National Institute for Health and Care Excellence

Draft for consultation

Behaviour change: digital and mobile health interventions

Evidence review for sexual health behaviour Evidence review underpinning recommendations 1.1 to 1.3 and 1.7 and the research recommendations in the guideline

NICE guideline <number>

Evidence reviews

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Draft for Consultation

These evidence reviews were developed by Public Health Guidelines

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ISBN:

Contents

Review question

What components and characteristics of digital and mobile health interventions are effective at changing sexual health behaviour?

Introduction

This review will cover digital and mobile health interventions for the individual. It will address established unhealthy behaviour relating to sexual health.

PICO table

PICO Element	Details
Population	**Included:** Everyone, including young people under 16 (and their families or carers), who would benefit from changing current unsafe sexual behaviours. Specific consideration will be given to people with the following conditions, who may benefit from managing sexual behaviour because it affects their mental wellbeing: • mental health conditions (including anxiety, depression and dementia) Specific consideration will also be given to people with learning disabilities and people with neurodevelopmental disorders such as autism. **Excluded:** Those (including young people under 16) who currently exhibit safe sexual behaviours. Those who have previously exhibited unsafe sexual behaviour but no longer do so and those who want to maintain safe sexual behaviours.
Intervention	**Included:** Digital and mobile health behaviour change interventions that focus on changing current harmful sexual behaviours. That is interventions that are delivered via a digital or mobile platform as a direct interface with participants. Examples include: • Text message-based services (including picture messages and audio messages) • Those delivered by the internet (such as by apps, email, websites, videos, social networking sites and multi-media) • Interactive voice response interventions Digital or mobile health interventions are typically automated, interactive and personalised although they may involve some direct or ongoing interaction with a practitioner or health care professional. However it should be the digital or mobile health technology itself that delivers the primary action, process of intervening or behaviour change techniques (as opposed to the healthcare practitioner or professional).The interventions may also focus on digital and mobile health strategies to improve mental wellbeing when managing sexual

PICO Element	Details
	behaviour (for example, managing stress, improving sleep and sleep hygiene, and reducing social isolation). **Excluded**: Interventions delivered solely by a healthcare professional or practitioner (for example counselling delivered over the telephone, video-links or by real-time live instant messaging), where the delivery of the primary action or process of intervening or behaviour change techniques is provided by the healthcare professional or practitioner Digital and mobile health interventions that aim to prevent the uptake of unsafe sexual behaviours (primary prevention) and/or to help maintain safe sexual behaviours. Clinical interventions to help with the diagnosis, treatment or management of a chronic physical or long-term mental health condition. Clinical or pharmacological methods of achieving behaviour change with no public health or health promotion element. For example, appointment reminders, medication reviews or self-care solely to improve medicine adherence. National policy, fiscal and legislative measures/ Changes to the public realm to support behaviour change (such as condom distribution schemes).
Comparator	Other intervention for example a healthcare professional led intervention without a digital element or a combination of health professional and digital led interventions. Passive control group (usual care, no intervention) If longitudinal cohort and 'before-and-after' intervention studies need to be included (see 'study design'), then before and after (time) will be a comparator. Trials with more than one comparator will be included if at least one of the experimental arms meets the technology-based intervention inclusion criteria (see above).
Outcomes	<u>Primary outcomes</u> Descriptive outcomes: Intervention components and study characteristics Short term and long term changes in sexual behaviours measured as: • Contraceptive use at last sex • Condom use (at last sex, frequency, consistency) Short or long term sexual health outcomes for example: • prevalence or incidence of STI's/HIV/BBV's • unintended pregnancy; teenage pregnancy or repeat pregnancy Extent of engagement (measured as self-report or automatically recorded usage data): • programme adherence/attrition, number of log-ins/visits, number of pages visited, number of sessions completed, time spent on the device, number of device components/features used).

PICO Element	Details
	• Self-reported interaction with the digital or m-health behaviour change intervention through quantitative approaches (i.e. self-report questionnaires) Secondary outcomes These will be extracted only if the study also reports a primary outcome. • Health-related quality of life • Resources use and costs • Safety or adverse effects, including unintended consequences. Cost/resource use associated with the intervention The following outcomes will be extracted in reviews of the health economic evidence, where available: • cost per quality-adjusted life year • cost per unit of effect • net benefit • net present value • cost/resource impact or use associated with the intervention or its components **Excluded:** Any study which does not include a primary outcome.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in Appendix A. Information on the synthesis and quality assessment of included studies is discussed on page 21.

Declarations of interest were recorded according to NICE's 2018 conflicts of interest policy.

Condom use was defined in different ways (consistent condom use, frequency and condom use at last intercourse). Dichotomous outcomes were defined as: consistent condom use (100% condom use vs <100%), condom use at last intercourse (yes vs no). When a study defined the outcome in ordinal scale as frequency (e.g always, usually, sometimes/almost never, never), the response categories were collapsed into two (e.g always vs not always condom use) to develop a composite measure and re-express the outcome as consistent condom use, which could be pooled in the meta-analysis.

For dichotomous outcomes, risk ratio (RR) was used as the effect measure for pooling the results. When results presented as odds ratios (OR), then OR was converted to RR. When raw data were available, the 2x2 table was created by the analyst and the RR was calculated.

Condom use was analysed as a continuous outcome (mean value and SD was provided for individual studies) using the mean difference as the effect estimate when a single study was included in the meta-analysis using a single scale to measure the outcome. When the studies assessed the same outcome but measure it in a variety of ways (using different measurement scales), in this circumstance, the results of the studies were standardized and therefore a standardized mean difference was used as a summary statistic for the meta-analysis.

For the second outcome of interest, STI incidence, when raw data were available, the analyst created the 2x2 table and a risk ratio was used for the analysis.

Public health evidence

Included studies

10424 references were identified from literature searches (between 2000 and 2019) outlined in Appendix E. 193 papers were ordered in full text. In total 15 primary studies met the inclusion criteria outlined below. 178 studies were excluded. See Appendix C for Public health evidence study selection.

Excluded studies

See appendix L for full list of excluded studies with reasons for exclusion.

1 Summary of studies included in the evidence review

Study	Population	Intervention	Comparator	Outcome used (relevant to protocol)	Risk of bias and follow-up
Internet-based interventions (n=12)					
Bannink et al 2014 (The Netherlands) **Cluster RCT**	Adolescents, third- and fourth-year secondary school students Recruited from schools N=1702	Computer based intervention (individually tailored feedback on a questionnaire that featured many health areas, including sexual health)	Same questionnaire without questions on negative sexual experience and suicide [other intervention]	Condom use[b]	High risk Follow-up, 4 months
Bailey et al 2016 (UK) **RCT**	Male ≥ 16 years **recruited from 3 UK sexual health clinics** N=159	Computer based intervention (individually tailored feedback website that addressed their barriers to condom use) plus usual care	Usual care [other intervention]	Condom use [d] STI incidence* Engagement	High risk Follow- up, 3months
Bowen et al 2008 (USA) **Before and after study**	≥18 years old men having sex with men **recruited through banner ads** N=425	Post-test included 3 computer-based modules on knowledge, partners and context that included scripted discussions in 6 sessions that provided tailored feedback.	pre-test questionnaire	Condom use/, proportion of times used a condom	High risk Follow- up, 1 week
Carpenter et al 2010 (USA) **RCT**	Men who have sex with men aged 18–39 years Recruited through banner advertisements N=199	Computer based intervention (risk assessment and individually tailored feedback, motivational, skills and educational exercises, and a HIV knowledge test)	Stress reduction training programme [other intervention]	Unprotected sex[a]	High risk Follow up, 3 months
Cheng 2019 **China**	Men who have sex with men aged ≥18 years	Computer based intervention (scripted scenarios with choice points and interactive	HIV referral service [other intervention]	Condomless anal sex	Some concerns Follow up, 3 months

RCT	Recruited through banner advertisements N=199	dialogue, and HIV information)			
Grimley et al 2009 (UK) **RCT**	Adults (aged 18 to 44) recruited from a clinic waiting area N=430	Computer tailored intervention (individually tailored feedback counselling website; graphics, photographs, audio editing packages and multimedia delivered messages, topics or intervention strategies)	Multiple health risk assessment [no intervention]	Condom use (consistency)[b] STI incidence*	High risk Follow up, 6 months
Kiene et al 2006 (USA) **RCT**	Undergraduates recruited from the University of Connecticut Psychology Department N=157	Computer tailored intervention (quizzes with personalised feedback, activities, goal setting exercises to generate self-motivating strategies)	Nutrition education intervention [other intervention]	Condom use	Some concerns Follow up, 1 month
Klein 2017 (USA) **RCT**	Female (18-34-year-old) Recruited from health clinics N=321	Computer based intervention (audio narration, visual presentation, interactivity, games and telenovela style videos)	Clinic standard care+ information brochures [other intervention]	Condom use[b] STI prevalence	Some concerns Follow up, 6 months
Mevissen et al 2011 (The Netherlands) **RCT**	Adults recruited from universities/ colleges (18-25 years old) **recruited from Universities/colleges** N=218	Computer based intervention (interactive question-and-answer format; virtual consultant delivered safe sex advice and optional risk information)	Non tailored intervention Control group [did not receive any intervention]	Condom use (consistency at follow up)	High risk Follow up, 3 months
Milam et al 2016 (USA) **RCT**	HIV-infected men who have sex with men (age <18 years)	Computer based intervention (tailored website providing risk-appropriate messages that used social influences	Only monthly brief computer assessed behaviour survey [no intervention]	STI incidence*	High risk Follow up, 12 months

	recruited from clinics N=181	and promoted moments of positive behaviour the participant mentioned) plus the monthly survey			
Downs et al 2004 (USA) **RCT**	Female aged 14-18 recruited from four Pittsburgh area healthcare sites N=300	Interactive video-based intervention with choice points that lead toward or away from unsafe sex. 30s pause allows user to perform cognitive rehearsal, imagining what they'd say/do	Content matched control: page book [other intervention] Topic- matched control: commercially and research brochures [other intervention]	Condom use frequency[c] STI diagnosis (incidence)*	High risk Follow up, 3 months
Gilbert et al 2008 (USA) **RCT**	Adults (≥18 years old & HIV positive) recruited via clinic advertisements N=476	Interactive video doctor intervention (messages delivered to reduce risky sex and drug behaviours; interactive discussion and counselling; feedback on changes since baseline)	Usual care [other intervention]	Unprotected sex	Some concerns Follow up, 6 months
Text message-based interventions (n=3)					
Chernick et al 2017(USA) **RCT**	Females aged 14-19 in the Emergency Department **Recruited from the emergency department** N=100	Text message-based intervention (information on family planning clinics)	Standard referral (SR) arm [no intervention]	Condom use[b] (last intercourse) Pregnancy Engagement	High risk Follow up, 3 months
McCarthy et al 2019 (Palestine) **RCT**	Females aged 18-24 Recruited from PFPPA's service delivery points and outreach sites	Text message- based intervention (goal setting, belief selection, anticipated regret, guided practice, verbal persuasion, tailoring and cultural similarity)	Messages about trial participation [no intervention]	Effective contraception use Unintended pregnancy	High risk Follow up, 4 months

	N=578				
Suffoletto et al 2013 (UK) **RCT**	Adult females in the Emergency Department **Discharged From the Emergency Department** N=52	Text message-based intervention to set goals and increase motivation to change unhealth sex behaviour	Welcome text messages [no intervention]	Condom use[b] (last sex) Engagement	High risk Follow up, 3 months

***** Raw data from primary studies were used and 2*2 tables were created, and a relative risk was calculated by the analysist

[a] unprotected sex was converted to protected sex for the purpose of the analysis

[b] Raw data from the primary studies were used for the condom use. 2*2 tables were created, and the relative risk was calculated by the analyst

[c] only f value available from this study; therefore, could not be included in the meta-analysis

[d] Study presented as median and interquartile range (with no raw data available); therefore, condom use was not included in the meta-analysis

Synthesis and quality assessment of effectiveness evidence included in the evidence review

Studies included in this review included RCTs and controlled before and after studies. Studies with a control group were assessed for risk of bias using the Cochrane's Risk of Bias 2.0 tool as referenced in Appendix H of the NICE methods manual. Meta-analysis was undertaken in Cochrane Review Manager (version 5.3).

With regards to imprecision, minimally important difference (MID) thresholds were used. Specifically, for dichotomous outcomes the default MID value of (0.8-1.25) was used. Uncertainty is present where confidence intervals cross the MID threshold. If the confidence interval crosses one lower MID threshold, this indicates 'serious' risk of imprecision. Crossing both MID thresholds indicates 'very serious' risk of imprecision in the effect estimate. When neither of the confidence intervals crossed the MID and the point estimate is also beyond the MID a minimally important difference is present. Overall, the change in the outcome is not meaningful when the CIs cross the MID. If the MID could not be calculated (e.g. because standard deviation of outcome measure at baseline was not reported in the paper) then we downgraded by 1 level as it was 'not possible to calculate imprecision from the information reported in the study.

GRADE evidence profiles were developed for pooled and non-pooled data. The studies reported multiple ways of measuring the same outcome. Therefore, to make the evidence clear, evidence statements were created to accompany the evidence profiles.

See appendix H for full GRADE tables.

Economic evidence

Included studies

A unified search for economic evidence was conducted across all review questions in the guideline. A total of 5,267 records were assessed against the eligibility criteria. 5,107 records were excluded based on information in the title and abstract. The full-text versions of 160 papers were retrieved and assessed and 1 study was assessed as meeting the inclusion criteria for this review question on unsafe sexual behaviour.

A re-run search was carried out in August 2019 to identify any additional economic evidence that was published during guideline development. 1,040 records were excluded based on information in the title and abstract. The full-text versions of 20 papers were retrieved and assessed and none were found to meet the inclusion criteria for this review question.

Excluded studies

179 full text documents were excluded for this question. The studies and the reasons for their exclusion are listed in appendix L. Studies were excluded for the following reasons: ineligible population (n=64), ineligible intervention (n=53), ineligible outcomes (n=29), ineligible study design (n=21) and systematic review (n=12). The selection process is shown in appendix D.

Summary of studies included in the economic evidence review

Study	Intervention and comparator key features	Costs	Effects	Incremental cost effectiveness and uncertainty	Quality assessment
Bailey, 2016 (UK) **Currency & cost year:** £; 2014 **Cost-effectiveness and cost-utility analysis** **Population:** Heterosexual sexually active men aged ≥ 16 years with female sexual partners and had recent condom-less sex or a suspected acute sexually transmitted infection (STI)	**INTERVENTION:** Men's Safer Sex website plus usual sexual health clinical care. The website provided individually tailored advice over a period of 1 year on barriers to condom use, especially on the impact of condoms on sexual pleasure. **COMPARATOR:** Usual sexual health clinical care only (no website)	**Total costs:** For the self-completed questionnaire total costs were not reported. However, the incremental cost for the intervention was reported as -£24 (95% CI -£145 to £97) For the resource use from clinical records a mean (SD) cost per patient was reported: Website: £189 (£159) No website: £214 (£264)	**Intermediate outcome of condomless sex:** Incidence rate ratio (IRR): 1.01 (95% CI: 0.52 to 1.96) **Clinical diagnosis of STIs over 1 year:** Control: 9/69 (13%) Intervention: 7/80 (8.8%) IRR: 0.75 (95% CI: 0.29 to 1.89) **QALYs:** Mean QALYs using EQ-5D-3L (SD) Intervention: 0.902 (0.112) Control: 0.904 (0.113) Mean QALYs using the sexual quality of life (SQoL) questionnaire (SD) Intervention: 0.936 (0.034)	**Full incremental analysis** Five separate incremental cost-effectiveness analyses were generated: 1. EQ-5D-3L for utility and self-completed resource use questionnaire 2. SQoL-3D for utility and self-completed resource use questionnaire 3. Disutility of a STI and resource use from medical records 4. Cost per STI prevented using self-completed resource use questionnaire 5. Cost per STI prevented using resource use from medical records. In analysis 1, 2 and 4 the intervention was dominant (i.e. improves health outcomes and reduces cost) Analysis 3 returned a cost-effectiveness result of £3,000 per QALY Analysis 5 returned an incremental cost per avoided STI of £291. **Analysis of uncertainty** Bootstrapping was used to generate cost-effectiveness acceptability curves. The impact of pregnancies in female sexual	**Overall applicability:** Directly applicable **Overall quality:** Potentially serious limitations

Study	Intervention and comparator key features	Costs	Effects	Incremental cost effectiveness and uncertainty	Quality assessment
			Control: 0.940 (0.032)	partners was included as a sensitivity analysis only. Probability intervention is cost effective at a threshold of £20,000/QALY: Analysis 1: 88% (same with or without pregnancies) Analysis 2: 68% (same with or without pregnancies) Analysis 3: 61% (69% if pregnancies included) The study also explored the impact of including the cost of developing the website on the results. Assuming the website cost £101,515 to develop and a trial population of 84 participants, this increased costs by £1,209 per participant and resulted in an ICER for analysis 1 of £39,466/QALY.	

Abbreviations: CI: confidence interval; IRR: incidence rate ratio; QALY: quality-adjusted life year; QoL: quality of life; SD: standard deviation; STI: sexually transmitted infection

Economic model

No original economic modelling was undertaken for this question.

Summary of the evidence

Evidence statements

Condom use;

Internet based interventions;

- Consistent condom use; very low-quality evidence from 1 RCT (Grimley 2009) with 6 months follow up, found a significant increase compared to no intervention.

- Condom use at last intercourse; low quality evidence from 1 RCT (Klein 2017), with 6 months follow up showed no difference compared to another intervention.

- Consistency of condom use; very low-quality evidence from 2 RCTs (Bannick 2014, Gilbert 2008) with a 4-6 months follow up found increased consistency of condom use compared to other interventions.

- Always condom use; low quality evidence from 1 RCT using a tailored intervention (Mevissen 2011) with a 3 month follow up, found an increase compared to no intervention.

- Consistency of condom use; low quality evidence from 2 RCTs (Mevissen 2011, Kiene 2006) with 1-3 months follow up found increased consistency of condom use compared to other interventions.

- Unprotected sex in those with positive or any serostatus; low quality evidence from 1 RCT (Carpenter 2010) with 3 months follow up found no difference compared to another intervention.

- Frequency of condom use; low quality evidence from 1 RCT (Downs 2004) with 3 months follow up found no difference compared to no intervention.

- Condom use, before and after intervention; very low-quality evidence (Bowen 2008) from 1 before and after study showed that condoms were used more often after the intervention.

Text message interventions;

- Condom use at last intercourse; very low-quality evidence from 2 RCTs (Chernick 2017, Suffoletto 2013) with 3 months follow up showed no difference in compared to no intervention.

STI

Internet based interventions;

- Low quality evidence from 2 RCTs (Bailey 2016, Downs 2004) with 6-12 month follow up 6-12 months, found a decreased risk for STI compared to other intervention.

- Very low-quality evidence from 2 RCTs (Grimley 2009, Milam 2016) with 6-12 month follow up 6-12 months, showed no difference in STI risk compared to no intervention.

Pregnancy

Text message interventions;

- Very low quality evidence from 2 RCT (Chernick 2017, McCarthy 2019) with 3 and 4-month follow up showed no difference in the risk of unwanted pregnancy using text message based interventions compared to no intervention.

Engagement

Level of user engagement was reported only in 3 studies (Bailey 2016, Chernick 2017, Suffoletto 2013) in a non-consistent way and no further conclusion could be made

Interactive voice response interventions

- No evidence was identified for this type of intervention

No evidence was identified on digital and mobile health behaviour change interventions for the following subgroups:

- People with mental health conditions (including anxiety, depression and dementia)
- People with learning disabilities and people with neurodevelopmental disorders

Economic evidence statements

One study assessed the feasibility and best design of a large-scale RCT and health economic evaluation of the Men's Safer Sex website in addition to usual care versus usual care. The analysis reported no statistically significant difference between the reported outcomes of STIs and QALYs. However, the analysis reported a dominant finding for the intervention in the base case. Because of the statistically insignificant findings for outcomes and overlap for costs the sensitivity analysis should report a range from dominated to dominant meaning it is difficult to present a meaningful finding from this analysis. The analysis was directly applicable to the review question with potentially serious limitations.

Recommendations

Please refer to the separate guideline document for recommendations.

Rationale and impact

Please refer to the separate guideline document for the rationale and impact.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The primary outcomes of interest were behaviour outcomes such as condom use, health outcomes such as STI (sexually transmitted infections), HIV (human immunodeficiency virus) and BBVs (blood borne viruses), and extent of engagement with the intervention. Condom use was defined in a variety of ways: condom use at last sex, frequency of condom use, and consistency of condom use. Within the studies condom use was reported in a variety of ways. When condom use was assessed in ordinal scales, response categories were collapsed into two, in order to develop a composite measure which could be included in the meta-analysis. STI was defined as incidence rate ratio or incidence rate and pregnancy outcomes were also outcomes of interest within this review. For consistency, STI incidence was re-expressed to STI risk. The committee discussed these outcomes and agreed that all were important for this review. Secondary outcomes were health-related quality of life, resource use and costs, and safety or adverse effects (including possible unintended consequences).

Committee discussed that engagement is an important indicator to build knowledge around the utility of the interventions. However, committee noted that the information on the level of engagement was insufficient as it was reported in only a small number of studies and reported in a non-consistent way.

The quality of the evidence

The quality of the evidence ranged from low to very low using GRADE. The overall low quality of the evidence was discussed by the committee and they agreed that this would make it difficult to make strong recommendations. Outcomes were downgraded mainly due to high risk of bias; due to attrition rates and self-reporting of the outcomes measurement. As agreed with the committee, further subgroup analyses according to mode of delivery (internet vs text message interventions) and condom use measurements (consistent condom use vs condom use at last intercourse) were also performed.

The committee was mindful of the various reporting of the outcomes, the low number of studies reported STI results, the complexity of the data and the fact that this is a rapidly growing field with new evidence. The committee taking all the above considerations into account discussed that there is some evidence and the need to reflect this in the recommendations. The committee noted that that there is evidence of the effectiveness of internet-based interventions at changing sexual behaviour, even if it is not of high quality. Specifically, committee noted that internet-based interventions increased condom use; however, it was unclear if this would be sustained behaviour change as there wasn't evidence after 6 months. The committee agreed that there is some evidence that internet-based interventions reduced the risk of STI, but they were aware that this evidence arises from a limited number of studies.

The committee noted that condom use was assessed using self-reporting; and they discussed that this can possibly exaggerate positive behaviours. The committee was aware of this risk of bias however, they discussed and accepted that self-reporting outcomes in sexual health studies is unavoidable. Condom use was further divided in two categories, consistent condom use, and condom use at last intercourse. The committee agreed that interventions seemed to be more effective in studies that reported consistent condom use compared to studies reported condom use at last intercourse. The committee agreed that STIs were reported in a more rigorous way using clinical evaluation compared to condom use. The committee discussed and agreed that there was likely to have been under-reporting in the studies of the behaviour change techniques used.

The committee noted that many of the studies were focused on targeted groups (men who have sex with men, those who are HIV positive, those attending the emergency department). Consequently, the committee questioned the generalisability of the results to a wider population. The committee discussed that some of these targeted groups are those that may be more likely to attend clinics and may have greater interaction with healthcare professional and clinicians compared to others. The committee also discussed whether there may be themes in the studies with specific populations (such as men who have sex with men, people in the emergency department).

The committee noted the lack of long term data as only one study reported outcomes for 12 months follow up. Therefore, they discussed that there is an issue whether there is sustainable behaviour change with the internet-based interventions. They discussed that it would be beneficial if long-term outcomes were captured to help establish whether the behaviour change is sustained over time. The committee also noted that none of the interventions included populations that may be considered to be hard to reach. However, committee discussed that digital interventions may be an option for accessing these populations, perhaps in areas like sexual health where there may be an element of potential stigma or reluctance to engage with services. Therefore, they decided to make a research recommendation.

The committee discussed that internet-based interventions may have an additive effect when offered in people who are at risk of harmful sexual behaviour and who are already in clinics, surgeries or in the community settings. They further discussed that it may be helpful to investigate the willingness of people to engage with these interventions in public space.

The committee noted that there was an under-reporting in the behaviour change techniques in the studies and this made it difficult to make recommendations relating specifically to behaviour change techniques. Feedback and monitoring followed by goal and planning and shaping knowledge were the most common reported techniques. The committee discussed and considered with their expertise that certain components may work better in some interventions as they can possibly be drivers of the behaviours. The committee further noted that specific components such as scripted dialogues, and choice points seemed to be more effective in some digital and mobile health interventions. Two interventions using videos and scripted dialogues found to be effective at increasing condom use. Another intervention using videos and offering the participants the opportunity to make choice points and perform cognitive rehearsal found to be effective at decreasing STI risk. Therefore, the committee decided to make a recommendation on specific components. The committee discussed that planning/ scripting which seems to work for sexual health behaviour may be different from other behaviours. They further mentioned that active interventions may be more effective for sexual health in particular; whereas daily interactions (such as regular text messages) may work for smoking but may be less effective within sexual health.

The committee were also mindful that only a few studies reported level of engagement and therefore no further conclusions relating to engagement with the interventions could be made. The committee also noted that there was a high rate of attrition in the included studies, and they discussed that it will be useful to capture the point that people don't

engage. The committee discussed that digital interventions may have a role in supporting underserved population.

They discussed that for the case of the sexual health, there are some restrictions on that, as apps can't provide some content of the intervention deemed as 'sexually explicit' to people aged less than 18. The experts further explained that erotic content that includes condom use can help to improve the association between the two but cannot be shown to under 18s. The committee further discussed considering the expert testimony that potential harms are associated with the use of commercially available apps especially for vulnerable population such as people being trafficked, and young groups who are vulnerable to sexual exploitation, therefore they discussed that it is important to consider patient history and predisposition when recommending apps.

The experts also advised the committee that digital and mobile health interventions may be more likely to get engagement from groups with a vested interest in the target behaviour and where digital engagement already happening. Experts gave as specific example the digital condom promotion intervention, which may be more appealing to those accessing online/digital self-screening for STI infections.

The committee discussed that it is helpful for those considering using digital and mobile health interventions to have resources that they can access. The committee gave specific example, such as the NHS digital apps or PHE resources. Therefore, the committee decided to make a recommendation of the use of reputable sources in relation to digital and mobile health interventions. However, the committee also discussed that digital technology intervention development moves quickly. This can make it difficult for those providing any evaluation of a specific digital or mobile health intervention to be completed in a timely manner.

Benefits and harms

The committee took into consideration that digital and mobile health interventions on sexual health is an emerging field with fast growing evidence and therefore they agreed that the review was challenging, and new evidence will emerge in the future. Therefore, the committee discussed the importance of using specific sources (NHS digital, NHS X, PHE) when considering digital interventions.

The committee agreed that there is some evidence, that internet-based interventions had some effect on increasing condom use. The committee noted that there is a small amount of evidence that internet-based interventions are effective at decreasing the risk of STI, but they noted that this evidence arising from a limited number of studies (only two) with low participant numbers. The committee also noted that text message interventions were not effective at increasing condom use; however, they were mindful that this evidence also arose from only 2 studies. They mentioned that timing and intensity of text messages may also be important. Motivation to change sexual behaviour may be different than other behaviour changes. Specifically, the committee discussed that regular text messages may be more effective or appropriate if trying to reduce smoking or alcohol consumption rather than unsafe sexual behaviour. Furthermore, the committee commented that it is important the timely and relevant delivery of the text messages in order to be received when they needed.

The committee noted that single session interventions or brief interventions were what had been used in the included studies and these showed some effectiveness at changing unsafe sexual behaviour. Therefore, the committee agreed that there was evidence to recommend the use of brief interventions at changing unsafe sexual behaviour.

The committee also discussed that it will useful to compare characteristics and components across different behaviours in order to identify whether the components are the same or different across behaviours (smoking, diet and exercise, smoking, sexual health), and

investigate the most effective ones. Therefore, the committee discussed that more research would be beneficial, and they made a research recommendation.

The committee also discussed the multifactorial nature of many behaviours. That alcohol and drug use may have an influence on areas such as unsafe sexual health behaviour. They further discussed that if harmful behaviours happen in combination whether digital and mobile health interventions should consider this and be tailored or designed differently.

The committee discussed that digital and mobile health interventions should be considered alongside, and may enhance, the existing services.

The committee also noted that none of the included studies reported harms, adverse effects or any unintended consequences related to the interventions. They consider this to be a considerable omission in this evidence and consider that it is important that research should consider if there are potential harms of the use of digital and mobile health intervention and therefore, they made a research recommendation.

Cost effectiveness and resource use

The committee discussed evidence from 1 published cost-effectiveness study (Bailey 2016b) conducted in the UK that compared a website designed to provide tailored advice on barriers to condom use in a sexual health clinic waiting room compared to sexual health clinic care alone. The study was a within-trial analysis with a 12-month time horizon. The randomised controlled trial upon which the cost-effectiveness analysis was based was designed as a feasibility study and explored different approaches to collecting data on resource use to estimate costs and on health-state utilities to estimate quality-adjusted life years (QALYs). Cost-effectiveness results were reported in terms of both cost per STI prevented and cost per QALY. Under different cost per QALY scenarios, the authors reported that the intervention ranged from being dominant (more effective and less costly) to being cost effective with an incremental cost-effectiveness ratio (ICER) of £3,000 per QALY versus usual care. However, the trial was designed as a feasibility study with a limited sample size; the authors noted some technical errors and poor response to collection of self-reported cost and outcomes data and results were subject to a high degree of uncertainty. The committee agreed that it was not possible to draw any formal conclusions about the cost effectiveness of the intervention or to make any generalisations about the cost effectiveness of different components and characteristics of digital interventions aimed at changing unsafe sexual behaviour on the basis of a single study.

The committee discussed the different cost components of relevance to economic evaluations of digital interventions. It noted that in the base case, the Bailey 2016b analysis did not take into account costs associated with development of the website but estimated these separately at £101,515. Taking the number of participants in the trial (n=84) as the denominator, the cost per patient for website development would be £1,209. If website development costs were factored into the cost-effectiveness analysis, the ICER for intervention versus usual care was estimated at approximately £40,000 per QALY. The committee discussed that the development cost of the intervention per patient was highly dependent on the number of people who would use the intervention and the expected uptake outside the context of a clinical trial but nonetheless agreed these costs can have a large impact on the cost effectiveness of digital interventions. The committee felt that in order to minimise these costs, it would be advisable for commissioners and practitioners to consider existing evidence-based digital interventions before commissioning development of a new digital intervention. If a decision has been made to commission a new digital intervention, the committee felt that it is important to consider regional-level collaboration or partnerships across the health and care system in order to maximise the reach and uptake of the intervention and to achieve economies of scale.

Overall discussion of the evidence across all review questions

Please refer to the separate guideline document (evidence review 1 – smoking behaviour) for the committee discussion of the evidence across all review questions.

References

Effectiveness studies

Bailey, Julia V., Webster, Rosie, Griffin, Mark et al. (2016) The Men's Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men. Digital health 2: 2055207616679002

Bannink, Rienke, Broeren, Suzanne, Joosten-van Zwanenburg, Evelien et al. (2014) Effectiveness of a Web-based tailored intervention (E-health4Uth) and consultation to promote adolescents' health: randomized controlled trial. Journal of medical Internet research16(5): e143

Bowen, A. M., Williams, M. L, Daniel, C. M. et al. (2008) Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of behavioral medicine 31(6): 463-77

Carpenter, Kelly M., Stoner, Susan A., Mikko, Aneke N. et al. (2010) Efficacy of a web-based intervention to reduce sexual risk in men who have sex with men. AIDS and behavior 14(3):549-57

Cheng, Weibin, Xu, Huifang, Tang, Weiming et al. (2019) Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases 19(1): 644

Chernick, L. S., Stockwell, M. S., Wu, M. et al. (2017) Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department. Journal of Adolescent Health 61(6):786-790

Downs, J. S., Murray, P. J., Bruine De Bruin, W. et al. (2004) Interactive video behavioral intervention to reduce adolescent females' STD risk: A randomized controlled trial. Social Science and Medicine 59(8): 1561-1572

Gilbert, Paul, Ciccarone, Daniel,Gansky, Stuart A. et al. (2008) Interactive "Video Doctor" counseling reduces drug and sexual risk behaviors among HIV-positive patients in diverse outpatient settings. PloS one 3(4): e1988

Grimley, D. M. and Hook, E. W. (2009) A 15-Minute interactive, computerized condom use intervention with biological endpoints. Sexually Transmitted Diseases 36(2): 73-78

Kiene, S. M. and Barta, W. D. (2006) A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior. Journal of Adolescent Health 39(3): 404-410

Klein, Charles H., Kuhn, Tamara, Altamirano, Midori et al. (2017) C-SAFE: A computer-delivered sexual health promotion program for Latinas. Health Promotion Practice 18(4): 516-525

McCarthy, O. L., Zghayyer, H., Stavridis, A. et al. (2019) A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine. Trials 20(1): 228

Mevissen, Fraukje E. F., Ruiter, Robert A. C., Meertens, Ree M. et al. (2011) Justify your love: testing an online STI-risk communication intervention designed to promote condom use and STI-testing. Psychology & health 26(2): 205-21

Milam, J., Morris, S., Jain, S. et al. (2016) Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and behavior 20(6): 1173-1181

Suffoletto, Brian, Akers, Aletha, McGinnis, Kathleen A. et al. (2013) A sex risk reduction text-message program for young adult females discharged from the emergency department. The Journal of adolescent health: official publication of the Society for Adolescent Medicine 53(3): 387-93

Economic studies

Bailey JV, Webster R, Hunter R, Griffin M, Freemantle N, Rait G, et al. The men's safer sex project: intervention development and feasibility randomized controlled trial of an interactive digital intervention to increase condom use in men. Health Technol Assess. 2016;20(91):1-152.

1 Appendices

Appendix A – Review protocols

Review protocol for sexual health

Field (based on PRISMA-P	Content
Review question	What components and characteristics of digital and mobile health interventions are effective at changing unsafe sexual behaviour?
Type of review question	Effectiveness
Objective of the review	This review aims to describe individual-level digital and mobile health interventions for changing behaviour in the target area of sexual health and identify the critical components and intervention characteristics shown to be effective. Intervention components may include: Specific behaviour change techniques used Mode of delivery (digital platform type) Intervention intensity and duration of provision (e.g. number of sessions or messages, total digital contact time or duration of active digital support). Recommendation or professional endorsement of an intervention Other intervention characteristics may include:

	Particular groups of interest (see 'population') Extent of targeting to a group or tailoring/personalisation to an individual Sociodemographic factors of the target audience (such as age, gender, socioeconomic group, and ethnicity and digital literacy) Level of healthcare professional/practitioner induction or interaction Level of user engagement
Eligibility criteria – population/disease/condition/issue/domain	**Included**: Everyone, including young people under 16 (and their families or carers), who would benefit from changing current unsafe sexual behaviours. Specific consideration will be given to people with the following conditions, who may benefit from managing sexual behaviour because it affects their mental wellbeing: mental health conditions (including anxiety, depression and dementia) Specific consideration will also be given to people with learning disabilities and people with neurodevelopmental disorders such as autism. **Excluded**: Those (including young people under 16) who currently exhibit safe sexual behaviours.

	Those who have previously exhibited unsafe sexual behaviour but no longer do so and those who want to maintain safe sexual behaviours.
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	Digital and mobile health behaviour change interventions that focus on changing current smoking behaviours. That is interventions that are delivered via a digital or mobile platform as a direct interface with participants. Examples include: Text message-based services (including picture messages and audio messages) Those delivered by the internet (such as by apps, email, websites, videos, social networking sites and multi-media) Interactive voice response interventions Digital or mobile health interventions are typically automated, interactive and personalised although they may involve some direct or ongoing interaction with a practitioner or health care professional. However, it should be the digital or mobile health technology itself that delivers the primary action, process of intervening or behaviour change techniques (as opposed to the healthcare practitioner or professional). The interventions may also focus on digital and mobile health strategies to improve mental wellbeing when managing sexual behaviour (for example, managing stress, improving sleep and sleep hygiene, and reducing social isolation). Studies must primarily focus on changing behaviours in regard to sexual health. If multiple behaviours are targeted within the technology results on these must be reported separately in order for extraction and analysis to be carried out. If the intervention focuses on changing multiple behaviours then results on alcohol consumption must be reported separately for

	extraction and analysis to be carried out. If the intervention reports on separate behaviours it may be included in multiple reviews with the relevant outcomes extracted according to the protocol, and could be further considered in a multi-behaviour meta-regression if data requirements are met for such an approach. **Excluded**: Interventions delivered solely by a healthcare professional or practitioner (for example counselling delivered over the telephone, video-links or by real-time live instant messaging), where the delivery of the primary action or process of intervening or behaviour change techniques is provided by the healthcare professional or practitioner. Digital and mobile health interventions that aim to prevent the uptake of unsafe sexual behaviours (primary prevention) and/or to help maintain safe sexual behaviours. Clinical interventions to help with the diagnosis, treatment or management of a chronic physical or long-term mental health condition. Clinical or pharmacological methods of achieving behaviour change with no public health or health promotion element. For example, appointment reminders, medication reviews or self-care solely to improve medicine adherence.

	National policy, fiscal and legislative measures Changes to the public realm to support behaviour change (such as condom distribution schemes). **Settings:** Any setting where people may be referred to, self-refer to, or access technology-based behaviour change interventions, including online or other digital access platforms. All countries to be included.
Eligibility criteria – comparator(s)/control or reference (gold) standard	**Included**: Other intervention for example a healthcare professional led intervention or a combination of health professional and digital led interventions. Passive control group (usual care, no intervention) If longitudinal cohort and 'before-and-after' intervention studies need to be included (see 'study design'), then before and after (time) will be a comparator. Trials with more than one comparator will be included if at least one of the experimental arms meets the technology-based intervention inclusion criteria (see above).

Outcomes and prioritisation	<u>Primary outcomes</u> Descriptive outcomes: Intervention components Short term and long term changes in sexual behaviours measured as: Contraceptive use at last sex Condom use (at last sex, frequency, consistency) Short or long term sexual health outcomes for example: prevalence or incidence of STI's/HIV/BBV's unintended pregnancy; teenage pregnancy or repeat pregnancy Extent of engagement (measured as self report or automatically recorded usage data): program adherence/attrition, number of log-ins/visits, number of pages visited, number of sessions completed, time spent on the device, number of device components/features used). Self-reported interaction with the digital or m-health behaviour change intervention (i.e. self-report questionnaires)

	Secondary outcomes These will be extracted only if the study also reports a primary outcome. Health-related quality of life Resources use and costs Safety or adverse effects, including unintended consequences. **Cost/resource use associated with the intervention** The following outcomes will be extracted in reviews of the health economic evidence, where available: cost per quality-adjusted life year cost per unit of effect net benefit net present value cost/resource impact or use associated with the intervention or its components **Excluded**:

	Any study which does not include a primary outcome.
Eligibility criteria – study design	**Included study designs**: Effectiveness studies: Systematic reviews of effectiveness studies Studies of effectiveness including: RCTs (including cluster RCTs) non-randomised controlled trials such as before and after studies interrupted time series Economic studies: Cost-utility (cost per QALY) Cost benefit (i.e. net benefit) Cost-effectiveness (Cost per unit of effect) Cost minimization Cost-consequence **Excluded study designs**:

	Cross-sectional studies
Other inclusion exclusion criteria	Systematic reviews (SRs) identified from database searches may be included as a primary source of data. Quality of identified SRs will be assessed against the inclusion criteria for this protocol. Where partially or fully applicable, the quality of the SR will be assessed using the ROBIS tool. Where the SR is: Fully applicable and moderate or high quality: details or data from systematic review will be used. Partially applicable and moderate or high quality: details or data from systematic review will be used. Any sections of the protocol not covered by the SR will be covered by usual searches. In addition to any SRs meeting the above criteria, other primary studies will be included if they were published after the publication date of the SR and meet the protocol inclusion criteria. Where SRs identified from database searches do not meet the above criteria, the included studies will be sifted to identify any primary studies not already identified by the searches that meet the inclusion criteria for this review. Full economic analyses and costing studies identified from searches will be included. Costing data will not be used for the purpose of the effectiveness review. Health economics reviews and modelling will be conducted by the York Health Economics Consortium (YHEC). Only papers published in the English language will be included. Only studies published since the year 2000 will be included. Only full published studies (not protocols or summaries) will be included.

Proposed sensitivity/sub-group analysis, or meta-regression	Where sufficient data are available, subgroup analysis or meta-regression will be used to identify the critical components or characteristics of interventions shown to be effective. Intervention components may include: Specific behaviour change techniques used Mode of delivery (digital platform type) Intervention intensity and duration of provision (e.g. number of sessions or messages, total digital contact time or duration of active digital support). Recommendation or professional endorsement of an intervention Other intervention characteristics may include: Particular groups of interest (see 'population') Extent of targeting to a group or tailoring/personalisation to an individual Sociodemographic factors of the target audience (such as age, gender, socioeconomic group, and ethnicity and digital literacy) Level of healthcare professional/practitioner induction or interaction Level of user engagement
Selection process – duplicate	The review will use the priority screening function within the EPPI-reviewer systematic reviewing software.

screening/selection/analysis	Double screening will be carried out for 10% of titles and abstracts by a second reviewer. Disagreements will be resolved by discussion. Inter-rater reliability will be assessed and reported. If below 90%, a second round of 10% double screening will be undertaken. The study inclusion and exclusion lists will be checked with members of the PHAC to ensure no studies are excluded inappropriately.
Data management (software)	EPPI Reviewer will be used: to store lists of citations to sift studies based on title and abstract to record decisions about full text papers to order freely available papers via retrieval function to request papers via NICE guideline Information Services to store extracted data Cochrane Review Manager 5 will be used to perform meta-analyses. R will be used for meta-regression.
Information sources – databases and dates	The purpose of the search is to identify the best available evidence to address the questions without producing an unmanageable volume of results. The following methods will be used to identify the evidence:

	the databases listed below will be searched with an appropriate strategy. the websites listed below will be searched or browsed with an appropriate strategy. **Database strategies** The database strategy will be adapted as appropriate from the one used in PH49 in 2013, taking into account the resources available to this review, the subscriptions that NICE has, changes in indexing policies and the final scope for the current evidence reviews. The principal search strategy is listed in Appendix A. The search strategy will take this broad approach: Behaviour change AND unhealthy behaviours (as detailed in the scope) AND digital OR mobile health interventions AND 2000-Current AND Limits Each unhealthy behaviour (lack of physical activity, unhealthy eating patterns or sedentary behaviour, smoking, hazardous or binge drinking and unsafe sexual behaviour) will be searched separately according to the individual Review Protocols.

	Feedback on the principal database strategy was sought from PHAC members. The principal search strategy will be developed in MEDLINE (Ovid interface) and then adapted, as appropriate, for use in the other sources listed, taking into account their size, search functionality and subject coverage. The other databases will be: Cochrane Central Register of Controlled Trials (CENTRAL) via Wiley Cochrane Database of Systematic Reviews (CDSR) via Wiley DARE (records up to March 2014 only) (CRD Embase via Ovid Health Management Information Consortium (HMIC) via Ovid MEDLINE via Ovid MEDLINE-in-Process (including Epub Ahead-of-Print) via Ovid PsycINFO via Ovid Social Policy and Practice (SPP) via Ovid

	Database search limits Database functionality will be used, where available, to exclude: non-English language papers animal studies editorials, letters and commentaries conference abstracts and posters registry entries for ongoing or unpublished clinical trials duplicates. Sources will be searched from 2000 to current. The database search strategies will not use any search filters for specific study types. **Cost effectiveness evidence**

	A separate search will be done for cost effectiveness evidence. The following databases will be searched again with agreed study-type search filters applied to a strategy based on the one in Appendix A: Embase via Ovid MEDLINE via Ovid MEDLINE-in-Process (including Epub Ahead-of-Print) via Ovid In addition, the following sources will be searched without study filters: EconLit via Ovid HTA database via CRD https://www.crd.york.ac.uk/CRDWeb/ NHS EED via CRD https://www.crd.york.ac.uk/CRDWeb **Website searching**

	The following websites will be searched with an appropriate strategy and the first 50 results examined to identify any UK reports or publications relevant to the review that have not already been identified: Google (restricting to uk domains) www.google.co.uk Google Scholar www.scholar.google.com NICE Evidence Search https://www.evidence.nhs.uk Searches will also be conducted on the following key websites for relevant UK reports or publications: Public Health England (www.gov.uk/government/organisations/public-health-england) Public Health Wales (www.wales.nhs.uk) Scottish Public Health Observatory (www.scotpho.org.uk) Department of Health (www.gov.uk/government/organisations/department-of-health) Public Health Agency (Northern Ireland) (www.publichealth.hscni.nt)

	Public Health Institute (www.cph.org.uk) Royal Society for Public Health (https://www.rsph.org.uk/) Centre for Behaviour Change UCL (https://www.ucl.ac.uk/behaviour-change) The Kings Fund (https://www.kingsfund.org.uk/) The Behavioural Insights Team (https://www.behaviouralinsights.co.uk/) Nesta (https://www.nesta.org.uk/) dblb computer science bibliography (https://dblp.uni-trier.de/) ACM Digital library (https://dl.acm.org/) The website results will be reviewed on screen and documents in English that are potentially relevant to review questions will be listed with their title and abstract (if available) in a Word document. **Quality assurance** The guidance Information Services team at NICE will quality assure the principal search strategy and peer review the strategies for the other databases.

	Any revisions or additional steps will be agreed by the review team before being implemented. Any deviations and a rationale for them will be recorded alongside the search strategies. **Search results** The database search results will be downloaded to EndNote before duplicates are removed using automated and manual processes. The de-duplicated file will be exported in RIS format for loading into EPPI-Reviewer for data screening.
Identify if an update	[If anupdate to an existing review, include question and date of original search. If helpful, add recommendations that might change as a result of this update.]
Author contacts	Please see the guideline development page
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual
Search strategy – for one database	For details please see appendix D of the full guideline
Data collection process – forms/duplicate	A standardised evidence table format will be used and published as appendix F (effectiveness evidence tables) or I (economic evidence tables) of the full guideline.

Data items – define all variables to be collected	For details please see evidence tables in appendix F (effectiveness evidence tables) or I (economic evidence tables) of the full guideline.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. For details please see Appendix H of Developing NICE guidelines: the manual Where appropriate, the risk of bias across all available evidence was evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/ When applying GRADE, where RCTs are considered the best available evidence for the question and outcome in question, they will start as high quality evidence. Where RCTs are not the most appropriate study design for a particular question or outcome, GRADE will be modified to allow for the study design considered most appropriate to start as high quality. Any adaptations of GRADE will be explained fully including a rationale to support the adaptation.
Criteria for quantitative synthesis (where suitable)	Studies will be grouped according to the type of intervention as appropriate. For details please see section 6.4 of Developing NICE guidelines: the manual
Methods for analysis – combining studies and exploring (in)consistency	For full details please see the methods chapter of the full guideline. Meta-analysis will be firstly used to determine the effect of digital and mobile health interventions within the specified behaviour area by synthesising all available data, regardless of study components or characteristics. This will provide an overall estimate of the effect of the interventions on behaviour. In order to carry out a meta-analysis, there will need to be similar

	studies meeting the inclusion criteria. Data from different studies will be meta-analysed if the studies are similar enough in terms of population, interventions, comparators and outcomes. Where meta-analysis is appropriate, a random effects model will be used to allow for the anticipated heterogeneity. This assumption will be tested with a fixed effects model. Unexplained heterogeneity will be examined where appropriate with sensitivity analysis. If the studies are found to be too heterogeneous to be pooled statistically, a narrative synthesis will be conducted. Methods for pooling cluster and individual randomised controlled trials will be considered where appropriate. If data are suitable for meta-analysis, subgroup meta-analyses will be used to answer the sub-questions identified above. If meta-analysis is deemed possible, sub group analysis or meta-regression may (if appropriate) be used to assess whether between-study variation in intervention effectiveness can be attributed to the presence of various study components or characteristics. Regression coefficients and their test of significance will be reported.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual.
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual

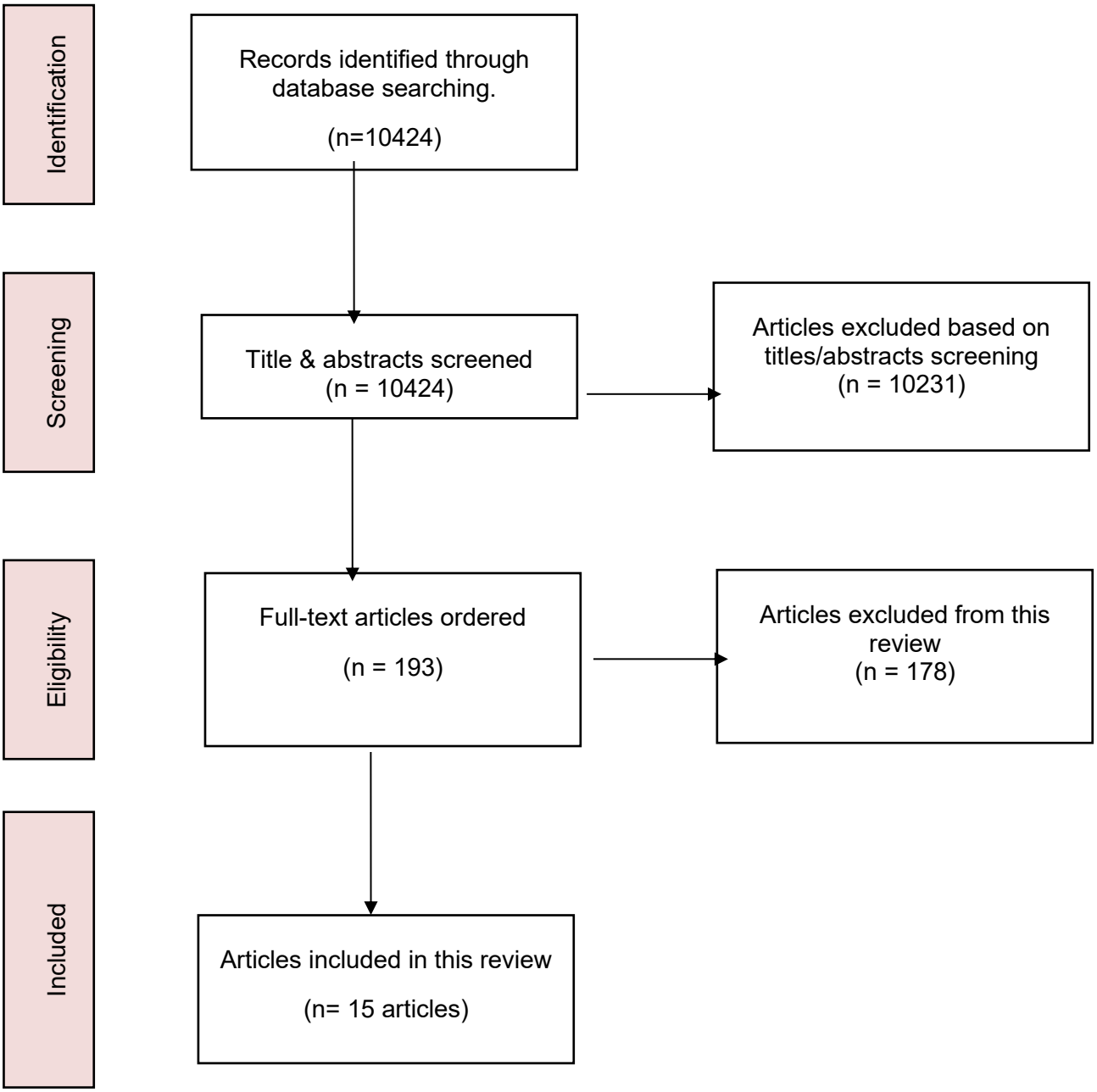
Rationale/context – Current management	For details please see the introduction to the evidence review in the full guideline.
Describe contributions of authors and guarantor	A multidisciplinary committee will develop the guideline. The committee will be convened by Public Health Internal Guidelines Development (PH-IGD) team and chaired by Ralph Bagge in line with section 3 of Developing NICE guidelines: the manual. Staff from Public Health Internal Guidelines Development team will undertake systematic literature searches, appraise the evidence, conduct meta-analysis where appropriate and draft the guideline in collaboration with the committee. Cost-effectiveness analysis will be conducted by YHEC where appropriate. For details please see Developing NICE guidelines: the manual.
Sources of funding/support	PH-IGD is funded and hosted by NICE. YHEC are contracted/funded by NICE to deliver cost effectiveness reviews and economic modelling for public health guidelines.
Name of sponsor	PH-IGD is funded and hosted by NICE
Roles of sponsor	NICE funds PH-IGD to develop guidelines for those working in the NHS, public health and social care in England
PROSPERO registration number	[If registered, add PROSPERO registration number]

1

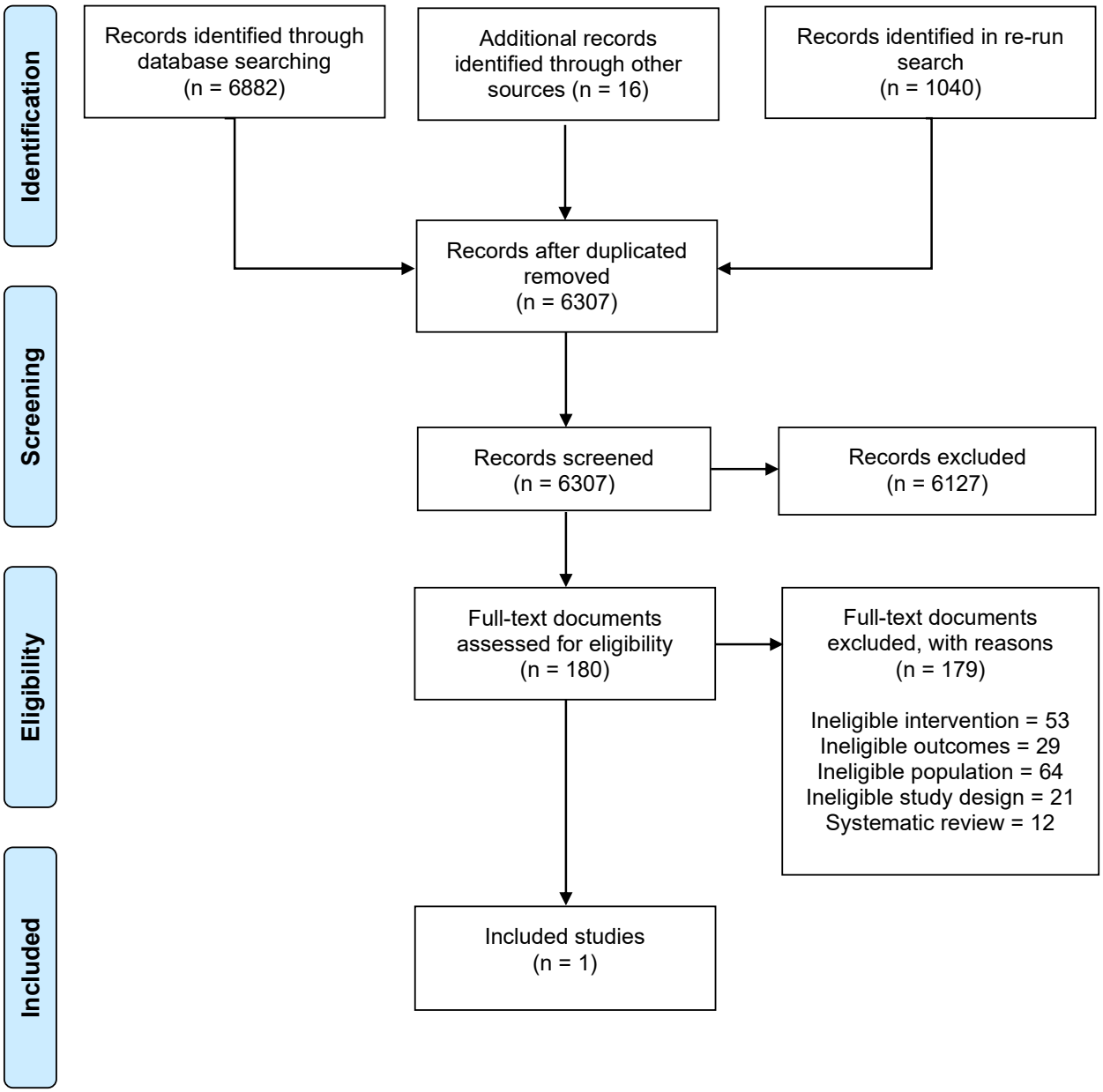
Appendix B – Research recommendation

See evidence review 1 (smoking) for all research recommendations and PICO tables.

Appendix C – Public health evidence study selection



Appendix D – Economic evidence study selection



Appendix E – Literature search strategies

Database name: MEDLINE

1 Health Behavior/ (45735)

2 Health Knowledge, Attitudes, Practice/ (100104)

3 Risk Reduction Behavior/ (11126)

4 Behavior Therapy/ (26513)

5 PSYCHOTHERAPY/ (52086)

6 Cognitive Therapy/ (22511)

7 MOTIVATION/ (61689)

8 Patient Education as Topic/ (81026)

9 Patient acceptance of healthcare/ (40896)

10 Health promotion/ (68095)

11 "Outcome and Process Assessment (Health Care)"/ (25456)

12 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (36892)

13 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab,kw. (102962)

14 motivat*.ti. (16890)

15 or/1-14 (553550)

16 exp Sexual Behavior/ (99179)

17 Sexual Health/ (384)

18 Sex education/ (8520)

19 exp Sexually Transmitted Diseases/ (323025)

20 HIV/ (17947)

21 Blood-Borne Pathogens/ (2912)

22 Pregnancy, Unplanned/ (1636)

23 Birth control/ (18898)

24 Pregnancy in Adolescence/ (7574)

25 Pregnancy Unwanted/ (2536)

26 Contraceptive Agents/ (4486)

27 Condoms/ (9651)

28 Contraception behavior/ (7465)

29 Condoms, Female/ (426)

30 (contracep* or condom*).tw. (79574)

31 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (81959)

32 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (316149)

33 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (15664)

34 (birth adj control*).tw. (4855)

35 (famil* adj3 plan*).tw. (27240)

36 or/16-35 (636204)

37 TELEMEDICINE/ (18600)

38 Therapy, Computer-Assisted/ (6398)

39 User-Computer Interface/ (35152)

40 Software Design/ (5729)

41 MULTIMEDIA/ (1807)

42 Computers, Handheld/ (3294)

43 Videotape Recording/ (11129)

44 Internet/ (66784)

45 Social Networking/ (2303)

46 Blogging/ (896)

47 Social Media/ (5336)

48 Electronic Mail/ (2484)

49 Cell Phones/ (7596)

50 Text Messaging/ (2095)

51 Smartphone/ (2476)

52 Mobile Applications/ (3633)

53 WEARABLE ELECTRONIC DEVICES/ (716)

54 Video Games/ (4517)

55 Virtual Reality/ (601)

56 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat*

or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (57351)

57 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (12655)

58 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (7090)

59 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (2854)

60 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (9776)

61 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (14820)

62 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (12269)

63 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (15767)

64 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (346382)

65 (e-mail* or email* or electronic mail*).tw. (14435)

66 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (12707)

67 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw. (44063)

68 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (53377)

69 ((virtual or augmented) adj3 reality).tw. (8743)

70 Speech Recognition Software/ (644)

71 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw,kw. (800)

72 IVR.tw. (1261)

73 or/37-72 (605180)

74 and/15,36,73 (3302)

75 limit 74 to yr="2000 -Current" (3093)

76 limit 75 to english language (3025)

77 Animals/ not Humans/ (4499580)

78 76 not 77 (3016)

79 limit 78 to (clinical conference or comment or editorial or historical article or letter or news) (45)

80 78 not 79 (2971)

Database name: MiP/epub ahead of print

1 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (5730)

2 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab. (16954)

3 motivat*.ti. (2463)

4 or/1-3 (22059)

5 (contracep* or condom*).tw. (5911)

6 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (10318)

7 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (30999)

8 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (1624)

9 (birth adj control*).tw. (388)

10 (famil* adj3 plan*).tw. (2515)

11 or/5-10 (45220)

12 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (16238)

13 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (1932)

14 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (2156)

15 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (479)

16 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (2391)

17 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (5486)

18 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (5786)

19 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (7338)

20 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (68364)

21 (e-mail* or email* or electronic mail*).tw. (3026)

22 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (2442)

23 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or fitbit*).tw. (10410)

24 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (12505)

25 ((virtual or augmented) adj3 reality).tw. (2072)

26 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw. (98)

27 IVR.tw. (321)

28 or/12-27 (115656)

29 and/4,11,28 (171)

30 limit 29 to yr="2000 -Current" (171)

31 11 and 28 (2798)

32 limit 31 to yr="2000 -Current" (2779)

33 30 or 32 (2779)

34 limit 33 to english language (2743)

35 limit 34 to (clinical conference or comment or editorial or historical article or letter or news) (18)

36 34 not 35 (2725)

Database name: Cochrane Library

#1 [mh ^"Health Behavior"]

#2 [mh ^"Health Knowledge, Attitudes, Practice"]

3 [mh ^"Risk Reduction Behavior"]

#4 [mh ^"Behavior Therapy"]

#5 [mh ^Psychotherapy]

#6 [mh ^"Cognitive Therapy"]

#7 [mh ^Motivation]

#8 [mh ^"Patient Education as Topic"]

#9 [mh ^"Patient acceptance of healthcare"]

#10 [mh ^"Health promotion"]

#11 [mh ^"Outcome and Process Assessment (Health Care)"]

#12 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)):ti

#13 ((behavio?r* or lifestyle* or "life style*") near/2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)):ab,kw

#14 motivat*:ti

#15 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14

#16 [mh "Sexual Behavior"]

#17 [mh ^"Sexual health"]

#18 [mh ^"Sex education"]

#19 [mh "Sexually Transmitted Diseases"]

#20 [mh ^HIV]

#21 [mh ^"Blood-Borne Pathogens"]

#22 [mh ^"Pregnancy, Unplanned"]

#23 [mh ^"pregnancy, unwanted"]

#24 [mh ^"Birth control"]

#25 [mh ^"Pregnancy in Adolescence"]

#26 [mh ^"Contraceptive Agents"]

#27 [mh ^Condoms]

#28 [mh ^"contraceptive behavior"]

#29 [mh ^"Condoms, Female"]

#30 (contracep* or condom*):ab

#31 ((sex* or intercourse or coit*) near/3 (risk* or protected or unprotected or safe* or unsafe* or behaviour* or behavior* or health* or unhealth* or educat*)):ti,ab

#32 (STD* or STI* or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*):ti,ab

#33 (pregnan* near/3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)):ti,ab

#34 (birth near control*):ab

#35 (famil* near/3 plan*):ab

#36 {Or #16-#35}

#37 [mh ^Telemedicine]

#38 [mh ^"Therapy, Computer-Assisted"]

#39 [mh ^"User-Computer Interface"]

#40 [mh ^"Software design"]

#41 [mh ^Multimedia]

#42 [mh ^"Computers, Handheld"]

#43 [mh ^"Videotape Recording"]

#44 [mh ^Internet]

#45 [mh ^"Social networking"]

#46 [mh ^Blogging]

#47 [mh ^"Social media"]

#48 [mh ^"Electronic mail"]

#49 [mh ^"Cell Phones"]

#50 [mh ^"Text messaging"]

#51 [mh ^Smartphone]

#52 [mh ^"Mobile applications"]

#53 [mh ^"Wearable electronic devices"]

#54 [mh ^"Video games"]

#55 [mh ^"Virtual reality"]

#56 ((digital* or digitis* or digitiz* or electronic*) near/3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)):ab

#57 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*):ab

#58 (ehealth* or e-health* or mhealth* or m-health* or mobile health*):ab

#59 ((laptop or palm or handheld or tablet or pda or pc) near/2 comput*):ab

#60 ((mobile* or cell* or tablet*) near (phone* or telephone* or handset* or hand-set*)):ab

#61 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*):ab

#62 ((mobile or electronic* or digital*) near/2 (device* or tablet*)):ab

#63 ((mobile or electronic* or digital* or device* or software*) near/3 application*):ab

#64 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*):ab

#65 (e-mail* or email* or electronic mail*):ab

#66 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*):ab

#67 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or fitbit*):ab

#68 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*):ab

#69 ((virtual or augmented) near/3 reality):ab

#70 [mh ^"Speech recognition software"]

#71 ((voice* or speech or speak*) near/3 response* near/3 (interact* or unit*)):ab,kw

#72 IVR:ab

#73 {Or #37-#72}

#74 #15 and #36 and #73 with Cochrane Library publication date from Jan 2000 to Jan 2019

#75 #15 and #36 and #73 with Publication Year from 2000 to 2019, in Trials

#76 #74 or #75

#77 "clinicaltrials.gov":so

#78 #76 not #77

Database name: Embase

1 behavior change/ (30093)

2 health behavior/ (60366)

3 attitude to health/ or risk reduction/ (194221)

4 behavior therapy/ (40848)

5 psychotherapy/ (81702)

6 cognitive therapy/ (42744)

7 motivation/ (91873)

8 patient education/ (106325)

9 patient attitude/ (62471)

10 health promotion/ (89869)

11 Outcome assessment/ (457551)

12 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (44283)

13 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab,kw. (139728)

14 motivat*.ti. (18066)

15 or/1-14 (1215576)

16 exp sexual behavior/ (193296)

17 sexual health/ (13798)

18 sexual education/ (10760)

19 exp sexually transmitted disease/ (82498)

20 Human immunodeficiency virus/ (107366)

21 bloodborne bacterium/ (1917)

22 unplanned pregnancy/ (4929)

23 birth control/ (3670)

24 adolescent pregnancy/ (9087)

25 unwanted pregnancy/ (3088)

26 contraceptive agent/ (17585)

27 condom/ (19009)

28 contraceptive behavior/ (3631)

29 female condom/ (327)

30 (contracep* or condom*).tw. (92108)

31 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (107869)

32 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (402069)

33 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (19045)

34 (birth adj control*).tw. (4393)

35 (famil* adj3 plan*).tw. (25587)

36 or/16-35 (761897)

37 telemedicine/ (19846)

38 computer assisted therapy/ (4471)

39 computer interface/ (29212)

40 digital computer/ (2375)

41 software design/ (577)

42 multimedia/ (3544)

43 personal digital assistant/ (1291)

44 videorecording/ (73097)

45 Internet/ (100705)

46 social network/ (13261)

47 blogging/ (251)

48 social media/ (13686)

49 e-mail/ (17918)

50 mobile phone/ (14777)

51 text messaging/ (3789)

52 smartphone/ (7111)

53 mobile application/ (7260)

54 electronic device/ (1763)

55 video game/ (2353)

56 virtual reality/ (14089)

57 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (82797)

58 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (16798)

59 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (8089)

60 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (3773)

61 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (12312)

62 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (20865)

63 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (12609)

64 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (15063)

65 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (461884)

66 (e-mail* or email* or electronic mail*).tw. (28490)

67 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (17591)

68 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw. (61241)

69 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (63540)

70 ((virtual or augmented) adj3 reality).tw. (11439)

71 automatic speech recognition/ (936)

72 interactive voice response system/ (577)

73 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw,kw. (1136)

74 IVR.tw. (1814)

75 or/37-74 (855169)

76 and/15,36,75 (5115)

77 limit 76 to yr="2000 -Current" (4971)

78 limit 77 to english language (4881)

79 nonhuman/ not human/ (4287071)

80 78 not 79 (4843)

81 limit 80 to (conference abstract or conference paper or "conference review" or editorial or letter) (1025)

82 80 not 81 (3818)

Database name: HMIC

1 behaviour change/ (537)

2 health behaviour/ or behaviour adaption/ or behaviour adjustment/ (1537)

3 behaviour therapy/ (248)

4 Psychotherapy/ (733)

5 Motivation/ or Achievement motivation/ (550)

6 Patient education/ (517)

7 Patient attitudes/ (164)

8 Health promotion/ (6616)

9 Patient outcome/ (3140)

10 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (890)

11 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab,sh. (2944)

12 motivat*.ti. (364)

13 or/1-12 (15732)

14 exp Sexual behaviour/ (760)

15 Sex psychology/ (8)

16 Sexual health/ (1002)

17 Sex education/ (431)

18 exp Sexually transmitted infections/ (637)

19 HIV/ (3544)

20 Contraceptives/ (104)

21 Condoms/ (100)

22 (contracep* or condom*).tw. (1229)

23 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (2428)

24 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (4869)

25 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (697)

26 (birth adj control*).tw. (54)

27 (famil* adj3 plan*).tw. (672)

28 or/14-27 (9094)

29 telemedicine/ or telehealth/ or telecare/ (2047)

30 exp Digital technology/ (24)

31 exp Digital media/ (47)

32 Computer software/ or Computer programs/ (635)

33 Multi media/ (54)

34 Personal digital assistants/ (2)

35 Videos/ or Video cameras/ (245)

36 Internet/ or exp Internet websites/ (2526)

37 Social networking/ (39)

38 Blogging/ (6)

39 Email/ (146)

40 Mobile telephones/ (278)

41 Text messaging/ (84)

42 Health technology/ or Telemeters/ (670)

43 Computer games/ (37)

44 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (1561)

45 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (1359)

46 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (315)

47 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (55)

48 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (298)

49 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (138)

50 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (68)

51 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (112)

52 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (9078)

53 (e-mail* or email* or electronic mail*).tw. (642)

54 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (223)

55 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw. (644)

56 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (1570)

57 ((virtual or augmented) adj3 reality).tw. (51)

58 Speech transmission systems/ (8)

59 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw. (13)

60 IVR.tw. (8)

61 or/29-60 (16864)

62 and/13,28,61 (46)

63 limit 62 to yr="2000 -Current" (42)

Database name: PsycINFO

1 Behavior Change/ (10040)

2 READINESS TO CHANGE/ or CHANGE STRATEGIES/ (1671)

3 Lifestyle Changes/ (1201)

4 Health Behavior/ or Health Knowledge/ (31387)

5 Health Attitudes/ or Harm Reduction/ (12361)

6 Attitude Change/ or Behavioural Intention/ (3329)

7 Behavior Therapy/ (8275)

8 PSYCHOTHERAPY/ (41127)

9 Cognitive Behavior Therapy/ or Cognitive Therapy/ (29024)

10 MOTIVATION/ (40120)

11 Client Education/ (3397)

12 Health Promotion/ (22859)

13 Treatment Outcomes/ (30053)

14 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (31454)

15 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab. (82304)

16 motivat*.ti. (27384)

17 or/1-16 (279310)

18 exp Psychosexual Behavior/ (89690)

19 Sex Education/ (2664)

20 SEXUAL ATTITUDES/ (3950)

21 exp Sexually Transmitted Diseases/ (43297)

22 HIV/ (33265)

23 Birth Control/ (2591)

24 Adolescent Pregnancy/ (2643)

25 Contraceptive Devices/ (708)

26 CONDOMS/ (3751)

27 (contracep* or condom*).tw. (15185)

28 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (54472)

29 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (54618)

30 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (6056)

31 (birth adj control*).tw. (1157)

32 (famil* adj3 plan*).tw. (3609)

33 or/18-32 (167076)

34 TELEMEDICINE/ (4612)

35 Computer Assisted Therapy/ (986)

36 Human Computer Interaction/ (9810)

37 Computer Assisted Instruction/ or Computer Software/ (21490)

38 MULTIMEDIA/ (2275)

39 Digital Computers/ (971)

40 Videotapes/ (1651)

41 INTERNET/ or Websites/ or Electronic Learning/ (31608)

42 Social Networks/ (11021)

43 Blog/ or Online Social Networks/ (7130)

44 Social Media/ (6015)

45 Computer Mediated Communication/ (5432)

46 Cellular Phones/ (4184)

47 Text Messaging/ (711)

48 Mobile Devices/ (2112)

49 Computer Applications/ (9199)

50 TECHNOLOGY/ or Electronic Communication/ (37416)

51 Computer Games/ (6638)

52 Virtual Reality/ (7375)

53 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (13000)

54 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (3061)

55 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (2395)

56 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (1171)

57 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (5013)

58 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (5141)

59 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (3213)

60 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (2361)

61 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (133456)

62 (e-mail* or email* or electronic mail*).tw. (8989)

63 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (4484)

64 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw. (25097)

65 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (70047)

66 ((virtual or augmented) adj3 reality).tw. (5577)

67 Automated Speech Recognition/ (963)

68 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw. (342)

69 IVR.tw. (276)

70 or/34-69 (284101)

71 and/17,33,70 (1655)

72 limit 71 to yr="2000 -Current" (1546)

73 limit 72 to english language (1510)

74 limit 73 to ("comment/reply" or editorial or letter) (26)

75 73 not 74 (1484)

Database name: Social Policy and Practice

1 (behaviour or behaviour change or behaviour modification).de. (4610)

2 health behaviour.de. (4)

3 Attitudes.de. (11556)

4 (risk reduction* or risk perception*).de. (24)

5 Psychotherapy.de. (2761)

6 cognitive behavioural therapy.de. (379)

7 Motivation.de. (959)

8 (patient education or health education).de. (1584)

9 compliance*.de. (74)

10 patient participation.de. (5)

11 (health promotion or health improvement or outcomes).de. (8394)

12 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (1168)

13 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab,de. (3938)

14 motivat*.ti. (483)

15 or/1-14 (31071)

16 (sexual behavio?r* or sexual activit* or harmful sexual behavio?r* or sexual health or sex education or sexually transmitted* or birth control or teenage pregnancy* or adolescent pregnancy).de. (2947)

17 (contracep* or condom*).tw,de. (559)

18 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw,de. (5165)

19 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw,de. (3987)

20 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw,de. (724)

21 (birth adj control*).tw,de. (25)

22 (famil* adj3 plan*).tw,de. (647)

23 or/16-22 (10197)

24 (telemedicine or telehealth or telecare).de. (331)

25 (Computers or Digital Technology).de. (2013)

26 Software.de. (100)

27 multimedia.de. (13)

28 Information technology.de. (3813)

29 videos.de. (211)

30 Internet.de. (2887)

31 Online services.de. (102)

32 (Social networks or Social Networking).de. (2616)

33 Blogging.de. (1)

34 (online communities or websites).de. (13)

35 Social media.de. (561)

36 email.de. (77)

37 mobile phones.de. (163)

38 text messag*.de. (1)

39 Computer apps.de. (50)

40 Computer games.de. (95)

41 virtual reality.de. (3)

42 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw,de. (875)

43 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw,de. (676)

44 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw,de. (47)

45 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw,de. (45)

46 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw,de. (288)

47 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw,de. (119)

48 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw,de. (92)

49 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw,de. (56)

50 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw,de. (8920)

51 (e-mail* or email* or electronic mail*).tw,de. (519)

52 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw,de. (110)

53 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw,de. (3844)

54 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw,de. (5913)

55 ((virtual or augmented) adj3 reality).tw,de. (62)

56 assistive technology.de. (1551)

57 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw,de. (4)

58 IVR.tw,de. (8)

59 or/24-58 (22461)

60 and/15,23,59 (233)

61 limit 60 to yr="2000 -Current" (224)

Database name: DARE

1	MeSH DESCRIPTOR Health Behavior
2	MeSH DESCRIPTOR Health Knowledge, Attitudes, Practice
3	MeSH DESCRIPTOR Risk Reduction Behavior
4	MeSH DESCRIPTOR Behavior Therapy
5	MeSH DESCRIPTOR PSYCHOTHERAPY
6	MeSH DESCRIPTOR Cognitive Therapy
7	MeSH DESCRIPTOR MOTIVATION

8	MeSH DESCRIPTOR Patient Education as Topic
9	MeSH DESCRIPTOR Patient Acceptance of Health Care
10	MeSH DESCRIPTOR Health promotion
11	MeSH DESCRIPTOR Outcome and Process Assessment (Health Care)
12	((behavio?r* or lifestyle* or "life style*")) AND ((change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*))
13	(motivat*):TI
14	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13
15	MeSH DESCRIPTOR sexual behavior EXPLODE ALL TREES
16	MeSH DESCRIPTOR Reproductive Health EXPLODE ALL TREES
17	MeSH DESCRIPTOR sex education
18	MeSH DESCRIPTOR sexually transmitted diseases EXPLODE ALL TREES
19	MeSH DESCRIPTOR HIV
20	MeSH DESCRIPTOR blood-borne pathogens
21	MeSH DESCRIPTOR Pregnancy, Unplanned
22	MeSH DESCRIPTOR Contraception EXPLODE ALL TREES
23	MeSH DESCRIPTOR Pregnancy in Adolescence
24	MeSH DESCRIPTOR Pregnancy, Unwanted
25	MeSH DESCRIPTOR Contraceptive Agents
26	MeSH DESCRIPTOR condoms
27	MeSH DESCRIPTOR condoms, female
28	MeSH DESCRIPTOR Contraception Behavior EXPLODE ALL TREES
29	(contracep*) OR (condom*)
30	(sex* or intercourse or coit*) AND (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat)

31	(STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*)
32	(pregnan*) AND (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)
33	(birth) AND (control*)
34	(famil*) AND (plan*)
35	#15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34
36	MeSH DESCRIPTOR Telemedicine
37	MeSH DESCRIPTOR Therapy, Computer-Assisted
38	MeSH DESCRIPTOR User-Computer Interface
39	MeSH DESCRIPTOR Software design
40	MeSH DESCRIPTOR Multimedia
41	MeSH DESCRIPTOR Computers, Handheld
42	MeSH DESCRIPTOR Videotape Recording
43	MeSH DESCRIPTOR Internet
44	MeSH DESCRIPTOR Social Networking
45	MeSH DESCRIPTOR Blogging
46	MeSH DESCRIPTOR social media
47	MeSH DESCRIPTOR Electronic Mail
48	MeSH DESCRIPTOR cell phones
49	MeSH DESCRIPTOR text messaging
50	MeSH DESCRIPTOR Smartphone
51	MeSH DESCRIPTOR Mobile Applications
52	MeSH DESCRIPTOR Video games
53	MeSH DESCRIPTOR Virtual Reality Exposure Therapy

54	((digital* or digitis* or digitiz* or electronic*)) AND ((intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*))
55	((telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*))
56	((ehealth* or e-health* or mhealth* or m-health* or mobile health*))
57	((laptop or palm or handheld or tablet or pda or pc)) AND (comput*)
58	((mobile* or cell* or tablet*)) AND ((phone* or telephone* or handset* or hand-set*))
59	((smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*))
60	((mobile or electronic* or digital*)) AND ((device* or tablet*))
61	((mobile or electronic* or digital* or device* or software*)) AND (application*)
62	((app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*))
63	((e-mail* or email* or electronic mail*))
64	((text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*))
65	((Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*))
66	((social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*))
67	((virtual or augmented)) AND (reality)
68	MeSH DESCRIPTOR Speech Recognition Software
69	((voice* or speech or speak*)) AND (response*) AND ((interact* or unit*))
70	(IVR)
71	#36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70
72	#14 AND #35 AND #71

73	(#72) IN DARE FROM 2000 TO 2019

Supplementary search techniques

Grey literature searching – see results below:

Search engines

Search engine	
Name	dblb computer science bibliography
URL	https://dblp.uni-trier.de/
Date searched	14/01/2019
Searcher	Andrea Heath
Search terms	“Sexual health” or “sexual behaviour/behavior” or (sex or sexual) AND “Behaviour/behaviour change”.
How the results were selected	Used search engine to perform Boolean searches on a range of selected terms (as above). Viewed results and exported potentially relevant results to Endnote if not already found in other database searches.
Results	4

Search engine	
Name	ACM Digital library
URL	https://dl.acm.org/
Date searched	15/01/2019
Searcher	Andrea Heath

Search terms	Used search engine to search “behaviour change” OR (digital OR apps OR technology OR mhealth OR ehealth OR internet OR online OR social media or smartphone) AND sexual. Separately searched “sexual health” and “sexual behaviour/behavior”. Limited to 2000 to date and Periodicals only for some results
How the results were selected	Viewed results of search combinations and exported potentially relevant results to Endnote
Results	9

Websites

Website	
Name	Public Health England
URL	www.gov.uk/government/organisations/public-health-england
Date searched	10/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Used search box to browse PHE documents using search terms digital, apps, smartphone, technology, internet, “sexual health”, “sexual behaviour”. Plus used advanced google search to search combination of terms. Also searched NICE Evidence Search using same key words and limiting to source (PHE).
Results	4

Website	
Name	Public Health Wales
URL	www.wales.nhs.uk
Date searched	10/01/2019
Searcher	Andrea Heath
Search terms (including any	Browsed Lifestyle section Sexual health

specific sections browsed)	
Results	0

Website	
Name	Scottish Public Health Observatory
URL	www.scotpho.org.uk
Date searched	10/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed “Sexual health” in Behaviours section. Also browsed “Reported and Papers”.
Results	0

Website	
Name	Department of Health
URL	www.gov.uk/government/organisations/department-of-health
Date searched	10/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Used search box to browse DoH documents using search terms “digital technology”, apps, smartphone, internet, “behaviour change”, “sexual behaviour”, “sexual health”. Also searched NICE Evidence Search using same key words and limiting to source (DoH) Did not include results that had already been picked up by other database searches eg HMIC
Results	2

Website	
Name	Public Health Agency (Northern Ireland)
URL	www.publichealth.hscni.nt
Date searched	10/01/2019
Searcher	Andrea Heath

Search terms (including any specific sections browsed)	Searched Publications using key terms – digital, apps, smartphone, technology, internet, “behaviour change”, “sexual health”, “sexual behaviour”
Results	0

Website	
Name	Public Health Institute
URL	www.cph.org.uk
Date searched	10/01/20190
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed area of expertise “Sexual and reproductive health”. Also searched via “advanced Google search” “sexual behaviour” and “sexual health” and website url.
Results	0

Website	
Name	Royal Society for Public Health
URL	https://www.rsph.org.uk/
Date searched	10/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed Reports. Also searched via “advanced Google search” using key terms and website url
Results	0

Website	
Name	Centre for Behaviour Change UCL
URL	https://www.ucl.ac.uk/behaviour-change
Date searched	15/01/2019

Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed website including link to Digital Health Hub. Also searched via Google advanced search combining site search with “sexual behaviour” or “sexual health”.
Results	1

Website	
Name	The Kings Fund
URL	https://www.kingsfund.org.uk
Date searched	14/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed Topics “Technology and data” and “Sexual health care”, searched Publications using key terms. Also searched via “advanced Google search” using key terms and website url
Results	2

Website	
Name	The Behavioural Insights Team
URL	https://www.behaviouralinsights.co.uk/
Date searched	14/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed Health category in Blogs & read potentially relevant blogs looking for links to publications. Also searched via “advanced Google search” using key terms and website url and browsed publications
Results	1

Website	
Name	nesta
URL	https://www.nesta.org.uk/

Date searched	15/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Browsed “Health” section, used search function to search key terms (“sexual health”, “sexual behaviour”). Also searched via “advanced Google search” using key terms and website url
Results	2

Website	
Name	NICE Evidence Search
URL	www.evidence.nhs.uk
Date searched	14/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	Used searched box to perform Boolean searches combining (behaviour change or digital technology, apps, computers, smartphone, internet) AND (“sexual behaviour” or “sexual health”). Imported most results to Endnote. One result added to Word doc and saved on k:drive
Results	6 (3 in Word doc and 3 in Endnote database)

Website	
Name	Google
URL	Google.co.uk
Date searched	15/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	(Behaviour OR Behavior) AND ("digital technology" or apps or smartphone or mhealth) AND (“sexual behaviour” or “sexual behavior” or “sexual health”) Browsed first 50 results and copy & pasted one relevant to search document, plus imported six to Endnote
Results	7

Website

Name	Google Scholar
URL	https://scholar.google.co.uk/
Date searched	15/01/2019
Searcher	Andrea Heath
Search terms (including any specific sections browsed)	(Behaviour OR Behavior) AND ("digital technology" or apps or smartphone or mhealth) AND (“sexual behaviour” or “sexual behavior” or “sexual health”) Browsed first 50 results and exported relevant results (if not duplicates) to Endnote
Results	4

Economic evidence

Note: a unified search for economic evidence was conducted for all review questions in this guideline

Database name: MEDLINE

1 Health Behavior/ (45965)
2 Health Knowledge, Attitudes, Practice/ (100524)
3 Risk Reduction Behavior/ (11188)
4 Behavior Therapy/ (26562)
5 PSYCHOTHERAPY/ (52164)
6 Cognitive Therapy/ (22511)
7 MOTIVATION/ (61890)
8 Patient Education as Topic/ (81150)
9 Patient acceptance of healthcare/ (41100)
10 Health promotion/ (68389)
11 "Outcome and Process Assessment (Health Care)"/ (25495)
12 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (31617)
13 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab,kw. (88489)
14 motivat*.ti. (14483)
15 or/1-14 (535137)
16 exp EXERCISE/ (174008)
17 exp EXERCISE MOVEMENT TECHNIQUES/ (7290)
18 exp SPORTS/ (168645)

19 exp exercise therapy/ (44950)
20 ((physical* or keep* or cardio* or aerobic or fitness or increas* or more or become or becoming or be or encourag*) adj3 (fit* or activ* or train*)).ti. (60086)
21 SEDENTARY LIFESTYLE/ (7220)
22 exercis*.ti. (97711)
23 (sedentary adj3 (behavio?r* or lifestyle* or less or time or change* or changing or modification* or modify or modifying or program* or intervention*)).tw. (8381)
24 FOOD HABITS/ (76202)
25 FOOD PREFERENCES/ (13168)
26 Nutrition therapy/ (1923)
27 *DIET/ (71783)
28 Body Mass Index/ (114816)
29 Healthy diet/ (2044)
30 diet*.ti. (155010)
31 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition* or weight* or overweight)).tw. (129962)
32 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).tw. (12879)
33 or/16-32 (767389)
34 SMOKING/ (134671)
35 SMOKING CESSATION/ (26370)
36 "TOBACCO USE CESSATION"/ or exp "TOBACCO USE"/ or "TOBACCO USE DISORDER"/ (13229)
37 SMOKERS/ (587)
38 Electronic Nicotine Delivery Systems/ or Vaping/ (2213)
39 (ecig* or e-cig* or e-voke* or juul* or vape* or vaping*).tw. (2057)
40 "TOBACCO USE CESSATION PRODUCTS"/ (1512)
41 exp Pipe smoking/ (75)
42 (waterpipe* or water pipe* or dokha or dokhas or hookah or hookahs or hooka or hookas or shisha or shishas or sheesha or sheeshas).tw. (1453)
43 (smoking* or smoker* or antismok* or anti smok* or anti-smok*).tw. (204950)
44 (tobacco* or nicotin* or cigar* or cigs).tw. (181144)
45 or/34-44 (344859)
46 exp ALCOHOL-RELATED DISORDERS/ (108758)
47 exp ALCOHOL DRINKING/ (64438)
48 exp Alcoholic Beverages/ (18633)
49 Drinking Behavior/ (6548)
50 ((Alcohol* or Drunk* or Drink* or beer* or wine* or liqor* or liquor* or spirit* or alcopop* or cider*) adj4 (consum* or misus* or abus* or intoxicat* or inebriat* or excess* or bing* or hazardous or harmful or heavy or problem* or risk* or frequen* or behavio?r* or temperance or abstinence or abstain* or stop or stopping)).tw. (102554)
51 or/46-50 (213234)
52 exp Sexual Behavior/ (99473)
53 Sexual Health/ (397)
54 Sex education/ (8530)
55 exp Sexually Transmitted Diseases/ (323661)

56 HIV/ (18005)
57 Blood-Borne Pathogens/ (2917)
58 Pregnancy, Unplanned/ (1647)
59 Birth control/ (18923)
60 Pregnancy in Adolescence/ (7591)
61 Pregnancy Unwanted/ (2539)
62 Contraceptive Agents/ (4490)
63 Condoms/ (9681)
64 Contraceptive behavior/ (7488)
65 Condoms, Female/ (426)
66 (contracep* or condom*).tw. (73799)
67 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (71922)
68 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (285872)
69 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (14081)
70 (birth adj control*).tw. (4473)
71 (famil* adj3 plan*).tw. (24787)
72 or/52-71 (592222)
73 or/33,45,51,72 (1805988)
74 TELEMEDICINE/ (18725)
75 Therapy, Computer-Assisted/ (6424)
76 User-Computer Interface/ (35219)
77 Software Design/ (5745)
78 MULTIMEDIA/ (1809)
79 Computers, Handheld/ (3301)
80 Videotape Recording/ (11137)
81 Internet/ (67068)
82 Social Networking/ (2350)
83 Online Social Networking/ (16)
84 Blogging/ (897)
85 Social Media/ (5412)
86 Electronic Mail/ (2493)
87 Cell Phones/ (7642)
88 Text Messaging/ (2119)
89 Smartphone/ (2534)
90 Mobile Applications/ (3700)
91 WEARABLE ELECTRONIC DEVICES/ (754)
92 Video Games/ (4558)
93 Virtual Reality/ (636)
94 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (41380)
95 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (10768)

96 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (4993)
97 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (2388)
98 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (7450)
99 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (9457)
100 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (6537)
101 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (8487)
102 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (279509)
103 (e-mail* or email* or electronic mail*).tw. (11476)
104 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (10318)
105 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw. (33899)
106 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (41146)
107 ((virtual or augmented) adj3 reality).tw. (6719)
108 Speech Recognition Software/ (648)
109 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw,kw. (705)
110 IVR.tw. (944)
111 or/74-110 (492045)
112 and/15,73,111 (12571)
113 Economics/ or exp "Costs and Cost Analysis"/ or Economics, Dental/ or exp Economics, Hospital/ or exp Economics, Medical/ or Economics, Nursing/ or Economics, Pharmaceutical/ or Budgets/ or exp Models, Economic/ or Markov Chains/ or Monte Carlo Method/ or Decision Trees/ (325711)
114 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab. (591398)
115 ((monte adj carlo) or markov or (decision adj2 (tree* or analys*))).ti,ab. (49362)
116 (value adj2 (money or monetary)).ti,ab. (1766)
117 Quality of Life/ or Health Status Indicators/ or Quality-Adjusted Life Years/ or Value of Life/ (201539)
118 (quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (205307)
119 (disability adjusted life or daly).ti,ab. (2537)
120 health* year* equivalent*.ti,ab. (38)
121 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab. (20533)
122 (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).ti,ab. (1222)

123 (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab. (4252)
124 (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab. (27)
125 (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab. (364)
126 (euroqol or euro qol or eq5d or eq 5d).ti,ab. (7253)
127 or/113-126 (1022455)
128 (((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab. (25248)
129 127 not 128 (1015741)
130 112 and 129 (1997)
131 limit 130 to yr="2000 -Current" (1930)
132 limit 131 to english language (1877)
133 Animals/ not Humans/ (4506319)
134 132 not 133 (1867)
135 limit 134 to (clinical conference or comment or editorial or historical article or letter or news) (6)
136 134 not 135 (1861)

Database name: MIP/Epubs

1 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (5835)
2 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab. (17570)
3 motivat*.ti. (2478)
4 or/1-3 (22736)
5 ((physical* or keep* or cardio* or aerobic or fitness or increas* or more or become or becoming or be or encourag*) adj3 (fit* or activ* or train*)).ti. (10100)
6 exercis*.ti. (12653)
7 (sedentary adj3 (behavio?r* or lifestyle* or less or time or change* or changing or modification* or modify or modifying or program* or intervention*)).tw. (2011)
8 diet*.ti. (18984)
9 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition* or weight* or overweight)).tw. (21928)
10 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).tw. (2112)
11 or/5-10 (60183)
12 (ecig* or e-cig* or e-voke* or juul* or vape* or vaping*).tw. (1052)
13 (waterpipe* or water pipe* or dokha or dokhas or hookah or hookahs or hooka or hookas or shisha or shishas or sheesha or sheeshas).tw. (483)
14 (smoking* or smoker* or antismok* or anti smok* or anti-smok*).tw. (25197)
15 (tobacco* or nicotin* or cigar* or cigs).tw. (21826)

16 or/12-15 (39043)
17 ((Alcohol* or Drunk* or Drink* or beer* or wine* or liqor* or liquor* or spirit* or alcopop* or cider*) adj4 (consum* or misus* or abus* or intoxicat* or inebriat* or excess* or bing* or hazardous or harmful or heavy or problem* or risk* or frequen* or behavio?r* or temperance or abstinence or abstain* or stop or stopping)).tw. (12511)
18 (contracep* or condom*).tw. (5959)
19 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (10438)
20 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (31223)
21 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (1632)
22 (birth adj control*).tw. (388)
23 (famil* adj3 plan*).tw. (2532)
24 or/18-23 (45570)
25 or/11,16-17,24 (148454)
26 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (16498)
27 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (1976)
28 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (2199)
29 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (480)
30 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (2400)
31 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (5555)
32 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (5858)
33 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (7401)
34 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (69069)
35 (e-mail* or email* or electronic mail*).tw. (3056)
36 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (2488)
37 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or fitbit*).tw. (10560)
38 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (12606)
39 ((virtual or augmented) adj3 reality).tw. (2107)
40 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw. (98)
41 IVR.tw. (320)
42 or/26-41 (116943)
43 and/4,25,42 (1103)

44 25 and 42 (10238)
45 limit 44 to yr="2017 -Current" (6808)
46 43 or 45 (7192)
47 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab. (126735)
48 ((monte adj carlo) or markov or (decision adj2 (tree* or analys*))).ti,ab. (21570)
49 (value adj2 (money or monetary)).ti,ab. (338)
50 (quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (39946)
51 (disability adjusted life or daly).ti,ab. (571)
52 health* year* equivalent*.ti,ab. (2)
53 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab. (2807)
54 (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).ti,ab. (716)
55 (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab. (795)
56 (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab. (5)
57 (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab. (22)
58 (euroqol or euro qol or eq5d or eq 5d).ti,ab. (1768)
59 or/47-58 (182507)
60 (((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab. (3669)
61 59 not 60 (181259)
62 46 and 61 (959)
63 limit 62 to yr="2000 -Current" (959)
64 limit 63 to english language (953)
65 limit 64 to (clinical conference or comment or editorial or historical article or letter or news) (0)
66 64 not 65 (953)

Database name: Embase

1 behavior change/ (30212)
2 health 93nglish9393/ (60586)
3 attitude to health/ or risk reduction/ (195169)
4 behavior therapy/ (40905)
5 psychotherapy/ (81847)
6 cognitive therapy/ (42796)
7 motivation/ (92282)
8 patient education/ (106609)
9 patient attitude/ (62747)

10 health promotion/ (90169)
11 Outcome assessment/ (459747)
12 ((behavio?r* or lifestyle* or “life style*”) and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (44885)
13 ((behavio?r* or lifestyle* or “life style*”) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab,kw. (144310)
14 motivat*.ti. (18165)
15 or/1-14 (1224078)
16 exp exercise/ (303603)
17 exp kinesiotherapy/ (69470)
18 exp sport/ (145038)
19 ((physical* or keep* or cardio* or aerobic or fitness or 94nglish94* or more or become or becoming or be or 94nglish9494*) adj3 (fit* or 94nglis* or train*)).ti. (83120)
20 sedentary lifestyle/ or sitting/ (30759)
21 physical activity/ (135422)
22 exercis*.ti. (132758)
23 (sedentary adj3 (behavio?r* or lifestyle* or less or time or change* or changing or modification* or modify or modifying or program* or intervention*)).tw. (13654)
24 feeding 94nglish9494/ or Food intake/ or Portion size/ (179314)
25 food preference/ (12426)
26 diet therapy/ (48807)
27 *diet/ (65042)
28 unhealthy diet/ or healthy diet/ (2365)
29 body mass/ (366272)
30 diet*.ti. (191322)
31 ((health* or unhealthy or poor* or chang* or 94nglis* or 94nglis* or recommend*) adj3 (eat* or diet* or food* or nutrition* or weight* or overweight)).tw. (200415)
32 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).tw. (19034)
33 or/16-32 (1387258)
34 smoking/ (277521)
35 smoking cessation/ (53791)
36 smoking habit/ (21151)
37 cigarette smoking/ or cigar smoking/ (51706)
38 exp “tobacco use”/ or tobacco dependence/ (366278)
39 smoking cessation program/ or smoking reduction/ (3105)
40 “smoking and smoking related phenomena”/ (180)
41 electronic cigarette/ or vaping/ or pipe smoking/ (4551)
42 (ecig* or e-cig* or e-voke* or juul* or vape* or vaping*).tw. (3494)
43 (waterpipe* or water pipe* or dokha or dokhas or hookah or hookahs or hooka or hookas or shisha or shishas or sheesha or sheeshas).tw. (2308)
44 (smoking* or smoker* or antismok* or anti smok* or anti-smok*).tw. (332911)
45 (tobacco* or nicotin* or cigar* or cigs).tw. (236781)
46 or/34-45 (559889)

47 drinking 95nglish9595/ (45140)
48 alcohol consumption/ (114518)
49 exp alcohol abuse/ (34844)
50 alcohol intoxication/ (11483)
51 alcohol abstinence/ (6164)
52 exp alcoholic beverage/ or alcohol/ (256320)
53 drunkenness/ (3118)
54 ((Alcohol* or Drunk* or Drink* or beer* or wine* or liqor* or liquor* or spirit* or alcopop* or cider*) adj4 (consum* or misus* or abus* or intoxicat* or inebriat* or excess* or bing* or hazardous or harmful or heavy or problem* or risk* or frequen* or behavio?r* or temperance or abstinence or abstain* or stop or stopping)).tw. (155984)
55 or/47-54 (426009)
56 exp sexual 95nglish9595/ (193908)
57 sexual health/ (13872)
58 sexual education/ (10789)
59 exp sexually transmitted disease/ (82663)
60 Human immunodeficiency virus/ (107533)
61 bloodborne bacterium/ (1919)
62 unplanned pregnancy/ (4958)
63 birth control/ (3680)
64 adolescent pregnancy/ (9109)
65 unwanted pregnancy/ (3097)
66 contraceptive agent/ (17643)
67 condom/ (19065)
68 contraceptive 95nglish9595/ (3665)
69 female condom/ (331)
70 (95nglish9595t* or condom*).tw. (92337)
71 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (108297)
72 (STD* or STI or “sexually transmitted disease*” or “sexually transmitted infection*” or HIV*).tw. (403110)
73 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (19148)
74 (birth adj control*).tw. (4414)
75 (famil* adj3 plan*).tw. (25694)
76 or/56-75 (763969)
77 or/33,46,55,76 (2864133)
78 telemedicine/ (20032)
79 computer assisted therapy/ (4478)
80 computer interface/ (29361)
81 digital computer/ (2380)
82 software design/ (586)
83 multimedia/ (3553)
84 personal digital assistant/ (1301)
85 videorecording/ (73411)

86 Internet/ (101111)
87 social network/ (13368)
88 blogging/ (257)
89 social media/ (13901)
90 e-mail/ (17996)
91 mobile phone/ (14846)
92 text messaging/ (3838)
93 smartphone/ (7244)
94 mobile application/ (7400)
95 electronic device/ (1838)
96 video game/ (2420)
97 virtual reality/ (14185)
98 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (83470)
99 (telemed* or tele-med* or telehealth* or tele-health* or 96nglish96* or tele-car*).tw. (16924)
100 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (8205)
101 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (3795)
102 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (12384)
103 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (21092)
104 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (12736)
105 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (15189)
106 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (464892)
107 (e-mail* or email* or electronic mail*).tw. (28650)
108 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (17696)
109 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*).tw. (61766)
110 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (64114)
111 ((virtual or augmented) adj3 reality).tw. (11530)
112 automatic speech recognition/ (941)
113 interactive voice response system/ (577)
114 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw,kw. (1138)
115 IVR.tw. (1818)
116 or/78-115 (860579)
117 and/15,77,116 (23998)

118 health-economics/ or exp economic-evaluation/ or exp health-care-cost/ or pharmacoeconomics/ or Monte Carlo Method/ or Decision Tree/ (541174)
119 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab. (928134)
120 ((monte adj carlo) or markov or (decision adj2 (tree* or analys*))).ti,ab. (77974)
121 (value adj2 (money or monetary)).ti,ab. (2925)
122 Quality of Life/ or Quality Adjusted Life Year/ or Quality of Life Index/ or Short Form 36/ or Health Status/ (535533)
123 (quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (385660)
124 (disability adjusted life or daly).ti,ab. (3883)
125 Health* year* equivalent*.ti,ab. (40)
126 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six or sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve or sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen or sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty or euroqol or euro qol or eq5d or eq 5d).ti,ab. (61852)
127 or/118-126 (1743470)
128 (((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab. (35250)
129 127 not 128 (1734611)
130 117 and 129 (4845)
131 limit 130 to yr=”2000 -Current” (4793)
132 limit 131 to 97nglish language (4708)
133 exp animal/ or exp animal-experiment/ or nonhuman/ (25358585)
134 (rat or rats or mouse or mice or hamster or hamsters or animal or animals or dog or dogs or cat or cats or bovine or sheep).ti,ab,sh. (5378979)
135 exp human/ or human-experiment/ (19263219)
136 133 or 134 (25494592)
137 136 not (136 and 135) (6232240)
138 (comment or editorial or letter or news).pt. (1648938)
139 137 or 138 (7818751)
140 132 not 139 (4617)
141 limit 140 to (conference abstract or conference paper or “conference review”) (1044)
142 140 not 141 (3573)

Database name: HTA/NHS EED

1 MeSH DESCRIPTOR Health Behavior
2 MeSH DESCRIPTOR Health Knowledge, Attitudes, Practice
3 MeSH DESCRIPTOR Risk Reduction Behavior
4 MeSH DESCRIPTOR Behavior Therapy

5 MeSH DESCRIPTOR PSYCHOTHERAPY
6 MeSH DESCRIPTOR Cognitive Therapy
7 MeSH DESCRIPTOR MOTIVATION
8 MeSH DESCRIPTOR Patient Education as Topic
9 MeSH DESCRIPTOR Patient Acceptance of Health Care
10 MeSH DESCRIPTOR Health promotion
11 MeSH DESCRIPTOR Outcome and Process Assessment (Health Care)
12 (behavio?r* or lifestyle* or "life style*") AND (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)
13 (motivat*):TI
14 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13
15 MeSH DESCRIPTOR Exercise EXPLODE ALL TREES
16 MeSH DESCRIPTOR Exercise Movement Techniques EXPLODE ALL TREES
17 MeSH DESCRIPTOR Sports EXPLODE ALL TREES
18 MeSH DESCRIPTOR Exercise therapy EXPLODE ALL TREES
19 (physical* or keep* or cardio* or aerobic or fitness or increas* or more or become or becoming or be or encourag*):TI AND (fit* or activ* or train*):TI
20 MeSH DESCRIPTOR Sedentary Lifestyle
21 (exercis*):TI
22 (sedentary) AND (behavio?r* or lifestyle* or less or time or change* or changing or modification* or modify or modifying or program* or intervention*)
23 MeSH DESCRIPTOR Feeding Behavior
24 MeSH DESCRIPTOR FOOD PREFERENCES
25 MeSH DESCRIPTOR Nutrition therapy
26 MeSH DESCRIPTOR Diet
27 MeSH DESCRIPTOR body mass index
28 MeSH DESCRIPTOR healthy diet
29 (diet*):TI
30 (health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) AND (eat* or diet* or food* or nutrition* or weight* or overweight)
31 (fruit* or vegetable*) AND (intake* or consum* or eat* or ate)
32 #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31
33 MeSH DESCRIPTOR Smoking
34 MeSH DESCRIPTOR Smoking cessation
35 MeSH DESCRIPTOR Tobacco use cessation
36 MeSH DESCRIPTOR Tobacco use EXPLODE ALL TREES
37 MeSH DESCRIPTOR Tobacco use disorder
38 MeSH DESCRIPTOR vaping EXPLODE ALL TREES
39 (ecig* or e-cig* or e-voke* or juul* or vape* or vaping*)
40 MeSH DESCRIPTOR tobacco use cessation products
41 (waterpipe* or water pipe* or dokha or dokhas or hookah or hookahs or hooka or hookas or shisha or shishas or sheesha or sheeshas)

42 (smoking* or smoker* or antismok* or anti smok* or anti-smok*)
43 (tobacco* or nicotin* or cigar* or cigs)
44 #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43
45 MeSH DESCRIPTOR Alcohol-related disorders EXPLODE ALL TREES
46 MeSH DESCRIPTOR Alcohol drinking EXPLODE ALL TREES
47 MeSH DESCRIPTOR Alcoholic beverages EXPLODE ALL TREES
48 MeSH DESCRIPTOR drinking behavior
49 (Alcohol* or Drunk* or Drink* or beer* or wine* or liqor* or liquor* or spirit* or alcopop* or cider*) AND (consum* or misus* or abus* or intoxicat* or inebriat* or excess* or bing* or hazardous or harmful or heavy or problem* or risk* or frequen* or behavio?r* or temperance or abstinence or abstain* or stop or stopping)
50 #45 OR #46 OR #47 OR #48 OR #49
51 MeSH DESCRIPTOR sexual behavior EXPLODE ALL TREES
52 MeSH DESCRIPTOR reproductive behavior EXPLODE ALL TREES
53 MeSH DESCRIPTOR sex education
54 MeSH DESCRIPTOR sexually transmitted diseases EXPLODE ALL TREES
55 MeSH DESCRIPTOR HIV
56 MeSH DESCRIPTOR blood-borne pathogens
57 MeSH DESCRIPTOR pregnancy, unplanned
58 MeSH DESCRIPTOR contraception EXPLODE ALL TREES
59 MeSH DESCRIPTOR pregnancy in adolescence
60 MeSH DESCRIPTOR pregnancy, unwanted
61 MeSH DESCRIPTOR contraceptive agents
62 MeSH DESCRIPTOR condoms
63 MeSH DESCRIPTOR condoms, female
64 MeSH DESCRIPTOR contraception behavior EXPLODE ALL TREES
65 (contracep* or condom*)
66 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*)
67 (sex* or intercourse or coit*) AND (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)
68 (pregnan*) AND (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)
69 (birth) AND (control*)
70 (famil*) AND (plan*)
71 #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70
72 #32 OR #44 OR #50 OR #71
73 MeSH DESCRIPTOR Telemedicine
74 MeSH DESCRIPTOR Therapy, Computer-Assisted
75 MeSH DESCRIPTOR User-Computer Interface
76 MeSH DESCRIPTOR Software design
77 MeSH DESCRIPTOR Multimedia
78 MeSH DESCRIPTOR Computers, Handheld
79 MeSH DESCRIPTOR Videotape Recording
80 MeSH DESCRIPTOR Internet

81 MeSH DESCRIPTOR Social Networking
82 MeSH DESCRIPTOR Blogging
83 MeSH DESCRIPTOR social media
84 MeSH DESCRIPTOR Electronic Mail
85 MeSH DESCRIPTOR cell phones
86 MeSH DESCRIPTOR text messaging
87 MeSH DESCRIPTOR Smartphone
88 MeSH DESCRIPTOR Mobile Applications
89 MeSH DESCRIPTOR Video games
90 MeSH DESCRIPTOR Virtual Reality Exposure Therapy
91 ((digital* or digitis* or digitiz* or electronic*)) AND ((intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*))
92 ((telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*))
93 ((ehealth* or e-health* or mhealth* or m-health* or mobile health*))
94 ((laptop or palm or handheld or tablet or pda or pc)) AND (comput*)
95 ((mobile* or cell* or tablet*)) AND ((phone* or telephone* or handset* or hand-set*))
96 ((smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*))
97 ((mobile or electronic* or digital*)) AND ((device* or tablet*))
98 ((mobile or electronic* or digital* or device* or software*)) AND (application*)
99 ((app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*))
100 ((e-mail* or email* or electronic mail*))
101 ((text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*))
102 ((Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or siri or fitbit*))
103 ((social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*))
104 ((virtual or augmented)) AND (reality)
105 MeSH DESCRIPTOR Speech Recognition Software
106 ((voice* or speech or speak*)) AND (response*) AND ((interact* or unit*))
107 (IVR)
108 #73 OR #74 OR #75 OR #76 OR #77 OR #78 OR #79 OR #80 OR #81 OR #82 OR #83 OR #84 OR #85 OR #86 OR #87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107
109 #14 AND #72 AND #108
110 (#109) IN NHSEED, HTA FROM 2000 TO 2019

Database name: Econlit

1 ((behavio?r* or lifestyle* or "life style*") and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ti. (1335)
2 ((behavio?r* or lifestyle* or "life style*") adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or technique* or establish* or individual*)).ab. (4267)
3 motivat*.ti. (2385)
4 or/1-3 (7713)
5 ((physical* or keep* or cardio* or aerobic or fitness or increas* or more or become or becoming or be or encourag*) adj3 (fit* or activ* or train*)).ti. (313)
6 exercis*.ti. (982)
7 (sedentary adj3 (behavio?r* or lifestyle* or less or time or change* or changing or modification* or modify or modifying or program* or intervention*)).tw. (30)
8 diet*.ti. (589)
9 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition* or weight* or overweight)).tw. (3617)
10 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).tw. (140)
11 or/5-10 (5350)
12 (ecig* or e-cig* or e-voke* or juul* or vape* or vaping*).tw. (26)
13 (waterpipe* or water pipe* or dokha or dokhas or hookah or hookahs or hooka or hookas or shisha or shishas or sheesha or sheeshas).tw. (18)
14 (smoking* or smoker* or antismok* or anti smok* or anti-smok*).tw. (2028)
15 (tobacco* or nicotin* or cigar* or cigs).tw. (2513)
16 or/12-15 (3638)
17 ((Alcohol* or Drunk* or Drink* or beer* or wine* or liqor* or liquor* or spirit* or alcopop* or cider*) adj4 (consum* or misus* or abus* or intoxicat* or inebriat* or excess* or bing* or hazardous or harmful or heavy or problem* or risk* or frequen* or behavio?r* or temperance or abstinence or abstain* or stop or stopping)).tw. (1658)
18 (contracep* or condom*).tw. (1206)
19 ((sex* or intercourse or coit*) adj3 (risk* or protected or unprotected or safe* or unsafe* or behavio?r* or health* or unhealth* or educat*)).tw. (936)
20 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*" or HIV*).tw. (2056)
21 (pregnan* adj3 (unplanned or planned or unwanted or unintended or unintentional* or repeat* or adolescen* or teen*)).tw. (280)
22 (birth adj control*).tw. (191)
23 (famil* adj3 plan*).tw. (959)
24 or/18-23 (4585)
25 or/11,16-17,24 (14591)
26 ((digital* or digitis* or digitiz* or electronic*) adj3 (intervention* or therap* or treatment* or medicine* or medical* or health* or monitoring or clinical* or communicat* or technol* or media* or device* or platform* or forum* or community* or communities* or discussion*)).tw. (1567)
27 (telemed* or tele-med* or telehealth* or tele-health* or telecar* or tele-car*).tw. (50)

28 (ehealth* or e-health* or mhealth* or m-health* or mobile health*).tw. (61)
29 ((laptop or palm or handheld or tablet or pda or pc) adj2 comput*).tw. (62)
30 ((mobile* or cell* or tablet*) adj (phone* or telephone* or handset* or hand-set*)).tw. (1151)
31 (smartphone* or smart-phone* or smart telephone* or iphone* or i-phone* or ipad* or i-pad* or blackberry* or smartwatch* or smart-watch* or android or device-based or mobile-based or podcast*).tw. (342)
32 ((mobile or electronic* or digital*) adj2 (device* or tablet*)).tw. (218)
33 ((mobile or electronic* or digital* or device* or software*) adj3 application*).tw. (346)
34 (app or apps or wearable* or online* or on-line* or internet* or www or web or website* or webpage* or portal or search engine*).tw. (15934)
35 (e-mail* or email* or electronic mail*).tw. (528)
36 (text messag* or texting or texter* or texted or SMS or short messag* or multimedia messag* or multi-media messag* or mms or instant messag* or picture messag* or audio messag*).tw. (263)
37 (Facebook* or YouTube* or Twitter* or LinkedIn* or Pinterest* or Google* or Tumblr* or Instagram* or WhatsApp* or Reddit* or Flickr* or SnapChat* or Yahoo* or Bing* or MSN* or Wikipedia* or Web 2* or alexa or fitbit*).tw. (1824)
38 (social media* or social network* or blog* or vlog* or video-blog* or gaming or game or games or gamification or wii fit or discussion board* or online forum*).tw. (36084)
39 ((virtual or augmented) adj3 reality).tw. (78)
40 ((voice* or speech or speak*) adj3 response* adj3 (interact* or unit*)).tw. (6)
41 IVR.tw. (8)
42 or/26-41 (54807)
43 and/4,25,42 (20)
44 limit 43 to yr="2000 -Current" (19)

Appendix F – Public health evidence tables

Intervention mode: internet-based programme

Bannink 2014

Bibliographic reference/s	**Bannick R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial. Journal of Medical Internet Research. 2014 May 16(5):e143.**
Study name	Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial
Registration	Nederlands Trial Register: NTR 3596; http://www.trialregister.nl/trialreg/admin/rctview.asp?TC=3596
Study type	Cluster RCT
Study dates	September 2012 – May 2013
Objective	To evaluate the effect of E-health4Uth and E-health4Uth and consultation on well-being and health behaviours delivered in preventative youth health care in secondary schools.
Country/ Setting	Netherlands
Number of participants / clusters	Of the 1989 eligible adolescents, 1702 (85.57%) participated: 533 (84.7%) in the E-health4Uth group, 554 (84.2%) in the E-health4Uth and consultation group, and 615 (87.6%) in the control group
Attrition	In total, 1256 adolescents participated at 4-month follow-up (73.79%). E-health4Uth group, 533 completed intervention and questionnaire, 392 completed follow-up. Extra participants were gained from self-referral (n=19) and because they were considered as at risk of mental health problems after consultation (n=17). E-health4Uth plus counselling group, 554 completed intervention and questionnaire, 430 completed follow-up. Extra participants were gained from referral (n=103), self-referral (n=8) and because they were considered as at risk of mental health problems after consultation (n=96). Control group, 615 completed questionnaire, 434 completed follow-up. Extra participants were gained from self-referral (n=14) and consultation (n=13).

<table>
<tr><td>Bibliographic reference/s</td><td colspan="4">Bannick R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial. Journal of Medical Internet Research. 2014 May 16(5):e143.</td></tr>
<tr><td>Study name</td><td colspan="4">Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial</td></tr>
<tr><td>Participant /community characteristics.</td><td colspan="4">TABLE 1. Comparison of baseline characteristics and sex risk

<table>
<tr><td></td><td>Intervention + counselling (n=658)
No. (%)</td><td>Intervention (n =629)
No. (%)</td><td>Control (n =702)
No. (%)</td></tr>
<tr><td>Number of school classes</td><td>26</td><td>27</td><td>25</td></tr>
<tr><td>Age (years), mean (SD)</td><td>15.95 (0.70)</td><td>15.84 (0.70)</td><td>15.79 (0.66)</td></tr>
<tr><td>Gender (female)</td><td>189 (44.0)</td><td>169 (43.1)</td><td>211 (48.6)</td></tr>
<tr><td>Ethnicity (Dutch)</td><td>241 (56.0)</td><td>223 (56.9)</td><td>223 (51.4)</td></tr>
<tr><td>Condom use

Never
Sometimes
Usually
Always</td><td>

12 (9.2)
25 (19.2)
25 (19.2)
68 (52.3)</td><td>

11 (11.2)
14 (14.3)
21 (21.4)
52 (53.1)</td><td>

14.6 (14)
18 (18.8)
15 (15.6)
49 (51.0)</td></tr>
<tr><td>CHQ-CF-GH4 score, mean (SD)</td><td>71.62 (18.49)</td><td>71.39 (17.87)</td><td>73.67 (17.78)</td></tr>
</table></td></tr>
<tr><td>Method of allocation</td><td colspan="4">School classes were the unit of randomisation at the individual level. A computer-generated list of random numbers was used to allocate school classes to one of the study arms. The randomization sequence was stratified with a 1:1:1 allocation using random block sizes of 3. This list was prepared by an investigator with no involvement in the trial and was applied by the researchers.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="4">Not reported</td></tr>
<tr><td>Exclusion criteria</td><td colspan="4">Not reported</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td colspan="3">Details</td></tr>
</table>

Bibliographic reference/s	**Bannick R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial. Journal of Medical Internet Research. 2014 May 16(5):e143.**	
Study name	Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial	
	Brief Name	E-health4Uth
	Rationale/theory/Goal	By completing E-health4Uth, adolescents will show a higher level of well-being and less risky behaviour at 4 months compared to control group. Adolescents in the E-health4Uth plus counselling will show a higher level of well-being and less risky behaviour at 4 months compared to control group. To gain more insight into the combined effect of E-health4Uth with a consultation, we assessed effects on well-being in the subgroup of adolescents' at risk of mental health problems at baseline, because only these adolescents were invited for a consultation with the nurse.
	Materials used	Internet-based self-reporting questionnaire on their health behaviours and tailored messages on individuals' behaviours.
	Procedures used	*E-health4Uth* During one classroom session (approximately 45 min), adolescents completed a self-report questionnaire via the Internet to assess health-risk behaviour and well-being with respect to the following topics: alcohol consumption, drug use, smoking, sexual behaviour, bullying, mental health status, suicidal thoughts, suicide attempts, and unpleasant sexual experiences. The questionnaire served as a baseline measurement and a basis to tailor the messages. The questionnaire was formed based on existing public health and health institutes instruments. Use of the instruments is backed by the National Institute for Public Health and Environment (RIVM), the Dutch association for residential and homecare organizations and infant and child health clinics (Actiz), and the Association of Municipal Public Health Services in the Netherlands (GGD Nederland). After completing the questionnaire, the participants received messages of similar length for each topic covered, tailored by answers given in the questionnaire. Messages were developed by the Department of Health Promotion and Health Education of the University of Maastricht, specifically with adolescents in mind. For each topic, a score was computed which was compared with the Dutch health norms for adolescents. Based on this score, a message was immediately presented on the screen that reflected the person's current behaviour or well-being in relation to the Dutch health norm,

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Study name	Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial	
		and the adolescent was offered advice to change unhealthy behaviour and/or to talk to a person of trust. The messages were displayed in red, orange, or green, indicating unhealthy behaviour, behaviour just below the norm, or behaviour meeting the Dutch health norm, respectively. The topics on well-being were always displayed in blue. Adolescents were encouraged to read more information on the topics and were provided with relevant links and were invited to follow the e-health4Uth Facebook page. Adolescents could self-refer to the nurse or email the nurse. After 1 month, adolescents received a reminder of the tailored messages by email. *e-Health4Uth and consultation interview* Participants in this group received the same intervention as the e-Health4Uth only group. Adolescents at risk of mental health problems as assessed by the nurse were invited for a consultation. Adolescents were classified as at risk of mental health problems when their score on the total problem scale of the Strengths and Difficulties Questionnaire (SDQ) was higher than 16, and/or their score on the SDQ for emotional problems was higher than 5, and/or they reported having suicidal thoughts occasionally or more frequently (or did not want to answer this question), and/or they reported a suicide attempt within the past year (or did not want to answer this question). The consultation took place at school with nurses already working at the school, experienced in consultation with adolescents at approximately 13 years of age. Nurses were trained in motivational interview techniques for adolescents 15-16 years of age. They received the results of the assessment for each referred adolescent before the consultation. During the consultation, the nurses focused on specific risk areas and on mental health in particular. Furthermore, they either initiated a further consultation with themselves or referred adolescents to another professional if they deemed this necessary. *Control*

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Bannick R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial. Journal of Medical Internet Research. 2014 May 16(5):e143.</td></tr>
<tr><td>Study name</td><td colspan="2">Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial</td></tr>
<tr><td rowspan="9"></td><td></td><td>Completed the same questionnaire as the two intervention groups, except questions on unpleasant sexual experience and suicide, as these were used to tailor messages not as measurements. Adolescents received no messages after the questionnaire.</td></tr>
<tr><td>Provider</td><td>-</td></tr>
<tr><td>Method of delivery</td><td>Internet, computer-based.</td></tr>
<tr><td>Location</td><td>Schools, The Netherlands</td></tr>
<tr><td>Duration</td><td>Questionnaire – 45 mins; Interview – not reported</td></tr>
<tr><td>Intensity</td><td>One session with optional extra reading after completing intervention</td></tr>
<tr><td>Tailoring/adaptation</td><td>Messages are tailored based on adolescents' responses</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">4 months</td></tr>
<tr><td>Data collection</td><td colspan="2">Condom use was assessed on ordinal scales by how often the adolescent had used condoms during intercourse (never to always). This question was only present if it was applicable, i.e. the adolescent was sexually active.
Health-related quality of life was measured by 4 items of the general health perceptions scale of the Child health Questionnaire-Child Form (CHQ-CF-GH4). One item is scored on a 5-point scale (1=excellent; 2-very good; 3=good; 4=moderate; 5=bad) and 3 items on a 5-point scale (1=true; 2=usually true; 3=do not know; 4=usually not true; 5=not true) A total score is calculated by weighing the scores and summing the weighed scores for all items (range 0-100).</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Change of behaviour baseline to 4-month follow-up
<table>
<tr><th></th><th>Intervention plus interview n (%)</th><th>Intervention n (%)</th><th>Control n (%)</th></tr>
<tr><td>Condom use during intercourse</td><td>4 months</td><td>4 months</td><td>4 months</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td>Bannick R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial. Journal of Medical Internet Research. 2014 May 16(5):e143.</td></tr>
<tr><td>Study name</td><td>Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial</td></tr>
<tr><td></td><td>
<table>
<tr><td>Always
Usually
Sometimes
Never</td><td>66 (43.7)
32 (21.2)
38 (25.2)
15 (9.9)</td><td>62 (52.1)
24 (20.2)
18 (15.1)
15 (12.6)</td><td>43 (40.6)
15 (14.2)
27 (25.5)
21 (19.8)</td></tr>
<tr><td></td><td>p vs control = 0.55</td><td>p vs control = 0.50</td><td></td></tr>
</table>
All values are n (%) unless specified otherwise.

Only raw data from intervention vs control were used for the meta-analysis.</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td>Table 2. Change in health-related quality of life from baseline to 4-month follow-up

<table>
<tr><td></td><td colspan="2">Intervention+ interview</td><td colspan="2">Intervention</td><td colspan="2">Control</td></tr>
<tr><td rowspan="3">CHQ-CF-GH4 score, mean (SD)</td><td>4 months</td><td>Change</td><td>4 months</td><td>Change</td><td>4 months</td><td>Change</td></tr>
<tr><td>74.00 (18.49)</td><td>+2.38 (18.49)</td><td>75.34 (16.56)</td><td>+3.95 (17.25)</td><td>73.73 (18.17)</td><td>+0.06 (17.98)</td></tr>
<tr><td colspan="2">p vs control = 0.10</td><td colspan="2">p vs control = 0.07</td><td colspan="2"></td></tr>
</table>
This outcome was not used in the meta analysis</td></tr>
<tr><td>Statistical Analysis</td><td>Participants were analysed in the groups to which they had been randomized, regardless of whether they received the allocated intervention or not (eg, not attending consultation after an invitation). Each analysis of the effectiveness of the intervention was performed on the follow-up data that was available on the outcome concerned. The multilevel regression analyses were performed in Stata 13.0 (StataCorp LP, College Station, TX, USA). Other analyses were performed in SPSS 21.0 (IBM Corp, Armonk, NY, USA). The significance level was set at .05 and tests were 2-sided. To indicate the clinical significance of any benefits of the interventions, we also report odds ratios (OR) for categorical and ordinal outcomes and Cohen's d (d) for continuous outcomes.
Differences between baseline characteristics of each of the groups were tested with t tests for continuous variables, Mann-Whitney U tests for ordinal variables and ch-squared tests for categorical variables. The effectiveness of the intervention was investigated by</td></tr>
</table>

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Study name	Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial		
	muttilevel logistic regression (categorical variables, ordinal (ordinal variables) and linear (continuous variables) regression analyses. Multilevel analysis adjusts for clusters (ie, classes) by taking the dependency between observations of adolescents from the same class into account. For the multilevel linear regression analyses, a bootstrapping method was used, to deal with the skewness of data. All regression analyses were adjusted for demographic factors that differed significantly between groups.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments (study adjusted for clustering)**
	Risk of bias arising from the randomisation process	Low risk	Randomisation present (by computer) No baseline differences were identified.
	Risk of bias due to deviations from intended interventions (assignment)	some concerns	Allocation assignment concealed. Per protocol analyses used.
	Risk of bias due to deviations from intended interventions (adherence)	Some concerns	Referrals from other arms where appropriate.
	Missing outcome data	High risk	High attrition rate overall.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Low risk	Data does not appear to be reported based on results.
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding	ZonMw, The Netherlands Organization for Health Research and Development		
Comments			

Bibliographic reference/s	**Bannick R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial. Journal of Medical Internet Research. 2014 May 16(5):e143.**	
Study name	Effectiveness of a Web-Based Tailored Intervention (E-health4Uth) and Consultation to Promote Adolescents' Health: Randomized Controlled Trial	
Additional references		
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences	
	Reward and threat	
	Repetition and substitution	
	Antecedents	
	Associations	
	Covert Learning	
	Natural Consequences	
	Feedback and monitoring	x
	Goals and planning	
	Comparison of the behaviour	
	Social support	
	Self-belief	
	Comparison of outcomes	x
	Identity	
	Shaping knowledge	x
	Regulation	

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<table>
<tr><td>Bibliographic reference/s</td><td>Bailey JV, Webster R, Griffin M, Freemantle N, Hunter R, Rait G, Estcourt C, Anderson J, Gerressu M, Stephenson J, Michie S. The Men’s Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men. Digital health. 2016 Nov;2:2055207616679002.</td></tr>
<tr><td>Study name</td><td>The Men’s Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men</td></tr>
<tr><td>Registration</td><td>Trial registration number: ISRCTN18649610</td></tr>
<tr><td>Study type</td><td>RCT</td></tr>
<tr><td>Study dates</td><td>28 July 2014 and 2 July 2015</td></tr>
<tr><td>Objective</td><td>To determine the feasibility of an online randomised controlled trial of the Men’s Safer Sex website, measuring condom use and sexually transmitted infection.</td></tr>
<tr><td>Country/ Setting</td><td>UK</td></tr>
<tr><td>Number of participants / clusters</td><td>N=159 men

99 were assigned to the intervention and 77 to control group.</td></tr>
<tr><td>Attrition</td><td>Only 23 in the intervention and 34 in the control group responded to 3-month online questionnaire. High attrition rates</td></tr>
<tr><td>Participant /community characteristics.</td><td>TABLE 1. Baseline characteristics

<table>
<tr><td>Demographic characteristics</td><td>Intervention n=84</td><td>Control n=75</td></tr>
<tr><td>Age, mean (SD)</td><td>29.3 (8.8)</td><td>29.5 (8.4)</td></tr>
<tr><td>Employment status, n (%)

School/college/training</td><td>

10 (11.9)</td><td>

19 (25.3)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Bailey JV, Webster R, Griffin M, Freemantle N, Hunter R, Rait G, Estcourt C, Anderson J, Gerressu M, Stephenson J, Michie S. The Men’s Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men. Digital health. 2016 Nov;2:2055207616679002.</td></tr>
<tr><td>Study name</td><td colspan="2">The Men’s Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men</td></tr>
<tr><td></td><td colspan="2"><table>
<tr><td>Working
Unemployed
Long- term or disabled
Other</td><td>61 (72.6)
11 (13.1)
1 (1.2)
1 (1.2)</td><td>49 (65.3)
5 (6.7)
0 (0)
2 (2.7)</td></tr>
<tr><td>Ethnicity
White British/Irish/Other</td><td>60 (71.4)</td><td>50 (66.7)</td></tr>
</table></td></tr>
<tr><td>Method of allocation</td><td colspan="2">Participants were randomly allocated 1:1 using an automated computer algorithm to either the intervention or control group. This allocation was unalterable.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="2">Male ≥16 years old; able to read English; with access to the internet; and at high risk of future STI (i.e. two or more sexual partners in the past
year and some non-condom use in the last 3 months; or symptoms of acute STI; or seeking treatment for an STI); and for whom at least half of their sexual
partners are female.</td></tr>
<tr><td>Exclusion criteria</td><td colspan="2">HIV-positive men and men with hepatitis B or C were excluded, since patients with these diagnoses are likely to receive health promotion in the course of routine clinical care. Men who have had sexual experience only ever with males, predominately with males, or no sexual experience at all were also excluded.</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td></td><td>Brief Name</td><td>The Men’s Safer Sex</td></tr>
<tr><td></td><td>Rationale/theory/Goal</td><td>The website addresses men’s barriers to condom use, particularly
condom use skills, impact upon pleasure and
judgement about potential risk of STI.
Relevant BCTs included instruction on how to perform the
behaviour and demonstration of the behaviour
The relevant BCT was problem solving.
Relevant BCTs included the use of nonspecific incentive, restructuring the physical environment, instructions on how to</td></tr>
</table>

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Study name	The Men's Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men	
		perform the behaviour, behaviour substitution, information about health consequences, focus on past success, distraction, behavioural practice/rehearsal, anticipated regret, information about social and environmental consequences, and social incentive.
	Materials used	Content was developed using behaviour change techniques, and interactive website features provided feedback tailored for individual users.
	Procedures used	The content and design of the intervention was based on evidence from the sexual health literature, theories of behaviour change, qualitative interviews with men in sexual health clinics and discussions with clinical and academic experts in sexual health and digital technologies. The development process was iterative, with a high level of user involvement. The website content incorporates behaviour-change techniques, and provides tailored feedback for individual users to address their barriers to condom use.
	Provider	-
	Method of delivery	website
	Location	Recruitment was done in three UK sexual clinics.
	Duration	
	Intensity	
	Tailoring/adaptation	Tailored feedback for individual users to address their barriers to condom use
	Planned treatment fidelity	-
	Actual treatment fidelity	-
	Other details	-
Follow up	3, 6 & 12 months	
Data collection	For sexual health outcomes, the Sexunzipped online sexual health questionnaire was used. The main sexual health outcome of interest was the number of episodes of condomless vaginal or anal sex with female partner/s over the previous 3 months, assessed at the 3-month follow-up. Participants were also asked to report the number of sexual partners over the last 3 months (both female and male).	

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Study name	The Men's Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men
	Participants were asked to report STI diagnoses over the past 3 months at every follow-up point. In order to assess laboratory diagnoses, all STI diagnoses recorded in sexual health clinic records over the 12-month study period (at the participating sites) were collected at the end of the study. Engagement of the intervention was also assessed. Customised DrupalTM web analytics software was used to record website usage (times the website was visited, pages visited).
Critical outcomes measures and effect size. (time points)	**TABLE 1. Condomless sex and STI diagnoses at baseline and follow-up.**

	Intervention (n=84)					**Control (n=75)**				
	Lower quartile	**median**	**Upper quartile**	**Max**	**N**	**Lower quartile**	**median**	**Upper quartile**	**Max**	**N**
Episodes of condomless vaginal or anal sex with a woman (in the past 3 months)										
Baseline	1	4	20	155	72	2	6	20	50	72
3 months	2	10	40	100	23	3	12	30	100	34
Self-reported STI in the last 3 months (online)										
Baseline	0	0	0	1	72	0	0	0	2	72
3 months	0	0	0	1	22	0	0	0	1	34

Table 2. Group comparisons for condomless sex and STI diagnoses

	baseline		**Follow-up**					
	Control Median (n) Inter-quartile	**Intervention Median (n) Inter-quartile range**	**Control Median (n) Inter-quartile**	**Intervention Median (n) Inter-quartile range**	**IRR**	**95% confidence interval**	**p-value**	**n**

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	range		**range**					
Number of episodes of condomless sex with a woman (in 3 months, at 3-month follow-up)	6 (72) 2,20	4 (72) 1,20	12 (34) 3,30	10 (23) 2,40	1.01	(0.52,1.96)	0.975	55
Number of STI diagnoses from clinic notes (over 1 year, at 12-month follow-up)	0 (69) 0,1	0 (80) 0,1	0 (69) 0,0	0 (80) 0,0	0.75	(0.29,1.90)	0.543	149

New acute STI diagnoses were recorded for 8.8% (7/80) of men in the intervention group, and 13.0% (9/69) in the control group over the course of 12 months. There was no statistically significant difference between the groups
(IRR 0.75; 95% CI 0.29 to 1.90).

	STI+	STI-
intervention	7	73
control	9	60

Relative risk was calculated using the data from the above table, RR=0.67(0.2637-1.7067)

Important outcomes measures and effect size. (time points)	**Website usage** Some 37% of participants in the intervention group visited the Men's Safer Sex website once (n=31/84), 26% more than once (n=22/84), and 37% did not see the website at all (n=31/84). Twenty-two (26%) participants returned to the website after leaving the clinic, with 59% of these participants logging into the

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Study name	The Men's Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men		
	website twice in total (n=13/22). The maximum number of return visits was eight. Participants visited a median number of 15 pages out of a total of 34 main topic or activity pages. Several factors hampered men's access to the intervention website: technical problems with clinic Wi-Fi stability, time taken with online research procedures (registration, consent, baseline outcome measurement), and being called in to appointments before accessing the intervention website.		
Statistical Analysis	The treatment effect at follow-up was estimated using generalised linear models with a loge link and Poisson error. The loge of the baseline values were included in each model as explanatory variables to account for baseline differences. Standard errors were estimated using variance components to account for over dispersion in the models. Incidence rate ratios (IRRs) comparing the control versus intervention groups were estimated from these models along with their 95% confidence intervals and p-values. Differences scores from pre- to posttest for anal sex index, casual partner were compared across groups using Student's t test and a difference was considered significant at p<.05.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Low risk	Automated computer algorithm was used for randomisation.
	Risk of bias due to deviations from intended interventions (assignment)	Low risk	Participants aware of assignment. Research staff and statistician blind. No deviations from assignment. Assigned by computer.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to regimen.
	Missing outcome data	High risk	High attrition rate and no analyses to account for this.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting outcomes
	Risk of bias in selection of the reported result	Low risk	Registered protocol
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		

Bibliographic reference/s	**Bailey JV, Webster R, Griffin M, Freemantle N, Hunter R, Rait G, Estcourt C, Anderson J, Gerressu M, Stephenson J, Michie S. The Men's Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men. Digital health. 2016 Nov;2:2055207616679002.**	
Study name	The Men's Safer Sex Trial: A feasibility randomised controlled trial of an interactive digital intervention to increase condom use in men	
Source of funding	This work was supported by a Health Technology Assessment (HTA) grant from the National Institute for Health Research.	
Comments		
Additional references		
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences	
	Reward and threat	x
	Repetition and substitution	
	Antecedents	x
	Associations	x
	Covert Learning	
	Natural Consequences	x
	Feedback and monitoring	x
	Goals and planning	x
	Social support	
	Comparison of behavior	x
	Self-belief	x
	Comparison of outcomes	
	Identity	
	Shaping knowledge	x
	Regulation	

Bowen 2008

<table>
<tr><td>Bibliographic reference/s</td><td>Bowen AM, Williams ML, Daniel CM, Clayton S. Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of Behavioural Medicine. 2008 Dec 31(6):463-477.</td></tr>
<tr><td>Study name</td><td>Internet based HIV prevention research targeting rural MSM:
feasibility, acceptability, and preliminary efficacy</td></tr>
<tr><td>Registration</td><td>-</td></tr>
<tr><td>Study type</td><td>pre and post test study</td></tr>
<tr><td>Study dates</td><td>Not reported</td></tr>
<tr><td>Objective</td><td>To examine the feasibility of a completely electronic research study where participants were recruited through banner ads, automatically randomized, informed of intervention procedures and completed multiple post-test questionnaires. To assess the retention of the program across multiple sessions. To assess module specific effects on skills model cognitions. To determine if the modules had a dose response effect on cognitive variables including self-efficacy and willingness to engage in risk reduction.</td></tr>
<tr><td>Country/ Setting</td><td>USA</td></tr>
<tr><td>Number of participants / clusters</td><td>425
427 completed pre-test</td></tr>
<tr><td>Attrition</td><td>375 retained at post-test 1 (88.2%)
326 retained at post-test 2 (76.7%)
294 retained at post-test 3 (69.2%)</td></tr>
<tr><td>Participant /community characteristics.</td><td>TABLE 1. Comparison of baseline characteristics and sex risk

<table>
<tr><td></td><td>Dropped out (n=131)</td><td>Completed
(n =294)</td></tr>
<tr><td>Age (%)
18-24
25-34
35-44
45-80</td><td>
48.9
29
8.4
13.7</td><td>
46.8
31.1
15.0
7.2</td></tr>
<tr><td>Sexual orientation
Gay</td><td>
86.3</td><td>
84.4</td></tr>
</table>
</td></tr>
</table>

Bibliographic reference/s	**Bowen AM, Williams ML, Daniel CM, Clayton S. Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of Behavioural Medicine. 2008 Dec 31(6):463-477.**	
Study name	Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy	
	Bisexual Heterosexual	13.7 0	15.3 0.3
	Ethnicity Non-hispanic white Hispanic Asian/API, African. Amer., Native. Amer., other	 80.2 9.9 9.9	 77.2 8.8 13.9
	Work status Full time Part time Unemployed	 53.1 20 26.9	 55.7 17.9 26.5
	Income <15000 15000-24999 25000-49999 >50000	 42.7 21.4 26 9.9	 36.7 25.9 27.9 9.5
Method of allocation		
Inclusion criteria	≥18 years old Has sex with a man in the last 12 months Lived in a rural area (living in a town of 75,000 people or fewer and at least 60 min drive from an urban centre)	
Exclusion criteria	Not reported	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	(Wyoming Rural AIDS Prevention Project) WRAPP
	Rationale/theory/Goal	Participants completed 3 modules, one 2-16 days before each of the 3 post tests. It was hypothesized that there would be a significantly greater increase in knowledge and knowledge

Bibliographic reference/s	**Bowen AM, Williams ML, Daniel CM, Clayton S. Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of Behavioural Medicine. 2008 Dec 31(6):463-477.**	
Study name	Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy	
		related self-efficacy (i.e., mechanical self-efficacy) after participation in the Knowledge modules than either of the other two modules (partner and contexts of risks).
	Materials used	3 modules hosted on the website (http://www.wrapphome.net/)
	Procedures used	All 3 of the modules were included in the 6 study arms. In the different arms, the participants completed the modules in different orders (spaced over days/weeks). After every module, participants completed a post-test questionnaire. *Knowledge module* This module was developed as the information component of the IMB model. It is a scripted conversation between a HIV-positive gay man and a second man with a recent high-risk sexual experience. It deals with living with HIV and prevention. Dialogue is broken up with interactive activities. More information and external links are made available. *Partner module* This model is the motivational component of the IMB model. It contrasts life goals with short-term high-risk situations as a scripted discussion about new and casual sex partners between 4 virtual men and the participant. It focuses on participants' long-term life goals, excuses for having unsafe sex, and determining if life goals are consistent with unsafe sex. Participants choose approaches to insisting on condom use and rating willingness to try the approach in an interactive dialogue. Participants' red flags (e.g. loneliness) that may lead to unsafe sex are identified. An interactive dialogue focusing on safe sex is presented for each of the red flags identified. *Context module* This module identifies specific risk reduction behaviours when looking for sex partners in bars and on the internet. A scripted discussion occurs between 4 virtual men and the participants, which suggests ways to improve safe sex. Participants identify red flags for safe sex and preferred approaches to safer sex. The module gives pros and cons of chat rooms and how to increase safety of face-to-face meetings.
	Provider	-
	Method of delivery	Internet
	Location	USA

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Bowen AM, Williams ML, Daniel CM, Clayton S. Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of Behavioural Medicine. 2008 Dec 31(6):463-477.</td></tr>
<tr><td>Study name</td><td colspan="2">Internet based HIV prevention research targeting rural MSM:
feasibility, acceptability, and preliminary efficacy</td></tr>
<tr><td rowspan="6"></td><td>Duration</td><td>10 (minimum) to 75 (maximum) days</td></tr>
<tr><td>Intensity</td><td>3 modules, each at least 48h apart</td></tr>
<tr><td>Tailoring/adaptation</td><td>Feedback depended on participant’s input to the interactive dialogue.</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">10-75 days</td></tr>
<tr><td>Data collection</td><td colspan="2">Questionnaires were filled out before completing the intervention (pre-test) and after completion of each intervention module (post-tests 1,2 & 3). Questionnaires were identical except demographic characteristics and behavioural histories were in the pre-test only. All questionnaires assessed participants’ HIV/AID knowledge, cognitive precursors to risk reduction behaviours (i.e., self-efficacies, outcome expectancies, and willingness to change risk behaviours), and recent HIV sexual risk behaviours.
Participants were evaluated on condom use expectancies by rating whether a statement reflected a belief about using condoms that was important on a 6-point Likert-type scale, “not important” to “very important”.
Actual condom use was assessed by asking “Of the (insert # anal sex partners) men you had anal sex with, how many did you use a condom with EVERY time?’’ The condom use index (CUI) was computed by dividing the number of partners with whom condom was used every time by the number of partners with whom the participant had anal sex.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Change of behaviour baseline to follow-up
<table>
<tr><th></th><th>Pre-test</th><th>Post-test 3</th><th>MD (SD)</th></tr>
<tr><td rowspan="2">Condom use/frequency of anal sex, mean (SD)</td><td>0.44 (0.46)</td><td>0.66 (0.44)</td><td>+0.22 (0.45)</td></tr>
<tr><td colspan="2">p < 0.001</td><td></td></tr>
</table>
All values are represented as proportion of times using condoms per instance of anal sex.
There was no control group, so the results are combined for the 6 arms as before and after results. Men who did not have sex were not included. After results only included completers of post-test 3.</td></tr>
</table>

Bibliographic reference/s	**Bowen AM, Williams ML, Daniel CM, Clayton S. Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of Behavioural Medicine. 2008 Dec 31(6):463-477.**		
Study name	Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy		
Important outcomes measures and effect size. (time points)			
Statistical Analysis	Missing data was handled by entering the modal response for 4 drop out. One was recorded as “drop-out”. Demographic comparisons were conducted using a chi squared test (significant p <0.05). Participants who completed post-test 3 were considered completers, all others were drop-outs. Completers were divided into groups depending on number of partners reported in the 30 days prior to starting the project. Groups were 0, 1, 2 or more sex partners; this was done as HIV risk was lowest in the 0 and 1 group and condom use was likely to be different with a single partner than multiple partners. Condom use index was considered significant when p <0.01. Changes were examined using 3 mixed model ANOVAs with independent variables of time (repeated measures; pre-test to post-test 3) by number of sex partners (between subjects; 0, 1, or ≥2).		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Some concerns	No information on how randomisation or concealment was conducted.
	Risk of bias due to deviations from intended interventions (assignment)	Some concerns	Participants not aware of allocation. Per protocol analyses used.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to regimen.
	Missing outcome data	High risk	High attrition rate overall. Missingness unlikely to be related to condom use (no baseline differences between completers and dropouts) No appropriate analysis to account for missing data.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).

Bibliographic reference/s	**Bowen AM, Williams ML, Daniel CM, Clayton S. Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy. Journal of Behavioural Medicine. 2008 Dec 31(6):463-477.**		
Study name	Internet based HIV prevention research targeting rural MSM: feasibility, acceptability, and preliminary efficacy		
	Risk of bias in selection of the reported result	Some concerns	No trial protocol registered
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding			
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents	x	
	Associations		
	Covert Learning		
	Natural Consequences	x	
	Feedback and monitoring	x	
	Goals and planning	x	
	Social support		
	Self-belief		
	Comparison of outcomes	x	
	Identity		
	Shaping knowledge		
	Regulation		

Carpenter 2010

<table>
<tr><td>Bibliographic reference/s</td><td>Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.</td></tr>
<tr><td>Study name</td><td>Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men</td></tr>
<tr><td>Registration</td><td>-</td></tr>
<tr><td>Study type</td><td>RCT</td></tr>
<tr><td>Study dates</td><td>Recruitment from 6/20/2006 to 11/16/2006, through banner advertisements posted on same-sex community websites.</td></tr>
<tr><td>Objective</td><td>To assess the effectiveness of single session internet-delivered multimedia safer sex intervention for young men who have sex with men (MSM) at 3-month follow-up.</td></tr>
<tr><td>Country/ Setting</td><td>USA</td></tr>
<tr><td>Number of participants / clusters</td><td>N=199
99 randomised to intervention and 100 randomised to control
1155 were screened for eligibility, of which 420 were eligible and 264 consented. 199 completed the baseline measures and were randomised.</td></tr>
<tr><td>Attrition</td><td>81 in intervention and 73 in control completed tutorial
59 in intervention and 53 in control completed follow-up measures.</td></tr>
<tr><td>Participant /community characteristics.</td><td>TABLE 1. Baseline characteristics

<table>
<tr><td></td><td>All participants (n=199)</td></tr>
<tr><td>Age, mean (SD)</td><td>26.3 (5.7)</td></tr>
<tr><td>Sexual orientation
Gay
Bisexual
Heterosexual</td><td>
86.3
13.7
0</td></tr>
<tr><td>Ethnicity
Non-hispanic white</td><td>
80.4</td></tr>
</table>
</td></tr>
</table>

Bibliographic reference/s	**Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.**
Study name	Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men
	Hispanic: 15.2 African American: 6.3 Asian American: 5.4 Hawaiian/Pacific Islander: 0.9 Native American: 7.1 Other: 2.7 HIV status Negative: 83.9 Positive: 0 Unknown: 16.1 Income <10000: 16.1 10000-20000: 19.6 21000-40000: 35.7 41000-60000: 20.5 <61000: 8.1 Unprotected anal intercourse (UAI) Any partner: 65.2 Positive/unknown partner: 34.8
Method of allocation	Computerised randomisation algorithm using random number tables. Designed to produce a comparable racial and ethnic distribution between groups.
Inclusion criteria	Men aged 18-39 years old HIV status negative or unknown Engaged in unprotected oral or anal sex in the past 3 months Access to windows-based computer with audio capabilities Internet access with Internet Explorer

Bibliographic reference/s	**Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.**	
Study name	Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men	
	Willing to provide active email address Read and understood English Resided in US Not participated in another psychosocial HIV intervention study in past year	
Exclusion criteria	Not reported	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	Hot and Safe M4M
	Rationale/theory/Goal	To reduce risk of HIV and other STIs by increasing knowledge of risk factors, providing skills training for safer behaviour, and increasing motivation for behaviour change. Individuals freedom to choose, personal responsibility and avoiding judgemental statements were emphasised.
	Materials used	A website allowed access to the intervention. Participants could complete the intervention over a number of sessions by saving their progress.
	Procedures used	*Intervention* An interactive assessment of HIV risk factors offering targeted feedback based on responses. Readiness to change was assessed and risky behaviours accompanied by interactive stage-based motivational exercises (decisional balance and goal setting). Communication skills included sexual rights, differences in communication styles and sexual safety contracts. Information on correct condom use was followed by true/false quiz about condom myths. Triggers for risky behaviour and alternatives for unsafe sex were presented through problem-solving exercises and audio narratives. Participants tested their HIV risk knowledge and learn more about HIV through a quiz-like game. Additional themes included interaction of HIV risk and experiencing depression, trauma, childhood sexual abuse, intimate partner violence, or racism. *Control* A stress reduction training program, eTranquility. Content was customised for a younger MSM population. Included health-related rationale for stress reduction, description of physiological effects of stress and training in three types of relaxation exercise: diaphragmatic breathing, progressive muscle relaxation, and guided imagery. Audio recorded instructions were provided for all three types of relaxation.
	Provider	-

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.</td></tr>
<tr><td>Study name</td><td colspan="2">Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men</td></tr>
<tr><td rowspan="7"></td><td>Method of delivery</td><td>Website</td></tr>
<tr><td>Location</td><td>USA</td></tr>
<tr><td>Duration</td><td>1.5-2h</td></tr>
<tr><td>Intensity</td><td>1 module, can be split into multiple sessions if desired.</td></tr>
<tr><td>Tailoring/adaptation</td><td>Goal setting and decisional balance exercise tailored depending on type of risky sexual behaviour reported by participants.</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">3 months</td></tr>
<tr><td>Data collection</td><td colspan="2">For each activity, participants reported the total number of times they had sex and the number of times without a condom in the preceding 90 days.
At follow-up, participants rated (on Likert scales ranging from 1 strongly disagree to 5 strongly agree) to what extent they agreed that the intervention was easy to use, attractive, and enjoyable.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Change of behaviour baseline to follow-up
<table>
<tr><td></td><td colspan="3">Intervention (N=59)</td><td colspan="3">Control (N=53)</td></tr>
<tr><td rowspan="2">Unprotected sex acts (positive serostatus; UAI only), mean (SD</td><td>Baseline</td><td>FU</td><td>MD</td><td>Baseline</td><td>FU</td><td>MD</td></tr>
<tr><td>2.3 (5.2)</td><td>0.3 (0.9)</td><td>-2 (4.81)</td><td>1.5 (4.5)</td><td>0.8 (1.9)</td><td>-0.7 (3.91)</td></tr>
<tr><td rowspan="2">Unprotected sex acts (any serostatus; UAI only), mean (SD)</td><td>Baseline</td><td>FU</td><td>MD</td><td>Baseline</td><td>FU</td><td>MD</td></tr>
<tr><td>6.2 (11.5)</td><td>4.1 (10.6)</td><td>-2.1 (10.68)</td><td>10.5 (15.5)</td><td>6.3 (13.4)</td><td>-4.2 (14.56)</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td>Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.</td></tr>
<tr><td>Study name</td><td>Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men</td></tr>
<tr><td></td><td>All values are represented as number of times having unprotected anal sex.</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td>
<table>
<tr><td></td><td>Intervention</td></tr>
<tr><td>Ease of use, mean (SD)</td><td>4.6 (0.6)</td></tr>
<tr><td>Attractiveness</td><td>4.2 (0.7)</td></tr>
<tr><td>Enjoyability</td><td>4.0 (0.8)</td></tr>
</table>
</td></tr>
<tr><td>Statistical Analysis</td><td>Preliminary analyses were conducted to determine whether there were any baseline demographic differences between men who completed the follow-up assessment and those who did not and, among completers, between those randomly assigned to the control group and those assigned to the intervention group.
In evaluating the effects of the intervention, sexual practices were examined by the number of unprotected acts by type of act. These analyses were conducted for acts reported with all partners, regardless of their reported serostatus, and again for acts reported with partners of positive or unknown serostatus (i.e., excluding partners reportedly known to be seronegative). Raw numbers of unprotected acts were highly skewed. Extreme values three or more standard deviations above the mean were dropped, and the data were log transformed for analysis using multivariate analysis of variance (MANOVA) with repeated measures. The between-subjects variable was experimental condition. The within-subjects variable was time (baseline vs. follow-up). The dependent variables were unprotected anal intercourse in general (UAI), unprotected receptive anal intercourse (URAI), unprotected insertive anal intercourse (UIAI), unprotected receptive oral intercourse (UROI), and unprotected insertive oral intercourse (UIOI).
Variables pertaining to satisfaction with the intervention were examined using independent-groups t-tests.</td></tr>
<tr><td>Risk of bias (ROB)
Overall ROB</td><td>Outcome name
<table>
<tr><th>Outcome</th><th>Judgement (Low / High / some concerns)</th><th>Comments</th></tr>
<tr><td>Risk of bias arising from the randomisation process</td><td>Low risk</td><td>Randomisation present (by computer)
No baseline differences were identified.</td></tr>
</table>
</td></tr>
</table>

Bibliographic reference/s	**Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.**		
Study name	Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men		
	Risk of bias due to deviations from intended interventions (assignment)	Some concerns	Participants not aware of allocation. Unclear if intention to treat used
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to regimen.
	Missing outcome data	High risk	High attrition rate overall. Missingness unlikely to be related to condom use (no baseline differences between completers and dropouts) No appropriate analysis to account for missing data.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Some concerns	No trial protocol registered
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding	National Institute of Mental Health, Grant No. R43 MH066465		
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		

Bibliographic reference/s	**Carpenter KM, Stoner AS, Mikko AN, Dhanak LP, Parsons JT. Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men. AIDS and Behavior. 2010 Jun 14(3):549-557.**	
Study name	Efficacy of a Web-Based Intervention to Reduce Sexual Risk in Men Who Have Sex with Men	
	Feedback and monitoring	x
	Goals and planning	x
	Social support	
	Comparison of the behavior	
	Self-belief	
	Comparison of outcomes	
	Identity	
	Shaping knowledge	x
	Regulation	

Cheng 2019

Bibliographic reference/s	**Cheng W, Xu H, Tang W, Zhong F, Meng G, Han Z, Zhao J. Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases. 2019 Dec;19(1):644.**
Study name	Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial
Registration	ChiCTR1800014260
Study type	RCT
Study dates	September 2010 and June 2011
Objective	To assess the effect of an Internet-based interventions on condomless sex among men who have sex with men
Country/ Setting	China
Number of participants / clusters	Of the 1608 participants; 1100 included and 550 were allocated in the online intervention and 550 were allocated in the standard referral
Attrition	Overall, a total of 1,608 participants were recruited and completed the baseline screening procedure. A total of 1,100 eligible participants were randomly allocated into either intervention or control group

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Cheng W, Xu H, Tang W, Zhong F, Meng G, Han Z, Zhao J. Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases. 2019 Dec;19(1):644.</td></tr>
<tr><td>Study name</td><td colspan="2">Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial</td></tr>
<tr><td>Participant /community characteristics.</td><td colspan="2">Table 1 Baseline demographic and behavioral characteristics of study participants recruited and randomized online in China, 2011 (n = 1,100)
<table>
<tr><td></td><td>Online Intervention (N = 550)- No (%)</td><td>Standard referral (N = 550)- No (%)</td></tr>
<tr><td>Age –Years
≤ 20
21–30
31–40
≥ 41</td><td>
24 (4.4)
351 (63.8)
137 (24.9)
38 (6.9)</td><td>
32 (5.8)
336 (61.1)
150 (27.3)
32 (5.8)</td></tr>
<tr><td>Ethnicity
Han
Minority</td><td>
531 (96.5)
19 (3.5)</td><td>
539 (98.0)
11 (2.0)</td></tr>
</table></td></tr>
<tr><td>Method of allocation</td><td colspan="2">Non blinded RCT
A preset computer randomisation algorithm was used to assign the participants into either the intervention or control group with a ratio of 1:1.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="2">The eligibility of target participants of this study was Internet users who were male, aged 18 years old or above, had been engaged in sexual intercourse with other men six months prior to the study, and agreed to use the same account for the next six months.</td></tr>
<tr><td>Exclusion criteria</td><td colspan="2">Participants were excluded if they have participated in an HIV intervention study before.</td></tr>
<tr><td rowspan="5">Intervention</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td>Brief Name</td><td></td></tr>
<tr><td>Rationale/theory/Goal</td><td>Theory of planned behaviour</td></tr>
<tr><td>Materials used</td><td>Intervention included two parts: part I, an interactive design of scenarios experiencing interventions, called “Choice of Life”, and part II, HIV information dissemination, named “Health Messenger”</td></tr>
<tr><td>Procedures used</td><td>The intervention engaged participants in real scenarios.</td></tr>
</table>

Bibliographic reference/s	**Cheng W, Xu H, Tang W, Zhong F, Meng G, Han Z, Zhao J. Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases. 2019 Dec;19(1):644.**	
Study name	Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial	
		Part 1: included interactive dialogue box After that, a contextualized option popped-up and asked for participants to make a decision. In the end, participants were told what happened in the story, and what decision had been made by those in the story and other participants. There were five scenarios, which included having unprotected anal intercourse with an intimate partner, encountering a sex partner in the pub, having sex with a commercial sex partner, experiencing a broken condom during intercourse, and taking an HIV test. Part II: HIV information dissemination (health messenger) Three themes of HIV information were elaborated upon and tailored for MSM and made visually appealing as well as MSM friendly. One theme was sent each week after part 1. Theme I, named “know more & love yourself more”, delivered basic knowledge of HIV/AIDS and risky contact for HIV transmission. Theme II, named “risky domino, which one is you?”, released the latest local HIV epidemic data among MSM to draw attention to risk awareness. Theme III, named “love faithfully & bottom safety”, clarified the misconceptions of sex behaviors, especially in intimate relationships. Participants were presented real-life scenarios to increase HIV risk perceptions and shared peers’ view to generate community norms awareness The control group received none of the prescribed intervention measures. Both groups were provided the standard HIV referral service, which was to recommend participants take an HIV test at a local clinic.
	Provider	
	Method of delivery	Via website
	Location	online
	Duration	
	Intensity	
	Tailoring/adaptation	Three themes of HIV information were elaborated upon and tailored for MSM

Bibliographic reference/s	**Cheng W, Xu H, Tang W, Zhong F, Meng G, Han Z, Zhao J. Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases. 2019 Dec;19(1):644.**		
Study name	Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial		
	Planned treatment fidelity	-	
	Actual treatment fidelity	-	
	Other details	-	
Follow up	3 months		
Data collection	The primary outcome of this trial was self-reported condomless anal sex with another male in the past three months.		
Critical outcomes measures and effect size. (time points)	**Table 2 Efficacy of the online intervention in reducing condomless anal sex among Chinese MSM, 2011 (n = 1,100)** Using multiple imputations intention-to-treat, the estimated risk difference was 8.9% (95%CI: 1.2, 16.6%). Risk ratio: 1.234 (95% CI:0.7050 to 0.9308)		
Important outcomes measures and effect size. (time points)	As above		
Statistical Analysis	Demographics and HIV-related behaviors were compared for participants who responded to the post-survey and those who did not. The primary analysis includes only individuals who responded to the post-survey, i.e., a completed record analysis. Intention-to-treat (ITT) with multiple imputations, which was used to impute the missing responses at post-survey, was used as a sensitivity analysis. Statistical analysis was performed using IBM SPSS Statistic Software for Windows Version 18 (SPSS Inc., Chicago, USA) and $P < 0.05$ was considered to be statistically significant.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Low risk	A preset computer randomisation algorithm was used to assign the
	Risk of bias due to deviations from intended interventions (assignment)	Low risk	Non- blinded study. No deviations from assignment.

Bibliographic reference/s	**Cheng W, Xu H, Tang W, Zhong F, Meng G, Han Z, Zhao J. Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases. 2019 Dec;19(1):644.**		
Study name	Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial		
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to regimen.
	Missing outcome data	Low risk	Low attrition rate and analyses to account for this.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting outcomes
	Risk of bias in selection of the reported result	Low risk	Registered protocol
	Other sources of bias		
	Overall Risk of Bias	Some concerns	
	Other outcome details		
Source of funding			
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences	x	
	Feedback and monitoring		
	Goals and planning		
	Social support		
	Comparison of behaviours		
	Self-belief		
	Comparison of outcomes		
	Identity		

Bibliographic reference/s	**Cheng W, Xu H, Tang W, Zhong F, Meng G, Han Z, Zhao J. Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial. BMC infectious diseases. 2019 Dec;19(1):644.**
Study name	Online HIV prevention intervention on condomless sex among men who have sex with men: a web-based randomized controlled trial
	Shaping knowledge: x Regulation:

Downs 2004

Bibliographic reference/s	**Downs JS, Murray PJ, Bruine de B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social Science & Medicine. 2004 Oct 59(8):1561–1572.**
Study name	Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial
Registration	-
Study type	RCT
Study dates	Not reported.
Objective	To assess an interactive video intervention aimed at increasing young women's ability to make less risky sexual health decisions.
Country/ Setting	USA
Number of participants / clusters	N=300
Attrition	14%
Participant /community characteristics.	TABLE 1. Comparison of baseline characteristics and sex risk

	All participants (n=300)
Sexual history Abstinent for 3 months	7.7%
Condom use (mean, scale 1-6)	4.26
STD diagnosis past 3 months (%)	25.6

Bibliographic reference/s	**Downs JS, Murray PJ, Bruine de B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social Science & Medicine. 2004 Oct 59(8):1561–1572.**	
Study name	Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial	
Method of allocation	Randomisation was done via random numbers table. Allocation method not disclosed.	
Inclusion criteria	Females aged 14-18 Heterosexual vaginal sexual activity in the previous 6 months Parental consent for those under 18	
Exclusion criteria	Not reported.	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	-
	Rationale/theory/Goal	Three arms were included in the study. An interactive video intervention, a content-matched control offering the same content in a book, and a topic-matched control using commercially available brochures. The hypothesis stated that the interactive video intervention would improve sexual health outcomes more than the same content provided in a book.
	Materials used	Interactive video (intervention only) 127-page book (content-matched control only) 23 brochures (topic-matched control only)
	Procedures used	*Interactive video* Videos focus on two sexual situations – one character has a boyfriend and one meets someone at a party. The video offers choice points in the situations including options that could lead toward or away from unsafe sex. A third character learns from her older sister about condoms. This character also learns about reproductive health, STD testing and symptoms, and eight key diseases. Condom use is presented as achieving positive outcomes instead of focusing on the negatives. Users select which sections to watch and how each proceeds. Users perform cognitive rehearsal, imagining what they would say or do, then ''practice it in their heads'' for 30s while the screen freezes. *Content-matched control* A 127-pagebook included all dialog from the video and selected images. Pages were sequenced like a ''choose your own adventure'' book. In order to encourage independent cognitive rehearsal, separate pages instructed readers to ''Stop!'' and think about what they could do in the situation presented. Unlike the video intervention, however, we could not force

Bibliographic reference/s	**Downs JS, Murray PJ, Bruine de B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social Science & Medicine. 2004 Oct 59(8):1561–1572.**	
Study name	Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial	
		users to pause. Anecdotal reports suggest that most users read the information in the presented page order, ignoring the structured interactivity that was imposed on those watching the video. *Topic-matched control* 23 commercially available brochures, which closely matched the video intervention in content and length (about 15,000 words) were selected, written at a very basic reading level. Brochures included commercial and research brochures from Family Health Council, Inc and ETR Associates. At each follow-up visit, participants spent at least 15 min with access to all sections to their intervention. Given the interactivity of the video and the choices available in the controls, participants in all conditions could review portions of sections they had seen previously, look at new sections, or choose some combination of old and new.
	Provider	-
	Method of delivery	Video/computer
	Location	-
	Duration	1-2h
	Intensity	1 session, but participants could do the intervention over a few sessions if they wanted.
	Tailoring/adaptation	Possibly, the video offers "choice points" but does not say if or what changes depending on the answer given.
	Planned treatment fidelity	-
	Actual treatment fidelity	
	Other details	-
Follow up	1, 3 & 6 months	
Data collection	*Self-reported behaviour* Sexual behaviour reported in previous 3 months: how often they used condoms rated from "never" to "every time with every partner" on a 6-point scale *STD acquisition* Self-reported diagnoses of chlamydia, crabs, genital herpes, genital warts, gonorrhea, hepatitis B, HIV, syphilis, or trichomoniasis in the past 3 months (only reported for final visit).	

<table>
<tr><td>Bibliographic reference/s</td><td>Downs JS, Murray PJ, Bruine de B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social Science & Medicine. 2004 Oct 59(8):1561–1572.</td></tr>
<tr><td>Study name</td><td>Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial</td></tr>
<tr><td></td><td>Ct was measured clinically by Roche Ct PCR assay, via a self-administered introital swabs by the research group.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td>TABLE 1. Change of behaviour baseline to follow-up
<table>
<tr><td></td><td colspan="2">Differences between intervention and control</td></tr>
<tr><td rowspan="2">Condom use, F statistic (p value)</td><td>baseline to 3 months</td><td>3 months to 6 months</td></tr>
<tr><td>F(1,206)=0.33 (p=0.57)</td><td>F(1,213)=2.13 (p=0.15)</td></tr>
<tr><td rowspan="2">STI diagnosis, OR (higher favours interventions)</td><td>baseline to 6 months</td><td rowspan="2"></td></tr>
<tr><td>2.79, p=0.05</td></tr>
</table></td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td></td></tr>
<tr><td>Statistical Analysis</td><td>Analyses conducted in SPSS.
ANCOVAs compared condom use of those in the video condition to control, controlling for baseline measures. Repeated measures ANOVAs were conducted to reveal changes over time across the entire sample, using linear contrasts when more than two time periods are involved, and are only reported where significant.
The two control groups were collapsed for simplicity of analysis, because both were informational controls and there were no significant differences between them on any variables of interest.
Abstinent participants were omitted from analyses on condom use, as they had no opportunity to use condoms.</td></tr>
<tr><td>Risk of bias (ROB)
Overall ROB</td><td>Outcome name
<table>
<tr><th>Outcome</th><th>Judgement (Low / High / some concerns)</th><th>Comments</th></tr>
<tr><td>Risk of bias arising from the randomisation process</td><td>Low risk</td><td>Randomisation present (by random number table)</td></tr>
<tr><td>Risk of bias due to deviations from intended interventions (assignment)</td><td>Some concerns</td><td>Participants not aware of allocation. Allocation method not disclosed.</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**Downs JS, Murray PJ, Bruine de B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social Science & Medicine. 2004 Oct 59(8):1561–1572.**		
Study name	Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial		
	Risk of bias due to deviations from intended interventions (adherence)	Some concerns	Participants adhered to regimen. Per protocol analyses used.
	Missing outcome data	High risk	High attrition rate overall (14%). No appropriate analysis to account for missing data.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Some concerns	No registered protocol.
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding			
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution	x	
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		
	Feedback and monitoring		
	Goals and planning		
	Social support		
	Comparison of the behavior		

Bibliographic reference/s	**Downs JS, Murray PJ, Bruine de B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social Science & Medicine. 2004 Oct 59(8):1561–1572.**	
Study name	Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial	
	Self-belief	x
	Comparison of outcomes	
	Identity	
	Shaping knowledge	x
	Regulation	

Gilbert 2008

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ''Video Doctor'' Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**
Study name	Interactive ''Video Doctor'' Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings
Registration	Clinicaltrials.gov NCT00447707
Study type	RCT
Study dates	December 2003 to September 2006
Objective	To improve screening and counselling about ongoing risky behaviours in HIV-infected patients. To test the efficacy of the "Positive choice" computer program in reducing illicit drug use, risky alcohol drinking and anal and vaginal intercourse without a condom.
Country/ Setting	USA Hospitals and clinics
Number of participants / clusters	N=476 243 were assigned to intervention 233 were assigned to usual care (control)
Attrition	For the intervention group, 18 were lost to both 3 month and 6-month follow ups, 43 lost to 3-month follow-up but returned at 6-months, 25 lost after 3-month follow-up; 182 completed 3-month follow-up, 200 completed 6-month follow-up. 240 included in final analysis For the control group, 20 were lost to both 3- and 6-month follow-ups, 25 lost to 3-month follow-up but returned at 6-months, 20 lost after 3-month follow-up; 188 completed 3-month follow-up, 193 completed 6-month follow-up. 231 included in final analysis

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**
Study name	Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings
Participant /community characteristics.	TABLE 1. Baseline characteristics

	Intervention (n=240)	**Control (n=231)**
Age, mean (SD)	43.9 (9.2)	44.3 (9.0)
Gender, %female	23	19
Ethnicity, n (%)		
Hispanic	39 (16)	20 (9)
Black	118 (49)	118 (51)
White	65 (27)	72 (31)
Other or multiple races	18 (8)	21 (9)
Transmission category, n (%)		
MSM or MSM/W	122 (51)	119 (51)
Other sexual risk	55 (23)	46 (20)
Injecting drug use alone	19 (8)	25 (11)
Injecting drug use & other risk(s)	13 (5)	19 (8)
Blood transfusion or blood products	5 (2)	2 (1)
Multiple risks	9 (4)	6 (3)
Don’t know or other	17 (7)	14 (6)
HIV viral load, n (%)		
Undetectable	111 (46)	102 (44)
≤10,000 copies	45 (19)	55 (24)
10,001-50,000 copies	27 (11)	25 (11)
>50,000 copies	14 (6)	14 (6)
Don’t know	43 (18)	35 (15)

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**	
Study name	Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings	
	Unprotected sex, n (%) With main partner With casual partner	 99 (41) 74 (31)
Method of allocation	Randomisation was done by the computer after participants completed the risk assessment. Allocation was done by the computer and independently of researchers.	
Inclusion criteria	≥18 years old HIV-positive for ≥3 months	
Exclusion criteria	No risky behaviour relating to drugs, sex, or alcohol in the past month	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	Positive choice
	Rationale/theory/Goal	Interactive risk-reduction messages based on principles of motivational interviewing delivered by an actor-portrayed video doctor would reduce risky drug and sexual behaviours in HIV-positive patients. A computer program cannot replace a skilled counsellor but may increase fidelity to some principles of motivational interviewing.
	Materials used	Computer program
	Procedures used	A Video Doctor simulated an interactive discussion and counselling session with the patient. The Video Doctor was empathetic, non-judgemental, consistent and did not hesitate when responding to the patient. Using a library of digital video clips, extensive branching logic, and participant input, the program tailored the video clips to the participant’s gender, risk profile, and readiness to change. At the conclusion of each session, the program printed 2 documents: 1) an ‘‘Educational Worksheet’’ for participants with questions for self-reflection, harm reduction tips, and local resources a ‘‘Cueing Sheet’’ for providers, which offered an at-a glance summary of the patient’s risk profile and readiness to change, and suggested risk-reduction counselling statements. A booster session was given at 3 months, which allowed reflection and updates to the Cueing Sheets and Educational Worksheets.

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**	
Study name	Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings	
		The control group received only usual care after completing the risk assessment.
	Provider	-
	Method of delivery	Computer
	Location	Clinic
	Duration	24 minutes (mean)
	Intensity	1 session with booster session at 3 months
	Tailoring/adaptation	Yes, responses from the Video Doctor depended on answers from the participants
	Planned treatment fidelity	-
	Actual treatment fidelity	
	Other details	-
Follow up	3- and 6-month follow-up data	
Data collection	The Positive Choice risky behaviour questionnaire was completed on a laptop at baseline and at each of the follow-ups. All baseline and follow-up risk assessments were done approximately 1 hour prior to a regularly scheduled medical appointment, allowing participants ample time to complete the computer session before the scheduled medical appointment. Positive Choice was integrated into the flow of each clinic. Sexual risk was defined as anal or vaginal intercourse without a condom; the program did not inquire about oral sex. Participants were asked for the total number of sex partners in the last 3 months, then asked to report condom use as a numeric percentage, from 0% (never used) to 100% (consistently used), with a main partner and/or up to 5 casual partners in the previous 3 months. Sexual risk was operationalized as a dichotomous variable (100% condom use versus ,100%) with main and/or casual partners, yielding a conservative definition of sexual risk.	
Critical outcomes measures and effect size. (time points)	**TABLE 1. Risky sexual behaviour at 3 months and 6 months**	

	Intervention (n=240)			**Control (n=231)**		
	Baseline	**3-months**	**6-months**	**Baseline**	**3-months**	**6-months**
	Main:			Main:		

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**
Study name	Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings

Any unprotected sex previous 3 months, n/N (%)	99 (41) Casual: 74 (31)	104/143 (73)	88/143 (62)	90 (39) Casual: 84 (36)	117/141 (83)	108/141 (77)
Absolute percentage change in condom use with main partners, mean % (SD)	-	+0.3 (0.5) n=75	+0.4 (0.5)	-	+0.2 (0.4) n=73	+0.2 (0.5) n=77
Absolute percent change in condom use with casual partners, mean % (SD)	-	+0.3 (0.5) n=53	+0.3 (0.5) n=63	-	+0.3 (0.5) n=66	+0.3 (0.5) n=68

Main: main partner; casual: casual partner(s). Baseline values reported main partner and casual partners separately but combined the values for follow-up. Values presented above are the worst-case sensitivity analysis (assumes ongoing risk for those lost to follow-up).

Percentage change excludes participants lost to follow-up.

Table 2. Usability and individuals’ views with intervention

<table>
<tr><td>Bibliographic reference/s</td><td colspan="3">Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.</td></tr>
<tr><td>Study name</td><td colspan="3">Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings</td></tr>
<tr><td></td><td colspan="3"><table>
<tr><td>Liked or very much liked the program (%)</td><td>97</td></tr>
<tr><td>Easy to use (%)</td><td>93</td></tr>
<tr><td>Too long (%)</td><td>13</td></tr>
<tr><td>Wanted more privacy while using (%)</td><td>4</td></tr>
</table></td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="3"></td></tr>
<tr><td>Statistical Analysis</td><td colspan="3">Differences in baseline characteristics between groups were assessed with chi-square and Fisher’s exact tests.
A Bonferroni correction (a= 0.05/3 =0.0167) was used to assess statistical significance among the 3 risks with 6-month follow-up the primary time point.
For all analyses, it was assumed that any participant enrolled in the study who failed to return for follow-up continued their reported risky behaviour, constituting a worst-case sensitivity analysis.
Differences between groups were compared with t-test p-values. All analyses were done on SAS version 9.1 statistical software (SAS Corporation, Cary NC, USA).</td></tr>
<tr><td>Risk of bias (ROB)
Overall ROB</td><td colspan="3">Outcome name<table>
<tr><th>Outcome</th><th>Judgement (Low / High / some concerns)</th><th>Comments</th></tr>
<tr><td>Risk of bias arising from the randomisation process</td><td>Low risk</td><td>Computer-generated randomisation. Computer-delivered allocation.</td></tr>
<tr><td>Risk of bias due to deviations from intended interventions (assignment)</td><td>Some concerns</td><td>No deviations from assignment. Assigned by computer. Some outcomes reported per protocol.</td></tr>
<tr><td>Risk of bias due to deviations from intended interventions (adherence)</td><td>Low risk</td><td>Participants adhered to regimen.
Intention to treat analysis.</td></tr>
<tr><td>Missing outcome data</td><td>Some concerns</td><td>High attrition rate overall.</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**		
Study name	Interactive ‘‘Video Doctor’’ Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings		
			Intention to treat analyses used but nothing further
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Low risk	Outcomes do not deviate from registered protocol.
	Other sources of bias		
	Overall Risk of Bias	Some concerns	
	Other outcome details		
Source of funding			
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		
	Feedback and monitoring	x	
	Goals and planning	x	
	Social support		
	Comparison of the behaviour		
	Self-belief		

Bibliographic reference/s	**Gilbert P, Ciccarone D, Gansky SA, Bangsberg DR, Clanon K, McPhee SJ, Calderón SH, Bogetz A, Gerbert B. Interactive ''Video Doctor'' Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings Journal of Adolescent Health. 2008 Apr 3(4):e1988.**
Study name	Interactive ''Video Doctor'' Counseling Reduces Drug and Sexual Risk Behaviors among HIV-Positive Patients in Diverse Outpatient Settings
	Comparison of outcomes
	Identity
	Shaping knowledge
	Regulation

Grimley 2009

Bibliographic reference/s	**Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.**
Study name	A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints
Registration	
Study type	RCT
Study dates	Data were collected from 2002 to 2005.
Objective	To evaluate the efficacy of a 15-minute theory-based behavioural intervention designed to increase condom use and reduce new cases of Neisseria gonorrhoeae and Chlamydia trachomatis.
Country/ Setting	UK
Number of participants / clusters	430 participants; intervention (n=203) and control (n=227).
Attrition	Of the 450 eligible men and women participants, 430 (96%) agreed to participate, completed the baseline assessment, and were randomized to study condition. At 6 months, a total of 158 (78%) of participants allocated to the intervention group returned; whereas, 132 (58%) of those allocated to the comparison condition returned to the clinic (75% vs. 58%, P = 0.02)
Participant /community characteristics.	TABLE 1. Intervention and Comparison Conditions at Enrolment

	Intervention	Control

<table>
<tr><td>Bibliographic reference/s</td><td>Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.</td></tr>
<tr><td>Study name</td><td>A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints</td></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>(n =203)
No. (%)</td><td>(n =227)
No. (%)</td></tr>
<tr><td>Age, (mean yr ± SD)</td><td>24.74 ± 5.7</td><td>25.14 ±5.9</td></tr>
<tr><td>Gender (%female)</td><td>121 (59.8)</td><td>123 (54.2)</td></tr>
<tr><td>Race
African American</td><td>183 (90.4)</td><td>199 (87.7)</td></tr>
<tr><td>Condom used last sexual encounter

No

100% condom use</td><td>

136 (67.0)

29 (14.0)</td><td>

148 (65.0)

44 (19.0)</td></tr>
<tr><td>STDs
History of any STIs
Yes</td><td>

122 (60.0)</td><td>

138 (61.0)</td></tr>
<tr><td>Current STD infection

Yes</td><td>

51 (25.0)</td><td>

52 (23.0)</td></tr>
</table>
The proportion of participants randomized to the intervention group who reported 100% condom use in the preceding 2 months was 14% (29/203); 19% (44/227) of participants assigned to the comparison group reported 100% condom use during the same time period.
Table 1 shows that no significant differences in the combined gonorrhea and/or chlamydia rates were detected across the 2 groups at baseline (intervention:
25% (51/203) vs. comparison: 23% (52/227); P =0.29).</td></tr>
<tr><td>Method of allocation</td><td>Participants were randomly assigned via the computer (using the “random path” function within the Authorware interaction icon) to the intervention or the comparison group stratified by gender and their baseline stage of change (motivational readiness) for using condoms consistently (100%) with their main partners.</td></tr>
</table>

Bibliographic reference/s	**Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.**	
Study name	A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints	
Inclusion criteria	Eligibility criteria included: age 18 to 44; no plans to move out of the area in the next 6 months; provision of written informed consent; and voluntarily seeking an STD evaluation	
Exclusion criteria	Not reported	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	SOLUTIONS
	Rationale/theory/Goal	The intervention was based on the framework of the transtheoretical model (TTM; also known as the “stages-of change” model). Other constructs from the model (decisional balance, self-efficacy, and the processes of change) have been described were utilized in the development of this stage-based interventions.
	Materials used	After providing written informed consent, participants were presented with brief, automated, interactive instructions on how to use the pointing device (mouse) to select response options on the assessment.
	Procedures used	The intervention was delivered via an audio, multimedia, computerized application that provided individualized interventions to patients based on their responses to assessment items. Using Macromedia Authorware software (Version 7.1) authoring environment, SOLUTIONS was programmed to deliver automated, individualized patient feedback in a systematic and standardized manner. The intervention application permits the inclusion of graphics, photographs, and multimedia to help reinforce particular topics, messages, or intervention strategies. Sound Forge audio editing package was used to create high quality audio. The behavioral intervention, SOLUTIONS, was delivered through a computerized multimedia interactive application. The system is programmed to assess risks behaviors, generates brief, tailored counseling messages selected as a result of preprogrammed theory- based decision rules and/or algorithms. Intervention messages simultaneously appeared on the computer screen and are heard by users through headphones to protect privacy and limit literacy concerns. Participants randomized to the comparison

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.</td></tr>
<tr><td>Study name</td><td colspan="2">A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints</td></tr>
<tr><td rowspan="10"></td><td></td><td>group (n =227) interacted with a computer-based (MHRA) multiple health risk assessment with no intervention.</td></tr>
<tr><td>Provider</td><td>-</td></tr>
<tr><td>Method of delivery</td><td>The intervention was delivered via a standard, personal computer.</td></tr>
<tr><td>Location</td><td></td></tr>
<tr><td>Duration</td><td>15 minutes</td></tr>
<tr><td>Intensity</td><td></td></tr>
<tr><td>Tailoring/adaptation</td><td>Tailored counselling messages according to patients’ specific needs.</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">6 months follow up</td></tr>
<tr><td>Data collection</td><td colspan="2">The primary outcome was specified as 100% condom use with a main partner.
A secondary outcome was the prevalence of new STDs (CT and/or GC) at the 6-month follow-up.

Participants randomized to the intervention group completed a brief behavioral assessment regarding (1) basic demographic characteristics (age, gender, race/
ethnicity, highest grade completed in school, marital status, etc.); (2) sexual risk behaviors (condom use with main partner, condom use at last sexual encounter, age of sexual initiation, history of STDs, and (3) number of partners (lifetime and in the past year).

At enrollment, specimens for culture were organism-specific tests for gonococcal and chlamydial infection collected in the context of routine STD clinical care. Test results for gonorrhea and chlamydia at baseline were obtained through electronic chart reviews for participants in the intervention and the comparison
group.
After completing the 6-month follow-up assessment, non-invasive urine samples (ligase chain reaction; LCR) were collected by the SOLUTIONS’ staff and transported to the UAB STD Research Laboratory for testing in accordance with the manufacturer’s instructions. A single urine sample was used to evaluate both infections.</td></tr>
<tr><td>Critical outcomes measures and</td><td colspan="2">TABLE 2. Effect of the SOLUTION Intervention on Self-Report Condom Use at 6-Months
<table><tr><td></td><td>baseline</td><td>6 months</td></tr></table></td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td>Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.</td></tr>
<tr><td>Study name</td><td>A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints</td></tr>
<tr><td>effect size. (time points)</td><td>
<table>
<tr><th>Outcomes</th><th>intervention</th><th>control</th><th>p</th><th>intervention</th><th>control</th><th>p</th></tr>
<tr><td>Consistent condom use</td><td>14% (29/203)</td><td>19% (44/227)</td><td>0.22</td><td>32% (65/203)</td><td>23% (52/227)</td><td>0.03</td></tr>
</table>
</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td>TABLE 3. Gonorrhea and Chlamydial Infection Rates at 6- Months
<table>
<tr><th></th><th colspan="3">baseline</th><th colspan="3">6 months</th></tr>
<tr><th>Outcomes</th><th>intervention</th><th>control</th><th>p</th><th>intervention</th><th>control</th><th>p</th></tr>
<tr><td>STD rates</td><td>25% (51/203)</td><td>23% (52/227)</td><td>0.22</td><td>6% (12/203)</td><td>13% (30/227)</td><td>0.04</td></tr>
</table>
</td></tr>
<tr><td>Statistical Analysis</td><td>Analysis of covariance (ANCOVA) was used to test hypotheses about the effects of treatment on condom use information, motivation, behavioral skills, and behaviour.

Comparisons across conditions at baseline were performed using chi-square or Fisher exact test (2-tailed). At both baseline and follow-up, chlamydia and gonorrhea infection rates were combined. A logistic regression analysis was conducted to predict STD infection at the 6-month assessment with the
selected baseline characteristics of the sample and baseline condition (intervention or comparison) as predictors.</td></tr>
<tr><td>Risk of bias (ROB)
Overall ROB</td><td>Outcome name
<table>
<tr><th>Outcome</th><th>Judgement (Low / High / some concerns)</th><th>Comments</th></tr>
<tr><td>Risk of bias arising from the randomisation process</td><td>Low risk</td><td>Randomisation present (by computer)
No baseline differences were identified.</td></tr>
<tr><td>Risk of bias due to deviations from intended interventions (assignment)</td><td>Some concerns</td><td>No information for blinding.</td></tr>
</table>
</td></tr>
</table>

Bibliographic reference/s	**Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.**		
Study name	A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints		
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Not applicable
	Missing outcome data	High risk	Also, attrition was 20% higher in the comparison group than the intervention group. An intent-to-treat analysis was not conducted.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Low risk	Data does not appear to be reported based on results.
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding			
Comments	Only 2 STDs as biologic outcomes, chlamydia and gonorrhoea were tested. Also, the study focused on a relatively small patient sample and only those reporting a main partner. Another limitation is that 2 different STD testing methods were used. At baseline, the conventional culture was used; whereas, at follow-up a more sensitive, nonculture method was used (i.e., LCR). Thus, there is the potential that some infections were missed at baseline.		
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		

Bibliographic reference/s	**Grimley DM, Hook III EW. A 15-minute interactive, computerized condom use intervention with biological endpoints. Sexually transmitted diseases. 2009 Feb 1;36(2):73-8.**	
Study name	A 15-Minute Interactive, Computerized Condom Use Intervention With Biological Endpoints	
	Feedback and monitoring	x
	Goals and planning	
	Social support	
	Comparison of the behavior	
	Self-belief	x
	Comparison of outcomes	
	Identity	
	Shaping knowledge	
	Regulation	

Kiene 2006

Bibliographic reference/s	**Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.**
Study name	A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior
Registration	
Study type	RCT
Study dates	
Objective	To assess whether a computer-delivered individually tailored intervention produces significant changes in predictors of safer sex behavior and in preventive behavior based on follow-up evaluation.
Country/ Setting	USA (Connecticut)
Number of participants / clusters	157 college students
Attrition	Of the 157 participants who completed the baseline measure and first intervention session, 152 (97%; 109 exp., 43 control) returned for the second session and 149 (95%; 107 exp., 42 control) returned for the four-week follow-up assessment.

Bibliographic reference/s	**Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.**	
Study name	A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior	
	There was no difference in attrition by treatment condition.	
Participant /community characteristics.	Participants averaged 18.86 years of age (SD = 2.30), 112 (71%) were female, and 45 were male. They were almost all heterosexual (98%), and all unmarried. 81% were Caucasian.	
Method of allocation	A software random number function assigned participants to condition	
Inclusion criteria	Undergraduates were recruited from the University of Connecticut Psychology Department participant pool and received course credit for participating	
Exclusion criteria	Not reported.	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	-
	Rationale/theory/Goal	The intervention content and delivery were based on the Information-Motivation- Behavioral Skills Model of Health Behavior Change and used Motivational Interviewing techniques.
	Materials used	The intervention was designed using an innovative tailoring strategy involving stage-matched personal goal setting and content to address deficits in information, motivation, or behavioral skills. The experimental intervention content consisted of two components. The first component consisted of condom use information, motivation, and behavioral skills-related content. The second consisted of a goal-setting exercise using Motivational Interviewing techniques (MI)
	Procedures used	During Session 1, participants completed the baseline assessment and received 15–40 minutes of intervention content. Two weeks later (48 hours) participants returned for the second primarily motivational intervention session lasting 10–20 minutes. Intervention Session 1 began with the computer-delivered individually tailored delivery of the condom use information, motivation, and behavioral skills content. The *information* content consisted of information presented on the computer screen about the effectiveness of condoms, correct usage, common problems and solutions, where to buy or

Bibliographic reference/s	**Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.**	
Study name	A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior	
		obtain free condoms, and ways to keep condoms handy. Finally, participants completed a quiz on the material they just read and were given feedback from the program about their answers. The *motivation* content consisted of a narrative presented on the computer screen with lists of the advantages of using condoms, of planning to use condoms, of communicating with a sexual partner about condoms, and the norms about college students' use of condoms, followed by an activity asking participants to pick the most important advantage and type in an explanation of why they picked that advantage. The *behavioral skills* content consisted of computer-based or computer-directed experiential activities designed to increase participants' skills at condom use negotiation and use including practicing correctly putting a condom on a penis model and a gender-specific condom use communication and negotiation activity. Session 1 concluded with an MI-based goal-setting exercise. Participants were presented with a stage-matched menu of goals and asked to pick one they would want to work on over the next two weeks. Two weeks after Session 2, participants returned to complete the follow-up assessment. Session 2 consisted of an extended version of the MI based goal-setting exercise that occurred in Session 1. The program queried participants about their progress toward the Session 1 goal and praised their effort. participants who did not achieve their goal were asked about barriers they had encountered and ways to overcome those barriers. Participants were then given the choice of keeping the same goal or setting a new goal to work on in the next two weeks. Participants who had achieved their goal engaged in a "discussion" with the program (i.e., typed entries) about the barriers they may face in maintaining the goal in the future and how they plan to overcome the barriers. Finally, they listed the benefits of achieving the goal and the goal itself on a sheet of paper to take with them. Control condition participants completed the same baseline and follow-up assessments, but their intervention content consisted of a time-matched nutrition intervention.

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.</td></tr>
<tr><td>Study name</td><td colspan="2">A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention
Increases HIV/AIDS Preventive Behavior</td></tr>
<tr><td rowspan="8"></td><td>Provider</td><td>-</td></tr>
<tr><td>Method of delivery</td><td>computer</td></tr>
<tr><td>Location</td><td></td></tr>
<tr><td>Duration</td><td>-</td></tr>
<tr><td>Intensity</td><td>-</td></tr>
<tr><td>Tailoring/adaptation</td><td>Tailoring of the first component was based on baseline measures of condom use information, motivation, and behavioural skills (IMB).</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">1 month follow up</td></tr>
<tr><td>Data collection</td><td colspan="2">Frequency of condom use and keeping condoms some place nearby where they were easily available (“keeping condoms handy”) during the past 30 days were each assessed with a single item with responses ranging from 1 (never) to 5 (always). A single item assessed how frequently participants had tried to persuade or convince a partner to use a condom during the past 30 days; responses 1 (never) to 3 (always).
Lifetime and past 30-days sexual activity and current relationship status were also assessed.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">Table 2 Baseline and follow-up mean and standard deviations for changes in safer sexual behaviors by condition
<table>
<tr><th></th><th>Intervention (n=54)
Mean (SE)</th><th>Control (n=23)
Mean (SE)</th></tr>
<tr><td>Primary outcome</td><td></td><td></td></tr>
<tr><td>Condom use at baseline</td><td>3.13 (1.53)</td><td>2.64 (1.55)</td></tr>
<tr><td>Condom use at 1 month follow up</td><td>3.71(1.57)</td><td>2.77 (1.41)</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.**		
Study name	A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior		
	Condom use during the past 30 days frequency scores range from 1 (never) to 5 (always).		
Important outcomes measures and effect size. (time points)	AS above		
Statistical Analysis	Analysis of covariance (ANCOVA) was used to test hypotheses about the effects of treatment on condom use information, motivation, behavioral skills, and behavior.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Low risk	Randomisation present (by computer) No baseline imbalances with respect to any demographic or outcome variables.
	Risk of bias due to deviations from intended interventions (assignment)	Some concerns	No information for blinding.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Not applicable
	Missing outcome data	Low risk	95% of the participants returned for the 1 month follow up assessment. There was no difference in attrition by treatment condition.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome which (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Low risk	Data does not appear to be reported based on results.

Bibliographic reference/s	**Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.**	
Study name	A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior	
	Other sources of bias	
	Overall Risk of Bias	Some concerns
	Other outcome details	
Source of funding		
Comments	A limitation of the present study is that the follow-up interval was short—30 days after the initial session—therefore, it is unknown if the detected changes due to the intervention were maintained over a longer period. A continuous measure of sexual risk behavior was used (i.e., a Likert scale assessing the self-reported proportion of protected sexual encounters); new data by other researchers suggest that an event-level measurement model may be more sensitive.	
Additional references		
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences	
	Reward and threat	
	Repetition and substitution	
	Antecedents	
	Associations	
	Covert Learning	
	Natural Consequences	
	Feedback and monitoring	x
	Goals and planning	x
	Social support	
	Comparison of the behavior	
	Self-belief	
	Comparison of outcomes	
	Identity	
	Shaping knowledge	

Bibliographic reference/s	**Kiene SM, Barta WD. A brief individualized computer-delivered sexual risk reduction intervention increases HIV/AIDS preventive behavior. Journal of adolescent health. 2006 Sep 1;39(3):404-10.**
Study name	A Brief Individualized Computer-Delivered Sexual Risk Reduction Intervention Increases HIV/AIDS Preventive Behavior
	Regulation

Klein 2017

Bibliographic reference/s	**Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.**
Study name	C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas
Registration	-
Study type	RCT
Study dates	
Objective	To assess the efficacy of C-SAFE, an updated computer-/tablet-based version of a face-to-face intervention designed to promote abstinence, mutual monogamy, correct and consistent condom use, full compliance with STI treatment protocol and reduction in number of sexual partners.
Country/ Setting	USA Family health clinic
Number of participants / clusters	N=321 164 were assigned to C-SAFE 157 were assigned to the control condition
Attrition	278 completed the 6-month follow-up assessment, an attrition rate of 14% in the intervention group and 12.7% in the control group.
Participant /community characteristics.	TABLE 1. Baseline characteristics

	AI participants (n=321)
Age, mean (SD)	27.15 (4.525)

Bibliographic reference/s	**Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.**
Study name	C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas

Gender, %female	23
Ethnicity, n (%)	
Marital status (%) Single Long-term partner Boyfriend	 37.3 31.3 19.8
Employment status (%) Full-time Part-time	 24.1 25.3
Income levels (%) <$6,000 $6,000-$12,000 $12,001-$17,000 $17,000-$23,000 $23,000-$45,000 >$45,000	 15.2 10.9 16.3 19.1 12.8
Sexual habits (%) Current male partner Only one male partner Always uses condom Ever had STI Current STI	 74.2 67.3 35 23.7 6.6
Condom use Always	 35 23.7

Method of allocation	Randomisation was done by the computer after participants completed the risk assessment. Allocation was done by the computer and independently of researchers.

Bibliographic reference/s	**Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.**	
Study name	C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas	
Inclusion criteria	Seeking sexual health services 18-34-year-old female Identified as Latina	
Exclusion criteria	Not reported.	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	C-SAFE
	Rationale/theory/Goal	To promote monogamy, safe sex and continued engagement with sexual health clinics. This would result in less unprotected sex, fewer new STIs, more monogamous relationships, fewer sexual partners, positive changes in psychosocial variables associated with positive sexual behaviours and increased compliance with STI treatment protocols.
	Materials used	Visual presentations, interactive components, games and telenovela-style videos.
	Procedures used	*Intervention* The C-SAFE application condenses a 9- to 12-hour–long, group-level intervention into a 2-hour–long program and follows the same trajectory of the face-to-face intervention, with the first session focusing on HIV/STI epidemiology and transmission and the second on sexual communication and condom use self-efficacy with partners. Each session combines audio narration in accessible language (including slang), visual presentations, interactive components (e.g., drop and drag, list creation, scroll-over pop-ups), several games (e.g., loteria card matching, show your salsa steps), and a series of telenovela-style videos. Participants may also stop at any point, resume where they left off, and if they desire, repeat already completed activities. *Control* Control condition participants received the clinic's standard of care plus printed brochures providing information on sexual health, partner communication, condom use, and STIs, and intervention condition participants used the C-SAFE intervention in one sitting.
	Provider	-
	Method of delivery	Computer program

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.</td></tr>
<tr><td>Study name</td><td colspan="2">C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas</td></tr>
<tr><td rowspan="7"></td><td>Location</td><td></td></tr>
<tr><td>Duration</td><td>2h</td></tr>
<tr><td>Intensity</td><td>2 sessions</td></tr>
<tr><td>Tailoring/adaptation</td><td>No</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td></td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">6 months</td></tr>
<tr><td>Data collection</td><td colspan="2"></td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Risky sexual behaviour at baseline and 6 months
<table>
<tr><td></td><td colspan="2">Intervention (n=164)</td><td colspan="2">Control (n=157)</td><td></td></tr>
<tr><td></td><td>Baseline</td><td>6-months</td><td>Baseline</td><td>6-months</td><td>Odds ratio (95% CI; p value)</td></tr>
<tr><td>Condom use at last sexual encounter (%)</td><td>-</td><td>42.6</td><td>-</td><td>48.8</td><td>0.778 (0.34, 1.76) p=0.546</td></tr>
<tr><td>Currently have an STI (%)</td><td>6.6*</td><td>6.71</td><td>6.6*</td><td>2.55</td><td>6.235 (0.39, 39.64),P= 0.052</td></tr>
</table>
Baseline outcome equivalent to “condom use at last sexual encounter” is “always uses condom”.
*value pooled at baseline, so this is the % for the whole cohort.

Table 2. Usability and individuals’ views with intervention
<table>
<tr><td></td><td>Intervention</td><td>Control</td><td>p value</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td colspan="4">Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.</td></tr>
<tr><td>Study name</td><td colspan="4">C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas</td></tr>
<tr><td></td><td colspan="4">
<table>
<tr><td>How well was the information was presented, mean</td><td>4.45</td><td>4.25</td><td>0.053</td></tr>
<tr><td>How clearly were the topics presented, mean</td><td>4.56</td><td>4.27</td><td>0.002</td></tr>
<tr><td>Overall, would you say you learned something new today, (%)</td><td>95.1</td><td>79.3</td><td><0.001</td></tr>
<tr><td>How would you rate the content in terms of usefulness to Latinas, mean</td><td>4.50</td><td>4.31</td><td>0.058</td></tr>
</table>
All factors rated on a scale from 1 (poor) to 5 (excellent).
</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="4"></td></tr>
<tr><td>Statistical Analysis</td><td colspan="4">Baseline differences between groups was assessed using t tests and chi-square tests, as appropriate.
For condoms at last time sex, a logistic regression model was constructed and calculated adjusted odds ratios, 95% CIs, and corresponding p values.
Analyses were made using SPSS Statistics 23.</td></tr>
<tr><td>Risk of bias (ROB)
Overall ROB</td><td colspan="4">Outcome name
<table>
<tr><th>Outcome</th><th>Judgement (Low / High / some concerns)</th><th>Comments</th></tr>
<tr><td>Risk of bias arising from the randomisation process</td><td>Some concerns</td><td>Unclear how randomisation occurred or if/how allocation was concealed.</td></tr>
</table>
</td></tr>
</table>

Bibliographic reference/s	**Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.**		
Study name	C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas		
	Risk of bias due to deviations from intended interventions (assignment)	Some concerns	Some analyses reported per protocol.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to assignment
	Missing outcome data	Low risk	Moderate attrition rate, attrition not dependent on true value
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting outcomes
	Risk of bias in selection of the reported result	Some concerns	No registered protocol
	Other sources of bias		
	Overall Risk of Bias	Some concerns	
	Other outcome details		
Source of funding			
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		
	Feedback and monitoring		
	Goals and planning		
	Social support		
	Comparison of the behavior		
	Self-belief		

Bibliographic reference/s	**Klein Ch, Kuhn T, Altamirano M, Lomonaco C. C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas. 2017 Jul 18(4):516-525.**	
Study name	C-SAFE: A Computer-Delivered Sexual Health Promotion Program for Latinas	
	Comparison of outcomes	
	Identity	
	Shaping knowledge	x
	Regulation	

Mevissen 2011

Bibliographic reference/s	**Meviseen FEF, Ruiter RAC, Meertens RM, Zimbile F, Schaalma HP. Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing. 2011 Feb 26(2):205-221.**
Study name	Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing
Registration	-
Study type	RCT
Study dates	Recruitment from November to December 2007
Objective	To assess the efficacy of a relationship-orientated, web-based intervention on risk perceptions, attitudes, normative beliefs, self-efficacy and skills related to condom use and STI testing in adults who reported being recently engaged in a heterosexual relationship
Country/ Setting	The Netherlands Universities and higher vocational training colleges
Number of participants / clusters	N=218 67 were assigned to tailored intervention, 81 assigned to non-tailored intervention and 70 assigned to control group.
Attrition	In tailored intervention group, 11 were lost after assignment because they had no sexual risk or a relationship longer than 6 months. A further 26 were lost at follow-up because relationship ended, no sex, no sexual history. 37 were included in final analyses. In the non-tailored intervention, 16 were lost after assignment because they had no sexual risk or a relationship longer than 6 months. 32 were lost at follow-up because relationship ended, no sex, no sexual history. 45 were included in final analyses. In the control group, 20 were lost after assignment because they had no sexual risk or a relationship longer than 6 months. 23 were lost at follow-up because relationship ended, no sex, no sexual history. 33 were included in final analyses.

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Meviseen FEF, Ruiter RAC, Meertens RM, Zimbile F, Schaalma HP. Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing. 2011 Feb 26(2):205-221.</td></tr>
<tr><td>Study name</td><td colspan="2">Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing</td></tr>
<tr><td>Participant /community characteristics.</td><td colspan="2">TABLE 1. Baseline characteristics
<table>
<tr><th></th><th>Tailored intervention (n=47)</th><th>Non-tailored intervention (n=65)</th><th>Control (n=59)</th></tr>
<tr><td>Age, mean (SD)</td><td>20.7 (1.9)</td><td>20.9 (1.7)</td><td>20.7 (1.6)</td></tr>
<tr><td>Gender, %female</td><td>59.6</td><td>56.9</td><td>67.8</td></tr>
<tr><td>STI testing
No
Yes
Positive
Negative</td><td>
80.8
19.2
33.3
66.7</td><td>
63.1
36.9
16.7
83.3</td><td>
64.4
35.6
19.0
81.0</td></tr>
<tr><td>Condom use
Always
Irregular
Never</td><td>
13.6
45.5
40.9</td><td>
18.0
45.9
36.1</td><td>
18.5
48.1
33.3</td></tr>
</table></td></tr>
<tr><td>Method of allocation</td><td colspan="2">A software random number function assigned the participants to one of the three study conditions. Method of allocation was not explicitly disclosed, but participants were sent the intervention via email. Unclear if this was sent automatically or by researcher.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="2">18-25 years old
Heterosexual
Relationship duration < 6 months
Dutch
Having access to email</td></tr>
<tr><td>Exclusion criteria</td><td colspan="2">None.</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td></td><td>Brief Name</td><td>-</td></tr>
</table>

Bibliographic reference/s	**Meviseen FEF, Ruiter RAC, Meertens RM, Zimbile F, Schaalma HP. Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing. 2011 Feb 26(2):205-221.**	
Study name	Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing	
	Rationale/theory/Goal	
	Materials used	Computer, interactive question-and-answer format with a virtual consultant
	Procedures used	The program guided the participant linearly through the questions, when one question was answered another appeared. This was meant to appear as a dialogue between participant and virtual consultant. The intervention covered three content domains, or blocks in which the following determinants were successively embedded: STI risk perception related to the current relationship (block 1); attitude, normative beliefs, self-efficacy and skills towards maintenance of condom use within the current relationship (block 2) and promoting STI-testing (block 3). Table 2 summarises the content of the different blocks (objectives, theoretical methods and practical strategies). Messages were tailored based on the answers participants gave and their risk category. After delivering the personalised advice, the consultant offered additional risk information, which was optional: scenario information (i.e. 'personal testimony' of a young man or woman about STIs and (un)safe sex in their relationship); probability information regarding the prevalence and infectiousness of STIs and information about the consequences and severity of STIs. Techniques derived from motivational interviewing. *Non-tailored intervention* A simplified version of the tailored intervention, which included the same determinants and contained similar risk questions. It did not have the question-answer structure of the tailored intervention.
	Provider	-
	Method of delivery	Web-based program
	Location	
	Duration	Not reported
	Intensity	1 session
	Tailoring/adaptation	Yes

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Meviseen FEF, Ruiter RAC, Meertens RM, Zimbile F, Schaalma HP. Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing. 2011 Feb 26(2):205-221.</td></tr>
<tr><td>Study name</td><td colspan="2">Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing</td></tr>
<tr><td rowspan="3"></td><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td></td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">3 months</td></tr>
<tr><td>Data collection</td><td colspan="2">Condom use was measured by how they had consistently used condoms at follow-up (0=never, 1=sometimes, 2=usually, 3=always, 4=in the beginning,
but not anymore). This scale was recoded into a linear outcome scale by
combining those indicating irregular condom use (sometimes, usually, in the beginning but not anymore) into one answer option, thus creating a 3-point outcome scale (0=never, 1=irregular condom use, 2=consistent condom use), as the baseline measure.
Participants were asked to report whether they and/or their partner had undergone an STI test (0=no, 1=STI and HIV-test, 2=HIV-test, 3=STI-test). The scale was recoded into a binary scale (0=not tested, 1=tested).</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Risky sexual behaviour at 3 months
<table>
<tr><td></td><td colspan="2">Tailored intervention (n=33)</td><td colspan="2">Non-tailored intervention (n=45)</td><td colspan="2">Control (n=37)</td></tr>
<tr><td></td><td>Baseline</td><td>3-months</td><td>Baseline</td><td>3-months</td><td>Baseline</td><td>3 months</td></tr>
<tr><td>Always use Condom mean (SD)</td><td>0.70</td><td>0.88 (0.70)</td><td>0.83</td><td>0.62 (0.61)</td><td>1.3</td><td>0.43 (0.65)</td></tr>
<tr><td>p values
vs tailored
vs nontailored
vs control</td><td></td><td>-

<0.001
<0.001</td><td></td><td><0.001

-
0.30</td><td></td><td><0.001

0.30
-</td></tr>
</table>
Baseline measures were calculated by using the percentages presented in the baseline characteristics and the 3-point scale, 0=never, 1=irregular condom use, 2=consistent condom use.</td></tr>
</table>

Bibliographic reference/s	**Meviseen FEF, Ruiter RAC, Meertens RM, Zimbile F, Schaalma HP. Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing. 2011 Feb 26(2):205-221.**		
Study name	Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing		
Important outcomes measures and effect size. (time points)			
Statistical Analysis	A MANOVA was performed for the effect of condition on the three linear behavioural measures. Significant multivariate effects were examined using univariate analyses. If the univariate main effect of condition was significant, simple contrast analyses were performed to test which groups differed significantly. The three follow-up binary measures were analysed using logistic regression with the factor 'condition' being recoded into two dummy variables: one representing the tailored group versus the control group, and the other one representing the non-tailored group versus the control group. Interaction terms were included in the original analyses to test whether demographic variables (i.e. gender, ethnic background and educational level) influenced the effect of condition on the outcome measures. No significant interaction effects were found, so analyses were repeated without the interaction terms.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Some concerns	Unclear how randomisation occurred or if/how allocation was concealed.
	Risk of bias due to deviations from intended interventions (assignment)	High risk	Analyses reported per protocol.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to assignment
	Missing outcome data	High risk	High attrition rate
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting outcomes
	Risk of bias in selection of the reported result	Some concerns	No registered protocol
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		

Bibliographic reference/s	**Meviseen FEF, Ruiter RAC, Meertens RM, Zimbile F, Schaalma HP. Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing. 2011 Feb 26(2):205-221.**	
Study name	Justify your love: Testing an online STI-risk communication intervention designed to promote condom use and STI-testing	
Source of funding		
Comments		
Additional references		
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences	
	Reward and threat	
	Repetition and substitution	
	Antecedents	
	Associations	
	Covert Learning	
	Natural Consequences	
	Feedback and monitoring	x
	Goals and planning	x
	Social support	
	Comparison of the behavior	
	Self-belief	
	Comparison of outcomes	x
	Identity	
	Shaping knowledge	x.
	Regulation	

Milam 2016

<table>
<tr><td>Bibliographic reference/s</td><td>Milam J, Morris S, Jain S, Sun X, Dubé MP, Daar ES, Jimenez G, Haubrich R, and The CCTG 592 Team. Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and Behaviour. 2016 June; 20(6): 1173–1181.</td></tr>
<tr><td>Study name</td><td>Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men</td></tr>
<tr><td>Registration</td><td>-</td></tr>
<tr><td>Study type</td><td>RCT</td></tr>
<tr><td>Study dates</td><td>November 2010 to July 2012</td></tr>
<tr><td>Objective</td><td>To evaluate the efficacy of a brief internet-based intervention, an internet survey only vs survey plus tailored risk reduction messages, provided monthly for 1 year, to reduce STIs and HIV transmission behaviours.</td></tr>
<tr><td>Country/ Setting</td><td>USA</td></tr>
<tr><td>Number of participants / clusters</td><td>N=181

188 were screened for eligibility and 181 were randomised. 179 completed baseline assessment

90 were assigned to intervention group (survey plus intervention) and 89 were assigned to control (survey only)</td></tr>
<tr><td>Attrition</td><td>In the intervention group, 18 (20%) were lost over 12 months and 58 (64%) completed 75% of internet visits.
In the control group, 22 (25%) were lost over 12 months and 49 (55%) completed 75% of internet visits.</td></tr>
<tr><td>Participant /community characteristics.</td><td>TABLE 1. Baseline characteristics

<table>
<tr><th></th><th>Intervention (n=90)</th><th>Control (n=89)</th></tr>
<tr><td>Age, mean</td><td>44.6</td><td>42.7</td></tr>
<tr><td>Race/ethnicity, n (%)
White
Black
Hispanic
Other</td><td>
32 (36)
28(31)
28 (31)
2 (3)</td><td>
27 (30)
27 (30)
29 (32)
7 (8)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td colspan="3">Milam J, Morris S, Jain S, Sun X, Dubé MP, Daar ES, Jimenez G, Haubrich R, and The CCTG 592 Team. Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and Behaviour. 2016 June; 20(6): 1173–1181.</td></tr>
<tr><td>Study name</td><td colspan="3">Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men</td></tr>
<tr><td></td><td colspan="3"><table>
<tr><td>Income ≥$2,000/month, n (%)</td><td>12 (22)</td><td>16 (24)</td></tr>
<tr><td>STI prevalence, n (%)</td><td>25 (28)</td><td>27 (30)</td></tr>
<tr><td>Unprotected anal/vaginal sex past month, n (%)</td><td>51 (57)</td><td>44 (50)</td></tr>
</table></td></tr>
<tr><td>Method of allocation</td><td colspan="3">Randomisation was stratified based on site, having a computer at home (yes/no), and ART use (yes/no).
Clinicians were blind to group assignment, but the method of allocation was not disclosed.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="3">HIV positive
<18 years of age
Men who have sex with men
English speaking
Adequate computer skills
No uncontrolled psychiatric condition
Risk of HIV transmission by having one or more of the following criteria:
(1) self-reported unprotected anal sex (either receptive or insertive) with any partner in the past 3 months; (2) more than two partners in the past year; (3) having an HIV-uninfected or unknown status partner in the past 3 months; and/or (4) any STI in the past year.</td></tr>
<tr><td>Exclusion criteria</td><td colspan="3">None reported.</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td colspan="2">Details</td></tr>
<tr><td></td><td>Brief Name</td><td colspan="2">-</td></tr>
<tr><td></td><td>Rationale/theory/Goal</td><td colspan="2">To assess if tailored messages concerning safer sex would have an added benefit to a sexual behaviour survey.</td></tr>
<tr><td></td><td>Materials used</td><td colspan="2">A monthly online survey with or without internet-delivered tailored messages concerning safer-sex, disclosure of HIV status to partners and the initiation of antiretroviral therapy.</td></tr>
<tr><td></td><td>Procedures used</td><td colspan="2">Intervention (tailored messages plus monthly survey)</td></tr>
</table>

Bibliographic reference/s	**Milam J, Morris S, Jain S, Sun X, Dubé MP, Daar ES, Jimenez G, Haubrich R, and The CCTG 592 Team. Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and Behaviour. 2016 June; 20(6): 1173–1181.**	
Study name	Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men	
		Each group received a unique web page that would give a risk appropriate message. Based on this stratification, there were different intensities of other static internet pages that had specific themes: (1) condom use; (2) disclosure to sex partners; (3) reduced use of drugs and alcohol; (4) initiation of ART (for those not reporting being on ART). Messages used social influences and promoted positive movements in behaviour based on the participant's current behaviour/intent. Data was collected by both confidential in-person interview and computer assisted survey self-report for all enrolled participants. *Control (monthly survey only)* Data collection was the same but no tailored messages were provided.
	Provider	-
	Method of delivery	Webpage
	Location	Clinic/at home.
	Duration	12 months
	Intensity	Every month
	Tailoring/adaptation	Yes, in the intervention arm, participants were provided with risk appropriate messages.
	Planned treatment fidelity	-
	Actual treatment fidelity	-
	Other details	-
Follow up	1 year	
Data collection	The primary outcome was the composite incidence variable of any new STI at any anatomic site. Secondary outcomes were derived from the computer assisted self-report surveys for: (1) any unprotected anal/vaginal sex with an HIV negative/unknown status partner during the past month, and (2) disclosure of status to HIV negative/unknown status partners (defined at each visit as disclosure to all partners). Each question had four options (non-disclosure, ≤50 % of the time, >50 % of the time, all disclosure), although we a priori planned to analyze this variable as all versus not all disclosed.	

<table>
<tr><td>Bibliographic reference/s</td><td>Milam J, Morris S, Jain S, Sun X, Dubé MP, Daar ES, Jimenez G, Haubrich R, and The CCTG 592 Team. Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and Behaviour. 2016 June; 20(6): 1173–1181.</td></tr>
<tr><td>Study name</td><td>Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men</td></tr>
<tr><td></td><td>STI screening assessments at baseline and every 3 months over 12 months included syphilis (serum RPR and if positive confirmatory treponemal test), as well as nucleic acid amplification testing (NAAT) of urine and swabs of pharynx and rectum for chlamydia and gonorrhea using Hologic Aptima.
As participants completed the web-based intervention, the data gathered was automatically integrated with their clinical and research data.
Messages for those randomized to the intervention arm were tailored based on the participants' prior month reported risk of transmission, which was classified as: (1) 'Very Low'—0 %; (2) 'Low'—<0.1 %; (3) 'High'—0.1–1.0 %; and (4) 'Very High'—>1.0 %. Risk of transmission was calculated using the number (N) of unprotected receptive anal (Nra), insertive anal (Nai), insertive vaginal sex acts (Niv), oral sex acts (No), and needle sharing (Nn) multiplied by a probability (P) estimates of per contact transmission rate for each act (Pra = 0.65*0.0011, Pai = 5*0.0011, Piv = 0.0011, Po = 0.1*0.0011, Pnd = 3*0.0011), multiplied for adjustment of recent STI (if Yes sti = 3.7 times increased risk, if No sti = 1) and ART use (if Yes art = 0.1, if No art = 1). Thus, estimated HIV transmission risk is the combined risk of not transmitting HIV subtracted from one.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td>TABLE 1. Risky sexual behaviour at 12 months
<table>
<tr><th></th><th colspan="2">Intervention (n=90)</th><th colspan="2">Control (n=89)</th><th rowspan="2">p value</th></tr>
<tr><th></th><th>Baseline</th><th>12 months</th><th>Baseline</th><th>12 months</th></tr>
<tr><td>STI incidence, n (%)</td><td>25 (28)</td><td>27 (30)</td><td>27 (30)</td><td>22 (25)</td><td>0.50</td></tr>
</table>
p value is for intervention vs control at 12 months.</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td>New sexual transmitted infections (STI)
<table>
<tr><th></th><th>Intervention (n=90)</th><th>Control (n=89)</th><th>p</th></tr>
<tr><td>STI incidence after baseline (%)</td><td>27 (30)</td><td>22 (25)</td><td>0.50</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**Milam J, Morris S, Jain S, Sun X, Dubé MP, Daar ES, Jimenez G, Haubrich R, and The CCTG 592 Team. Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and Behaviour. 2016 June; 20(6): 1173–1181.**		
Study name	Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men		
Statistical Analysis	The study was powered to compare the incidence rates of the primary endpoint between the two study arms using a two-sample binomial test for proportions. Initially, to achieve 80 % power to detect a reduction in STI incidence rates from 25 to 10 %, with a two-sided alpha of 0.05, we estimated a need for 200 participants. Enrolment was halted at 181 participants because of slow recruitment. However, the statistical power of the study was not impacted because the STI incidence rate was higher than originally anticipated. Baseline characteristics were compared between arms using Fisher's exact test for categorical variables and Wilcoxon Rank-Sum test for continuous variables. Primary analyses were performed on a modified intent-to-treat (mITT) population, defined as randomized participants who completed the baseline visit (n = 179). A logistic regression model was used to compare the difference in any new STI during the study between the study arms, adjusting for the baseline STI status, ART use and methamphetamine use at baseline. Unprotected sex was assessed using a generalized estimating equation (GEE) model with study arm, visit (treated as a categorical variable), study arm-by-visit interaction as the dependent variables. Additional prespecified analyses (as determined by the investigators when the protocol was developed) were performed on a subset that completed 75 % or more of monthly internet visits (as-treated- 9/12 months; n = 107) and for those that continued on study through month 12 (regardless of many internet visits they completed; study completers, n = 140). Statistical analyses were performed in R (http://cran.r-pro ject.org), version 3.0.2.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Some concerns	Unclear how randomisation occurred or if/how allocation was concealed.
	Risk of bias due to deviations from intended interventions (assignment)	Low risk	Participants not aware of assignment. Intention to treat analyses used.
	Risk of bias due to deviations from intended interventions (adherence)	High risk	No appropriate analysis to account for lack of compliance with intervention.
	Missing outcome data	High risk	High attrition rate and no analyses to account for this.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting outcomes
	Risk of bias in selection of the reported result	Some concerns	No registered protocol
	Other sources of bias		

Bibliographic reference/s	**Milam J, Morris S, Jain S, Sun X, Dubé MP, Daar ES, Jimenez G, Haubrich R, and The CCTG 592 Team. Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men. AIDS and Behaviour. 2016 June; 20(6): 1173–1181.**	
Study name	Randomized Controlled Trial of an Internet Application to Reduce HIV Transmission Behavior Among HIV Infected Men Who have Sex with Men	
	Overall Risk of Bias	High risk
	Other outcome details	
Source of funding	This work was supported by the California HIV Research Program (CHRP- MC08-SD-700 and EI-11-SD-005). Additional funding- NIAID Grants: AI 064086 (K24 to RH); AI 36214 (CFAR Clinical Investigation and Biostatistics Core).	
Comments		
Additional references		
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences	
	Reward and threat	
	Repetition and substitution	
	Antecedents	
	Associations	
	Covert Learning	
	Natural Consequences	
	Feedback and monitoring	x
	Goals and planning	
	Social support	
	Comparison of the behavior	
	Self-belief	
	Comparison of outcomes	x
	Identity	
	Shaping knowledge	x
	Regulation	

Intervention mode: text messages

McCarthy 2019

Bibliographic reference/s	**McCarthy OL, Zghayyer H, Stavridis A, Adada S, Ahamed I, Leurent B, Edwards P, Palmer M, Free C. A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine. Trials. 2019 Dec;20(1):228.**
Study name	A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine
Registration	ClinicalTrials.gov, NCT02905461
Study type	RCT
Study dates	8 December 2016 and 22 July 2017
Objective	The objective of this trial was to estimate the effect of a contraceptive behavioral intervention delivered by mobile phone text message on young Palestinian women's attitudes towards effective contraception.
Country/ Setting	Palestine
Number of participants / clusters	825 were eligible for inclusion. 578 were included in the study of which; 289 were allocated to intervention and 289 to control group.
Attrition	Retention did not differ between the groups (81% in the control and 79% in the intervention group.
Participant /community characteristics.	**Table 1** Baseline characteristics

	Intervention N = 289, %(n)	Control N = 289, %(n)
Age –Years mean, (sd) 18-19 20-24	 21.2 (1.75) 32.5 (94) 67.5 (195)	 21.4 (1.77) 25.9 (75) 74.0. (214)
Highest level of education completed Primary	 0.7 (2)	 0.7 (2)

Bibliographic reference/s	**McCarthy OL, Zghayyer H, Stavridis A, Adada S, Ahamed I, Leurent B, Edwards P, Palmer M, Free C. A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine. Trials. 2019 Dec;20(1):228.**	
Study name	A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine	
	Secondary University Technical	21.1 (61) 66.4 (192) 11.8 (34) 22.8 (66) 66.1 (191) 10.4 (30)
Method of allocation	Participants would have been aware of the allocation after they started receiving the messages. Allocation was masked from the research staff collecting outcome data unless the participant revealed it to them. Treatment allocation was masked from the researchers who analysed the data.	
Inclusion criteria	Women were eligible to take part if they were between 18 and 24 years of age, did not report using an effective method of contraception, owned a personal mobile phone lived in the West Bank and could read Arabic.	
Exclusion criteria	-	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	
	Rationale/theory/Goal	The intervention was informed by the integrated behavioural model
	Materials used	The intervention contained the following behavior change methods, adapted for delivery by mobile phone: belief selection, facilitation, anticipated regret, guided practice, verbal persuasion, tailoring, cultural similarity, arguments, shifting perspective and goal setting.
	Procedures used	The intervention messages provided information about contraception, targeted beliefs identified in the development phase that influence contraceptive use (e.g. misconceptions about the side effects and health risks of contraception, belief that non-hormonal methods are better because they are not harmful to health) and aimed to support young women in believing that they can influence their reproductive health. Participants allocated to the intervention group received zero to three messages per day (113 messages for female-not married and 120 messages for female-married) for 120 days. Participants allocated to the control group received 16 control messages about trial participation over 120 days.

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">McCarthy OL, Zghayyer H, Stavridis A, Adada S, Ahamed I, Leurent B, Edwards P, Palmer M, Free C. A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine. Trials. 2019 Dec;20(1):228.</td></tr>
<tr><td>Study name</td><td colspan="2">A randomized controlled trial of an intervention delivered by mobile phone
text message to increase the acceptability of effective contraception among young women in Palestine</td></tr>
<tr><td rowspan="8"></td><td>Provider</td><td>Mobile phone</td></tr>
<tr><td>Method of delivery</td><td>Text messages</td></tr>
<tr><td>Location</td><td></td></tr>
<tr><td>Duration</td><td>120 days</td></tr>
<tr><td>Intensity</td><td>Intervention: 0-3 messages/ day over 120 days
Control: 16 messages over 120 days</td></tr>
<tr><td>Tailoring/adaptation</td><td>Tailored according to marital status
(marital status was used as a proxy for sexual activity because in this context it was thought inappropriate to ask about sexual activity if not married).</td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">4 months</td></tr>
<tr><td>Data collection</td><td colspan="2">At baseline, we collected personal and demographic data and the primary
outcome data via self-completed paper questionnaire. Data on all outcomes were collected at 4-month follow up.
The primary outcome was the proportion of participants reporting that at least one method of effective contraception was acceptable at 4 months post randomization. Secondary outcomes were the use of effective contraception
at 4 months and any use during the study, the acceptability of individual methods and service uptake, unintended pregnancy and abortion.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">Table 2 Primary and secondary outcomes
<table>
<tr><th></th><th>Intervention
N = 229, % (n)</th><th>Control
N = 235, % (n)</th><th>Adjusted OR
(95% CI), p-value</th></tr>
<tr><td>Use of effective contraception</td><td>8.7 (20)</td><td>8.5(20)</td><td>1.42 (0.66-3.07), p=0.37</td></tr>
<tr><td>Unintended pregnancy</td><td>2.4 (7/289)</td><td>3.1 (9/289)</td><td>0.75 (0.27–2.10), p=0.59</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**McCarthy OL, Zghayyer H, Stavridis A, Adada S, Ahamed I, Leurent B, Edwards P, Palmer M, Free C. A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine. Trials. 2019 Dec;20(1):228.**		
Study name	A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine		
Important outcomes measures and effect size. (time points)	As above		
Statistical Analysis	Analyses were conducted according to randomized group and only participants with complete outcome data were included in the principal analysis. All statistical tests were two-sided and considered significant at the 5% level. The analysis was conducted using Stata 15. The chi-squared test was used to investigate whether loss to follow up differed by trial arm.		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Low risk	The online trial database and randomization system were used to generate the allocation sequence
	Risk of bias due to deviations from intended interventions (assignment)	Low risk	Staff and researched masked to treatment allocation. No deviations from assignment.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Participants adhered to regimen.
	Missing outcome data	High risk	High attrition rate.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting outcomes
	Risk of bias in selection of the reported result	Low risk	Registered protocol
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		

Bibliographic reference/s	**McCarthy OL, Zghayyer H, Stavridis A, Adada S, Ahamed I, Leurent B, Edwards P, Palmer M, Free C. A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine. Trials. 2019 Dec;20(1):228.**	
Study name	A randomized controlled trial of an intervention delivered by mobile phone text message to increase the acceptability of effective contraception among young women in Palestine	
Source of funding		
Comments		
Additional references		
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences	
	Reward and threat	
	Repetition and substitution	x
	Antecedents	
	Associations	
	Covert Learning	
	Natural Consequences	x
	Feedback and monitoring	
	Goals and planning	x
	Social support	
	Comparison of behaviours	
	Self-belief	x
	Comparison of outcomes	x
	Identity	
	Shaping knowledge	
	Regulation	

Chernick 2017

<table>
<tr><td>Bibliographic reference/s</td><td>Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.</td></tr>
<tr><td>Study name</td><td>Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department</td></tr>
<tr><td>Registration</td><td>clinicaltrials.gov Identifier: NCT02093884.</td></tr>
<tr><td>Study type</td><td>RCT</td></tr>
<tr><td>Study dates</td><td>January – November 2014</td></tr>
<tr><td>Objective</td><td>To determine the feasibility and acceptability of an emergency department-based texting intervention to increase contraception initiation among adolescent females at high risk of pregnancy.</td></tr>
<tr><td>Country/ Setting</td><td>USA</td></tr>
<tr><td>Number of participants / clusters</td><td>N=100
50 were allocated to intervention, 50 allocated to control.
410 were assessed, of which 127 fitted the inclusion/exclusion criteria. 27 refused to participate.</td></tr>
<tr><td>Attrition</td><td>In the intervention group, 17 (34%) were lost at follow-up.
In the control group, 5 (10%) were lost at follow-up.</td></tr>
<tr><td>Participant /community characteristics.</td><td>TABLE 1. Comparison of baseline characteristics and sex risk

<table>
<tr><td></td><td>Intervention (n=50)</td><td>Control (n=50)</td></tr>
<tr><td>Age, n (%)
14-17
18-19</td><td>
11 (22.4)
38 (77.6)</td><td>
12 (24.4)
37 (75.6)</td></tr>
<tr><td>Ethnicity
Hispanic
American Indian/Alaskan Native
Asian
Black/African American
Native Hawaiian/Pacific Islander
White
More than one
Don’t know</td><td>
41 (83.7)
2 (4.1)
1 (2.0)
7 (14.3)
0 (0)
6 (12.2)
8 (16.3)
25 (51.0)</td><td>
45 (91.8)
2 (4.1)
0 (0)
7 (14.3)
4 (8.2)
0 (0)
14 (28.6)
22 (44.9)</td></tr>
</table>
</td></tr>
</table>

Bibliographic reference/s	**Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.**
Study name	Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department

Sexual history		
Condom use at last intercourse	16 (32.7)	12 (24.5)
Ever used contraception	16 (32.7)	12 (24.5)
Ever been pregnant	15 (30.6)	18 (36.7)
Talked about starting contraception past 3 months	8 (16.3)	12 (24.5)
Two or more sexual partners past 3 months	13 (26.5)	12 (24.5)
How much do you want to get pregnant now?		
I want to be pregnant now.	8 (16.3)	4 (8.2)
I don't care if I get pregnant now.	5 (10.2)	6 (12.2)
I don't want to be pregnant.	36 (73.5)	39 (79.6)
How much are you planning to get pregnant?		
I am planning hard to get pregnant.	5 (10.2)	5 (10.2)
I am planning a little to get pregnant.	4 (8.2)	2 (4.1)
I am not planning to get pregnant.	40 (81.6)	42 (85.7)

Method of allocation	Block randomisation 1:1, with allocation concealed by a software program. Outcome assessors were blinded to the study arm.
Inclusion criteria	Females aged 14-19 Sexually active with males in past 3 months Presented to ED for reproductive health complaint
Exclusion criteria	Patients who were using effective contraception methods Pregnant adolescents Had cognitive impairment No mobile phone

Bibliographic reference/s	**Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.**	
Study name	Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department	
	Did not speak English or Spanish	
Intervention	**TIDieR Checklist criteria**	**Details**
	Brief Name	-
	Rationale/theory/Goal	Work done on the previous health Belief model identified barriers and enablers to using contraceptives, which was used as a basis for the intervention.
	Materials used	Text messages (TM)
	Procedures used	*Intervention* Participants were sent identical message series and timing. No detail on content was given in the study. Although patients neither received a wallet card nor a standardized physician monologue, they did receive written or spoken discharge instructions at the discretion of their physician attending. Information about the family planning clinic was incorporated into the text messages. To assess acceptability, interest in future messages, liking the messages, preferences for distribution schedule, and concerns about cost or safety during phone call follow-up were assessed. The popularity of website links was reported by our mobile platform. *Control* The standard referral (SR) arm consisted of a wallet card advertising a walk-in family planning clinic and a standardized monologue given by the ED physicians describing the need for reproductive care.
	Provider	-
	Method of delivery	Text messages
	Location	-
	Duration	3 months
	Intensity	Daily to every 5 days
	Tailoring/adaptation	No

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.</td></tr>
<tr><td>Study name</td><td colspan="2">Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department</td></tr>
<tr><td rowspan="3"></td><td>Planned treatment fidelity</td><td>To assess feasibility, rates of screening, recruitment, randomization, retention, opt-outs (to stop receiving messages), and technological failures were examined. Text message delivery rates were reported by our mobile platform service.</td></tr>
<tr><td>Actual treatment fidelity</td><td>All in the intervention arm:
8 received no text messages, 36 received at least half the messages and 25 received the full intervention. 70.8% of all text messages were successfully delivered. 3 opted out.</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">3 months</td></tr>
<tr><td>Data collection</td><td colspan="2">The primary outcome was effective contraception initiation, documented via electronic medical record (EMR) and self-report on 3-month follow-up.
Secondary outcomes were collected similarly and included proportion of participants becoming pregnant.
Usability was measured through interest in future messages, liking the messages, preferences for distribution schedule, and concerns about cost or safety during phone call follow-up. Feasibility was examined by rates of screening, recruitment, randomization, retention, opt-outs (to stop receiving messages), and technological failures.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Change of behaviour baseline to follow-up
<table>
<tr><th></th><th>Intervention (n=50)</th><th>Control (n=50)</th></tr>
<tr><td>Contraception initiation, n (%)</td><td>N (%)</td><td>N(%)</td></tr>
<tr><td>Baseline</td><td>16 (32.7)</td><td>12 (24.5)</td></tr>
<tr><td>Follow up</td><td>6 (12)</td><td>12 (24.5)</td></tr>
</table>
<table>
<tr><th></th><th>Intervention (n=50)</th><th>Control (n=50)</th></tr>
<tr><td>Pregnancy, n (%)</td><td>N (%)</td><td>N(%)</td></tr>
<tr><td>Baseline</td><td>0</td><td>0</td></tr>
<tr><td>Follow up</td><td>4 (8)</td><td>5 (10.2)</td></tr>
</table>
Table 2. Usability
<table>
<tr><th></th><th>Intervention (n=50)</th></tr>
</table></td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td colspan="3">Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.</td></tr>
<tr><td>Study name</td><td colspan="3">Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department</td></tr>
<tr><td></td><td colspan="3">
<table>
<tr><td>Wanted to receive future messages, n (%)</td><td>36 (87.8)</td></tr>
<tr><td>Read half or more of the texts and liked the messages, n (%)</td><td>31/41 (75.6)</td></tr>
<tr><td>Would not change texting frequency, n (%)</td><td>31/41 (75.6)</td></tr>
<tr><td>Wanted messages to be sent less frequently, n (%)</td><td>4/41 (9.8)</td></tr>
</table>
Participants particularly liked messages about the family planning clinic, STIs, birth control and condoms. The most popular websites were the family planning website and Bedsider.org</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="3"></td></tr>
<tr><td>Statistical Analysis</td><td colspan="3">The intention-to-treat (ITT) population included all randomized patients. The per-protocol population included participants who completed follow-up and excluded intervention group participants who received no texts.</td></tr>
<tr><td>Risk of bias (ROB)
Overall ROB</td><td colspan="3">Outcome name
<table>
<tr><th>Outcome</th><th>Judgement (Low / High / some concerns)</th><th>Comments</th></tr>
<tr><td>Risk of bias arising from the randomisation process</td><td>Some concerns</td><td>Randomisation present (by computer)
Baseline differences in wanting to get pregnant</td></tr>
<tr><td>Risk of bias due to deviations from intended interventions (assignment)</td><td>Low risk</td><td>Participants not aware of allocation.</td></tr>
<tr><td>Risk of bias due to deviations from intended interventions (adherence)</td><td>Low risk</td><td>Participants adhered to regimen.
Intention to treat analyses used.</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.**		
Study name	Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department		
	Missing outcome data	High risk	High attrition rate overall. No appropriate analysis to account for missing data.
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Low risk	No deviations in outcomes from registered protocol.
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding	This study was supported by the Society of Family Planning Research Fund. This study was also supported by the National Center for Advancing Translational Sciences, National Institutes of Health, through grant number UL1 TR000040, formerly the National Center for Research Resources, grant number UL1 RR024156.		
Comments			
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		
	Feedback and monitoring		
	Goals and planning		
	Social support		
	Comparison of the behavior		

Bibliographic reference/s	**Chernick LS, Stockwell MS, Wu M, Castaño PM, Schnall R, Westhoff CL, Santelli J, Dayan PS. Texting to increase contraceptive initiation among adolescents in the emergency department. Journal of Adolescent Health. 2017 Dec 1;61(6):786-90.**	
Study name	Texting to Increase Contraceptive Initiation Among Adolescents in the Emergency Department	
	Self-belief	
	Comparison of outcomes	
	Identity	
	Shaping knowledge	x
	Regulation	

Suffoletto 2013

Bibliographic reference/s	**Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.**
Study name	A Sex Risk Reduction Text-Message Program for Young Adult Females Discharged From the Emergency Department
Registration	The trial was registered with ClinicalTrials.gov (number NCT01548183).
Study type	RCT
Study dates	Between September 2011 and April 2012.
Objective	To assess a text message (SMS) sex risk reduction program among at-risk young adult female patients discharged from an emergency department (ED).
Country/ Setting	UK
Number of participants / clusters	52 female women were included in the study; SMS program (n=23), control group (n=29)
Attrition	High attrition rate overall to 3-month follow-up (Three-month follow-up was completed in 56% of participants).

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.</td></tr>
<tr><td>Study name</td><td colspan="2">A Sex Risk Reduction Text-Message Program for Young Adult Females
Discharged From the Emergency Department</td></tr>
<tr><td>Participant /community characteristics.</td><td colspan="2">TABLE 1. Comparison of baseline characteristics and sex risk

<table>
<tr><td></td><td>Intervention
(n =203)
No. (%)</td><td>Control
(n =227)
No. (%)</td></tr>
<tr><td>Age (years), mean (SD)</td><td>22 (2)</td><td>21 (2)</td></tr>
<tr><td>Black race</td><td>18 (78)</td><td>16 (55)</td></tr>
<tr><td>Condom use

Never
Sometimes
Always</td><td>

16 (84)
3 (16)
0</td><td>

15 (58)
5 (19)
6 (23)</td></tr>
</table></td></tr>
<tr><td>Method of allocation</td><td colspan="2">Participants were randomized to either the intervention or control group using
a computer-generated random sequence.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="2">To be eligible, patients had to self-report hazardous drinking behaviour, based on a score >3 on the three item Alcohol Use Disorder Identification Test-Consumption. In addition, eligible women had to report at least one of the following: more than 1 male sexual partner in the past 3 months, no condom use at last sexual intercourse, or alcohol/drug use concurrent with their last sexual intercourse.</td></tr>
<tr><td>Exclusion criteria</td><td colspan="2">Women were excluded if they reported current substance abuse or psychiatric
treatment because most already have structured support for risk behaviour prevention which would contaminate the study outcome assessment. Women were also excluded if they reported having a monogamous partner for >2 years or were planning pregnancy in next 3 months because of the low rate of condom
use in these individuals. Those who did not have a personal mobile phone with text messaging features were also excluded.</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td></td><td>Brief Name</td><td></td></tr>
<tr><td></td><td>Rationale/theory/Goal</td><td>Health Belief Model and the Information Motivation Behavior model.</td></tr>
</table>

Bibliographic reference/s	**Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.**	
Study name	A Sex Risk Reduction Text-Message Program for Young Adult Females Discharged From the Emergency Department	
	Materials used	
	Procedures used	Each Sunday at noon, intervention participants received a sequence of text messages that assessed risky encounters over the past week, were provided personalized feedback on risk behaviour, and were prompted collaborative goal setting to not have a risky encounter for the coming week. Following the precepts of the Health Belief Model: text messages aiming to increase an individual's perceived susceptibility to getting an STD, perceived severity of health risk associated with an STD, and benefits of adopting protective behaviours (using condoms). According to the Information-Motivation- Behavioural Skills model constructs, messages relaying effective health information about STDs specific to young adult women, increasing personal motivation to adopting healthy sexual behaviours and tools to increase self-efficacy for protected sexual encounters. If there was no respond within 6 hours of a query, a second text message was sent out repeating the initial message. Control group participants received a series of welcome text messages describing what to expect: "Welcome to the Female Health Behaviour Study. Each week for 12 weeks, control subjects received the following text message, "Please look for our text in X weeks to complete your web-based follow-up," where [X] was the number of weeks until study completion.
	Provider	-
	Method of delivery	Via text messages
	Location	
	Duration	

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.</td></tr>
<tr><td>Study name</td><td colspan="2">A Sex Risk Reduction Text-Message Program for Young Adult Females
Discharged From the Emergency Department</td></tr>
<tr><td rowspan="5"></td><td>Intensity</td><td>Every Sunday text messages were sent out to participants.</td></tr>
<tr><td>Tailoring/adaptation</td><td></td></tr>
<tr><td>Planned treatment fidelity</td><td>-</td></tr>
<tr><td>Actual treatment fidelity</td><td>-</td></tr>
<tr><td>Other details</td><td>-</td></tr>
<tr><td>Follow up</td><td colspan="2">3 months</td></tr>
<tr><td>Data collection</td><td colspan="2">Primary behavioural outcomes of interest at 3-month follow-up included the
proportion of participants reporting condom use with last vaginal sex and the proportion with always protected sex over the past 28 days.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">TABLE 1. Comparison of baseline characteristics and sex risk

<table>
<tr><th></th><th>Intervention (n=23)
n (%)</th><th>Control (n=29)
n (%)</th><th>P value</th></tr>
<tr><td>Condom use with last vaginal sex</td><td>4 (17)</td><td>10 (34)</td><td>0.02</td></tr>
</table>
All values are n (%) unless specified otherwise.</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="2">Table 2. Change in selected sex behaviours by exposure from baseline to 3-month follow-up

<table>
<tr><th></th><th colspan="3">Intervention n=15</th><th colspan="3">Control n=21</th></tr>
<tr><th></th><th>Baseline</th><th>3 months</th><th>Change</th><th>Baseline</th><th>3 months</th><th>Change</th></tr>
<tr><td>Condom use with last vaginal sex</td><td>3 (20)</td><td>8 (53)</td><td>+5 (33)</td><td>9 (43)</td><td>8 (38)</td><td>-1 (5)</td></tr>
</table></td></tr>
</table>

Bibliographic reference/s	**Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.**		
Study name	A Sex Risk Reduction Text-Message Program for Young Adult Females Discharged From the Emergency Department		
	<u>Adherence to SMS intervention</u> A total of 39% of intervention participants completed all weekly assessments, 74% replied to at least half of assessments, and only one participant missed all 12 weeks.		
Statistical Analysis	For the statistical analysis was used: chi-square tests to examine associations between categorical variables, t-tests for normally distributed continuous variables, and Wilcoxon rank-sum tests for variables with nonparametric distributions. Plots and examination of skewness and kurtosis were used to identify evidence of nonnormality for continuous variables. Chi-square test were used to compare primary and secondary behavioural outcomes of interest. The strength of association between treatment condition and behavioral outcomes was also examined using logistical regressions. Because of unbalanced baseline risk behaviors between treatment groups, the presence of baseline risk was included as an independent variable in models. All tests are two-tailed and differences are considered statistically significant if $p \leq .05$. All data were analyzed using STATA 10.0 (Statacorp, Inc).		
Risk of bias (ROB) **Overall ROB**	**Outcome name**		
	Outcome	**Judgement (Low / High / some concerns)**	**Comments**
	Risk of bias arising from the randomisation process	Low risk	Randomisation present (by computer) No baseline differences were identified.
	Risk of bias due to deviations from intended interventions (assignment)	Some concerns	No information for blinding.
	Risk of bias due to deviations from intended interventions (adherence)	Low risk	Not applicable
	Missing outcome data	High risk	high attrition rate overall to 3-month web-based follow-up

Bibliographic reference/s	**Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.**		
Study name	A Sex Risk Reduction Text-Message Program for Young Adult Females Discharged From the Emergency Department		
	Risk of bias in measurement of the outcome	Some concerns	Self-reporting of the outcome (Subjective outcome assessment may be affected by knowledge of intervention received).
	Risk of bias in selection of the reported result	Low risk	Data does not appear to be reported based on results.
	Other sources of bias		
	Overall Risk of Bias	High risk	
	Other outcome details		
Source of funding	EMF-Century Council grant		
Comments	Not enough power to detect significant differences between intervention and control group behavioral outcomes. Small sample size Sub-optimal completion of text-message dialog in the SMS group over 12 weeks and a high attrition rate overall to 3-month web-based follow-up.		
Additional references			
Behaviour change techniques (16 theoretical clusters)	Scheduled consequences		
	Reward and threat		
	Repetition and substitution		
	Antecedents		
	Associations		
	Covert Learning		
	Natural Consequences		
	Feedback and monitoring	x	
	Goals and planning	x	
	Social support		
	Comparison of the behavior		

Bibliographic reference/s	**Suffoletto B, Akers A, McGinnis KA, Calabria J, Wiesenfeld HC, Clark DB. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health. 2013 Sep 1;53(3):387-93.**	
Study name	A Sex Risk Reduction Text-Message Program for Young Adult Females Discharged From the Emergency Department	
	Self-belief	
	Comparison of outcomes	
	Identity	
	Shaping knowledge	
	Regulation	

Appendix G – Summary of characteristics of the interventions

Study details	Key features	Intensity/duration	Tailoring	Engagement
Bannink et al 2014 **Computer tailor programme**	**E-health4Uth**: An internet based self-reported questionnaire to assess health-risk behaviour and well-being for the following topics: alcohol consumption, drug use, smoking, sexual behavior, bullying, mental health status, suicidal thoughts, suicide attempts, and unpleasant sexual experiences. The questionnaire was formed based on existing public health and health institutes instruments. Tailored messages based on participants' answers to questionnaire. For each topic, a score was computed which was compared with the Dutch health norms for adolescents and tailored messages indicated the persons current behavior or well-being in relation to the Dutch health norm. A reminder of the tailored message sent to participants after 1 month via email. **E-health4Uth and Consultation Intervention**: same questionnaire and intervention as above plus Adolescents at risk of mental health problems were assessed by the nurse and were invited for a consultation. The nurses were trained to apply motivational interviewing.	1 session with optional extra reading after completing intervention	Tailored feedback based on adolescents' responses to the questionnaire.	Not reported
Bailey et al 2016 **Computer tailored programme**	The content of the intervention was developed using behaviour change techniques and interactive website features provided feedback tailored for individual users	Not reported	Tailored feedback for individual users to address their barriers to condom use	A third (37%) of the intervention group did not see the Men's Safer Sex website

Study details	Key features	Intensity/duration	Tailoring	Engagement
Bowen 2008 **Computer tailored programme**	The intervention based on the Information–Motivation–Behavioural Skills Model Three modules: Knowledge module, partner module and context module including scripted discussions.	3modules with 6 sessions	Tailored feedback based on participant's input to interactive sessions.	Not reported
Carpenter 2010 **Computer tailored programme**	The intervention consisted of risk assessment and feedback, motivational exercises, skills training, and education. Participants tested their HIV risk knowledge and learn more about HIV through a quiz-like game.	1 session	Goal setting and decisional balance exercise tailored depending on type of risky sexual behaviour reported by participants.	Not reported
Cheng 2019 **Computer tailored programme**	The intervention based on: theory of planned behaviour Intervention included two parts: part I, an interactive design of scenarios experiencing interventions, called "Choice of Life", and part II, HIV information dissemination, named "Health Messenger. Intervention included: • real-life scenarios • Interactive dialogue box • Popped up option • Participants make a decision • 3 themes on HIV information	Not reported	Three themes of HIV information were elaborated upon and tailored for MSM	Not reported

Study details	Key features	Intensity/duration	Tailoring	Engagement
Grimley 2009 **Computer tailored programme**	The intervention was based on the Transtheoretical model. Intervention included: graphics, photographs, audio editing packages and multimedia to help reinforce particular topics, messages, or intervention strategies. Use of computer programmed algorithms to provide tailored counselling messages	15 minutes session	Personalised tailored feedback based on participants' individual needs.	Not reported
Kiene 2006 **Computer tailored programme**	The intervention content based on: Information-Motivation-Behavioral Skills Model of Health behaviour change and on Motivational interviewing techniques. Intervention included: quizzes with personalized feedback, activities to motivate participants to use condoms, and Mi-based goal setting exercise helping participants to generate self-motivating strategies.	2 sessions	Individually tailored feedback based on participants' quiz answers.	Not reported
Klein 2017 **Computer programme**	The intervention included audio narration, visual presentations, interactive components, games and telenovela style videos	2 sessions	No tailoring	Not reported
Mevissen 2011 **Computer based (virtual consultant)**	The content of the intervention messages was guided by the theoretical frameworks of the AIDS Risk Reduction Model and the Extended Parallel Process Model. The intervention used: an interactive question-and-answer format. A virtual consultant delivered personalised safe sex advise, and then optional additional risk information. Techniques derived from motivational interviewing.	1 session	The program tailored the feedback and questions to the participant's prior answers and in part to his or her gender.	Not reported

Study details	Key features	Intensity/duration	Tailoring	Engagement
Milam 2016 **Computer tailored programme**	The theoretical framework for the intervention approach and risk behaviour messages was based on SCT and the TTM of Change. Each group received a unique web page that would give a risk appropriate message. Messages used social influences and promoted positive movements in behaviour based on the participant's current behaviour/intention. Participants could input and receive their personal information	Every month (for 12 months).	Tailored messages based on the participants' prior month reported risk of transmission.	Not reported
Downs 2004 **Video based programme**	Intervention used a mental models theory approach to develop an interactive video intervention Intervention focussed on video storylines offering choices for the user to make including options that could lead toward or away from unsafe sex. Programme offered the users the choice to select which sections to watch and how each proceeds. Also, users perform cognitive rehearsal, with the screen freezing for 30s, imagining what they would say or do.	1 session	No tailoring	Not reported
Gilbert et al 2008 (USA) **Video based intervention**	The intervention used interactive messages based on principles of motivational interviewing delivered by an actor-portrayed video doctor to reduce risky drug and sexual behaviours in HIV-positive patients. A Video Doctor simulated an interactive discussion and counselling session with the patient. A further booster session at 3 months was also provided, including feedback reflecting changes made since baseline. Intervention components, including Video Doctor clips, a Cueing Sheet, and an Educational Worksheet	1 session (24 mins on average) with booster session at 3 months	The program tailored the video clips to the participant's gender, risk profile, and readiness to change.	Not reported

Study details	Key features	Intensity/duration	Tailoring	Engagement
Chernick et al 2017 (USA) **Text message intervention**	Text content of the intervention was based on Modified Health Belief Model Participants were sent identical message series and timing. Information about the family planning clinic was incorporated into the text messages. No other info for content of the intervention	Daily to every 5 days	No tailoring	Most (36/41; 87.7%) in the intervention group liked and wanted future reproductive health messages.
McCarthy et al 2019 **(Palestine)** **Text message intervention**	The intervention was based on: Integrated behavioural model The intervention contained the following behaviour change methods, adapted for delivery by mobile phone: belief selection, facilitation, anticipated regret, guided practice, verbal persuasion, tailoring, cultural similarity, arguments, shifting perspective and goal setting.	0-3 messages/ day over 120 days	Tailored according to marital status	Not reported
Suffoletto et al 2013 (UK) **Text message intervention**	The intervention was based on: Health Belief Model and Information motivation behaviour model A sequence of text messages each Sunday at noon to set goals, record weekly risky encounter and provide personalised feedback based on risk behaviour	12 weeks	Personalised feedback on risk behaviour	Moderate adherence to SMS sex risk assessments (39% completed all weekly assessments)

See appendix F for full evidence tables.

Appendix H – GRADE tables

GRADE profile 1: Behavioural outcomes for digital and mobile health interventions (intervention vs no intervention)- dichotomous outcomes

Quality assessment							No of patients		Effect		Certainty
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intervention	No intervention	Relative (95% CI)	Absolute	
condom use at follow up											
Grimley 2009, Chernick 2017, Suffoletto 2013	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	79/267 (29.6%)	71/286 (24.8%)	RR 1.16 (0.72 to 1.88)	40 more per 1000 (from 70 fewer to 218 more)	⊕OOO VERY LOW
condom use at follow up - internet based intervention											
Grimley 2009	randomised trials	very serious[3]	no serious inconsistency	no serious indirectness	serious[4]	none	65/203 (32%)	52/227 (22.9%)	RR 1.4 (1.02 to 1.91)	92 more per 1000 (from 5 more to 208 more)	⊕OOO VERY LOW
condom use at follow up - text message intervention											
Chernick 2017, Suffoletto 2013	randomised trials	very serious[5]	serious[6]	no serious indirectness	very serious[7]	none	14/64 (21.9%)	19/59 (32.2%)	RR 0.91 (0.36 to 2.29)	29 fewer per 1000 (from 206 fewer to 415 more)	⊕OOO VERY LOW

[1] Downgraded 2 levels as: high risk of bias in 1 of the 3 studies and some concerns in the other 2 studies. Main reasons: attrition rates, self-reporting of the outcome, risk of bias due to deviations from intended interventions

[2] Downgraded 1 level as I2 >50% but lower than 75%, indicating moderate level of heterogeneity

[3] Downgraded 1 level as the upper end of the CI crosses the default MID (0.8-1.25).

Intervention vs no intervention

GRADE profile 2: Behavioural outcomes for digital and mobile health interventions (intervention vs other intervention)- dichotomous outcomes

Quality assessment							No of patients		Effect		Certainty
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Condom use measurement	Control	Relative (95% CI)	Absolute	
condom use											
Klein 2017, Bannick 2014, Gilbert 2008, Cheng 2019	randomised trials	serious[1]	serious[2]	no serious indirectness	serious[3]	none	429/976 (44%)	486/954 (50.9%)	RR 1.16 (0.99 to 1.35)	117 more per 1000 (from 7 fewer to 257 more)	⊕OOO VERY LOW
condom use - consistent condom use (100%vs<100%)											
Bannick 2014, Gilbert 2008, Cheng 2019	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	359/812 (44.2%)	409/797 (51.3%)	RR 1.24 (1.13 to 1.37)	123 more per 1000 (from 67 more to 190 more)	⊕OOO VERY LOW
condom use - condom use last intercourse											
Klein 2017	randomised trials	serious[6]	no serious inconsistency	no serious indirectness	serious[5]	none	70/164 (42.7%)	77/157 (49%)	RR 0.87 (0.69 to 1.1)	64 fewer per 1000 (from 152 fewer to 49 more)	⊕⊕OO LOW

[1] Downgraded 1 level as: high risk of bias in 1 of the 4 studies and some concerns in the other 3 studies. Main reasons: attrition rates, self-reporting of the outcome, risk of bias due to deviations from intended interventions. Also, some concerns as it was unclear if randomisation was concealed.
[2] Downgraded 1 level as I2 >50% but lower than 75%, indicating moderate level of heterogeneity
[3] Downgraded 1 level as the upper end of the CI crosses the default MID (0.8-1.25).
[4] Downgraded 2 levels as high risk of bias in 1 of the 3 studies due to high attrition rate and some concerns in the other 2 studies due to self-reporting of the outcome
[5] Downgraded 1 level as the lower end of the CI crosses the default MID (0.8-1.250
[6] Downgraded 1 level as some concerns in the risk of bias; unclear if randomisation was concealed and self- reporting of the outcome

GRADE profile 3: Behavioural outcomes for digital and mobile health interventions (intervention vs no intervention)- continuous outcomes

Quality assessment	No of patients	Effect	Certainty

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intervention	No intervention	Absolute	
condom use - internet tailored intervention vs no intervention (Better indicated by lower values)										
Mevissen 2011	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	37	MD 0.45 higher (0.13 to 0.77 higher)	⊕⊕OO LOW

[1] High risk of bias due to: unclear if allocation concealment; high attrition rates; self-reporting of the outcome.

[2] Downgraded 1 level as the upper confidence interval includes calculated MID for this outcome measure (for MD is 0.5 the SD of control either side of the point estimate)

GRADE profile 4: Behavioural and health outcomes for digital and mobile health interventions (intervention vs other intervention)- continuous outcomes

Quality assessment							No of patients		Effect	Certainty
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intervention	Other intervention	Absolute	
condom use (Better indicated by lower values)										
Mevissen 2011, Kiene 2006	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision[2]	none	87	68	SMD 0.49 higher (0.16 to 0.83 higher)	⊕⊕OO LOW
unprotected sex on people with positive serostatus (Better indicated by lower values)										
Carpenter 2010	randomised trials	very serious[3]	no serious inconsistency	no serious indirectness	Serious[4]	none	59	53	MD 0.50 lower (1.06 lower to 0.06 higher)	⊕⊕OO LOW
unprotected sex on people with any serostatus (Better indicated by lower values)										
Carpenter 2010	randomised trials	very serious[5]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	53	MD 2.20 lower (6.71 lower to 2.31 higher)	⊕⊕OO LOW

[1] High risk of bias in one study due to: high attrition rates and self-reporting of the outcome and no clear information for the allocation concealment.

[2] Not downgraded - the confidence interval is precise - does not cross the effect size of 0.5 in either direction (default minimal important difference for standardised mean difference)

[3]High risk of bias due to: high attrition rates; subjective reporting of the outcome; selection of reported outcomes

[4] Downgraded 1 level as the lower confidence interval crosses the effect size (for MD is 0.5 the SD of control either side of the point estimate).

[5] High risk of bias due to: high attrition rates; subjective reporting of the outcome; selection of reported outcomes.

GRADE profile 5: Health outcomes for digital and mobile health interventions (intervention vs no intervention)- dichotomous outcomes

Quality assessment							No of patients		Effect		Certainty
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intervention	No intervention	Relative (95% CI)	Absolute	
STI at follow up (6-12 months)- internet based intervention											
Grimley 2009, Milam 2016	randomised trials	very serious[1]	very serious[2]	no serious indirectness	very serious[3]	none	39/293 (13.3%)	52/316 (16.5%)	RR 0.75 (0.28 to 2)	41 fewer per 1000 (from 118 fewer to 165 more)	⊕OOO VERY LOW
Unintended pregnancy -text message intervention											
Chernick 2017, McCarthy 2019	randomised trials	very serious[3]	no serious inconsistency	no serious indirectness	very serious[4]	none	11/339 (3.2%)	14/333 (4.2%)	RR 0.7 (0.2 to 2.46)	11 fewer per 1000 (from 27 fewer to 26 more)	⊕OOO VERY LOW

[1] Downgraded 2 levels as: attrition bias due to loss to follow up and self-reporting of the outcome in both studies. Also, no information for blinding in 1 study and no information for allocation concealment in one study.
[2] Downgraded 2 levels: I2 >75%, indicating high level of heterogeneity
[3] Downgraded 2 levels as high risk of bias in both of the studies due to high attrition rates and self-reporting of the outcomes
[4] Downgraded 2 levels as both of the CI crosses the default MID (0.8-1.25)

GRADE profile 6: Health outcomes for digital and mobile health interventions (intervention vs other intervention)- dichotomous outcomes

Quality assessment							No of patients		Effect		Certainty
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intervention	Other intervention	Relative (95% CI)	Absolute	
STI at follow up (6-12 months)											

Bailey 2016, Downs 2004	randomised trials	very serious[1]	no serious inconsistency[2]	no serious indirectness	no serious imprecision	none	7/80 (8.8%)	9/69 (13%)	RR 0.52 (0.28 to 0.98)	63 fewer per 1000 (from 3 fewer to 94 fewer)	⊕OOO very LOW

[1] High risk of bias due to: high attrition rates and self-reporting of the outcome in both of the studies
[2] No inconsistency as I2=0%
Data from number of patients in intervention and control group were only available from Bailey study.

Grade profile 7. Behavioural outcomes for digital and mobile health interventions (before and after study)- continuous outcomes

Quality assessment							No of patients		Effect		Certainty
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Before and after intervention**	**Control**	**Relative (95% CI)**	**Absolute**	
proportion of times used a condom (Better indicated by lower values)											
1	before and after study	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	294	425	-	MD 0.22 higher (0.15 to 0.29 higher)	⊕OOO VERY LOW

[1] Downgraded 2 levels due to high risk of bias due to attrition
[2] Downgraded 1 level as the upper confidence interval includes calculated MID for this outcome measure

Appendix I – Health economic evidence profiles

Study	Bailey 2016			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Bailey 2016 (UK) **Type of analysis:** CUA conducted alongside a randomized controlled trial. No modelling was undertaken. **Perspective:** NHS **Time horizon:** 1 year **Discounting:** Not applicable	**Population:** Heterosexually active men aged ≥ 16 years with female sexual partners and had recent condom-less sex or a suspected acute STI **Population – sociodemographic factors/cohort settings:** Mean age (SD) Intervention: 29.3 (8.8) Comparator: 29.5 (8.4) Ethnicity Intervention: white 71.4%, black 13.1% Comparator: white 66.7%, black 16.0% **INTERVENTION** **Description:** Men's Safer Sex website plus usual sexual health clinical care	**Two sets of resource costs were collected:** 1. Using a self-completed resource use questionnaire 2. Estimating resource use from clinical records **Total costs:** For the self-completed questionnaire total costs were not reported. However, the incremental cost for the intervention was reported as -£24 (95% CI -£145 to £97) For the resource use from clinical records a mean cost per patient was reported: **Mean cost per patient (SD) (from clinical records)** Website: £189 (£159) No website: £214 (£264) Reviewer notes: Two SDs either side of the mean	**Intermediate outcome of condomless sex:** Incidence rate ratio (IRR): 1.01 (95% CI: 0.52 to 1.96) **Clinical diagnosis of STIs over 1 year:** Control: 9/69 (13%) Intervention: 7/80 (8.8%) IRR: 0.75 (95% CI: 0.29 to 1.89) **QALYs:** Mean QALYs using EQ-5D-3L (SD) Intervention: 0.902 (0.112) Control: 0.904 (0.113) Mean QALYs using the sexual quality of life (SQoL) questionnaire (SD) Intervention: 0.936 (0.034) Control: 0.940 (0.032)	**Full incremental analysis** Five separate incremental cost-effectiveness analyses were generated: 1. EQ5D-3L for utility and self-completed resource use questionnaire 2. SQoL-3D for utility and self-completed resource use questionnaire 3. Disutility of an STI and resource use from medical records 4. Cost per STI prevented using self-completed resource use questionnaire 5. Cost per STI prevented using resource use from medical records. In analysis 1, 2 and 4 the intervention was dominant (i.e. improves health outcomes and reduces cost) Analysis 3 returned a cost-effectiveness result of £3,000 per QALY Analysis 5 returned an incremental cost per avoided STI of £291. **Analysis of uncertainty**

Study	Bailey 2016			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
	'Website' intervention asked participants to look at the Men's Safer Sex website while they were waiting in sexual health clinic waiting rooms and to then fill in online surveys 3, 6, 9 and 12 months later. The website provided individually tailored advice on barriers to condom use, especially on the impact of condoms on sexual pleasure. **Mode:** Website **Intensity and duration:** Web-based sessions over one year **Tailoring**: Yes **Healthcare professional involvement:** Digital intervention was offered in addition to usual sexual health clinical care.	represents 95% of the cohort. This means the mean costs and standard deviations imply that more than one quarter of participants are contributing money to the NHS which is impossible. These costs should have been calculated using median and interquartile ranges which would give a more realistic indication of the true costs. **Currency & cost year:** GBP £; 2014 **Cost components incorporated:** Condoms, GP resource use (tests and treatment), sexual health services (tests, counselling and treatment, pregnancy (miscarriage)		Bootstrapping was used to generate cost-effectiveness acceptability curves. The impact of pregnancies in female sexual partners was included as a sensitivity analysis only. Probability intervention is cost effective at a threshold of £20,000/QALY: Analysis 1: 88% (same with or without pregnancies) Analysis 2: 68% (same with or without pregnancies) Analysis 3: 61% (69% if pregnancies included) The study also explored the impact of including the cost of developing the website on the results. Assuming the website cost £101,515 to develop and a trial population of 84 participants, this increased costs by £1,209 per participant and resulted in an ICER for analysis 1 of £39,466/QALY.

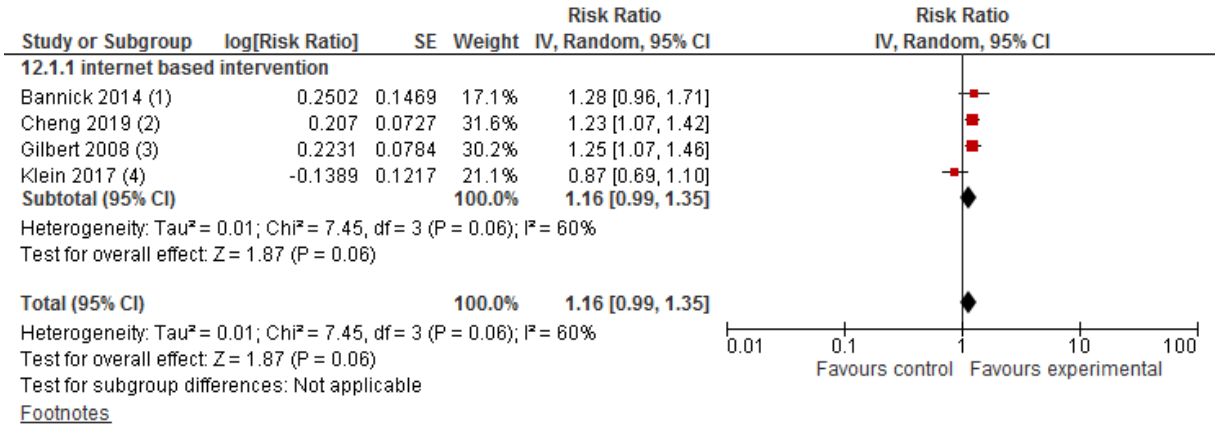
Study	Bailey 2016			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
	Behaviour change techniques used: Reward and threat; Associations; Antecedents; Natural consequences; Feedback and monitoring; Goals and planning; Comparison of behaviour; Shaping knowledge **COMPARATOR:** **Description:** 'No website' comparator group (usual sexual health clinical care only). Participants only completed the online surveys, via e-mail 3, 6 and 12 months later.			
Data sources				
Health outcomes: Within trial analysis (reported within this publication) **Quality-of-life weights:** Utility scores to calculate QALYs were collected using two different questionnaires: (1) generic preference-based measure of HRQoL – the EQ-5D-3L and (2) a sexual health-specific HRQoL measure – the SQoL questionnaire.				
Comments				
Source of funding: The study was funded by the NIHR Health Technology Assessment programme. **Limitations:** The authors acknowledged the need for further assessment of the appropriateness of EQ-5D-3L in measuring of sexual health promotion interventions. Costs differed for cost per sexual health clinic appointment using the NHS payment tariff compared with bottom-up costing. Website running costs were not included in the analyses, as there was no information available on ongoing running costs. **Other:** None				
Overall applicability: Directly applicable		**Overall quality:** Potentially serious limitations		

Study	Bailey 2016			
Study details	Population & interventions	Costs	Health outcomes	Cost-effectiveness
Abbreviations: CUA: cost-utility analysis; HRQoL: health-related quality of life; NHS: National Health Service; NIHR: National Institute for Health Research; QALY: quality-adjusted life year; RCT: randomised controlled trial; SD: standard deviation; SQoL: Sexual quality of life				

Appendix J – Forest plots

1. Behavioural outcomes: intervention vs other intervention

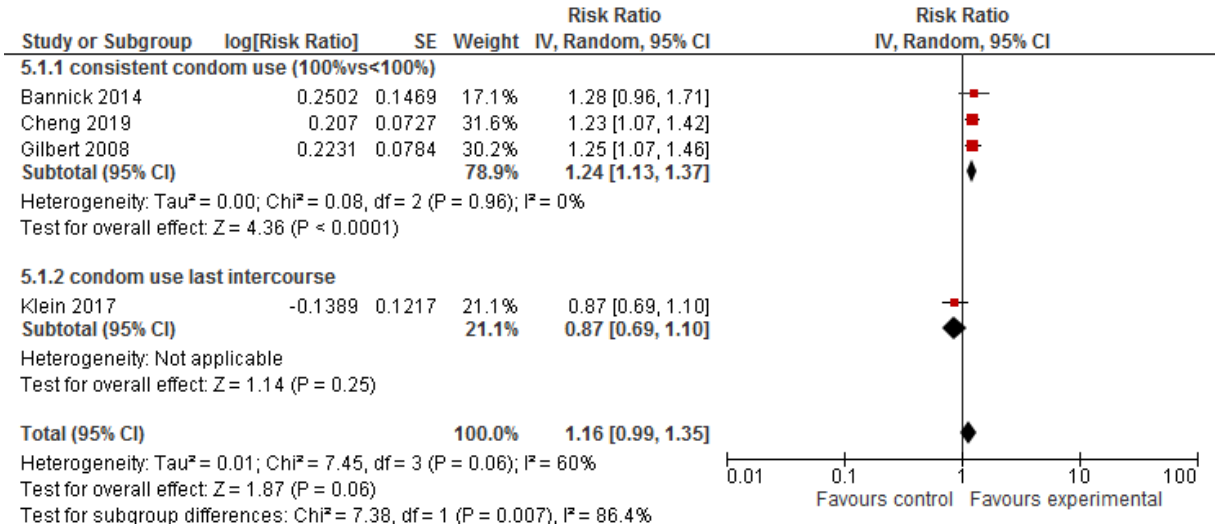
1.1 Comparison: Intervention vs other intervention, Outcome: condom use



Footnotes

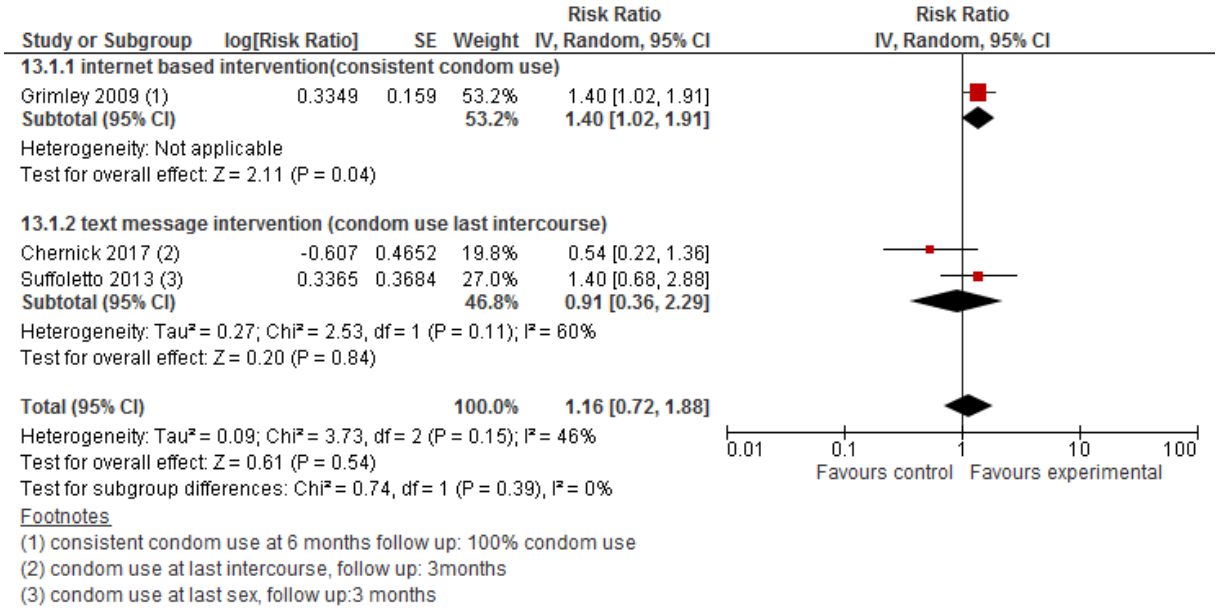
(1) always condom use at intercourse (initially defined in ordinal scale as frequency). the response categories were collapsed into...
(2) condom use at evry time at previous 3 months
(3) 100% condom use in anal or vaginal intercourse, folow up: 6 months
(4) condom use at last intercourse, follow up: 6 months

1.2 Comparison: Intervention vs other intervention: Sensitivity analysis according to condom measurement



2. Behavioural outcomes: intervention vs no intervention

2.3 Comparison: Intervention vs no intervention, Outcome: condom use, Sensitivity analysis: digital platform



Footnotes

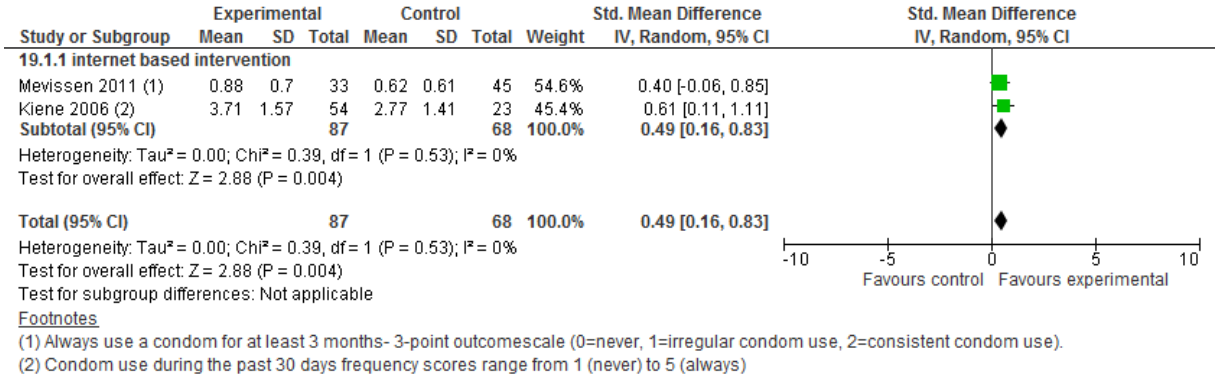
(1) consistent condom use at 6 months follow up: 100% condom use

(2) condom use at last intercourse, follow up: 3months

(3) condom use at last sex, follow up:3 months

Behavioural outcomes: intervention vs other intervention

2.1 Comparison: intervention vs other intervention, Outcome: condom use



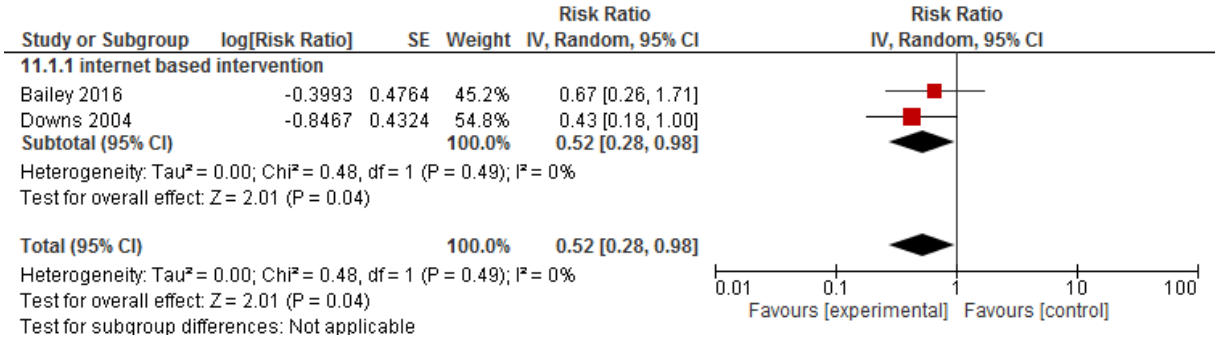
Footnotes

(1) Always use a condom for at least 3 months- 3-point outcomescale (0=never, 1=irregular condom use, 2=consistent condom use).

(2) Condom use during the past 30 days frequency scores range from 1 (never) to 5 (always)

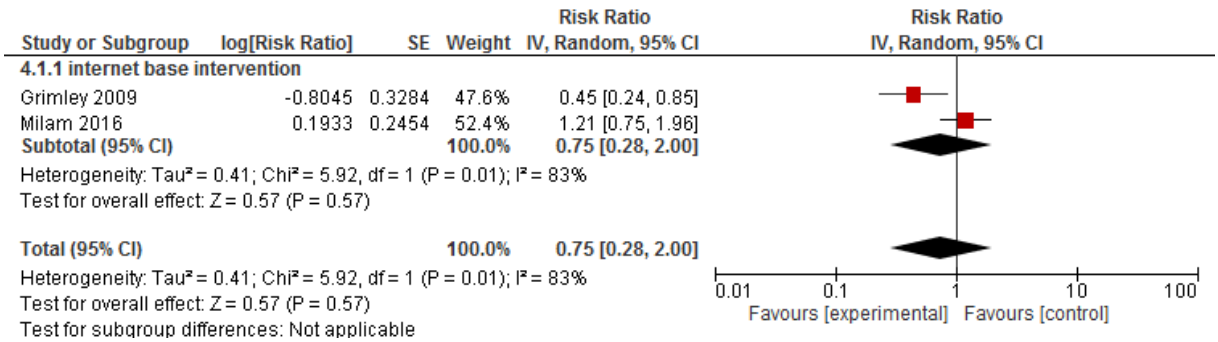
3. Health outcomes: intervention vs other intervention

3.1 Comparison: Intervention vs other intervention, Outcome: STI

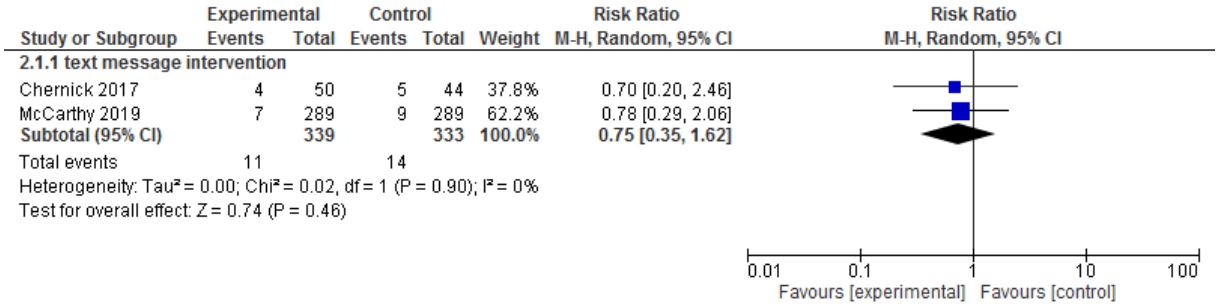


4.Health outcomes: intervention vs no intervention

4.1 Comparison: Intervention vs no intervention, Outcome: STI



4.2 Comparison: Intervention vs no intervention, Outcome: unwanted pregnancy



Appendix K – Excluded studies

Public Health studies

Study	Reason for exclusion
Abaza, Haitham and Marschollek, Michael (2017) mHealth Application Areas and Technology Combinations*. A Comparison of Literature from High and Low/Middle Income Countries. Methods of information in medicine 56(7): e105-e122	- Review article but not a systematic review
Adams, J.; Neville, S.; Dickinson, P. (2013) Evaluation of Bro Online: An Internet-based HIV prevention initiative for gay and bisexual men. International Journal of Health Promotion and Education 51(5): 239-247	- No usability of the data
Adebayo, D. O.; Udegbe, I. B.; Sunmola, A. M. (2006) Gender, Internet use, and sexual behavior orientation among young Nigerians. Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society 9(6): 742-52	- No usability of the data
Al-Ajlouni, Yazan A., Park, Su H., Schneider, John A. et al. (2018) Partner meeting venue typology and sexual risk behaviors among French men who have sex with men. International journal of STD & AIDS 29(13): 1282-1288	- Study does not contain a relevant intervention
Alarcon Gutierrez, Miguel, Fernandez Quevedo, Manuel, Martin Valle, Silvia et al. (2018) Acceptability and effectiveness of using mobile applications to promote HIV and other STI testing among men who have sex with men in Barcelona, Spain. Sexually transmitted infections 94(6): 443-448	- Not a relevant study design
Allison, Jeroan J., Kiefe, Catarina I., Wall, Terry et al. (2005) Multicomponent Internet continuing medical education to promote chlamydia screening. American journal of preventive medicine 28(3): 285-90	- No outcomes of interest

Study	Reason for exclusion
Anand, T., Nitpolprasert, C., Jantarapakde, J. et al. (2019) Implementation and impact of a technology-based HIV risk-reduction intervention among Thai men who have sex with men using "Vialogues": a randomized controlled trial. AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV	- Study does not contain a relevant intervention
Anderson, Mollie Blair (2018) The Condom Carnival: Assessment of a novel group intervention aimed to decrease sexual risk and increase condom use among college students. Dissertation Abstracts International: Section B: The Sciences and Engineering 78(8be): No-Specified	- Not a relevant study design
Anonymous (2007) Fourth Annual National HIV/AIDS Youth Story-writing and Video Contests. AIDS patient care and STDs 21(10): 784-785	- Conference abstract
Anonymous (2010) Websites offer STD tests and education. AIDS patient care and STDs 24(5): 344	- Conference abstract
Anonymous (2010) Summaries for patients. HIV nucleic acid testing program with automated Internet and voicemail systems. Annals of internal medicine 152(12): i30	- Not a relevant study design
Anonymous (2010) Community-based computer-assisted motivational intervention reduces repeat births to adolescents. Journal of the National Medical Association 102(2): 154	- Not a relevant study design
Anonymous (2011) UN HIV/AIDS strategy through social media. Australian nursing journal (July 1993) 19(6): 38	- Not a relevant study design
Arya, Monisha, Huang, Anna, Kumar, Disha et al. (2018) The Promise of Patient-Centered Text Messages for Encouraging HIV Testing in an Underserved Population. The Journal of the Association of Nurses in AIDS Care : JANAC 29(1): 101-106	- No usability of the data - No comparison group

Study	Reason for exclusion
Bachmann, Laura H., Grimley, Diane M., Gao, Hongjiang et al. (2013) Impact of a computer-assisted, provider-delivered intervention on sexual risk behaviors in HIV-positive men who have sex with men (MSM) in a primary care setting. AIDS Education and Prevention 25(2): 87-101	- Not a relevant study design
Bailey, J. V., Murray, E., Rait, G. et al. (2010) Interactive computer-based interventions for sexual health promotion. Cochrane Database of Systematic Reviews	- Systematic review-not directly applicable to review protocol
Bailey, J. V., Murray, E., Rait, G. et al. (2012) Computer-based interventions for sexual health promotion: Systematic review and meta-analyses. International Journal of STD and AIDS 23(6): 408-413	- Systematic review-not directly applicable to review protocol
Bailey, Julia V., Pavlou, Menelaos, Copas, Andrew et al. (2013) The Sexunzipped trial: optimizing the design of online randomized controlled trials. Journal of medical Internet research 15(12): e278	- No outcomes of interest
Baltierra, Nina B., Muessig, Kathryn E., Pike, Emily C. et al. (2016) More than just tracking time: Complex measures of user engagement with an internet-based health promotion intervention. Journal of biomedical informatics 59: 299-307	- Study does not contain a relevant intervention
Bannink, Rienke, Joosten-van Zwanenburg, Evelien, van de Looij-Jansen, Petra et al. (2012) Evaluation of computer-tailored health education ('E-health4Uth') combined with personal counselling ('E-health4Uth + counselling') on adolescents' behaviours and mental health status: design of a three-armed cluster randomised controlled trial. BMC public health 12: 1083	- study protocol
Bauermeister, Jose A., Pingel, Emily S., Jadwin-Cakmak, Laura et al. (2015) Acceptability and preliminary efficacy of a tailored online HIV/STI testing intervention for young men who have sex with men: the Get Connected! program. AIDS and behavior 19(10): 1860-74	- No outcomes of interest

Study	Reason for exclusion
Bell, David L., Garbers, Samantha, Catallozzi, Marina et al. (2018) Computer-Assisted Motivational Interviewing Intervention to Facilitate Teen Pregnancy Prevention and Fitness Behavior Changes: A Randomized Trial for Young Men. The Journal of adolescent health : official publication of the Society for Adolescent Medicine 62(3s): S72-S80	- study protocol
Bilardi, J. E., Fairley, C. K., Hopkins, C. A. et al. (2010) Let them know: Evaluation of an online partner notification service for chlamydia that offers E-mail and SMS messaging. Sexually Transmitted Diseases 37(9): 563-565	- Not a relevant study design
Billings, Douglas W., Leaf, Samantha L., Spencer, Joy et al. (2015) A Randomized Trial to Evaluate the Efficacy of a Web-Based HIV Behavioral Intervention for High-Risk African American Women. AIDS and behavior 19(7): 1263-74	- Study does not contain a relevant intervention
Biswas, Kamal Kanti, Hossain, Altaf, Chowdhury, Rezwana et al. (2017) Using mHealth to Support Postabortion Contraceptive Use: Results From a Feasibility Study in Urban Bangladesh. JMIR formative research 1(1): e4	- Study does not contain a relevant intervention
Blas, Magaly M. (2009) Effect of an online video-based intervention to increase HIV testing in gay-identified and non-gay-identified men who have sex with men in Peru. Dissertation Abstracts International: Section B: The Sciences and Engineering 69(9b): 5298	- No outcomes of interest
Blas, Magaly M., Alva, Isaac E., Carcamo, Cesar P. et al. (2010) Effect of an online video-based intervention to increase HIV testing in men who have sex with men in Peru. PloS one 5(5): e10448	- No outcomes of interest
Bonar, Erin E., Koocher, Gerald P., Benoit, Matthew F. et al. (2018) Perceived Risks and Benefits in a Text Message Study of Substance Abuse and Sexual Behavior. Ethics & behavior 28(3): 218-234	- Not a relevant study design
Bonar, Erin E., Walton, Maureen A., Cunningham, Rebecca M. et al. (2014) Computer-enhanced	- No outcomes of interest

Study	Reason for exclusion
interventions for drug use and HIV risk in the emergency room: preliminary results on psychological precursors of behavior change. Journal of substance abuse treatment 46(1): 5-14	
Bountress, Kaitlin E., Metzger, Isha W., Maples-Keller, Jessica L. et al. (2017) Reducing sexual risk behaviors: secondary analyses from a randomized controlled trial of a brief web-based alcohol intervention for underage, heavy episodic drinking college women. Addiction research & theory 25(4): 302-309	- Study does not contain a relevant intervention
Bourne, C., Knight, V., Guy, R. et al. (2011) Short message service reminder intervention doubles sexually transmitted infection/HIV re-testing rates among men who have sex with men. Sexually transmitted infections 87(3): 229-31	- No outcomes of interest
Bourne, Chris, Zablotska, Iryna, Williamson, Anthony et al. (2012) Promotion and uptake of a new online partner notification and retesting reminder service for gay men. Sexual health 9(4): 360-7	- No outcomes of interest
Bowen, Anne M.; Horvath, Keith; Williams, Mark L. (2007) A randomized control trial of Internet-delivered HIV prevention targeting rural MSM. Health education research 22(1): 120-7	- No outcomes of interest
Bowen, Deborah; Jabson, Jennifer; Kamen, Charles (2016) mHealth: an avenue for promoting health among sexual and gender minority populations?. mHealth 2: 36	- Not a relevant study design
Brady, Sonya S., Sieving, Renee E., Terveen, Loren G. et al. (2015) An Interactive Website to Reduce Sexual Risk Behavior: Process Evaluation of TeensTalkHealth. JMIR research protocols 4(3): e106	- Not a relevant study design
Brewer, Devon D. (2011) Knowledge of blood-borne transmission risk is inversely associated with HIV infection in sub-Saharan Africa. Journal of infection in developing countries 5(3): 182-98	- No usability of the data - Not a relevant study design

Study	Reason for exclusion
Brown Iii, William, Ibitoye, Mobolaji, Bakken, Suzanne et al. (2015) Cartographic Analysis of Antennas and Towers: A Novel Approach to Improving the Implementation and Data Transmission of mHealth Tools on Mobile Networks. JMIR mHealth and uHealth 3(2): e63	- Not a relevant study design
Brown, Katherine E.; Beasley, Kerrie; Das, Satyajit (2018) Self-Control, Plan Quality, and Digital Delivery of Action Planning for Condom and Contraceptive Pill Use of 14-24-Year-Olds: Findings from a Clinic-Based Online Pilot Randomised Controlled Trial. Applied psychology. Health and well-being 10(3): 391-413	- No outcomes of interest
Brown, L. J., Tan, K. S., Guerra, L. E. et al. (2018) Using behavioural insights to increase HIV self-sampling kit returns: a randomized controlled text message trial to improve England's HIV self-sampling service. HIV Medicine 19(9): 585-596	- No usability of the data
Brown, Ludella and Tabi, Marian M. (2013) Increasing HIV/AIDS awareness among African-American women: an exploratory study. Journal of National Black Nurses' Association : JNBNA 24(1): 48-54	- Study does not contain a relevant intervention
Buhi, Eric R., Klinkenberger, Natalie, Hughes, Shana et al. (2013) Teens' use of digital technologies and preferences for receiving STD prevention and sexual health promotion messages: implications for the next generation of intervention initiatives. Sexually transmitted diseases 40(1): 52-4	- No usability of the data
Bull, Sheana S., Levine, Deborah K., Black, Sandra R. et al. (2012) Social media-delivered sexual health intervention: a cluster randomized controlled trial. American journal of preventive medicine 43(5): 467-74	- Study does not contain a relevant intervention
Bull, Sheana, Devine, Sharon, Schmiege, Sarah J. et al. (2016) Text Messaging, Teen Outreach Program, and Sexual Health Behavior: A Cluster Randomized Trial. American journal of public health 106(s1): S117-S124	- Study does not contain a relevant intervention

Study	Reason for exclusion
Burke, Susan M. (2018) Texting as a Strategy to Increase Contraception Use Compliance in Adolescent Females. Journal of pediatric nursing 43: 134-135	- Not a relevant study design
Burns, Kara; Keating, Patrick; Free, Caroline (2016) A systematic review of randomised control trials of sexual health interventions delivered by mobile technologies. BMC public health 16(1): 778	- Systematic review-not directly applicable to review protocol
Bushley, Abigail W., Cassel, Kevin, Hernandez, Brenda Y. et al. (2005) A tailored multi-media campaign to promote the human papillomavirus cohort study to young women. Preventive medicine 41(1): 98-101	- No usability of the data - Not a relevant study design
Cabecinha, Melissa, Mercer, Catherine H., Gravningen, Kirsten et al. (2017) Finding sexual partners online: prevalence and associations with sexual behaviour, STI diagnoses and other sexual health outcomes in the British population. Sexually transmitted infections 93(8): 572-582	- Not a relevant study design
Caceres, C. F. (2015) A HOPE for HIV prevention in virtual MSM communities. The Lancet HIV 2(1): e6-e7	- Not a relevant study design
Calderon, Y., Cowan, E., Leu, C. S. et al. (2013) A human immunodeficiency virus posttest video to increase condom use among adolescent emergency department patients. Journal of Adolescent Health 53(1): 79-84	- No outcomes of interest
Carey, M. P., Senn, T. E., Walsh, J. L. et al. (2015) Evaluating a Brief, Video-Based Sexual Risk Reduction Intervention and Assessment Reactivity with STI Clinic Patients: Results from a Randomized Controlled Trial. AIDS and behavior 19(7): 1228-1246	- Comparator in study does not match that specified in protocol
Carvalho, Telma, Alvarez, Maria-Joao, Pereira, Cicero et al. (2016) Stage-based computer-delivered interventions to increase condom use in young men. International Journal of Sexual Health 28(2): 176-186	- No eligible population

Study	Reason for exclusion
Cassell, J. A., Dodds, J., Estcourt, C. et al. (2015) The relative clinical effectiveness and cost-effectiveness of three contrastingapproaches to partner notification for curable sexually transmitted infections: A cluster randomised trial in primary care. Health Technology Assessment 19(5): 1-144	- Study does not contain a relevant intervention
Castano, P. M., Bynum, J. Y., Andres, R. et al. (2012) Effect of daily text messages on oral contraceptive continuation: A randomized controlled trial. Obstetrics and Gynecology 119(1): 14-20	- Study does not contain a relevant intervention - No outcomes of interest
Castor, D., Pilowsky, D. J., Hadden, B. et al. (2010) Sexual risk reduction among non-injection drug users: report of a randomized controlled trial. AIDS care 22(1): 62-70	- Study does not contain a relevant intervention
Catalani, C., Philbrick, W., Fraser, H. et al. (2013) mHealth for HIV treatment & prevention: A systematic review of the literature. Open AIDS Journal 7(1): 17-41	- No outcomes of interest
Chavez, N. R.; Shearer, L. S.; Rosenthal, S. L. (2014) Use of Digital Media Technology for Primary Prevention of STIs/HIV in Youth. Journal of Pediatric and Adolescent Gynecology 27(5): 244-257	- Review article but not a systematic review
Chen, Elizabeth and Mangone, Emily Rose (2016) A Systematic Review of Apps using Mobile Criteria for Adolescent Pregnancy Prevention (mCAPP). JMIR mHealth and uHealth 4(4): e122	- No usability of the data
Chen, Yen-Tyng, Bowles, Kristina, An, Qian et al. (2018) Surveillance Among Men Who have Sex with Men in the United States: A Comparison of Web-Based and Venue-Based Samples. AIDS and behavior 22(7): 2104-2112	- Not a relevant study design
Chi, B. H. and Stringer, J. S. A. (2010) Mobile phones to improve HIV treatment adherence. The Lancet 376(9755): 1807-1808	- Not a relevant study design

Study	Reason for exclusion
Cohen, Adam Carl (2017) Evaluating an online patient engagement platform and smartphone application that notifies clients of sexually transmitted infection test results. Dissertation Abstracts International: Section B: The Sciences and Engineering 77(10be): No-Specified	- Not a relevant study design
Cooley, Philip C., Rogers, Susan M., Turner, Charles F. et al. (2001) Using Touch Screen Audio-CASI to Obtain Data on Sensitive Topics. Computers in human behavior 17(3): 285-293	- No usability of the data
Coomes, Curtis M., Lewis, Megan A., Uhrig, Jennifer D. et al. (2012) Beyond reminders: A conceptual framework for using short message service to promote prevention and improve healthcare quality and clinical outcomes for people living with HIV. AIDS Care 24(3): 348-357	- Review article but not a systematic review
Cordova, David, Mendoza Lua, Frania, Ovadje, Lauretta et al. (2017) Randomized Controlled Trials of Technology-Based HIV/STI and Drug Abuse Preventive Interventions for African American and Hispanic Youth: Systematic Review. JMIR public health and surveillance 3(4): e96	- Systematic review-not directly applicable to review protocol
Cornelius, J. B., Dmochowski, J., Boyer, C. et al. (2013) Text-messaging-enhanced hiv intervention for african american adolescents: A feasibility study. Journal of the Association of Nurses in AIDS Care 24(3): 256-267	- No usability of the data - Study does not contain a relevant intervention
Cote, J., Cossette, S., Ramirez-Garcia, P. et al. (2017) Improving Health and Reducing Comorbidity Associated with HIV: The Development of TAVIE en sante, a Web-Based Tailored Intervention to Support the Adoption of Health Promoting Behaviors among People Living with HIV. BioMed Research International 2017: 4092304	- No outcomes of interest - No usability of the data
Courtenay-Quirk, C., Horvath, K. J., Ding, H. et al. (2010) Perceptions of HIV-related websites among persons recently diagnosed with HIV. AIDS Patient Care and STDs 24(2): 105-115	- Not a relevant study design

Study	Reason for exclusion
Cruess, D. G., Burnham, K. E., Finitsis, D. J. et al. (2018) A Randomized Clinical Trial of a Brief Internet-based Group Intervention to Reduce Sexual Transmission Risk Behavior Among HIV-Positive Gay and Bisexual Men. Annals of behavioral medicine : a publication of the Society of Behavioral Medicine 52(2): 116-129	- Study does not contain a relevant intervention
Cruess, Dean G., Burnham, Kaylee E., Finitsis, David J. et al. (2018) A Randomized Clinical Trial of a Brief Internet-based Group Intervention to Reduce Sexual Transmission Risk Behavior Among HIV-Positive Gay and Bisexual Men. Annals of behavioral medicine : a publication of the Society of Behavioral Medicine 52(2): 116-129	- Study does not contain a relevant intervention
Cumming, Grant P., Cochrane, Rosemary, Currie, Heather D. et al. (2012) Web-based survey 'Contraception and attitudes to sexual behaviour' completed by women accessing a UK menopause website. Menopause international 18(3): 106-9	- No comparison group - Study does not contain a relevant intervention
Darbes, Lynae, Crepaz, Nicole, Lyles, Cynthia et al. (2008) The efficacy of behavioral interventions in reducing HIV risk behaviors and incident sexually transmitted diseases in heterosexual African Americans. AIDS 22(10): 1177-1194	- Study does not contain a relevant intervention
Dawson Rose, Carol, Cuca, Yvette P., Kamitani, Emiko et al. (2015) Using Interactive Web-Based Screening, Brief Intervention and Referral to Treatment in an Urban, Safety-Net HIV Clinic. AIDS and behavior 19suppl2: 186-93	- No comparison group
Deglise, Carole; Suggs, L. Suzanne; Odermatt, Peter (2012) SMS for disease control in developing countries: a systematic review of mobile health applications. Journal of telemedicine and telecare 18(5): 273-81	- Systematic review-not directly applicable to review protocol
DeLamater, J.; Wagstaff, D. A.; Havens, K. K. (2000) The impact of a culturally appropriate STD/AIDS education intervention on black male adolescents' sexual and condom use behavior. Health education &	- Study does not contain a relevant intervention

Study	Reason for exclusion
behavior : the official publication of the Society for Public Health Education 27(4): 454-70	
Di Noia, Jennifer, Schinke, Steven P., Pena, Juan B. et al. (2004) Evaluation of a brief computer-mediated intervention to reduce HIV risk among early adolescent females. The Journal of adolescent health : official publication of the Society for Adolescent Medicine 35(1): 62-4	- No outcomes of interest
Dickson-Gomez, Julia, Tarima, Sergey, Glasman, Laura R. et al. (2018) Intervention Reach and Sexual Risk Reduction of a Multi-level, Community-Based HIV Prevention Intervention for Crack Users in San Salvador, El Salvador. AIDS and behavior	- No eligible population - Not a relevant study design - Study does not contain a relevant intervention
Dietrich, Janan J., Lazarus, Erica, Andrasik, Michele et al. (2018) Mobile Phone Questionnaires for Sexual Risk Data Collection Among Young Women in Soweto, South Africa. AIDS and behavior 22(7): 2312-2321	- Not a relevant study design
Dokkum, Nynke F. B., Koekenbier, Rik H., van den Broek, Ingrid V. F. et al. (2012) Keeping participants on board: increasing uptake by automated respondent reminders in an Internet-based chlamydia screening in the Netherlands. BMC public health 12: 176	- No comparison group - Study does not contain a relevant intervention
Downs, J. S., Ashcraft, A. M., Murray, P. J. et al. (2018) Video Intervention to Increase Perceived Self-Efficacy for Condom Use in a Randomized Controlled Trial of Female Adolescents. Journal of Pediatric and Adolescent Gynecology 31(3): 291	- Comparator in study does not match that specified in protocol
Drozd, F., Skeie, L. G., Kraft, P. et al. (2014) A web-based intervention trial for depressive symptoms and subjective well-being in patients with chronic HIV infection. AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV 26(9): 1080-1089	- No outcomes of interest

Study	Reason for exclusion
Eathington, Patricia, Baldwin, Kathleen, Jones, Krista et al. (2013) Delivering sexually transmitted infection education via text messaging: An evidence-based project. Western Journal of Nursing Research 35(9): 1236-1237	- Not a relevant study design
Ebin, Julie and Van Wagenen, Aimee (2006) Developing Successful Sexual Health and Support Services for Bisexual People: Lessons Learned from the BiHealth Program. Journal of Bisexuality 6(12): 165-189	- Not a relevant study design
Eleuteri, S., Rossi, R., Tripodi, F. et al. (2018) Sexual health in your hands: How the smartphone apps can improve your sexual wellbeing?. Sexologies 27(3): e57-e60	- Review article but not a systematic review
Escobar-Chaves, S. L., Shegog, R., Moscoso-Alvarez, M. R. et al. (2011) Cultural tailoring and feasibility assessment of a sexual health middle school curriculum: A pilot test in Puerto Rico. Journal of School Health 81(8): 477-484	- No outcomes of interest
Escobar-Viera, Cesar Gabriel (2017) Assessing the impact of depressive symptoms on the intention to use mHealth interventions among people living with HIV and participating in the Florida health cohort. Dissertation Abstracts International: Section B: The Sciences and Engineering 77(9be): No-Specified	- Not a relevant study design
Essien, E. James, Mgbere, Osaro, Monjok, Emmanuel et al. (2011) Effectiveness of a video-based motivational skills-building HIV risk-reduction intervention for female military personnel. Social science & medicine (1982) 72(1): 63-71	- Study does not contain a relevant intervention
Evans, Alexandra E.; Edmundson-Drane, Elizabeth W.; Harris, Karol K. (2000) Computer-assisted instruction: An effective instructional method for HIV prevention education?. Journal of Adolescent Health 26(4): 244-251	- No outcomes of interest
Ezegbe, Bernedeth, Eseadi, Chiedu, Ede, Moses O. et al. (2018) Efficacy of rational emotive digital storytelling	- No outcomes of interest

Study	Reason for exclusion
intervention on knowledge and risk perception of HIV/AIDS among schoolchildren in Nigeria. Medicine 97(47): e12910	- Study does not contain a relevant intervention
Fernandez, M. Isabel, Hosek, Sybil G., Hotton, Anna L. et al. (2016) A randomized controlled trial of POWER: An Internet-based HIV prevention intervention for Black bisexual men. AIDS and Behavior 20(9): 1951-1960	- Study does not contain a relevant intervention
Ferrer, R. A., Fisher, J. D., Buck, R. et al. (2011) Pilot test of an emotional education intervention component for sexual risk reduction. Health psychology 30(5): 656-660	- Study does not contain a relevant intervention
Fiellin, L. E., Hieftje, K. D., Pendergrass, T. M. et al. (2017) Video Game Intervention for Sexual Risk Reduction in Minority Adolescents: randomized Controlled Trial. Journal of medical internet research 19(9): e314	- No outcomes of interest - Study does not contain a relevant intervention
Free, C., McCarthy, O., French, R. S. et al. (2016) Can text messages increase safer sex behaviours in young people? Intervention development and pilot randomized controlled trial. Health Technology Assessment 20(57): 1-81	- Not a relevant study design
Gabarron, Elia and Wynn, Rolf (2016) Use of social media for sexual health promotion: a scoping review. Global health action 9: 32193	- Review article but not a systematic review
Gamage, Deepa G., Fuller, Candice A., Cummings, Rosey et al. (2011) Advertising sexual health services that provide sexually transmissible infection screening for rural young people - what works and what doesn't. Sexual health 8(3): 407-11	- Not a relevant study design
Garett, Renee; Smith, Justin; Young, Sean D. (2016) A Review of Social Media Technologies Across the Global HIV Care Continuum. Current opinion in psychology 9: 56-66	- Review article but not a systematic review

Study	Reason for exclusion
Gibbs, Jo, Gkatzidou, Voula, Tickle, Laura et al. (2017) 'Can you recommend any good STI apps?' A review of content, accuracy and comprehensiveness of current mobile medical applications for STIs and related genital infections. Sexually transmitted infections 93(4): 234-235	- Not a relevant study design
Gilbert, M., Bonnell, A., Farrell, J. et al. (2017) Click yes to consent: Acceptability of incorporating informed consent into an internet-based testing program for sexually transmitted and blood-borne infections. International Journal of Medical Informatics 105: 38-48	- Not a relevant study design
Gilbert, Mark, Haag, Devon, Hottes, Travis Salway et al. (2016) Get Checked... Where? The Development of a Comprehensive, Integrated Internet-Based Testing Program for Sexually Transmitted and Blood-Borne Infections in British Columbia, Canada. JMIR research protocols 5(3): e186	- No usability of the data
Goedel, William C., Mitchell, Jason W., Krebs, Paul et al. (2017) Willingness to Use Mobile Phone Apps for HIV Prevention Among Men Who Have Sex with Men in London: Web-Based Survey. JMIR mHealth and uHealth 5(10): e153	- Not a relevant study design
Gold, J., Aitken, C. K., Dixon, H. G. et al. (2011) A randomised controlled trial using mobile advertising to promote safer sex and sun safety to young people. Health education research 26(5): 782-794	- Comparator in study does not match that specified in protocol
Gold, Judy, Lim, Megan S. C., Hocking, Jane S. et al. (2011) Determining the impact of text messaging for sexual health promotion to young people. Sexually transmitted diseases 38(4): 247-52	- Not a relevant study design
Govender, Kaymarlin, Beckett, Sean, Masebo, Wilfred et al. (2019) Effects of a Short Message Service (SMS) Intervention on Reduction of HIV Risk Behaviours and Improving HIV Testing Rates Among Populations located near Roadside Wellness Clinics: A Cluster Randomised Controlled Trial in South Africa, Zimbabwe and Mozambique. AIDS and behavior	- Not focused on behaviour change

Study	Reason for exclusion
Gragnano, Andrea and Miglioretti, Massimo (2017) Is a web video effective in increasing intention to use condoms? A test based on the Health Action Process Approach. Applied Psychology Bulletin 279(65): 2-14	- No usability of the data
Guse, Kylene, Levine, Deb, Martins, Summer et al. (2012) Interventions using new digital media to improve adolescent sexual health: a systematic review. The Journal of adolescent health : official publication of the Society for Adolescent Medicine 51(6): 535-43	- Systematic review-not directly applicable to review protocol
Halpern, Carolyn Tucker, Mitchell, Ellen M. H., Farhat, Tilda et al. (2008) Effectiveness of web-based education on Kenyan and Brazilian adolescents' knowledge about HIV/AIDS, abortion law, and emergency contraception: findings from TeenWeb. Social science & medicine (1982) 67(4): 628-37	- No outcomes of interest - Study does not contain a relevant intervention
Harrington, Elizabeth K., Drake, Alison L., Matemo, Daniel et al. (2019) An mHealth SMS intervention on Postpartum Contraceptive Use Among Women and Couples in Kenya: A Randomized Controlled Trial. American journal of public health 109(6): 934-941	- Study does not contain a relevant intervention
Hebert, Luciana E., Hill, Brandon J., Quinn, Michael et al. (2018) Mobile contraceptive application use in a clinical setting in addition to standard contraceptive counseling: A randomized controlled trial. Contraception 98(4): 281-287	- Study does not contain a relevant intervention
Heeren, G. A., Jemmott, J. B., Ngwane, Z. et al. (2013) A randomized controlled pilot study of an HIV risk-reduction intervention for sub-Saharan African university students. AIDS and behavior 17(3): 1105-1115	- Study does not contain a relevant intervention
Hersh, A. R., Munoz, L. F., Rincon, M. et al. (2018) Video compared to conversational contraceptive counseling during labor and maternity hospitalization in Colombia: A randomized trial. Contraception 98(3): 210-214	- Study does not contain a relevant intervention
Hickman, Nichole Erin and Schaar, Gina (2018) Impact of an Educational Text Message Intervention on	- No outcomes of interest

Study	Reason for exclusion
Adolescents' Knowledge and High-Risk Behaviors. Comprehensive child and adolescent nursing 41(1): 71-82	
Hickson, Ford, Tomlin, Keith, Hargreaves, James et al. (2015) Internet-based cohort study of HIV testing over 1 year among men who have sex with men living in England and exposed to a social marketing intervention promoting testing. Sexually transmitted infections 91(1): 24-30	- Not a relevant study design
Hieftje, Kimberly, Edelman, E. Jennifer, Camenga, Deepa R. et al. (2013) Electronic media-based health interventions promoting behavior change in youth: a systematic review. JAMA pediatrics 167(6): 574-80	- Systematic review-not directly applicable to review protocol
Hightow-Weidman, Lisa B., LeGrand, Sara, Muessig, Kathryn E. et al. (2019) A Randomized Trial of an Online Risk Reduction Intervention for Young Black MSM. AIDS and behavior 23(5): 1166-1177	- Study does not contain a relevant intervention
Hightow-Weidman, Lisa B., Pike, Emily, Fowler, Beth et al. (2012) HealthMpowerment.org: feasibility and acceptability of delivering an internet intervention to young Black men who have sex with men. AIDS care 24(7): 910-20	- Study does not contain a relevant intervention
Horvath, Keith J. and Bauermeister, Jose A. (2017) eHealth Literacy and Intervention Tailoring Impacts the Acceptability of a HIV/STI Testing Intervention and Sexual Decision Making Among Young Gay and Bisexual Men. AIDS education and prevention : official publication of the International Society for AIDS Education 29(1): 14-23	- No outcomes of interest
Hou, Su- I. (2009) HIV-related behaviors among black students attending Historically Black Colleges and Universities (HBCUs) versus white students attending a traditionally white institution (TWI). AIDS care 21(8): 1050-7	- Not a relevant study design
Hudnut-Beumler, Julia; Po'e, Eli; Barkin, Shari (2016) The Use of Social Media for Health Promotion in Hispanic Populations: A Scoping Systematic Review. JMIR public health and surveillance 2(2): e32	- Review article but not a systematic review

Study	Reason for exclusion
Hugo, J. M., Stall, R. D., Rebe, K. et al. (2016) Knowledge, Attitudes and Beliefs regarding Post Exposure Prophylaxis among South African Men who have Sex with Men. AIDS and behavior 20(suppl3): 350-356	- Not a relevant study design
Hull, Peter, Mao, Limin, Prestage, Garrett et al. (2016) The use of mobile phone apps by Australian gay and bisexual men to meet sex partners: an analysis of sex-seeking repertoires and risks for HIV and STIs using behavioural surveillance data. Sexually transmitted infections 92(7): 502-507	- Not a relevant study design
Iacobucci, Gareth (2018) Sixty seconds on . . . contraceptive apps. BMJ (Clinical research ed.) 361: k2019	- Not a relevant study design
Ingersoll, K., Frederick, C., MacDonnell, K. et al. (2018) A Pilot RCT of an Internet Intervention to Reduce the Risk of Alcohol-Exposed Pregnancy. Alcoholism: Clinical and Experimental Research 42(6): 1132-1144	- Study does not contain a relevant intervention
Ingersoll, Karen S., Ceperich, Sherry Dyche, Nettleman, Mary D. et al. (2005) Reducing alcohol-exposed pregnancy risk in college women: initial outcomes of a clinical trial of a motivational intervention. Journal of substance abuse treatment 29(3): 173-80	- Study does not contain a relevant intervention
Jackson, Dawnyea D., Ingram, Lucy Annang, Boyer, Cherrie B. et al. (2016) Can technology decrease sexual risk behaviors among young people? Results of a pilot study examining the effectiveness of a mobile application intervention. American Journal of Sexuality Education 11(1): 41-60	- Not focused on behaviour change
Jackson, Dawnyea Dominique (2015) The development, implementation, and testing of an interactive sexual health web-based application intervention to reduce sexual risk behaviors among college students. Dissertation Abstracts International: Section B: The Sciences and Engineering 76(1be): No-Specified	- Not a relevant study design

Study	Reason for exclusion
Jaganath, Devan, Gill, Harkiran K., Cohen, Adam Carl et al. (2012) Harnessing Online Peer Education (HOPE): integrating C-POL and social media to train peer leaders in HIV prevention. AIDS care 24(5): 593-600	- Study does not contain a relevant intervention
Johnson, W. D., Diaz, R. M., Flanders, W. D. et al. (2008) Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. Cochrane Database of Systematic Reviews	- Systematic review-not directly applicable to review protocol
Johnson, W. D., Holtgrave, D. R., McClellan, W. M. et al. (2005) HIV intervention research for men who have sex with men: a 7-year update. AIDS Education and Prevention 17(6): 568-589	- Study does not contain a relevant intervention
Jones, Jamal and Salazar, Laura F. (2016) A Review of HIV Prevention Studies that Use Social Networking Sites: Implications for Recruitment, Health Promotion Campaigns, and Efficacy Trials. AIDS and behavior 20(11): 2772-2781	- Systematic review-not directly applicable to review protocol
Jones, Krista; Baldwin, Kathleen A.; Lewis, Patricia Ryan (2012) The potential influence of a social media intervention on risky sexual behavior and Chlamydia incidence. Journal of community health nursing 29(2): 106-20	- Not a relevant study design - Study does not contain a relevant intervention
Jones, Krista, Eathington, Patricia, Baldwin, Kathleen et al. (2014) The impact of health education transmitted via social media or text messaging on adolescent and young adult risky sexual behavior: a systematic review of the literature. Sexually transmitted diseases 41(7): 413-9	- Systematic review-not directly applicable to review protocol
Jones, Rachel (2012) Handheld computers to run ACASI to assess HIV risk and deliver tailored soap opera video feedback: acceptability among young adult urban women. The Journal of the Association of Nurses in AIDS Care : JANAC 23(3): 260-7	- Not a relevant study design
Jones, Rachel and Lacroix, Lorraine J. (2012) Streaming weekly soap opera video episodes to	- No comparison group

Study	Reason for exclusion
smartphones in a randomized controlled trial to reduce HIV risk in young urban African American/black women. AIDS and behavior 16(5): 1341-58	- No usability of the data
Kang, Melissa, Rochford, Arlie, Skinner, Rachel et al. (2012) Facilitating chlamydia testing among young people: a randomised controlled trial in cyberspace. Sexually transmitted infections 88(8): 568-73	- Study does not contain a relevant intervention
Kang, Melissa; Skinner, Rachel; Usherwood, Tim (2010) Interventions for young people in Australia to reduce HIV and sexually transmissible infections: a systematic review. Sexual health 7(2): 107-28	- Study does not contain a relevant intervention
Karyotaki, E. (2018) Internet-based interventions for people with HIV and depression. The Lancet HIV 5(9): e474-e475	- Not a relevant study design
Kennedy, David P., Hunter, Sarah B., Chan Osilla, Karen et al. (2016) A computer-assisted motivational social network intervention to reduce alcohol, drug and HIV risk behaviors among Housing First residents. Addiction science & clinical practice 11(1): 4	- study protocol
Kerani, R. P., Fleming, M., Deyoung, B. et al. (2011) A randomized, controlled trial of inSPOT and patient-delivered partner therapy for gonorrhea and chlamydial infection among men who have sex with men. Sexually Transmitted Diseases 38(10): 941-946	- No outcomes of interest
Kitagawa, Risa (2015) Texting and sexual health: experimental evidence from an information intervention in Kenya. Proceedings of the Seventh International Conference on Information and Communication Technologies and Development: 1-10	- Study does not contain a relevant intervention
Klein, Charles H. and Card, Josefina J. (2011) Preliminary efficacy of a computer-delivered HIV prevention intervention for African American teenage females. AIDS education and prevention : official publication of the International Society for AIDS Education 23(6): 564-76	- Study does not contain a relevant intervention

Study	Reason for exclusion
Knight, R., Karamouzian, M., Salway, T. et al. (2017) Online interventions to address HIV and other sexually transmitted and blood-borne infections among young gay, bisexual and other men who have sex with men: A systematic review. Journal of the International AIDS Society 20(3): e25017	- Systematic review-not directly applicable to review protocol
L'Engle, Kelly L., Mangone, Emily R., Parcesepe, Angela M. et al. (2016) Mobile Phone Interventions for Adolescent Sexual and Reproductive Health: A Systematic Review. Pediatrics 138(3)	- Systematic review-not directly applicable to review protocol
Laisaar, Kaja-Triin, Raag, Mait, Rosenthal, Marika et al. (2015) Behavioral Interventions to Reduce Sexual Risk Behavior in Adults with HIV/AIDS Receiving HIV Care: A Systematic Review. AIDS patient care and STDs 29(5): 288-98	- Systematic review-not directly applicable to review protocol
Lehmiller, J. J. and Ioerger, M. (2014) Social networking smartphone applications and sexual health outcomes among men who have sex with men. PLoS ONE 9(1): e86603	- Not a relevant study design
Lim, Megan S. C., Hocking, Jane S., Aitken, Campbell K. et al. (2012) Impact of text and email messaging on the sexual health of young people: a randomised controlled trial. Journal of epidemiology and community health 66(1): 69-74	- Study does not contain a relevant intervention
Lim, Megan S. C., Hocking, Jane S., Hellard, Margaret E. et al. (2008) SMS STI: a review of the uses of mobile phone text messaging in sexual health. International journal of STD & AIDS 19(5): 287-90	- Review article but not a systematic review
Lin, Y. J., Lee, C. H., Chang, C. C. et al. (2016) Evaluation of a Video-Based Intervention to Promote Condom Use Among College Students in Taiwan. Studies in health technology and informatics 226: 101-104	- No comparison group - No outcomes of interest
Long, L., Abraham, C., Paquette, R. et al. (2017) Erratum to "Brief interventions to prevent sexually transmitted infections suitable for in-service use: A systematic review" [Prev. Med. (2016) 91 364-382]	- Systematic review-not directly applicable to review protocol

Study	Reason for exclusion
(S0091743516301633)(10.1016/j.ypmed.2016.06.038). Preventive Medicine 96: 163-164	
Lopez Laureen, M., Stockton Laurie, L., Chen, Mario et al. (2014) Behavioral interventions for improving dual-method contraceptive use. Cochrane Database of Systematic Reviews: Reviews issue3	- Systematic review-not directly applicable to review protocol
Lopez, Laureen M., Grey, Thomas W., Chen, Mario et al. (2016) Behavioral interventions for improving contraceptive use among women living with HIV. The Cochrane database of systematic reviews: cd010243	- Systematic review-not directly applicable to review protocol
Lustria, Mia Liza A., Cortese, Juliann, Gerend, Mary A. et al. (2016) A model of tailoring effects: A randomized controlled trial examining the mechanisms of tailoring in a web-based STD screening intervention. Health psychology : official journal of the Division of Health Psychology, American Psychological Association 35(11): 1214-1224	- No usability of the data
Lydie, Nathalie, de Barbeyrac, Bertille, Bluzat, Lucile et al. (2017) Chlamyweb Study I: rationale, design and acceptability of an internet-based chlamydia testing intervention. Sexually transmitted infections 93(3): 179-187	- No comparison group
Mangone, Emily Rose; Lebrun, Victoria; Muessig, Kathryn E. (2016) Mobile Phone Apps for the Prevention of Unintended Pregnancy: A Systematic Review and Content Analysis. JMIR mHealth and uHealth 4(1): e6	- Systematic review-not directly applicable to review protocol
Mausbach, B. T., Semple, S. J., Strathdee, S. A. et al. (2007) Efficacy of a behavioral intervention for increasing safer sex behaviors in HIV-negative, heterosexual methamphetamine users: results from the Fast-Lane Study. Annals of behavioral medicine 34(3): 263-274	- No eligible population - Study does not contain a relevant intervention
McKenney, Jennie, Sullivan, Patrick S., Bowles, Kristina E. et al. (2018) HIV Risk Behaviors and Utilization of Prevention Services, Urban and Rural Men Who Have Sex with Men in the United States:	- Not a relevant study design

Study	Reason for exclusion
Results from a National Online Survey. AIDS and behavior 22(7): 2127-2136	
Miller, M. K., Champassak, S., Goggin, K. et al. (2016) Brief behavioral intervention to improve adolescent sexual health a feasibility study in the emergency department. Pediatric Emergency Care 32(1): 17-19	- No usability of the data - Not a relevant study design
Mobley, Victoria, Cope, Anna, Dzialowy, Nicole et al. (2018) A Comparison of Syphilis Partner Notification Outcomes by Reported Use of Internet-based Apps to Meet Sex Partners in North Carolina, 2013-2016. Sexually transmitted diseases 45(12): 823-828	- Not a relevant study design
Moniz, Michelle H.; Meyn, Leslie A.; Beigi, Richard H. (2015) Text Messaging to Improve Preventive Health Attitudes and Behaviors During Pregnancy: A Prospective Cohort Analysis. The Journal of reproductive medicine 60(910): 378-82	- No usability of the data
Muessig, Kathryn E., Pike, Emily C., Legrand, Sara et al. (2013) Mobile phone applications for the care and prevention of HIV and other sexually transmitted diseases: a review. Journal of medical Internet research 15(1): e1	- Review article but not a systematic review
Nadarzynski, Tom, Burton, Jack, Henderson, Kimberley et al. (2019) Targeted advertisement of chlamydia screening on social media: A mixed-methods analysis. Digital health 5: 2055207619827193	- Not a relevant study design
Nik Farid, N. D., Mohd Arshad, M. F. B., Yakub, N. A. et al. (2018) Improving Malaysian adolescent sexual and reproductive health: An Internet-based health promotion programme as a potential intervention. Health Education Journal 77(7): 837-848	- No outcomes of interest
Noar, S. M.; Pierce, L. B.; Black, H. G. (2010) Can computer-mediated interventions change theoretical mediators of safer sex? A meta-analysis. Human Communication Research 36(3): 261-297	- Systematic review-not directly applicable to review protocol

Study	Reason for exclusion
Noar, Seth M.; Black, Hulda G.; Pierce, Larson B. (2009) Efficacy of computer technology-based HIV prevention interventions: a meta-analysis. AIDS (London, England) 23(1): 107-15	- Systematic review-not directly applicable to review protocol
Nugroho, Adi, Erasmus, Vicki, Zomer, Tizza P. et al. (2017) Behavioral interventions to reduce HIV risk behavior for MSM and transwomen in Southeast Asia: a systematic review. AIDS care 29(1): 98-104	- Systematic review-not directly applicable to review protocol
O'Leary, A. (2001) Social-cognitive theory mediators of behavior change in the National Institute of Mental Health Multisite HIV Prevention Trial. Health psychology 20(5): 369-376	- No outcomes of interest
Portnoy, David B., Scott-Sheldon, Lori A. J., Johnson, Blair T. et al. (2008) Computer-delivered interventions for health promotion and behavioral risk reduction: a meta-analysis of 75 randomized controlled trials, 1988-2007. Preventive medicine 47(1): 3-16	- Systematic review-not directly applicable to review protocol
Reback, C. J.; Fletcher, J. B.; Leibowitz, A. A. (2019) Cost effectiveness of text messages to reduce methamphetamine use and HIV sexual risk behaviors among men who have sex with men. Journal of Substance Abuse Treatment 100: 59-63	- No usability of the data
Reback, Cathy J., Fletcher, Jesse B., Swendeman, Dallas A. et al. (2019) Theory-Based Text-Messaging to Reduce Methamphetamine Use and HIV Sexual Risk Behaviors Among Men Who Have Sex with Men: Automated Unidirectional Delivery Outperforms Bidirectional Peer Interactive Delivery. AIDS and behavior 23(1): 37-47	- Data not reported in an extractable format
Ronen, Keshet, Golden, Matthew R., Dombrowski, Julia C. et al. (2019) Uptake and Impact of Short Message Service Reminders via STI Partner Services on HIV/STI Testing Frequency among Men Who Have Sex with Men. Sexually transmitted diseases	- Not focused on behaviour change
Schnall, Rebecca, Travers, Jasmine, Rojas, Marlene et al. (2014) eHealth interventions for HIV prevention in high-risk men who have sex with men: a systematic	- Systematic review-not directly applicable to review protocol

Study	Reason for exclusion
review. Journal of medical Internet research 16(5): e134	
Schonnesson, Lena Nilsson; Bowen, Anne M.; Williams, Mark L. (2016) Project SMART: Preliminary Results From a Test of the Efficacy of a Swedish Internet-Based HIV Risk-Reduction Intervention for Men Who Have Sex With Men. Archives of sexual behavior 45(6): 1501-11	- Study does not contain a relevant intervention
Swanton, R.; Allom, V.; Mullan, B. (2015) A meta-analysis of the effect of new-media interventions on sexual-health behaviours. Sexually Transmitted Infections 91(1): 14-20	- Systematic review-not directly applicable to review protocol
Tanner, Amanda E., Song, Eunyoung Y., Mann-Jackson, Lilli et al. (2018) Preliminary Impact of the weCare Social Media Intervention to Support Health for Young Men Who Have Sex with Men and Transgender Women with HIV. AIDS patient care and STDs 32(11): 450-458	- No outcomes of interest
Villegas, N., Santisteban, D., Cianelli, R. et al. (2014) The development, feasibility and acceptability of an Internet-based STI-HIV prevention intervention for young Chilean women. International nursing review 61(1): 55-63	- No usability of the data
Whitaker, R., Hendry, M., Aslam, R. et al. (2016) Intervention now to eliminate repeat unintended pregnancy in teenagers (INTERUPT): A systematic review of intervention effectiveness and cost-effectiveness, and qualitative and realist synthesis of implementation factors and user engagement. Health Technology Assessment 20(16): 1-214	- Not a relevant study design
Widman, L., Nesi, J., Kamke, K. et al. (2018) Technology-Based Interventions to Reduce Sexually Transmitted Infections and Unintended Pregnancy Among Youth. Journal of Adolescent Health 62(6): 651-660	- Systematic review-not directly applicable to review protocol
Widman, Laura, Golin, Carol E., Kamke, Kristyn et al. (2018) Sexual Assertiveness Skills and Sexual Decision-Making in Adolescent Girls: Randomized	- Not focused on behaviour change

Study	Reason for exclusion
Controlled Trial of an Online Program. American journal of public health 108(1): 96-102	- No outcomes of interest
Wilson, E., Leyrat, C., Baraitser, P. et al. (2019) Does internet-accessed STI (e-STI) testing increase testing uptake for chlamydia and other STIs among a young population who have never tested? Secondary analyses of data from a randomised controlled trial. Sexually Transmitted Infections	- Study does not contain a relevant intervention
Ybarra, M., Prescott, T. L., Phillips, G. L. et al. (2015) Intervention-end outcomes for Guy2Guy, a text messaging-based HIV prevention program for gay, bisexual, and queer adolescent men. Journal of sexual medicine. Conference: 22nd congress of theworld association for sexual health, WAS 2015. Singapore 12(supplement5): 321	- Conference abstract
Yee, Lynn and Simon, Melissa (2010) The role of the social network in contraceptive decision-making among young, African American and Latina women. The Journal of adolescent health : official publication of the Society for Adolescent Medicine 47(4): 374-80	- Not a relevant study design

Economic studies

Full reference	Reason for exclusion
Aalbers T, Baars MAE, Rikkert MGMO. Characteristics of effective internet-mediated interventions to change lifestyle in people aged 50 and older: a systematic review. Ageing Res Rev. 2011;10(4):487-97.	Ineligible outcomes
Abrantes AM, Blevins CE, Battle CL, Read JP, Gordon AL, Stein MD. Developing a Fitbit-supported lifestyle physical activity intervention for depressed alcohol dependent women. J Subst Abuse Treat. 2017;80:88-97.	Ineligible outcomes

Full reference	Reason for exclusion
Adams J. Worth doing badly? Sexual health promotion in primary care. Br J Gen Pract. 2003;53(497):981.	Ineligible study design
Aittasalo M, Rinne M, Pasanen M, Kukkonen-Harjula K, Vasankari T. Promoting walking among office employees - evaluation of a randomized controlled intervention with pedometers and e-mail messages. BMC Public Health. 2012;12(403):1-11.	Ineligible population
Alfonso J, Hall TV, Dunn ME. Feedback-based alcohol interventions for mandated students: an effectiveness study of three modalities. Clin Psychol Psychother. 2013;20(5):411-23.	Ineligible outcomes
Alouki K, Delisle H, Bermudez-Tamayo C, Johri M. Lifestyle interventions to prevent type 2 diabetes: a systematic review of economic evaluation studies. J Diabetes Res. 2016;2016:E2159890.	Systematic review
Aminde LN, Takah NF, Zapata-Diomedi B, Veerman JL. Primary and secondary prevention interventions for cardiovascular disease in low-income and middle-income countries: a systematic review of economic evaluations. Cost Eff Resour Alloc. 2018;16(22):1-34.	Systematic review
Angus C, Latimer N, Preston L, Li J, Purshouse R. What are the implications for policy makers? A systematic review of the cost-effectiveness of screening and brief interventions for alcohol misuse in primary care. Frontiers in Psychiatry. 2014;5:114.	Ineligible intervention
Angus C, Li J, Romero-Rodriguez E, Anderson P, Parrott S, Brennan A. Cost-effectiveness of strategies to improve delivery of brief interventions for heavy drinking in primary care: results from the ODHIN trial. Eur J Public Health. 2018;29(2):219-25.	Ineligible intervention
Archer E, Groessl EJ, Sui X, McClain AC, Wilcox S, Hand GA, et al. An economic analysis of traditional and technology-based approaches to weight loss. Am J Prev Med. 2012;43(2):176-82.	Ineligible population
Bailey J, Mann S, Wayal S, Hunter R, Free C, Abraham C, et al. Sexual health promotion for young people delivered via digital media: a scoping review. NIHR Journals Library 2015	Ineligible study design
Bhardwaj NN, Wodajo B, Gochipathala K, Paul DP, 3rd, Coustasse A. Can mHealth revolutionize the way we manage adult obesity? Perspect Health Inf Manag. 2017;14:1A.	Systematic review
Blake H. Text messaging interventions increase adherence to antiretroviral therapy and smoking cessation. Evid Based Med. 2014;19(1):35-36.	Ineligible outcomes
Blankers M, Nabitz U, Smit F, Koeter MW, Schippers GM. Economic evaluation of internet-based interventions for harmful	Ineligible population

Full reference	Reason for exclusion
alcohol use alongside a pragmatic randomized controlled trial. J Med Internet Res. 2012;14(5):E134.	
Block G, Sternfeld B, Block CH, Block TJ, Norris J, Hopkins D, et al. Development of alive! (A lifestyle intervention via email), and its effect on health-related quality of life, presenteeism, and other behavioral outcomes: randomized controlled trial. J Med Internet Res. 2008;10(4):E43.	Ineligible outcomes
Brown J. Internet-based intervention for smoking cessation (StopAdvisor) in people with low and high socioeconomic status: a randomised controlled trial. Lancet Respir Med. 2014;2(12):997-1006.	Ineligible study design
Bull S, Devine S, Schmiege SJ, Pickard L, Campbell J, Shlay JC. Text messaging, teen outreach program, and sexual health behavior: a cluster randomized trial. Am J Public Health. 2016;106(S1):S117-24.	Ineligible intervention
Burford O, Jiwa M, Carter O, Parsons R, Hendrie D. Internet-based photoaging within Australian pharmacies to promote smoking cessation: randomized controlled trial. J Med Internet Res. 2013;15(3):E64.	Ineligible population
Burgos JL, Patterson TL, Graff-Zivin JS, Kahn JG, Rangel MG, Lozada MR, et al. Cost-effectiveness of combined sexual and injection risk reduction interventions among female sex workers who inject drugs in two very distinct Mexican border cities. PLoS ONE. 2016;11(2):E0147719.	Ineligible intervention
Burn E, Marshall AL, Miller YD, Barnett AG, Fjeldsoe BS, Graves N. The cost-effectiveness of the MobileMums intervention to increase physical activity among mothers with young children: a Markov model informed by a randomised controlled trial. BMJ Open. 2015;5(4):E007226.	Ineligible outcomes
Burn E, Nghiem S, Jan S, Redfern J, Rodgers A, Thiagalingam A, et al. Cost-effectiveness of a text message programme for the prevention of recurrent cardiovascular events. Heart. 2017;103(12):923-30.	Ineligible population
Calhoun PS, Datta S, Olsen M, Smith VA, Moore SD, Hair LP, et al. Comparative effectiveness of an internet-based smoking cessation intervention versus clinic-based specialty care for veterans. J Subst Abuse Treat. 2016;69:19-27.	Ineligible population
Carr SM, Lhussier M, Forster N, Geddes L, Deane K, Pennington M, et al. An evidence synthesis of qualitative and quantitative research on component intervention techniques, effectiveness, cost-effectiveness, equity and acceptability of different versions of	Ineligible outcomes

Full reference	Reason for exclusion
health-related lifestyle advisor role in improving health. Health Technol Assess. 2011;15(9)	
Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barron V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. Lancet. 2010;376(9754):1775-84.	Ineligible outcomes
Chen F, Su W, Becker SH, Payne M, Sweet CMC, Peters AL, et al. Clinical and economic impact of a digital, remotely-delivered intensive behavioral counseling program on medicare beneficiariesat risk for diabetes and cardiovascular disease. PLoS ONE. 2016;11(10):E0163627.	Ineligible intervention
Chen YF, Madan J, Welton N, Yahaya I, Aveyard P, Bauld L, et al. Effectiveness and cost-effectiveness of computer and other electronic aids for smoking cessation: a systematic review and network meta-analysis. Health Technol Assess. 2012;16(38):1-205.	Ineligible population
Cheng Q, Church J, Haas M, Goodall S, Sangster J, Furber S. Cost-effectiveness of a population-based lifestyle intervention to promote healthy weight and physical activity in non-attenders of cardiac rehabilitation. Heart Lung Circ. 2016;25(3):265-74.	Ineligible intervention
Cheung KL, Wijnen B, de Vries H. A review of the theoretical basis, effects, and cost effectiveness of online smoking cessation interventions in the netherlands: a mixed-methods approach. J Med Internet Res. 2017;19(6):E230.	Ineligible population
Cheung K-L, Wijnen BFM, Hiligsmann M, Coyle K, Coyle D, Pokhrel S, et al. Is it cost-effective to provide internet-based interventions to complement the current provision of smoking cessation services in the Netherlands? An analysis based on the EQUIPTMOD. Addiction. 2018;113(Suppl 1):87-95.	Ineligible population
Clayforth C, Pettigrew S, Mooney K, Lansdorp-Vogelaar I, Rosenberg M, Slevin T. A cost-effectiveness analysis of online, radio and print tobacco control advertisements targeting 25-39 year-old males. Aust N Z J Public Health. 2014;38(3):270-74.	Ineligible intervention
Cleghorn C, Wilson N, Nair N, Kvizhinadze G, Nghiem N, McLeod M, et al. Health Benefits and Cost-Effectiveness From Promoting Smartphone Apps for Weight Loss: Multistate Life Table Modeling. JMIR mHealth and uHealth 2019;7(1): e11118	Ineligible intervention
Cobiac LJ, Vos T, Barendregt JJ. Cost-effectiveness of interventions to promote physical activity: a modelling study. PLos Med. 2009;6(7):1-11.	Ineligible population

Full reference	Reason for exclusion
Cohen DA, Wu SY, Farley TA. Comparing the cost-effectiveness of HIV prevention interventions. J Acquir Immune Defic Syndr. 2004;37(3):1404-14.	Ineligible intervention
Comello, Maria Leonora G and Porter, Jeannette H. Concept Test of a Smoking Cessation Smart Case. Telemed J E Health 2018:4	Ineligible intervention
Cooper K, Shepherd J, Picot J, Jones J, Kavanagh J, Harden A, et al. An economic model of school-based behavioral interventions to prevent sexually transmitted infections. Int J Technol Assess Health Care. 2012;28(4):407-14.	Ineligible intervention
Crombie IK, Falconer DW, Irvine L, Williams B, Ricketts IW, Humphris G, et al. Reducing alcohol-related harm in disadvantaged men: development and feasibility assessment of a brief intervention delivered by mobile telephone. NIHR Journals Library 2013	Ineligible study design
Crombie IK, Irvine L, Williams B, Sniehotta FF, Petrie DJ, Jones C, et al. Text message intervention to reduce frequency of binge drinking among disadvantaged men: the TRAM RCT. London: National Institute for Health Research; 2018. Available from: https://www.ncbi.nlm.nih.gov/books/NBK507396/pdf/Bookshelf_NBK507396.pdf.	Ineligible population
Daley A, Jolly K, Madigan C, Griffin R, Roalfe A, Lewis A, et al. A brief behavioural intervention to promote regular self-weighing to prevent weight regain after weight loss: a RCT. NIHR Journals Library 2019	Ineligible intervention
Daly AT, Deshmukh AA, Vidrine DJ, Prokhorov AV, Frank SG, Tahay PD, et al. Cost-effectiveness analysis of smoking cessation interventions using cell phones in a low-income population. Tob Control. 2019;28(1):88-94.	Ineligible population
Dandona L, Kumar SG, Kumar GA, Dandona R. Cost-effectiveness of HIV prevention interventions in Andhra Pradesh state of India. BMC Health Serv Res. 2010;10(117):1-8.	Ineligible intervention
Devi R, Singh SJ, Powell J, Fulton EA, Igbinedion E, Rees K. Internet-based interventions for the secondary prevention of coronary heart disease. Cochrane Database Syst Rev. 2015;12:CD009386.	Ineligible outcomes
Dobbie F, Hiscock R, Leonardi-Bee J, Murray S, Shahab L, Aveyard P, et al. Evaluating long-term outcomes of NHS stop smoking services (ELONS): a prospective cohort study. Health Technol Assess. 2014;18(35):1-424.	Ineligible intervention
Donker T, Blankers M, Hedman E, Ljotsson B, Petrie K, Christensen H. Economic evaluations of internet interventions for	Ineligible outcomes

Full reference	Reason for exclusion
mental health: a systematic review. Psychol Med. 2015;45(16):3357-76.	
Drost RM, Paulus AT, Jander AF, Mercken L, de Vries H, Ruwaard D, et al. A web-based computer-tailored alcohol prevention program for adolescents: cost-effectiveness and intersectoral costs and benefits. J Med Internet Res. 2016;18(4):E93.	Ineligible population
Ekpu VU, Brown AK. The economic impact of smoking and of reducing smoking prevalence: review of evidence. Tobacco Use Insights. 2015;8:1-35.	Systematic review
Emery JL, Coleman T, Sutton S, Cooper S, Leonardi-Bee J, Jones M, et al. Uptake of tailored text message smoking cessation support in pregnancy when advertised on the internet (MiQuit): observational study. J Med Internet Res. 2018;20(4):E146.	Ineligible study design
Emmons KM, Puleo E, Greaney ML, Gillman MW, Bennett GG, Haines J, et al. A randomized comparative effectiveness study of Healthy Directions 2: a multiple risk behavior intervention for primary care. Prev Med. 2014;64:96-102.	Ineligible intervention
Estabrooks PA, Wilson KE, McGuire TJ, Harden SM, Ramalingam NP, Schoepke L, et al. A quasi-experiment to assess the impact of a scalable, community-based weight loss program: combining reach, effectiveness, and cost. J Gen Intern Med. 2017;32(Suppl 1):24-31.	Ineligible population
Fischer HH, Durfee MJ, Raghunath SG, Ritchie ND. Short Message Service Text Message Support for Weight Loss in Patients With Prediabetes: Pragmatic Trial. JMIR Diabetes. 2019;4(2):e12985.	Ineligible study design
Fletcher A, Willmott M, Langford R, White J, Poole R, Brown R, et al. Pilot trial and process evaluation of a multilevel smoking prevention intervention in further education settings. NIHR Journals Library 2017	Ineligible study design
Folse SB, Falzon L, Trudeau KJ, Sciamanna CN, Schwartz JE, Davidson KW. Computer-based interventions for weight loss or weight maintenance in overweight or obese people. Cochrane Database Syst Rev. 2009;1:CD007675.	Ineligible study design
Forrest JI, Wiens M, Kanters S, Nsanzimana S, Lester RT, Mills EJ. Mobile health applications for HIV prevention and care in Africa. Curr Opin HIV AIDS. 2015;10(6):464-71.	Ineligible study design
Galarraga O, Colchero MA, Wamai RG, Bertozzi SM. HIV prevention cost-effectiveness: a systematic review. BMC Public Health. 2009;9(Suppl 1):S5.	Ineligible intervention

Full reference	Reason for exclusion
Gallagher R, Neubeck L. How health technology helps promote cardiovascular health outcomes. Med J Aust. 2016;205(3):107-08.	Ineligible study design
GC V, Wilson EC, Suhrcke M, Hardeman W, Sutton S. Are brief interventions to increase physical activity cost-effective? A systematic review. Br J Sports Med. 2016;50(7):408-17.	Systematic review
Gillett M, Royle P, Snaith A, Scotland G, Poobalan A, Imamura M, et al. Non-pharmacological interventions to reduce the risk of diabetes in people with impaired glucose regulation: a systematic review and economic evaluation. Health Technol Assess. 2012;16(33):1-236.	Ineligible intervention
Godfrey C. Cost effectiveness of treatment for alcohol problems: findings of the randomised UK alcohol treatment trial (UKATT). BMJ. 2005;331(7516):544-48.	Ineligible intervention
Golsteijn RH, Peels DA, Evers SM, Bolman C, Mudde AN, de Vries H, et al. Cost-effectiveness and cost-utility of a web-based or print-delivered tailored intervention to promote physical activity among adults aged over fifty: an economic evaluation of the Active Plus intervention. Int J Behav Nutr Phys Act. 2014;11:122.	Ineligible population
Goode AD, Lawler SP, Brakenridge CL, Reeves MM, Eakin EG. Telephone, print, and web-based interventions for physical activity, diet, and weight control among cancer survivors: a systematic review. J Cancer Surviv. 2015;9(4):660-82.	Ineligible outcomes
Gozzoli V, Palmer AJ, Brandt A, Spinas GA. Economic and clinical impact of alternative disease management strategies for secondary prevention in type 2 diabetes in the Swiss setting. Swiss Med Wkly. 2001;131(21-22):303-10.	Ineligible intervention
Graham AL, Chang Y, Fang Y, Cobb NK, Tinkelman DS, Niaura RS, et al. Cost-effectiveness of internet and telephone treatment for smoking cessation: an economic evaluation of The iQUITT Study. Tob Control. 2013;22(6):E11.	Ineligible population
Guerriero C, Cairns J, Roberts I, Rodgers A, Whittaker R, Free C. The cost-effectiveness of smoking cessation support delivered by mobile phone text messaging: txt2stop. Eur J Health Econ. 2013;14(5):789-97.	Ineligible population
Harris J, Felix L, Miners A, Murray E, Michie S, Fergusn E, et al. Adaptive e-learning to improve dietary behaviour: a systematic review and cost-effectiveness analysis. Health Technol Assess. 2011;15(37):1-160.	Ineligible population
Harris T, Kerry S, Victor C, Iliffe S, Ussher M, Fox-Rushby J, et al. A pedometer-based walking intervention in 45- to 75-year-olds, with	Ineligible intervention

Full reference	Reason for exclusion
and without practice nurse support: the PACE-UP three-arm cluster RCT. Health Technol Assess. 2018;22(37):1-274	
Hawkins J, Charles JM, Edwards M, Hallingberg B, McConnon L, Edwards RT, et al. Acceptability and Feasibility of Implementing Accelorometry-Based Activity Monitors and a Linked Web Portal in an Exercise Referral Scheme: Feasibility Randomized Controlled Trial. J Med Internet Res 2019;21(3):e12374	Ineligible intervention
Henderson JA, Chubak J, O'Connell J, Ramos MC, Jensen J, Jobe JB, et al. Design of a randomized controlled trial of a web-based intervention to reduce cardiovascular disease risk factors among remote reservation-dwelling American Indian adults with type 2 diabetes. J Prim Prev. 2012;33(4):209-22.	Ineligible study design
Hersey JC, Khavjou O, Strange LB, Atkinson RL, Blair SN, Campbell S, et al. The efficacy and cost-effectiveness of a community weight management intervention: a randomized controlled trial of the health weight management demonstration. Prev Med. 2012;54(1):42-49.	Ineligible population
Hollingworth W, Hawkins J, Lawlor DA, Brown M, Marsh T, Kipping RR. Economic evaluation of lifestyle interventions to treat overweight or obesity in children. Int J Obes. 2012;36(4):559-66.	Ineligible intervention
Holmen H, Torbjornsen A, Wahl AK, Jenum AK, Smastuen MC, Arsand E, et al. A mobile health intervention for self-management and lifestyle change for persons with type 2 diabetes, part 2: one-year results from the Norwegian randomized controlled trial renewing health. Diabetes Technol Ther. 2016;18(Suppl 1):S58-59.	Ineligible study design
Holtz B, Krein SL, Bentley DR, Hughes ME, Giardino ND, Richardson CR. Comparison of veteran experiences of low-cost, home-based diet and exercise interventions. J Rehabil Res Dev. 2014;51(1):149-60.	Ineligible outcomes
Hunter R, Wallace P, Struzzo P, Vedova RD, Scafuri F, Tersar C, et al. Randomised controlled non-inferiority trial of primary care-based facilitated access to an alcohol reduction website: cost-effectiveness analysis. BMJ Open. 2017;7(11):E014577.	Ineligible population
Iribarren SJ, Cato K, Falzon L, Stone PW. What is the economic evidence for mHealth? A systematic review of economic evaluations of mHealth solutions. PLoS ONE. 2017;12(2):E0170581.	Systematic review
Jacobs-van der Bruggen MA, Bos G, Bemelmans WJ, Hoogenveen RT, Vijgen SM, Baan CA. Lifestyle interventions are cost-effective in people with different levels of diabetes risk: results from a modeling study. Diabetes Care. 2007;30(1):128-34.	Ineligible intervention

Full reference	Reason for exclusion
Jacobs-van der Bruggen MA, van Baal PH, Hoogenveen RT, Feenstra TL, Briggs AH, Lawson K, et al. Cost-effectiveness of lifestyle modification in diabetic patients. Diabetes Care. 2009;32(8):1453-58.	Ineligible intervention
Jones M, Smith M, Lewis S, Parrott S, Coleman T. A dynamic, modifiable model for estimating cost-effectiveness of smoking cessation interventions in pregnancy: application to an RCT of self-help delivered by text message. Addiction. 2019;114(2):353-65.	Ineligible population
Joo N-S, Park Y-W, Park K-H, Kim C-W, Kim B-T. Cost-effectiveness of a community-based obesity control programme. J Telemed Telecare. 2010;16(2):63-7.	Ineligible population
Kachur R, Hall W, Coor A, Kinsey J, Collins D, Strona FV. The use of technology for sexually transmitted disease partner services in the united states: a structured review. Sex Transm Dis. 2018;45(11):707-12.	Ineligible outcomes
Kaner EF, Beyer FR, Garnett C, Crane D, Brown J, Muirhead C, et al. Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations. Cochrane Database Syst Rev. 2017;9:CD011479.	Ineligible outcomes
Keyserling TC, Sheridan SL, Draeger LB, Finkelstein EA, Gizlice Z, Kruger E, et al. A comparison of live counseling with a web-based lifestyle and medication intervention to reduce coronary heart disease risk: a randomized clinical trial. JAMA Intern Med. 2014;174(7):1144-57.	Ineligible population
Khan N, Marvel FA, Wang J, Martin SS. Digital health technologies to promote lifestyle change and adherence. Curr Treat Options Cardiovasc Med. 2017;19(8):60.	Ineligible outcomes
King C, Llewellyn C, Shahmanesh M, Abraham C, Bailey J, Burns F, et al. Sexual risk reduction interventions for patients attending sexual health clinics: a mixed-methods feasibility study. Health Technol Assess. 2019;23(12):1-122	Ineligible study design
Korber K. Quality assessment of economic evaluations of health promotion programs for children and adolescents-a systematic review using the example of physical activity. Health Econ Rev. 2015;5(1):1-14.	Ineligible intervention
Krishna S, Boren SA, Balas EA. Healthcare via cell phones: a systematic review. Telemed J E Health. 2009;15(3):231-40.	Ineligible study design
Krishnan A, Finkelstein EA, Levine E, Foley P, Askew S, Steinberg D, et al. A Digital Behavioral Weight Gain Prevention Intervention in	Ineligible intervention

Full reference	Reason for exclusion
Primary Care Practice: Cost and Cost-Effectiveness Analysis. J Med Internet Res. 2019;21(5):e12201	
Kruger J, Brennan A, Strong M, Thomas C, Norman P, Epton T. The cost-effectiveness of a theory-based online health behaviour intervention for new university students: an economic evaluation. BMC Public Health. 2014;14(1011):1-16.	Ineligible population
Krukowski RA, Tilford JM, Harvey-Berino J, West DS. Comparing behavioral weight loss modalities: incremental cost-effectiveness of an internet-based versus an in-person condition. Obesity (Silver Spring). 2011;19(8):1629-35.	Ineligible population
Larsen B, Marcus B, Pekmezi D, Hartman S, Gilmer T. A web-based physical activity intervention for Spanish-speaking Latinas: a costs and cost-effectiveness analysis. J Med Internet Res. 2017;19(2):E43.	Ineligible population
Larsen-Cooper E, Bancroft E, Rajagopal S, O'Toole M, Levin A. Scale matters: a cost-outcome analysis of an m-health intervention in Malawi. Telemed J E Health. 2016;22(4):317-24.	Ineligible population
Lawlor DA, Kipping RR, Anderson EL, Howe LD, Chittleborough CR, Moure-Fernandez A, et al. Active for Life Year 5: a cluster randomised controlled trial of a primary school-based intervention to increase levels of physical activity, decrease sedentary behaviour and improve diet. NIHR Journals Library 2016	Ineligible intervention
Leahey TM, Fava JL, Seiden A, Fernandes D, Doyle C, Kent K, et al. A randomized controlled trial testing an internet delivered cost-benefit approach to weight loss maintenance. Prev Med. 2016;92:51-57.	Ineligible population
Leahey TM, Thomas G, Fava JL, Subak LL, Schembri M, Krupel K, et al. Adding evidence-based behavioral weight loss strategies to a statewide wellness campaign: a randomized clinical trial. Am J Public Health. 2014;104(7):1300-06.	Ineligible population
Levy DE, Klinger EV, Linder JA, Fleegler EW, Rigotti NA, Park ER, et al. Cost-effectiveness of a health system-based smoking cessation program. Nicotine Tob Res 2017;19(12):1508-15.	Ineligible intervention
Lewis BA, Williams DM, Neighbors CJ, Jakicic JM, Marcus BH. Cost Analysis of Internet vs. Print Interventions for Physical Activity Promotion. Psychol Sport Exerc. 2010: 11(3):246-249	Ineligible study design
Li R, Qu S, Zhang P, Chattopadhyay S, Gregg EW, Albright A, et al. Economic evaluation of combined diet and physical activity promotion programs to prevent type 2 diabetes among persons at	Ineligible outcomes

Full reference	Reason for exclusion
increased risk: a systematic review for the community preventive services task force. Ann Intern Med. 2015;163(6):452-60.	
Little P, Stuart B, Hobbs FR, Kelly J, Smith ER, Bradbury KJ, et al. An internet-based intervention with brief nurse support to manage obesity in primary care (POWeR+): a pragmatic, parallel-group, randomised controlled trial. Lancet. 2016;4(10):821-8.	Ineligible population
Little P, Stuart B, Richard Hobbs FD, Kelly J, Smith ER, Bradbury KJ, et al. Randomised controlled trial and economic analysis of an internet-based weight management programme: POWeR+ (positive online weight reduction). Health Technol Assess. 2017;21(4):1-61.	Ineligible population
Lohan M, Aventin A, Maguire L, Curran R, McDowell C, Agus A, et al. Increasing boys' and girls' intentions to avoid teenage pregnancy: a cluster randomised controlled feasibility trial of an interactive video drama-based intervention in post-primary schools in Northern Ireland. Public Health Research. 2017; 5(1): Available from: https://dx.doi.org/10.3310/phr05010	Ineligible study design
Lohse N, Marseille E, Kahn JG. Development of a model to assess the cost-effectiveness of gestational diabetes mellitus screening and lifestyle change for the prevention of type 2 diabetes mellitus. Int J Gynaecol Obstet. 2011;115(Suppl 1):S20-25.	Ineligible intervention
Lorig KR, Ritter PL, Dost A, Plant K, Laurent DD, McNeil I. The expert patients programme online, a 1-year study of an internet-based self-management programme for people with long-term conditions. Chronic Illness. 2008;4(4):247-56.	Ineligible population
Loveman E, Frampton GK, Shepherd J, Picot J, Cooper K, Bryant J, et al. The clinical effectiveness and cost-effectiveness of long-term weight management schemes for adults: a systematic review. Health Technol Assess. 2008;15(2):1-182.	Ineligible outcomes
Lu C, Schultz AB, Sill S, Petersen R, Young JM, Edington DW. Effects of an incentive-based online physical activity intervention on health care costs. J Occup Environ Med. 2008;50(11):1209-15.	Ineligible population
Luxton DD, Hansen RN, Stanfill K. Mobile app self-care versus in-office care for stress reduction: a cost minimization analysis. J Telemed Telecare. 2014;20(8):431-35.	Ineligible population
Maddison R, Pfaeffli L, Whittaker R, Stewart R, Kerr A, Jiang Y, et al. A mobile phone intervention increases physical activity in people with cardiovascular disease: results from the HEART randomized controlled trial. Eur J Prev Cardiol. 2015;22(6):701-9.	Ineligible population
Marcolino MS, Oliveira JAQ, D'Agostino M, Ribeiro AL, Alkmim MBM, Novillo-Ortiz D. The impact of mHealth interventions:	Ineligible outcomes

Full reference	Reason for exclusion
systematic review of systematic reviews. JMIR Mhealth Uhealth. 2018;6(1):E23.	
Mateo KF, Jay M. Access to a behavioral weight loss website with or without group sessions increased weight loss in statewide campaign. J Clin Outcomes Manag. 2014;21(8):345-48.	Ineligible outcomes
Mauriello LM, Gkbayrak NS, Van Marter DF, Paiva AL, Prochaska JM. An internet-based computer-tailored intervention to promote responsible drinking: findings from a pilot test with employed adults. Alcohol Treat Q. 2011;30(1):91-108.	Ineligible outcomes
McConnon A, Kirk SFL, Cockroft JE, Harvey EL, Greenwood DC, Thomas JD, et al. The internet for weight control in an obese sample: results of a randomised controlled trial. BMC Health Serv Res. 2007;7:206.	Ineligible population
Medical Advisory S. Behavioural interventions for type 2 diabetes: an evidence-based analysis. Ont Health Technol Assess Ser. 2009;9(21):1-45.	Ineligible outcomes
Miners A, Harris J, Felix L, Murray E, Michie S, Edwards P. An economic evaluation of adaptive e-learning devices to promote weight loss via dietary change for people with obesity. BMC Health Serv Res. 2012;12(190):1-9.	Ineligible population
Moreau M, Gagnon M-P, Boudreau F. Development of a fully automated, web-based, tailored intervention promoting regular physical activity among insufficiently active adults with type 2 diabetes: integrating the I-change model, self-determination theory, and motivational interviewing components. JMIR research protocols. 2015;4(1):E25.	Ineligible study design
Murphy SM, Campbell ANC, Ghitza UE, Kyle TL, Bailey GL, Nunes EV, et al. Cost-effectiveness of an internet-delivered treatment for substance abuse: data from a multisite randomized controlled trial. Drug Alcohol Depend. 2016;161:119-26.	Ineligible population
Naughton F, Cooper S, Bowker K, Campbell K, Sutton S, Leonardi-Bee J, et al. Adaptation and uptake evaluation of an SMS text message smoking cessation programme (MiQuit) for use in antenatal care. BMJ Open. 2015;5(10):E008871.	Ineligible outcomes
Naughton F, Cooper S, Foster K, Emery J, Leonardi-Bee J, Sutton S, et al. Large multi-centre pilot randomized controlled trial testing a low-cost, tailored, self-help smoking cessation text message intervention for pregnant smokers (MiQuit). Addiction. 2017;112(7):1238-49.	Ineligible population
Neumann A, Schwarz P, Lindholm L. Estimating the cost-effectiveness of lifestyle intervention programmes to prevent	Ineligible intervention

Full reference	Reason for exclusion
diabetes based on an example from Germany: Markov modelling. Cost Eff Resour Alloc. 2011;9(17):1-13.	
Ohinmaa A, Chatterley P, Nguyen T, Jacobs P. Telehealth in substance abuse and addiction: review of the literature on smoking, alcohol, drug abuse and gambling. Alberta: Institute of Health Economics; 2010. Available from: https://www.ihe.ca/advanced-search/telehealth-in-substance-abuse-and-addiction-review-of-the-literature-on-smoking-alcohol-drug-abuse-and-gambling.	Systematic review
Olmstead TA, Ostrow CD, Carroll KM. Cost-effectiveness of computer-assisted training in cognitive-behavioral therapy as an adjunct to standard care for addiction. Drug Alcohol Depend. 2010;110(3):200-07.	Ineligible population
Oosterhoff M, Bosma H, van Schayck OCP, Evers SMAA, Dirksen CD, Joore MA. A systematic review on economic evaluations of school-based lifestyle interventions targeting weight-related behaviours among 4-12year olds: issues and ways forward. Prev Med. 2018;114:115-22.	Ineligible intervention
Osilla KC, Van Busum K, Schnyer C, Larkin JW, Eibner C, Mattke S. Systematic review of the impact of worksite wellness programs. Am J Manag Care. 2012;18(2):E68-81.	Ineligible outcomes
Padwal RS, Klarenbach S, Sharma AM, Fradette M, Jelinski SE, Edwards A, et al. The evaluating self-management and educational support in severely obese patients awaiting multidisciplinary bariatric care (EVOLUTION) trial: principal results. BMC Med. 2017;15(1):46.	Ineligible population
Park AL, McDaid D, Weiser P, Von Gottberg C, Becker T, Kilian R, et al. Examining the cost effectiveness of interventions to promote the physical health of people with mental health problems: a systematic review. BMC Public Health. 2013;13(787):1-17.	Ineligible outcomes
Peels DA, Hoogenveen RR, Feenstra TL, Golsteijn RH, Bolman C, Mudde AN, et al. Long-term health outcomes and cost-effectiveness of a computer-tailored physical activity intervention among people aged over fifty: modelling the results of a randomized controlled trial. BMC Public Health. 2014;14(1):1099.	Ineligible population
Perman G, Rossi E, Waisman GD, Aguero C, Gonzalez CD, Pallordet CL, et al. Cost-effectiveness of a hypertension management programme in an elderly population: a Markov model. Cost Eff Resour Alloc. 2011;9(4):1-11.	Ineligible intervention
Pifarre M, Carrera A, Vilaplana J, Cuadrado J, Solsona S, Abella F, et al. TControl: a mobile app to follow up tobacco-quitting patients. Comput Methods Programs Biomed. 2017;142:81-89.	Ineligible population

Full reference	Reason for exclusion
Pringle A, Cooke C, Gilson N, Marsh K, McKenna J. Cost-effectiveness of interventions to improve moderate physical activity: a study in nine UK sites. Health Educ J. 2010;69(2):211-24.	Ineligible intervention
Prinja S, Bahuguna P, Rudra S, Gupta I, Kaur M, Mehendale SM, et al. Cost effectiveness of targeted HIV prevention interventions for female sex workers in India. Sex Transm Infect. 2011;87(4):354-61.	Ineligible intervention
Prybutok G. An analysis of randomised controlled trials that utilise internet based smoking reduction/cessation programs. IJEH. 2015;8(2-4):202-19.	Ineligible outcomes
Radcliff TA, Bobroff LB, Lutes LD, Durning PE, Daniels MJ, Limacher MC, et al. Comparing costs of telephone vs face-to-face extended-care programs for the management of obesity in rural settings. J Acad Nutr Diet. 2012;112(9):1363-73.	Ineligible intervention
Rasu RS, Hunter CM, Peterson AL, Maruska HM, Foreyt JP. Economic evaluation of an internet-based weight management program. Am J Manag Care. 2010;16(4):E98-104.	Ineligible population
Reback, C.J.; Fletcher, J.B.; Leibowitz, A.A. Cost effectiveness of text messages to reduce methamphetamine use and HIV sexual risk behaviors among men who have sex with men. Journal of Substance Abuse Treatment 2019;100: 59-63	Ineligible outcome
Redman LM, Gilmore LA, Breaux J, Thomas DM, Elkind-Hirsch K, Stewart T, et al. Effectiveness of SmartMoms, a novel ehealth intervention for management of gestational weight gain: randomized controlled pilot trial. JMIR Mhealth Uhealth. 2017;5(9):E133.	Ineligible population
Riemsma R, Pattenden J, Bridle M, Sowden A, Mather L, Watt I, et al. A systematic review of the effectiveness of interventions based on a stages-of-change approach to promote individual behaviour change in health care settings. Health Technol Assess. 2002; 6(24): 1-244.	Systematic review
Rinaldi G, Kiadaliri AA, Haghparast-Bidgoli H. Cost effectiveness of HIV and sexual reproductive health interventions targeting sex workers: a systematic review. Cost Eff Resour Alloc. 2018;16(63):1-13.	Ineligible intervention
Robertson C, Archibald D, Avenell A, Douglas F, Hoddinott P, van Teijlingen E, et al. Systematic reviews of and integrated report on the quantitative, qualitative and economic evidence base for the management of obesity in men. Health Technol Assess. 2014;18(35)	Systematic review
Robroek SJW, Polinder S, Bredt FJ, Burdorf A. Cost-effectiveness of a long-term internet-delivered worksite health promotion	Ineligible population

Full reference	Reason for exclusion
programme on physical activity and nutrition: a cluster randomized controlled trial. Health Educ Res. 2012;27(3):399-410.	
Rogozińska E, Marlin N, Jackson L, Rayanagoudar G, Ruifrok AE, Dodds J, et al. Effects of antenatal diet and physical activity on maternal and fetal outcomes: individual patient data meta-analysis and health economic evaluation. Health Technol Assess. 2017;21(41):1-158.	Ineligible intervention
Rollo ME, Burrows T, Vincze LJ, Harvey J, Collins CE, Hutchesson MJ. Cost evaluation of providing evidence-based dietetic services for weight management in adults: in-person versus eHealth delivery. Nutr Diet. 2018;75(1):35-43.	Ineligible population
Rubinstein A, Garcia Marti S, Souto A, Ferrante D, Augustovski F. Generalized cost-effectiveness analysis of a package of interventions to reduce cardiovascular disease in Buenos Aires, Argentina. Cost Eff Resour Alloc. 2009;7(10):1-10.	Ineligible intervention
Sacks N, Cabral H, Kazis LE, Jarrett KM, Vetter D, Richmond R, et al. A web-based nutrition program reduces health care costs in employees with cardiac risk factors: before and after cost analysis. J Med Internet Res. 2009;11(4):E43.	Ineligible population
Sanyal C, Stolee P, Juzwishin D, Husereau D. Economic evaluations of eHealth technologies: a systematic review. PLoS ONE. 2018;13(6):E0198112.	Ineligible study design
Schulz DN, Smit ES, Stanczyk NE, Kremers SPJ, de Vries H, Evers SMAA. Economic evaluation of a web-based tailored lifestyle intervention for adults: findings regarding cost-effectiveness and cost-utility from a randomized controlled trial. J Med Internet Res. 2014;16(3):E91.	Ineligible study design
Schulz DN, Smit ES, Stanczyk NE, Kremers SPJ, De Vries H, Evers SMAA. Economic evaluation of a web-based tailored lifestyle intervention for adults: findings regarding cost-effectiveness and cost-utility from a randomized controlled trial. Diabetes Technol Ther. 2015;17(Suppl 1):S54-55.	Ineligible population
Semwal M, Whiting P, Bajpai R, Bajpai S, Kyaw BM, Tudor C. Digital Education for Health Professions on Smoking Cessation Management: Systematic Review by the Digital Health Education Collaboration. J Med Internet Res 2019;21(3):e13000	Ineligible study design
Sevick MA, Napolitano MA, Papandonatos GD, Gordon AJ, Reiser LM, Marcus BH. Cost-effectiveness of alternative approaches for motivating activity in sedentary adults: results of project STRIDE. Prev Med. 2007;45(1):54-61.	Ineligible intervention

Full reference	Reason for exclusion
Sharifi M, Franz C, Horan CM, Giles CM, Long MW, Ward ZJ, et al. Cost-effectiveness of a clinical childhood obesity intervention. Pediatrics. 2017;140(5):1-11.	Ineligible intervention
Shaw R, Fenwick E, Baker G, McAdam C, Fitzsimons C, Mutrie N. 'Pedometers cost buttons': the feasibility of implementing a pedometer based walking programme within the community. BMC Public Health. 2011;11(200):1-9.	Ineligible population
Shepherd J, Kavanagh J, Picot J, Cooper K, Harden A, Barnett-Page E, et al. The effectiveness and cost-effectiveness of behavioural interventions for the prevention of sexually transmitted infections in young people aged 13–19: a systematic review and economic evaluation. Health Technol Assess. 2010;14(7):1-230.	Ineligible intervention
Skov-Ettrup L. The effectiveness of telephone counselling and internet- and text-message-based support for smoking cessation: results from a randomized controlled trial. Addiction. 2016;111(7):1257-66.	Ineligible population
Smit ES, Evers SM, de Vries H, Hoving C. Cost-effectiveness and cost-utility of internet-based computer tailoring for smoking cessation. J Med Internet Res. 2013;15(3):E57.	Ineligible population
Smit F, Lokkerbol J, Riper H, Majo MC, Boon B, Blankers M. Modeling the cost-effectiveness of health care systems for alcohol use disorders: how implementation of eHealth interventions improves cost-effectiveness. J Med Internet Res. 2011;13(3):E56.	Ineligible population
Smith KJ, Hsu HE, Roberts MS, Kramer MK, Orchard TJ, Piatt GA, et al. Cost-effectiveness analysis of efforts to reduce risk of type 2 diabetes and cardiovascular disease in Southwestern Pennsylvania, 2005-2007. Prev Chronic Dis. 2010;7(5):A109.	Ineligible intervention
Smith KJ, Kuo S, Zgibor JC, McTigue KM, Hess R, Bhargava T, et al. Cost effectiveness of an internet-delivered lifestyle intervention in primary care patients with high cardiovascular risk. Prev Med. 2016;87:103-09.	Ineligible population
Smith MY, Cromwell J, DePue J, Spring B, Redd W, Unrod M. Determining the cost-effectiveness of a computer-based smoking cessation intervention in primary care. Manag Care. 2007;16(7):48-55.	Ineligible population
Sniehotta FF, Evans EH, Sainsbury K, Adamson A, Batterham A, Becker F, et al. Behavioural intervention for weight loss maintenance versus standard weight advice in adults with obesity: A randomised controlled trial in the UK (NULevel Trial). PLoS Med. 2019;16(5):e1002793	Ineligible population

Full reference	Reason for exclusion
Sohn S, Helms TM, Pelleter JT, Muller A, Krottinger AI, Schoffski O. Costs and benefits of personalized healthcare for patients with chronic heart failure in the care and education program "Telemedicine for the Heart". Telemed J E Health. 2012;18(3):198-204.	Ineligible intervention
Southard BH, Southard DR, Nuckolls J. Clinical trial of an internet-based case management system for secondary prevention of heart disease. J Cardpulm Rehabil. 2003;23(5):341-34.	Ineligible population
Stanczyk NE, Smit ES, Schulz DN, De Vries H, Bolman C, Muris JWM, et al. An economic evaluation of a video- and text-based computer-tailored intervention for smoking cessation: a cost-effectiveness and cost-utility analysis of a randomized controlled trial. PLoS ONE. 2014;9(10):E110117.	Ineligible population
Sukhanova A, Ritzwoller DP, Alexander G, Calvi JH, Carlier C, McClure JB, et al. Cost analyses of a web-based behavioral intervention to enhance fruit and vegetable consumption. Int J Behav Nutr Phys Act. 2009;6:92.	Ineligible population
Sun Y, You W, Almeida F, Estabrooks P, Davy B. The effectiveness and cost of lifestyle interventions including nutrition education for diabetes prevention: a systematic review and meta-analysis. J Acad Nutr Diet. 2017;117(3):E36(404-21).	Ineligible intervention
Thangaratinam S, Rogozinska E, Jolly K, Glinkowski S, Duda W, Borowiack E, et al. Interventions to reduce or prevent obesity in pregnant women: a systematic review. Health Technol Assess. 2007;16(31):1-191.	Ineligible intervention
The Swedish Council on Technology Assessment in Health Care. Methods of promoting physical activity. A systematic review. Stockholm: SBU; 2006. 1-14. Available from: https://www.ncbi.nlm.nih.gov/books/NBK447978/pdf/Bookshelf_NBK447978.pdf.	Systematic review
Van den Bruel A, Cleemput I, Van Linden A, Schoefs D, Ramaekers D, Bonneux L. Effectiveness and cost-effectiveness of treatments for smoking cessation. KCE. 2004;1A	Systematic review
van Luenen S, Kraaij V, Garnefski N, Spinhoven P, van den Akker-van Marle ME. Cost-utility of a guided Internet-based intervention in comparison with attention only for people with HIV and depressive symptoms: A randomized controlled trial. J Psychosom Res. 2019;118:34-40	Ineligible outcome
Van Wier MF, Dekkers JC, Bosmans JE, Heymans MW, Hendriksen IJM, Pronk NP, et al. Economic evaluation of a weight control program with e-mail and telephone counseling among	Ineligible population

Full reference	Reason for exclusion
overweight employees: a randomized controlled trial. Int J Behav Nutr Phys Act. 2012;9(112):1-12.	
Vickerman KA, Keller PA, Deprey M, Lachter RB, Jenssen J, Dreher M. Never quit trying: reengaging tobacco users in statewide cessation services. J Public Health Manag Pract. 2018;24(3):E25-33.	Ineligible population
Vidmar AP, Pretlow R, Borzutzky C, Wee CP, Fox DS, Fink C, et al. An addiction model-based mobile health weight loss intervention in adolescents with obesity. Pediatr Obes. 2019;14(2):E12464.	Ineligible population
Wake M, Baur LA, Gerner B, Gibbons K, Gold L, Gunn J, et al. Outcomes and costs of primary care surveillance and intervention for overweight or obese children: the LEAP 2 randomised controlled trial. BMJ. 2009;339:(B3308)	Ineligible intervention
Wake M, Gold L, McCallum Z, Gerner B, Waters E. Economic evaluation of a primary care trial to reduce weight gain in overweight/obese children: the LEAP trial. Ambul Pediatr. 2008;8(5):336-41.	Ineligible intervention
Webb J, Fife-Schaw C, Ogden J. A randomised control trial and cost-consequence analysis to examine the effects of a print-based intervention supported by internet tools on the physical activity of UK cancer survivors. Public Health. 2019;171:106-115	Ineligible outcome
Webb J, Hall J, Hall K, Fabunmi-Alade R. Increasing the frequency of physical activity very brief advice by nurses to cancer patients. A mixed methods feasibility study of a training intervention. Public Health. 2016;139:121-33.	Ineligible population
West R, Coyle K, Owen L, Coyle D, Pokhrel S, Group ES. Estimates of effectiveness and reach for 'return on investment' modelling of smoking cessation interventions using data from England. Addiction. 2018;113(Suppl 1):19-31.	Ineligible intervention
Whitaker R, Hendry M, Aslam R, Booth A, Carter B, Charles JM, et al. Intervention now to eliminate repeat unintended pregnancy in teenagers (INTERUPT): a systematic review of intervention effectiveness and cost-effectiveness, and qualitative and realist synthesis of implementation factors and user engagement. Health Technol Assess. 2016;20(16):1-214.	Ineligible intervention
Whittaker F, Wade V. The costs and benefits of technology-enabled, home-based cardiac rehabilitation measured in a randomised controlled trial. J Telemed Telecare. 2014;20(7):419-22.	Ineligible intervention
Wong CK, Jiao F-F, Siu S-C, Fung CS, Fong DY, Wong K-W, et al. Cost-effectiveness of a short message service intervention to	Ineligible intervention

Full reference	Reason for exclusion
prevent type 2 diabetes from impaired glucose tolerance. J Diabetes Res. 2016;2016	
Wu S, Cohen D, Shi Y, Pearson M, Sturm R. Economic analysis of physical activity interventions. Am J Prev Med. 2011;40(2):149-58.	Systematic review
Wyke S, Bunn C, Andersen E, Silva MN, van Nassau F, McSkimming P, et al. The effect of a programme to improve men's sedentary time and physical activity: The European Fans in Training (EuroFIT) randomised controlled trial. PLoS Med. 2019;16(2):e1002736	Ineligible intervention
Wyke S, Hunt K, Gray CM, et al. Football Fans in Training (FFIT): a randomised controlled trial of a gender-sensitised weight loss and healthy living programme for men – end of study report. NIHR Journals Library 2015	Ineligible intervention
Zanaboni P, Lien LA, Hjalmarsen A, Wootton R. Long-term telerehabilitation of COPD patients in their homes: interim results from a pilot study in Northern Norway. J Telemed Telecare. 2013;19(7):425-9.	Ineligible study design
Zivin K, Sen A, Plegue MA, Maciejewski ML, Segar ML, AuYoung M, et al. Comparative effectiveness of wellness programs: impact of incentives on healthcare costs for obese enrollees. Am J Prev Med. 2017;52(3):347-52.	Ineligible population
Zoellner JM, You W, Estabrooks PA, Chen Y, Davy BM, Porter KJ, et al. Supporting maintenance of sugar-sweetened beverage reduction using automated versus live telephone support: findings from a randomized control trial. Int J Behav Nutr Phys Act. 2018;15(1):97.	Ineligible outcomes

Appendix L – Intervention matrix

The intervention matrix was made to assess if any associations between intervention components and effectiveness could be deduced. This was then to be tested through subgroup analysis. However, this was not possible because the interventions contained many different components and combinations of components. Therefore, deducing which single components that were associated with effectiveness was not possible.

Key for "Outcomes" columns	
Most effective (green boxes)	Significantly more effective than other arms.
Equivalent (yellow boxes)	If the other arm is "most effective", then equivalent arm is also effective, but the other arm is significantly more effective
	If the other arm is "ineffective", then equivalent arm is also ineffective, but the other arm is significantly less effective
Ineffective (red boxes)	Significantly less effective than other arms.

			Components of intervention					Components of intervention											
								Knowledge on smoking and cessation											
Study	Intervention mode	Arm	Personalised feedback	subjective norms	normative feedback	Decisional balance exercise	verbal persuasion	Health information	Safe sex advise	info on conom use	info on STI barriers	skills to adress condom use barriers	Education on harms of STI	eduaction and prevention of HIV	benefits adopting protective behaviour	disclosure of HIV status	Multiple health assessment	Assess risk behaviour	booster session
No chronic condition																			
Bannink 2014	computer	Intervention	Yes	No	yes	yes	yes	No	No	Yes	No	No	No	No	No	No	No	Yes	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	yes	No
Bailey 2016	Computer	Intervention	Yes	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Bowen 2008	computer	Intervention	Yes	No	No	No	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Carpenter 2010	computer	Intervention	Yes	No	No	No	No	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes	No
		Control	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
Chernick 2017	text	Intervention	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
		Control	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
Downs 2004	Video	Intervention	No	No	No	No	No	Yes	No	Yes	No	No	No	No	yes	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Gilbert 2008	Video	Intervention	yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Grimley 2009	Computer	Intervention	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No
Kiene 2006	Computer	Intervention	yes	No	No	No	No	No	No	yes	No	No	No	No	yes	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Klein 2017	Computer	Intervention	No	No	No	No	No	yes	No	No	No	No	No	No	No	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Mevissen 2011	computer	Intervention	yes	No	No	No	No	yes	Yes	No	No	No	Yes	No	No	No	No	No	No
		other intervention	No	No	No	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Milam 2016	Computer	Intervention	yes	No	No	No	No	No	yes	Yes	No	No	No	No	No	yes	No	Yes	No
		Control	No	No	No	No	No	No	yes	Yes	No	No	No	No	No	yes	No	No	No
Sufoletto 2013	Text	Intervention	yes	No	No	No	No	yes	No	No	No	No	yes	No	yes	No	No	yes	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
McCarthy 2019	text	Intervention	No	No	No	No	yes	No	No	No	No	No	No	No	No	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Cheng 2019	computer	Intervention	No	yes	No	No	No	yes	No	No	No	No	No	yes	No	No	No	No	No
		Control	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

	s of intervention						Components of intervention													
							Monitoring													
Study	Exercises/ quizzes	Intention discuss STI testing	cognitive rehearsal	scripted dialogue/ scenarios	general text messages for the study	Videos/audio files	building skills by identifying specific risk reduction behaviours	action planning	decisional balance	prompts and cues	Goal setting	Review behaviour goals.	choosing preferred approaches to safer sex	Readiness/ Stage of change	motivation texts	problem solving	promote positive behaviour movements	Reminders	normative beliefs	positive Attitudes towards condom
No chronic con																				
Bannink 2014	No	No	No	No	No	No	No	No	yes	No	yes	No	No	No	No	No	No	yes	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Bailey 2016	No	No	No	No	No	No	No	Yes	No	yes	Yes	yes	No	No	No	Yes	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Bowen 2008	No	No	No	Yes	No	No	Yes	No	No	No	No	No	yes	No	No	No	No	yes	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Carpenter 2010	Yes	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Chernick 2017	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Downs 2004	No	No	Yes	No	No	yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Gilbert 2008	No	No	No	yes	No	yes	No	No	No	No	No	No	No	yes	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Grimley 2009	No	No	No	No	No	yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Kiene 2006	yes	No	No	No	No	No	No	No	No	No	yes	No	No	yes	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Klein 2017	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Mevissen 2011	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	yes	yes	yes
	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	yes	yes
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Milam 2016	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	yes	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Sufoletto 2013	No	No	No	No	No	No	No	No	No	No	yes	No	No	No	No	No	No	yes	No	No
	No	No	No	No	yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
McCarthy 2019	No	No	No	No	No	No	No	No	No	No	yes	No	No	No	No	No	No	No	No	No
	No	No	No	No	yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Cheng 2019	No	No	No	Yes	No	No	No	No	yes	No	No	No	No	No	No	No	No	No	No	No
	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Study	Reminders	normative beliefs	positive Attitudes towards condom	Motivation and self-efficacy	virtual consultant/ men	Tailoring	Intensity	Outcomes: Condom use	STI	Engagement	contraceptive use
No chronic con											
Bannink 2014	yes	No	No	No	No	Yes	1 session with optional extra reading after completing intervention				
	No	No	No	No	No	No	usual care (assessment with questionnaire)				
Bailey 2016	No	No	No	No	No	No	un known				
	No	No	No	No	No	No	unknown (clinic care)				
Bowen 2008	yes	No	No	yes	Yes	Yes	3 modules, each at least 48h apart				
	No	No	No	No	No		Pre-test questionnaires				
Carpenter 2010	No	No	No	yes	No	yes	1 session				
	No	No	No	No	No	No	1 session				
Chernick 2017	No	No	No	No	No	No	Daily to every 5 days				
	No	No	No	No	No	No	wallet card,physician monologue				
Downs 2004	No	No	No	No	No	No	1 session, but participants could do the intervention over a few sessions				
	No	No	No	No	No	No	pagebook/ brochures				
Gilbert 2008	No	No	No	No	yes	yes	1 session with booster session at 3 months				
	No	No	No	No	No	No	clinic usual care				
Grimley 2009	No	No	No	No	No	yes	15 min session				
	No	No	No	No	No	No	15 min session				
Kiene 2006	No	No	No	yes	No	yes	2 sessions				
	No	No	No	No	No	No	unknown				
Klein 2017	No	No	No	yes	No	No	2 sessions				
	No	No	No	No	No	No	not known				
Mevissen 2011	yes	yes	yes	yes	Yes	yes	unknown				
	No	yes	yes	yes	No	No	unknown				
	No	No	No	No	No	No	unknown				
Milam 2016	No	No	No	No	No	yes	every month for 12 months				
	No	No	No	No	No	No	12 months survey				
Sufoletto 2013	yes	No	No	yes	No	No	every Sunday at noon text messages sent				
	No	No	No	No	No	No	each week for 12 weeks				
McCarthy 2019	No	No	No	No	No	yes	0-3 texts/ day for 120 days				
	No	No	No	No	No	No	16 text messages over 120 days				
Cheng 2019	No	No	No	No	No	yes	intervention with 2 parts				
	No	No	No	No	No	No	unknown				

Key:

Most effective | Equivalent | Ineffective

Proportion of people abstinent considered effective: 20%