope briefly mentions children/young people and people with neurodevelopmental conditions. The document should give these populations more space as intervention is likely to be more successful within this group. Technology based intervention should target children from early ages and young people and should be made fun (e.g. by using virtual reality programmes or computer games that target healthy eating, exercise/fitness, alcohol, drugs and smoking etc.)	Thank you for your comment. Children and young people under 16 (and their families or carers), who would benefit from changing an established unhealthy behaviours will be included as a population of interest within the guideline. Specific consideration will also be given to people with learning disabilities and people with neurodevelopmental disorders such as autism. Equal priority will be given to identifying evidence across all population groups, including children and young

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			Apps targeting parents and the whole family with the objective to capture difficulties early and through developmental change moderate neurodevelopmental conditions, mental health and physical health ailments (including also speech and language delay, behavioural eating difficulties, obesity, sleep difficulties, anxiety and depression in children with autism, behavioural modification in children and young people with ADHD and psychoeducation of parents of children with ADHD inducing behavioural changes etc.). In that sense it is hard to see how prevention, early identification and behavioural intervention could be separated (although the document states that it would not consider prevention). Another group that would require a different consideration and approach is a group of older adults in whom use of technology to induce behavioural change will have its own challenging.[1] [1] https://blogs.ucl.ac.uk/cbc-digi-hub-blog/2018/03/23/the-use-of-technology-to-promote-health-behavior-change-in-older-adults/	people and older adults. Augmented reality, virtual reality and gaming will be included as examples of technologies that may incorporate behaviour change components or techniques in the evidence review protocols. We will also pass on the reference provided to our information specialist colleagues to include for consideration when searching for evidence.
Royal College of Paediatrics and Child Health	9	9	The document incudes health-related quality of life but does not speak about Self-rated health (SRH) which should be included	Thank you for your comment. Specific outcomes will be explicitly defined in the evidence review protocols.
Royal College of Psychiatrists	5-6	10-25	The College is surprised there is no mention of substance misuse/ illicit drugs. Drugsmeter is a widely known online tool for substance misuse. There is also a drinkmeter.	Thank you for your comment. As this guideline will complement the NICE guideline on behaviour change: individual approaches, we have included the same behavioural areas that were assessed within this previous guideline and drugs misuse was not an area within this guidance. This area is also more closely aligned with clinical interventions which are outside of the remit of this scope. NICE has several guidelines on Drug misuse and prevention, including NG64, CG51, CG52, NG58

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				and CG120.
Royal College of Psychiatrists	General	General	The College hopes NICE take into account work done on predictive analytics in secure settings, such as this paper by Dr David Fearnley - https://onlinelibrary.wiley.com/doi/abs/10.1002/cbm.2074?af=R&	Thank you for your comment. Artificial intelligence including machine learning and predictive analytics will be excluded within the scope of the guidance. Although it is an area of importance, it lacks technological advancement within the area of personal behaviour change interventions. However we will pass this information on the surveillance team for their consideration during the future guideline update.
Tees, Esk and Wear Valleys NHS Foundation Trust	General	General	Smartphones are used in healthcare more and more and can educate and be a great addition for communication (Mosa, A.S.M. et al, 2012). However, going down this route can isolate individuals and increase their dependence on technologies. Research shows this can increase stress/anxiety or compulsions to check the phone, and increase the risk of physical ailments associated with overuse of smartphones and technologies (Archer, D., 2013). One example is the impact on sleep: Studies into the light from smartphones/tablets show that exposure reduces levels of the hormone that prepares the body for sleep (Walker, M., 2017). It is worth considering the benefits to this type of tool compared to face to face social interactions, which can help alleviate problems such as loneliness, depression and suicidal thoughts. Looking at an app is very impersonal therefore it needs to be introduced alongside a solid face to face intervention, not as a substitute. • Book - Walker, M. (2017). Why we sleep: The new science of sleep and dreams. In A. Lane (Ed.), ISBN-10: 0241269067 • Mosa, A. S. M., Yoo, I., & Sheets, L. (2012). A Systematic Review of Healthcare Applications for Smartphones. BMC Medical Informatics and Decision Making, 12, 67. http://doi.org/10.1186/1472-6947-12-67 • Archer, D. (2013). Smartphone Addiction. Psychology	Thank you for your comment. We have now added this as a separate question within the scope. Please see question 7 within section 3.5 'key issues and draft questions'.

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			today, accessed online July 2018.	
Tees, Esk and Wear Valleys NHS Foundation Trust	General	General	Ross, K. and Wing, R. (2016) found that supplementing technology with phone calls is more effective. E.g. leading to greater weight loss as compared with technology alone. (**Obesity**, 1 July 2016, https://doi.org/10.1002/oby.21536). Other studies have found that interventions including text/ e-mail feedback to be most effective (e.g. Allen, J., Stephens, J., and Patel, A. 2014, Telemedicine Journal and E-Health 20 (12), pp. 1103-1120). Would there be any scope for incorporating a small number of progress checks (phone calls/ e-mails/ texts) to supplement self-directed use of technology?	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
Tees, Esk and Wear Valleys NHS Foundation Trust	1	23, 24	Suggest replacing 'harmful drinking' with 'harmful levels of alcohol consumption'	Thank you for your comment. We have now replaced the term 'harmful drinking' with 'hazardous or binge drinking'. This is in line with previous NICE guidance on alcohol use.
UCL Centre for Behaviour Change	5	13	The draft scope currently excludes interventions in which the involvement of a practitioner or other healthcare professional goes beyond the initial stage of induction or orientation. We	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care

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			believe that it is important to include such interventions (i.e. 'blended' interventions), providing that the digital technology is used to deliver intervention content and is not solely used as a data collection tool. The inclusion of blended interventions is also critical for assessing factors that may moderate the effectiveness of digital interventions (see, for example, Little et al., 2016, "An internet-based intervention with brief nurse support to manage obesity in primary care (POWeR+): a pragmatic, parallel-group, randomised controlled trial", *Lancet Diabetes & Endocrinology*).	professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered'. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'. We will also pass on the list to our information specialist colleagues to include for consideration.
UCL Centre for Behaviour Change	6	9	The draft scope currently states that digital interventions targeting "self-care to improve medication adherence" should be excluded. We believe that digital interventions to improve medication adherence should be included in the guidance, not only because medication adherence is a key health-related behaviour, but also because digital interventions to support medication adherence constitute a large proportion of the published literature on digital behaviour change interventions. We therefore believe that the inclusion of such interventions is critical to improving our understanding of the effectiveness and	Thank you for your comment. Clinical or pharmacological methods of achieving behaviour change with no public health or health promotion element will not be included within the guidance. For example, appointment reminders, medication reviews or self-care solely to improve medicine adherence. This is because this is stepping in to the clinical realm of interventions and is not within the remit of NICE Public Health Guidance.

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			cost-effectiveness of technology-based behaviour change interventions.	
Weight Watchers UK Ltd	General	General	Weight Watchers welcome the timely development of specific guidance from NICE on technology-based intervention for behaviour change, given the exponential growth of such interventions and the need for clarity on effectiveness	Thank you for your comment and positive support.
Weight Watchers UK Ltd	General	General	To what extent are the content of technologies going to be benchmarked against existing expert guidance? For example, that physical activity recommendations are in line with Chief Medical Officer Guidance? That nutritional guidance is evidence based? A technology based intervention could be effective in utilising behaviour change techniques but include inaccurate and misleading information. This is al ready very real problem in the area of food diary technology interventions where incorrect algorithms have been used to calculate an individual's BMI and calorie intake, resulting in inaccurate calorie allowances and physical activity recommendations.	Thank you for your comment. This guideline will not focus on the effectiveness of individual digital technologies, but on the effectiveness of the behaviour change components or techniques used within such technologies. However, NICE recognises the importance of the information provided by such technologies being accurate and up to date and will align this work with the ongoing work on the digital evidence framework, currently in development by NICE, PHE and NHS England, once it is published.
Weight Watchers UK Ltd	General	General	*In response to question: It is NICE's intention to include only behaviour change interventions in which any active feedback is delivered by the technology-based intervention itself, and to exclude any interventions in which the involvement of a practitioner goes beyond the initial stage of induction or orientation. Is this a sensible approach or are there other interventions that we should be aware of?* Whilst it makes sense to focus on this defined area, it is useful to note that some health technologies offer a combination of technology based interventions and those that have involvement of a practioner; what a participant decides to engage with is what drives the use of the options of tools and interactions. This may make the distinction when reviewing the	Thank you for your comment. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.

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			evidence base a challenge. It seems sensible that remote practioner / healthcare professional behaviour change interventions that use technology to host / enable interactions have other related NICE guidance to inform practice and service development and thus do not need to be included in this guidance.	
Weight Watchers UK Ltd	5	16-17	It is advised that more clarity is needed in terms of intervention, as the use of text messages for example can be via remote interaction with a practioner / healthcare professional, or automated via algorithms. Suggest; '..are delivered without direct or ongoing interaction with, or intervention by, a practioner or health care professional for example remote contact via messaging services, social media, text messages, telephone calls etc. This guidance does includes those interventions delivered via automated communication channels such as automated text messages, emails, in app tools, wearable devices, photo recognition or the internet'	Thank you for your comment. We will consider digital behaviour change techniques or components that may involve some direct or ongoing interaction with a practitioner or health care professional. This is because a healthcare practitioner or professional may refer people to these interventions, or they may provide some form of induction or orientation in their use as well as some ongoing support. However it should be the technology itself that is responsible for delivering the action or process of intervening or behaviour change techniques as opposed to the health care practitioner or professional. This information has now been updated in section 3.3 'Key areas that will be covered', in light of your suggestion. During the evidence reviews and protocols we will consider other interventions as comparators. For example digital and m-health behaviour change interventions may be compared with usual care or other active interventions, such as behaviour change technologies supplemented by healthcare practitioner input or behaviour change interventions solely delivered by a health care professional. We have also added an additional question on the impact of the level of health practitioner or professional input within digital interventions. Please see question 6 within section 3.5 'Key issues and draft questions'.
Weight Watchers UK	5	20 - 25	The list of lifestyle behaviours is comprehensive and relevant. However, we would suggest that some of the language could	Thank you for your comment. The list of behaviours has now been amended in light of stakeholder comments and is now as

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Ltd			be more neutral and orientated towards change, particularly the use of 'poor' to describe eating patterns and weight loss, which is a quite subjective rather than descriptive term. An alternative could be: - Stop smoking - Achieve a healthier level of alcohol consumption - Achieve healthier eating patterns - Increase physical activity - Etc Rather than poor weight management would it be more useful to explicitly state weight loss? Please also see point below.	follows: - tobacco dependence - hazardous or binge drinking - unhealthy eating patterns - a lack of physical activity or sedentary behaviour - unsafe sexual behaviour As poor weight management is not a behaviour but a physiological outcome of eating or physical activity behaviours, this has been removed from the list. We have now also added 'overweight or obesity' to this list of conditions that will be given specific consideration. This is to ensure we do not miss evidence which considers interventions that are targeted at this population.
Weight Watchers UK Ltd	5	22	We were not clear from the scope if regulating food patterns was to be treated as a behavioural outcome distinct from weight management? It would seem unusual if so. Dietary behaviours that might be usefully monitored outside of weight management might relate to improved dietary quality such as eating five a day, for which technology is available.	Thank you for your comment. We agree that poor weight management is not a behaviour but a physiological outcome of eating or physical activity behaviours. We have now removed this from the list of behaviours and specified 'unhealthy eating patterns' and 'a lack of physical activity or sedentary behaviour' within the list of key areas that will be covered. We have now also added 'overweight or obesity' to this list of conditions that will be given specific consideration. This is to ensure we do not miss evidence which considers interventions that are targeted at this population.
Weight Watchers UK Ltd	5	25	As 'poor weight management'/weight loss is not a behaviour but a physiological outcome of a complex cluster of behaviours including food regulation, improved dietary quality, portion control, physical activity, positive mindset etc. we would suggest that weight loss or achievement of a healthier body weight is more clearly specified.	Thank you for your comment. We agree that poor weight management is not a behaviour but a physiological outcome of eating or physical activity behaviours. We have now removed this from the list of behaviours and specified 'unhealthy eating patterns' and 'a lack of physical

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				activity or sedentary behaviour' within the list of key areas that will be covered. We have now also added 'overweight or obesity' to this list of conditions that will be given specific consideration. This is to ensure we do not miss evidence which considers interventions that are targeted at this population.
Weight Watchers UK Ltd	6	1-3	Weight Watchers welcome the recognition and inclusion of the need for holistic strategies that improve wellbeing as part of interventions. Other examples here may include positive thinking styles and practicing gratitude.	Thank you for your comment.
Weight Watchers UK Ltd	6	4	As a comment, we assume that the inclusion of interventions that aim to change multiple behaviours concurrently is to examine if these are advisable? Current evidence and clinical practice discourage attempting to change multiple behaviours, e.g. in the National Centre for Smoking Cessation training it is made clear that health professionals should discourage clients from trying to lose weight whilst making a quit attempt.	Thank you your comment. During the evidence reviews we will include and assess the effectiveness of interventions that aim to change multiple behaviours.
Weight Watchers UK Ltd	6	22-24	Please can there be some clarification around point 7, that the scope will not include maintenance of healthy behaviours? Is this when it is entirely separate to initial behaviour change listed in page 5, lines 20 -25? Weight maintenance and other maintenance behaviours are crucial in sustained behaviour change and technologies that do not have this built in are unlikely to achieve any sustainable results.	Thank you for your comment the guideline will only focus on technologies to help manage established lifestyle behaviours. Information is given within point 7 in the section titled 'areas that will not be covered' which highlights that interventions that aim to prevent the uptake of behaviours will not be included within the scope of this guidance. However the guidance will cover primary versus secondary prevention of conditions. For example we will include evidence where someone has a risk behaviour but does not have an associated condition. We will also include evidence where someone has a risk behaviour and does have a condition that would benefit from changing the risk behaviour. However this will not include clinical interventions, but only interventions for which managing established lifestyle behaviours may benefit

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				health outcomes for those with a condition).

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