Mid-Term Review of the Ten Year Tobacco Strategy for Northern Ireland

Evidence Review

Institute of Public Health

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Evidence Review

A report prepared by the Institute of Public Health for the Tobacco Strategy Mid-Term Review Group

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Table of Contents

List of Tables and Figures

Tables

List of Tables and Figures

Figures

Glossary

AIDS	Acquired Immune Deficiency Syndrome
ASSIST	A Stop Smoking in Schools Trial
CHD	Coronary Heart Disease
CO	Carbon monoxide
COPD	Chronic Obstructive Pulmonary Disorder
CPIT	Cessation in Pregnancy Incentives Trial
c-RCT	Cluster-Randomised Control Trial
DECIPHer	Centre for the Development and Evaluation of Complex Interventions for Public Health Improvement
DVA	Driver and Vehicle Agency
EHR	Electronic Health Record
ETS	Environmental Tobacco Smoke
EU	European Union
EU SILNE-R	Enhancing the Effectiveness of Programs and Strategies to Prevent Youth Smoking: A Comparative Realist Evaluation of Seven European Cities
FUSE	The Centre for Translational Research in Public Health
GP	General Practitioner
IPH	Institute of Public Health
HIV	Human Immunodeficiency Virus
HPS	Health Promoting Schools
HSC	Health and Social Care
HSCT	Health and Social Care Trust
MMS	Multimedia Service
NG	NICE Guidance
NHS	National Health Service
NI	Northern Ireland
NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health Research
NIMATS	Northern Ireland Maternity Service

NPT	Normalisation Processing Theory
NRT	Nicotine Replacement Therapy
OR	Odds Ratio
PHA	Public Health Agency
RCT	Randomised Control Trial
RR	Relative Risk
SEGs	Serious Educational Games
SFC	Smokefree Class Competition
SHS	Second-hand smoke
SMS	Short Message Service
UK	United Kingdom
US	United States
USD	United States Dollars
WHO	World Health Organization

Executive Summary

Background

This evidence review forms part of the mid-term review of the *Ten Year Tobacco Control Strategy for Northern Ireland (2012-2022)* (Department of Health Social Services and Public Safety, 2012). The Strategy goals are:

- Fewer people starting to smoke
- More smokers quitting
- Protecting people from tobacco smoke

The Strategy names three priority groups – children and young people, pregnant women and their partners who smoke and disadvantaged people who smoke.

This report aims to shape the future delivery of the Strategy in line with certain review level evidence. Evidence is presented relating to existing approaches set out in the Strategy and its action plans, as well as on potential new approaches.

Methods

A Project Initiation Document was developed with the core research questions and project parameters as proposed by the Department of Health strategy leads. A detailed review protocol was developed. The literature search sourced review level evidence published between January 2012 and June 2018.

- Databases searched
- Cochrane Library
- Health Systems Evidence
- Centre for Reviews and Dissemination
- NHS Evidence
- National Institute for Health and Care Excellence
- Public Health Well
- UK Centre for Alcohol and Tobacco Studies
- Lenus
- OpenGrey

Search strings

Database search terms were developed in agreement with the Department of Health and relevant advisory groups. The search strings included individual terms and combinations of the terms below:

- Smoking
- Tobacco
- Smoking prevention

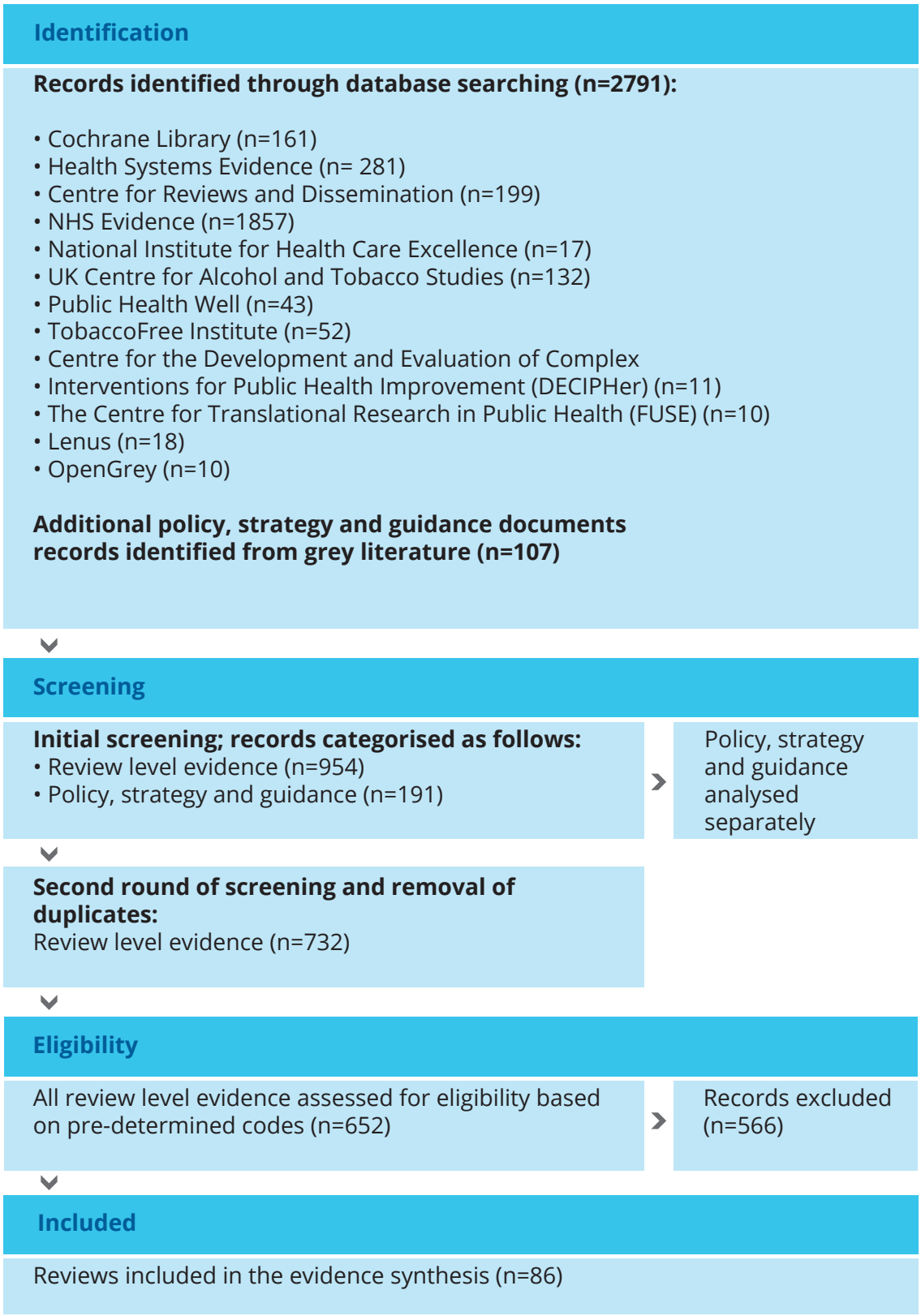
- Smoking cessation
- Environmental tobacco smoke exposure
- Second-hand smoke exposure
- Tobacco control policies

On the basis that devolved decision making does not apply to all tobacco control interventions in Northern Ireland, this evidence review did not interrogate non-devolved matters such as tobacco taxation, product manufacturing, product manufacturing and certain components of broadcast marketing/advertising.

Given that parallel evidence review processes are already underway in the UK and the Republic of Ireland on e-cigarettes, this review did not include evidence relating to e-cigarettes.

The evidence was collated and coded in order to extract and synthesise the relevant information. Evidence was presented according to the three main Strategy objectives and the three priority groups. Evidence was then mapped against the actions delivered under the Strategy to date. This was followed by an interpretative assessment resulting in a set of implications for the future implementation of the Northern Ireland Strategy.

Figure E1. Chart illustrating categorisation of evidence relating to smoking cessation.



Findings

Evidence on fewer people starting to smoke

School-based policies and programmes

- There is limited evidence that school-based tobacco control policies are effective in preventing the uptake of smoking among young people. The critical components of effective school-based policies appear to be comprehensive whole school approaches that incorporate school-based tobacco control policies or restrictions, clear rules and consistent enforcement.
- Implementation of tobacco control policies in schools are influenced by context, training and support, as well as perceptions of programme providers.
- Curriculum based interventions appear to be more effective in preventing smoking uptake among young people, particularly those with a focus on problem solving, decision making and coping strategies (social competence) as well as dealing with peer pressure and developing skills to resist offers of tobacco (social influence).
- There was a lack of high-quality evidence about the effectiveness of incentives aimed at children and adolescents for preventing smoking uptake. Preliminary evidence from the Smokefree Class Competition[1] suggested a reduced risk of progression from experimental to regular smoking.
- The WHO Health Promoting Schools programme reported a positive effect on smoking prevention. However study limitations exist, including sample size, post-intervention follow-up and socio-demographic impacts.
- Peer-led interventions may have some role in preventing uptake of smoking.

Family and community programmes

- Stand-alone family-based interventions[2] (and as adjunct to school-based programmes) were shown to be effective in helping prevent uptake of smoking among young people.
- Family-based interventions, with an encouraging authoritative parenting style, were effective in reducing the likelihood of young people starting smoking.
- There is insufficient evidence to draw any conclusions on the role of educational computer games in preventing smoking among young people.
- Successful mass media campaigns were based on the 'social influences' or 'social learning theory' and used provocative messages to prompt effective personal reactions. Mass media campaigns can be effective in preventing smoking uptake in young people, but there are substantial methodological challenges in assessing the impact of broad population level approaches like mass media public awareness campaigns on smoking prevention.

Healthcare based interventions

- Behavioural interventions delivered through primary care settings can be effective in preventing smoking uptake, but the long-term impact is unclear.
- Face-to-face, print and telephone advice provided in primary care, was shown to be effective in reducing smoking initiation up to three years after the intervention in children and young people who have not yet become regular smokers. Effect sizes were comparable with school-based programmes.

1. A European school-based smoking prevention programme.
2. Family-based interventions could include any components to change parenting behaviour, parental of sibling smoking behaviour, or family communication or interaction.

Regulatory and legislative measures

- Significant legislative developments introduced in the context of the current Strategy include increased tobacco taxation, removal of vending machines, standardised tobacco packaging and bans on point of sale display. These non-devolved legislative approaches were not examined in detail in the review but are significant in reducing the appeal, accessibility and affordability of tobacco products to children.
- Evidence from the introduction of more recent measures such as standardised tobacco packaging and limiting point of sale display are not yet well described in the review level literature.
- Legislative changes introduced under previous tobacco control strategies remain an important consideration in terms of legacy effects. Notably, restrictions on age of sale, advertising and smoke-free workplaces and public places are important levers in reducing the appeal and accessibility of tobacco products.
- Access to tobacco products is a key driver of consumption; policies to restrict access, particularly among young people, are critical in preventing uptake of smoking.
- Early evidence on legislation restricting smoking in cars where children are present suggest benefits in terms of partial protection from second-hand smoke and increased awareness among parents. There is no evidence to date that this legislation has helped prevent uptake of smoking among children.
- Use of other drugs including alcohol and cannabis are significant considerations in smoking prevention, but there is no clear guidance on how to address these in prevention efforts.

Evidence on more smokers quitting (Pharmacological approaches)

Effective smoking cessation agents

- Evidence from high quality studies, found all forms of Nicotine Replacement Therapy (NRT) (gum, transdermal patch, nasal spray, inhibitor and sublingual tablets/lozenges) significantly increased smoking cessation for those smoking at least 15 cigarettes a day.
- There was evidence to suggest that effectiveness of NRT is dose dependent with higher doses of NRT more effective than lower doses.
- There was some evidence that adherence to NRT interventions led to improvements in smoking cessation, with the effects more pronounced at six-months or longer follow-up.
- Varenicline was shown to be effective in smoking cessation and to some extent in relapse prevention.
- Single forms of NRT and bupropion were found to be equally effective for smoking cessation with varenicline found to be superior to both. Combination NRT was found to be more effective than bupropion and single forms of NRT.

Non-effective smoking cessation agents

- Pharmacological agents showing no effect on smoking quit rates include nicotine vaccines, silver acetate and opioid antagonists (ie naltrexone).
- There was no consistent evidence to support the effectiveness of acupuncture, acupressure, laser stimulation or electro-stimulation for smoking cessation.

Insufficient evidence

- There is some evidence that different genotypes and ethnic groups may react differently to pharmacological supports to quitting, but there was not enough evidence to guide clinical practice.
- There was insufficient evidence to determine if antidepressants increased quit rates when used in conjunction with NRT.

Evidence on more smokers quitting (Behavioural approaches)

Psychosocial

Psychosocial interventions comprise many different elements including counselling, motivational techniques and behavioural therapies. Key findings on these approaches are listed below:

- Motivational interviewing was shown to be modestly successful in promoting smoking cessation when compared to brief advice or usual care. This technique for smoking cessation was more successful when delivered by GPs in the primary care setting.
- The delivery of smoking cessation interventions is critically important to their success. Psychosocial interventions (counselling / advice / strategies) delivered by nurses increased the likelihood of smoking abstinence among primary and secondary care patients at six months.
- Duration of psychosocial interventions was also shown to be an important feature with interventions lasting longer than one month effective for smoking cessation.
- Psychosocial interventions (mostly telephone support) were effective in achieving smoking abstinence in patients with coronary heart disease demonstrating a significant effect on smoking abstinence.

Technological and tele-communications

- Mobile phone messaging (SMS or MMS)[3] can be effective in achieving smoking cessation on a short-term basis (up to 3 months), with mixed evidence reported for smoking cessation at longer follow-up (6 months).
- There was mixed evidence relating to telephone support and the use of quitlines. Some evidence showed telephone quitlines to be an important source of support; proactive telephone counselling was beneficial to smokers who seek help from quitlines, with call-back counselling enhancing their usefulness.
- Automated telecommunications systems do not appear to have an effect on maintenance of smoking abstinence. However, these findings are based on low quality evidence.
- There was no evidence that internet-based approaches are more effective than other active smoking interventions. There was no evidence of their effectiveness among adolescents and young adults.

Advice and information

- Print-based self-help materials, used on their own can be marginally, but significantly effective in smoking cessation.

3. SMS – Short Message Service; MMS – Multimedia Message Service.

- Long term success is dependent on doctors systematically identifying smoking patients and offering routine advice.
- Brief interventions are a low-cost way of identifying and signposting patients to relevant services. The evidence demonstrates that brief interventions of less than one month in duration, without support over time, were not effective.

Incentives

- Incentives for smoking cessation are based on various models including reward only, employer supported schemes and deposit schemes which smokers contribute to themselves. From the available evidence, incentives appear to boost smoking cessation rates while they are in place. Although deposit schemes[4] have a lower uptake, they appear to be more effective than reward-only schemes.

Objective measures

- There was insufficient evidence about the effectiveness of biomedical risk assessment[5] as an aid to smoking cessation.

Lifestyle changes

- No conclusions could be drawn from multi-modal interventions (diet/ physical activity/ education/ lifestyle counselling) for secondary stroke prevention.

Mass media

- There is mixed and insufficient evidence relating to the effectiveness of mass media in helping to change smoking behaviour at a population level. Although there is some evidence of increased calls to quitlines and some behaviour change in reviews of mass media campaigns, the extent of behaviour change is unclear. Duration and intensity are important considerations in mass media campaigns and follow-up periods need to be sufficient to detect changes in smoking behaviour.
- There was insufficient evidence to determine if mass media campaigns changed smoking behaviour among ethnic minorities; it was unclear if cultural adaption for ethnic minority groups was an effective element of the mass media campaigns

Recruitment

- It was not possible to draw firm conclusions about the effectiveness of recruitment strategies to smoking cessation programmes. Nonetheless, personal, tailored messages recruitment strategies that are proactive and intensive may enhance recruitment to smoking cessation programmes.

Co-morbidities

- No clear evidence that brief interventions were effect for patients with coronary heart disease. Where patients were followed up one month after the initial contact, the chances of quitting where increased substantially, but the authors have cautioned about overestimation of the effects of psychosocial interventions.

4. Deposit schemes require the smoker to contribute the money they would otherwise have spent on tobacco.
5. Physical measurement of exhaled carbon monoxide as means of increasing motivation (with or without another intervention such as counselling) for smoking cessation.

Evidence on more smokers quitting (Pharmacological and Behavioural approaches)

Effective combined interventions to smoking cessation

- Combined pharmacological and behavioural approaches are more effective than pharmacological alone or behavioural only approaches.
- Behavioural support either in person or by telephone, in addition to pharmacotherapy has a small but important effect on smoking cessation.
- Behavioural therapy delivered in a group format aids smoking cessation. Group therapy was shown to be more effective than self-help approaches, but not necessarily any more effective than advice from a healthcare provider.
- There is consistent evidence that individual counselling increases smoking cessation compared to less intensive support, such as brief intervention.
- There is some evidence that behavioural interventions can increase tobacco abstinence among smokeless tobacco users whether they are motivated or not to stop. Telephone counselling may be an important component of an intervention.
- Interventions directed towards the individual smoker increase the likelihood of quitting ie individual and group counselling, pharmacological treatment and multiple interventions targeting smoking as the primary or only outcome.
- Smokers can be given the choice to quit using either smoking reduction of abrupt quit approaches, but further research is needed to determine which methods of reduction are most effective and which categories of smokers benefit most.
- Successful smoking cessation was not dependent on the provider, with no differences noted between specialist and non-specialist providers.
- In the workplace setting, it was concluded that interventions (individual and group counselling, pharmacotherapy, and multiple interventions with smoking cessation as the primary or only outcome) directed towards the individual smoker increased the likelihood of quitting. Comprehensive programmes targeting multiple lifestyle behaviours did not reduce smoking prevalence.
- There was some merit in the use of exercise-based interventions for smoking cessation in the short term (3 months). There was limited evidence of the effectiveness of exercise aiding smoking cessation at 12 months.
- Training healthcare professionals in the delivery of smoking cessation interventions delivered a measurable effect on smoking cessation. Healthcare professionals who received training were more likely to ask patients to set a quit date, make follow-up appointments, provide counselling and self-help materials and prescription of a quit date.
- Healthcare settings are an important environment for recruitment and successful smoking cessation, regardless of motivation to quit.
- High intensity behavioural interventions initiated in hospital, with more than one-month supportive follow-up, are effective in achieving successful smoking cessation.
- Intensive interventions (combined pharmacotherapy and behavioural), initiated at least four weeks prior to surgery, are effective in changing smoking behaviour in the long term and reducing the risk of post-operative complications.

- Combined pharmacological and behavioural approaches to smoking cessation are effective for patients with COPD.
- Interventions delivered by oral health professionals in the dental or community setting are effective in increasing smoking cessation.
- Combined pharmacological and behavioural interventions were shown to be effective in achieving short-term smoking abstinence among people living with HIV/AIDS.
- For smokers with current and past depression, there was significant benefit in adding a psychosocial component to a standard smoking cessation intervention. Bupropion had a positive effect on people with current depression; it was also beneficial in relation to long term smoking cessation for smokers with past depression, but the evidence is weak.
- Bupropion is effective for smoking cessation in patients with schizophrenia without any adverse effect on mental health. Varenicline was also shown to be effective.
- Evidence for smoking cessation among people in treatment or recovery from alcohol or drug dependence was considered low quality, but there was evidence of effectiveness in smoking cessation and reducing the health consequences of smoking.
- Behavioural approaches are a good starting point for tobacco cessation among water pipe users, but interventions need to reflect the different social and contextual use of water pipes.

Non-effective combined interventions

- Existing evidence does not support the use of behavioural approaches to prevent smoking relapse, but extended use of varenicline may reduce relapse.
- Comprehensive programmes targeting multiple lifestyle behaviours did not reduce smoking prevalence.

Insufficient evidence

- Paucity of evidence relating to smoking cessation among indigenous populations.
- Limited evidence that behavioural support or pharmacotherapies increase smoking cessation among young people in the long term. Group-based behavioural interventions showed some potential.

Evidence on role of healthcare systems

- The introduction of an electronic reminder in the clinical setting led to improved documentation of smoking status, provision of counselling and referral to smoking cessation services.

No firm conclusions could be reached about the effectiveness of system change interventions within healthcare settings for increasing smoking cessation or the provision of smoking cessation care or both. This was largely due to low quality evidence.

Evidence on more smokers quitting (regulation)

- Most evidence suggests that standardised packaging will reduce smoking.
- There is consistent evidence that standardised packaging reduces the appeal of smoking.
- There is a lack of good quality evidence on the effect of cigarette size on tobacco consumption.

Protecting people from tobacco smoke

- From the reviews identified in this literature search, a small number demonstrated positive impacts on reducing exposure to second-hand smoke. Of those reviews that showed positive effects, the most effective measures appeared to be smoke-free legislation and smoke-free policies within institutions.
- Smoke-free legislation has been effective in reducing second-hand smoke exposure and improving health outcomes for children and adults.
- Smoking bans in institutions such as hospitals, universities and prisons offer benefits for staff and students, patients and prisoners in terms of reduced exposure to second-hand smoke (SHS) as well as some reduction in active smoking.
- In terms of non-regulatory approaches, most reviews assessed interventions aimed at changing parental behaviour to reduce second-hand smoke exposure for children in the context of parental smoking cessation.
- Supporting parents, including expectant parents to quit smoking is theoretically sound as a means to reduce second-hand smoke exposure among children but there is little evidence on 'what works' for this group.
- There is limited evidence of 'what works' in terms of interventions to support 'mitigation' behaviours around exposing others to second-hand smoke in non-regulated and domestic environments.

Conclusions relating to pregnancy and smoking

Smoking cessation

- NRT helped reduce smoking among women at the closest follow-up to end of pregnancy. Evidence for smoking abstinence at longest follow-up postnatally was weaker.
- There is some evidence that NRT with behavioural support is effective for smoking cessation in pregnancy. There was no evidence that NRT had a positive or negative effect on pregnancy and infant outcomes.
- Psychosocial interventions can support women in stopping smoking during pregnancy and reduce the proportion of infants born with low birthweight or admitted to neonatal intensive care after birth. Education alone is not sufficient; psychosocial interventions need to include counselling, feedback or incentives.
- There was mixed evidence relating to telephone support and the use of quitlines. Some evidence showed telephone quitlines to be an important source of support; proactive telephone counselling was beneficial to smokers who seek help from quitlines, with

call-back counselling enhancing their usefulness. In another review, there was no firm evidence that women receiving telephone support were less likely to smoke at the end of pregnancy or during the post-natal period.

- Studies of the use of incentives for pregnant smokers showed that smoking cessation at the end of pregnancy and following birth increased. There was some evidence for improved smoking cessation when support from a 'significant other' (who also received reward vouchers) was provided.
- There was insufficient evidence to support the use of high or low feedback during ultrasound scan on health behaviours during pregnancy.

Protection from second-hand smoke

- There is some evidence that clinical interventions (which included NRT, counselling by a physician, midwife or counsellor; brief advice and reminders by a physician for partners of pregnant women) can reduce the exposure of women to second-hand smoke during pregnancy.
- There is insufficient evidence to support an effect for peer or partner support for reduced exposure to second-hand smoke among pregnant women.

Considerations for the Mid-term Review Group

Based on an independent synthesis and interpretation of the published evidence, the following considerations have been developed for the Mid-term Review Group. These considerations are presented in line with the strategic objectives and priority groups identified within the Strategy and take into account the Tobacco Control Action Plan 2015-2020 led by the Public Health Agency.

Fewer people starting to smoke

Strategy priorities and their relationship with the evidence studied

The Strategy priorities in relation to fewer people starting to smoke in the general population are to:

- Further reduce the impact of tobacco marketing, either through legislation or public information campaigns
- Raising public awareness of the harms of smoking, through traditional methods as well as exploiting new media
- Working with Her Majesty's Revenue and Customs to combat illicit tobacco trade
- Supporting the UK government in measures aimed at reducing prevalence e.g. by tax increases

The stated Strategy priorities in relation to fewer people starting to smoke among the priority group 'children and young people' are to:

- To prevent those under the legal age of sale from accessing tobacco products through legislative measures
- To ensure that educational establishments, from primary through to tertiary level, are educating and/or appropriately supporting awareness raising as to the harm caused by tobacco.

There have been many significant legislative and programme developments over the course of the Strategy to date. The evidence on the implementation of the programmes in the Northern Ireland setting needs to be considered alongside the evidence of the effectiveness of policies and programmes from the international literature presented in this review.

Table E1. Summary of implications for policy across the evidence categories		
Evidence category	**Actions stated in NI Strategy**	**Implications for policy**
Regulatory measures	Advertising – no changes made	Research needed on new channels of tobacco advertising and operation of tobacco industry marketing and lobbying in Northern Ireland.
	Age of sale restrictions – no changes made	Keep a watching brief on Tobacco 21[6]. Consider feasibility of adopting provisions relating to setting a minimum age of sale for the vendor as well as the purchaser of tobacco products, similar to those provisions proposed in the forthcoming Republic of Ireland Public Health (Tobacco and Nicotine Inhaling Products) Bill 2019.
	Banning sale of tobacco from vending machines (2012)	Nothing further to suggest.
	Banning point of sale display (2015)	Evidence supportive – need to assess impact of e-cigarette advertising moving into spaces previously occupied by tobacco sales.
	Additional sanctions on retailers for underage sales (2015)	Review of enforcement and impact at end of Strategy term.
	Standardised packaging of tobacco (2015)	Supported by evidence. Nothing further to suggest.
	Prohibiting smoking in cars with children (pending)	No reviews published yet. Dependent on political structure to progress.
	Increase price through taxation	Supported by evidence but a non-devolved matter.

6. Tobacco 21 is a national campaign aimed at raising the minimum legal age for tobacco and nicotine sales in the US to 21.

	Sale of e-cigarettes by age	Not covered in this evidence review.
	Illicit trade	Revisit at end of Strategy particularly in light of potential changes to membership of European Union and cross-border trade.
School-based policies and programmes	Roll out of Smokebusters in primary schools	Share learning through a UK and Ireland knowledge exchange event on school-based programmes.
	Evaluations of Smokebusters x 2	Consider refresh of programme in light of (i) this review level evidence (ii) emerging interface with mental health issues (iii) e-cigarette content (iv) fidelity optimisation (v) development of social competency elements.
	Literature review on school programmes completed by Ulster University	
	Dead Cool evaluation (secondary schools)	Incorporate learning from the evaluation into programme development.
Family and community programmes	Parenting support	Results from family and community programmes are as convincing as school-based but seem to be underdeveloped in current Strategy.
	Peer-led approaches	Underdeveloped but no 'off the shelf' programme evident – work to source and transfer a well-evaluated model from elsewhere.
Primary care programmes	No structured programme for smoking prevention intervention in primary care settings	Targeted behavioural interventions in primary care can prevent young people taking up smoking. Probably an area for development.

Media messaging	No Smoking Day Annual public information campaign Programme of social media messaging www.up-2-you.net	Examine the 'spunout' model in Republic of Ireland. Comprehensive assessment of the responses of children to the mass media as well as adults
	Review on new media and tobacco control	
	Communications plan in partnership with Innovation lab	
Incentives	No programmes	Actively support the roll-out and evaluation of incentive programmes in smoking cessation services for pregnant women and the general public.
Other	Tobacco and other drug use	Produce estimates of use of combined use of tobacco and cannabis and explore impact of cannabis use on smoking prevention.

Other recommendations

- Consider making people with mental health issues a designated target group in the next strategy alongside pregnant women, children and young people and routine/manual workers
- Integrate messaging on smoking into mental health supports, resources and community level actions for children and young people
- Progress the development of smoke-free higher education campuses on third level campuses
- Develop better insights into children's perceptions and misperceptions and create a platform to listen to children's narratives on smoking appeal and initiation
- Promote influential youth ambassadors and grow youth-led communication channels
- Develop guidelines for child health services in terms of brief advice/ motiviational interviewing on how to effectively encourage children not to start smoking and respond to children disclosing smoking behaviours

More smokers quitting

Strategy priorities and their relationship with the evidence studied

The Strategy priorities in relation to the general population are to:

- Increase the number of people accessing smoking cessation services
- Effectively promote cessation services including consideration of a single brand for all health and social care services
- Ensure effective referrals system across HSC to smoking cessation services
- Expand brief intervention training to other professions
- Monitor effectiveness of stop smoking schemes elsewhere for consideration in Northern Ireland
- Update the existing framework for training services
- Review the role for harm reduction to assist those who can't quit

The stated Strategy priorities for the priority group 'children and young people' are to:

- Increase awareness of specialist cessation services
- Undertake research to determine how to increase uptake
- Consider how to address particular needs of children in care and young offenders

The stated Strategy priority for the priority group 'disadvantaged people who smoke' is to:

- Increase cessation rates among manual workers and those with mental health issues, taking into account the particular needs of these groups

The stated Strategy priorities for the priority group 'pregnant women and their partners who smoke' are to:

- Increase signposting to cessation services
- Consider incentive schemes
- Improve postnatal support

This evidence review did not consider any evidence in relation to the use of e-cigarettes as a smoking cessation aid or harm reduction intervention. The evidence was not included in this review as there two significant evidence reviews underway in the UK and the Republic of Ireland that will be published in 2020.

Table E2. Summary of implications for the general population based on the evidence category - smoking cessation - pharmacological and behavioural interventions	
Overview of actions stated in NI Strategy 2012-present	**Implications for further Strategy implementation**
Expansion of stop smoking services to people with chronic disease, patients undergoing surgery and looked after children **NICE guidelines updated March 2018 to reflect new evidence** **Integration of stop smoking advice into clinical management protocols** **Delivery of regionally consistent brief intervention training to people working with priority groups** **Want2Stop campaign** **Pilot of mobile stop smoking service in supermarket car parks trialled** **New framework for training services developed 2015 and implemented 2016**	Invest in the effective knowledge dissemination, service integration and monitoring of NICE guideline 92 in line with stated intentions to date.
	Review data on patterns of compliance with quit-support medications and consider options to increase compliance in NI.
	Review data on patterns of compliance with quit-support medications and consider options to increase compliance in NI.
	Maintain a watching brief on evidence relating to the role of antidepressant medications and potential drug interactions (real and perceived).
	Retain policy of not recommending or investing in alternative therapies of unproven benefit.
	Continue to develop and integrate stop smoking services for existing target groups including those with chronic disease. Explore feasibility of adding a new focus on substance misuse services and HIV/AIDS service.
	Incorporate the smoking cessation element into existing surgical audit processes aiming to assess the sufficiency of smoking cessation intervention in terms of intensity and timing and surgical outcomes.
	Consider use of biomedical risk assessment as optional rather than core. If applied, use low cost technology–spirometry and exhaled CO and 'lung age'
	Retain current commitment to individual counselling in line with NICE guidance 92.
	Grow and evaluate the use of online and mobile phone tailoring and interactive interventions in line with NICE guidance 92.

	Explore different programme design and evaluation options for group counselling – focus on children and young people.
	Expand the use of financial incentives to increase reach and effectiveness of the Northern Ireland stop smoking service.
	Develop current workplace programmes to incorporate onsite counselling and incentives building on the successful roll-out of the 28-day challenge in NI workplaces.
	Host an innovation lab to create ideas on how to make recruitment strategies more personalised, proactive and intensive through online and face-to-face methods.
	Retain and deepen investment in training and skills development, particularly in the primary care setting.
	Review the current level of brief intervention offered by oral health practitioners and the adequacy of data, training and monitoring.
	Ensure that smoking cessation training, professional development and referral pathways feature in any new oral health strategy for Northern Ireland.
	Generic motivational interviewing and group counselling may need to be adapted to the needs of users with chronic mental health issues. Guidance on any adaptations would be required.
	Extended use of varenicline may prevent relapse. The current extent of use should be assessed.
	Smoking cessation programmes initiated in hospital are most beneficial when there is continued follow up.

Table E3. Summary of implications for the general population based on the evidence category - smoking cessation – legislative/regulatory	
Overview of actions stated in NI Strategy 2012-present	**Implications for further Strategy implementation**
Introduction of standardised packaging (2015)	Maintain a watching brief on the extent and nature of illicit and non-standardised packaging available in Northern Ireland.
	Protect and retain the commitment to comply with UK legislation on standardised packaging of tobacco in the context of the EU Tobacco Products Directive.
	Protect and retain the commitment to comply with the UK legislation on smoking in workplaces and public places.
Ongoing enforcement and monitoring of smoke-free legislation	Protect and retain the commitment to comply with the UK legislation on smoking in workplaces and public places.
	Grow current practice on the integration of stop smoking referrals as part of the expansion of tobacco-free areas.

Table E4. Summary of implications for the priority group 'children and young people' based on the evidence related to smoking cessation	
Overview of actions stated in NI Strategy 2012-present	**Implications for further Strategy implementation**
Expansion of stop smoking services to looked after children	Invest in the effective knowledge dissemination, service integration and monitoring of NICE guideline 92 in line with stated intentions to date.
NICE guidelines updated March 2018 to reflect new evidence (applicable from age 12 and older)	Review data on use of quit-support medications among children and young people alongside current practice on barriers to access including parental consent.

Delivery of regionally consistent brief intervention training to people working with priority groups **Want2Stop campaign** **New framework for training services developed 2015 and implemented 2016**	Ensure that school-based programmes and policies incorporate referrals to stop smoking services as well as a focus on smoking prevention.
	Explore novel approaches to enhance referrals of young smokers to quit services and consider design of bespoke 'youth' interface with the service.
	Explore different programme design and evaluation options for group counselling as may be more effective for this group.
	Integrate stop smoking support into sexual and reproductive health services for young people.
	Review the current level of brief intervention offered by oral health practitioners and the adequacy of smoking cessation advice/oral health promotion for older children engaged with dental health services.

Table E5. Summary of implications for the priority group 'pregnant women and their partners who smoke' based on the evidence related to smoking cessation

Overview of actions stated in NI Strategy 2012- present	Implications for further Strategy implementation
Report delivered in 2014 on evidence to support service design and comparison of service models in each Trust **Delivery of brief intervention training** **Study underway on use of incentives** **Want2Stop campaign** **New framework for training services developed 2015 and implemented 2016**	Consider the benefits of service reconfiguration with enhanced regional and national leadership.
	Repeat the comparative review of the service models in each Trust area undertaken in 2014 – assess on a five-yearly basis.
	Invest in development of NIMATS data to embed smoking data and strategy actions within a wider maternal and child health dataset.
	Integrate NRT provision as part of Trust-led cessation service and progress the facility for nurse-prescribers.

	Develop a time-bound action plan to enhance current practice for CO testing at booking.
	Review findings from the NIHR funded study on use of incentives taking place within NI maternity services and agree implications for strategy and programmes.

Table E6. Summary of implications for the priority group 'disadvantaged people who smoke' based on the evidence related to smoking cessation

Overview of actions stated in NI Strategy 2012- present	Implications for further Strategy implementation
NICE guidelines updated March 2018 to reflect new evidence **Delivery of regionally consistent brief intervention training to people working with priority groups** **Want2Stop campaign** **New framework for training services developed 2015 and implemented 2016** **PhD project on barriers to quitting smoking completed**	Invest in the effective knowledge dissemination, service integration and monitoring of NICE guideline 92 in line with stated intentions to date.
	• Increase the reach of the stop smoking service to disadvantaged communities in line with practice in Scotland and as recommended in the UK wide equity impact analysis of stop smoking services through • Investment • Increasing the contact points (number and type) • Setting and monitoring equity targets • Enhancing primary care target-based systems • Health literacy interventions • Enhanced allocation of resource to engagement, support and follow up procedures
	• Review the level of allocations for stop smoking service in the context of social need as measured by the Northern Ireland Multiple Deprivation Measure.
	• Retain key performance indicators and monitoring system in relation to routine and manual workers but enhance with additional data on the unemployed.

	• Using logic modelling, identify the pathways by which all actions in the Strategy are contributing towards reducing inequalities in smoking.
	• Expand use of financial incentives within general stop smoking services and within services for pregnant women and their partners.
	• Commission an equity audit of the Strategy as a component of the end of Strategy review.
	• Target workplaces with large number of low income and/or precarious workers.
	• Develop a checklist for all smoking cessation services to support them to address barriers in service accessibility and effectiveness.

Protecting people from tobacco smoke

Strategy priorities and their relationship with the evidence studied

The Strategy priorities in relation to the general population are:

- Further awareness raising around harm caused by exposure to SHS in private areas not covered by smoke-free legislation
- Increased compliance with the legislative ban on smoking in work vehicles
- Encouraging organisations to voluntarily expand their smoke-free areas

The stated Strategy priority for the priority group 'children and young people' is:

- Consideration of legislation banning smoking in cars

There were no stated Strategy priorities for the priority groups 'disadvantaged adults' and 'pregnant women and their partners who smoke' in relation to second-hand smoke exposure.

Table E7. Summary of implications for the general population based on the evidence category – second-hand smoke exposure	
Overview of actions stated in NI Strategy 2012 to end 2018	**Implications for further Strategy implementation**
Continued monitoring and enforcement of smoke-free legislation **Enhanced support for Council enforcement officers** **HSC Trusts smoke-free and local steering groups in place** **Targeting of non-compliant businesses focused on work vehicles** **Partnership with DVA on data sharing** **Passage of Tobacco Retailers Act NI (2014)** **Development of tobacco retailers register in line with legislation (Tobacco Retailers Act)** **Smoke-free school gates initiative implemented** **Promotion of smoke-free touchlines** **Legislation restricting smoking in cars with children drafted and awaiting political enactment**	Secure ongoing and appropriate investment in current systems of enforcement in relation to NI smoke-free legislation and the allied monitoring and reporting system. Guard against any dilution of the UK legislation – the more comprehensive the legislative cover, the greater the health returns. Consider appropriate extensions of the current legislation, for example the feasibility of extending provisions to outdoor areas of restaurants as proposed in the Republic of Ireland. Smoking in work vehicles is an ongoing challenge for NI but there was no clear guidance from the review level literature. However, adopting an implementation science approach may be useful in targeting compliance issues. Maintain investment and periodically refresh the leadership on smoke-free health care services in the Trusts. Review the factors supporting and hindering effective implementation of smoke-free campuses to guide policy and practice development. There is not yet any review level evidence for the results of expansion of smoke-free spaces beyond the legislation with the exception of university campuses and prisons. Evidence supports the expansion of smoke-free regulations in these two settings. The evidence might reasonably be applied to other settings. Build aspects of empowerment and management of second-hand smoke

	exposure into cancer survivorship and chronic disease self-management guidelines.
	Community of practice/network on implementation of smoke-free spaces beyond current legislation.

Table E8. Summary of implications for the priority group 'children and young people' based on the evidence related to second-hand smoke exposure

Overview of actions stated in NI Strategy 2012- present	Implications for further Strategy implementation
Smoke-free school gates initiative implemented **Promotion of smoke-free touchlines** **Legislation restricting smoking in cars with children drafted and awaiting political enactment**	There is not yet any review level evidence on the health returns from banning smoking in cars with children as legislative measures are a relatively new phenomenon. Notwithstanding this lag of evidence, there should be no further delay on enactment of UK-wide legislation in NI.
	Behaviours of smoking parents in relation to exposing children to second-hand smoke in Northern Ireland are poorly understood. Research should focus on identifying potentially effective motivations and supports for behaviour change including both quitting and exposure reduction.
	Explore current practice in smoking cessation referral for parents of children from specialist paediatric services where child health outcomes are directly related to SHS exposure (e.g. respiratory and ear nose and throat).
	Continue to invest in and expand smoke-free educational establishments in primary, secondary and third level settings – ideally in the context of whole-school/organisation approaches.
	Explore opportunities to further promote smoking cessation services to parents and partners of pregnant women to help reduce second-hand smoke exposure within families and reduce smoking prevalence among parents.

Table E9. Summary of implications for the priority group 'pregnant women and their partners who smoke' based on the evidence related to second-hand smoke exposure	
Overview of actions stated in NI Strategy 2012- present	**Implications for further Strategy implementation**
Although no specific actions were identified in the Strategy, a variety of actions were progressed through the Action Plan.	Investigate the current level of SHS exposure among pregnant women in NI.
	Continue to develop smoking cessation services in line with evidence presented in the smoking cessation chapter, with a focus on integrating the use of financial incentives, taking into account learning from local studies of implementation, for example the Smoking Cessation in Pregnancy Incentives Trial (CPIT).
	Review the adequacy of current services in Northern Ireland for post-natal support and follow up for women who successfully quit during pregnancy to reduce the risk of postnatal relapse.

Table E10. Summary of implications for the priority group 'disadvantaged people who smoke' based on the evidence related to second-hand smoke exposure	
Overview of actions stated in NI Strategy 2012- present	**Implications for further Strategy implementation**
No specific actions identified	No specific guidance from the review level literature on reducing exposure for socially disadvantaged groups.
	However, the following targeting approaches may offer benefits for reducing second-hand smoke exposure for socially disadvantaged groups: • Investment in enhanced smoking cessation in disadvantaged communities • Investment in smoking cessation and reducing second-hand smoke exposure in pregnancy

	• Preferential attention to drive legislative compliance on smoking in commercial vehicle fleets primarily operated by lower income workers • Further development of stop smoking referrals and exposure reduction messages through early years and parenting support services, particularly those serving disadvantaged communities and lone parent families
Set targets for reducing tobacco use in different social groups	Ensure accountability and leadership for reducing inequalities in tobacco related harm.
	Convene a task and finish group to bring forward prioritised recommendations for addressing inequalities in smoking in NI.

1 Introduction

Introduction

1.1 Policy Context

In 2012, the then Department of Health, Social Services and Public Safety (now Department of Health) launched its Ten Year Tobacco Control Strategy for Northern Ireland (Department of Health Social Services and Public Safety, 2012). The Strategy aims to create a tobacco free society through the following three objectives:

1. Fewer people starting to smoke
2. More smokers quitting
3. Protecting people from tobacco smoke.

While the Strategy is aimed at the entire population, three priority groups were also identified by the Department of Health as particularly vulnerable to the damaging effects of smoking and in need of focused policy attention.

These priority groups were:

1. Children and young people
2. Disadvantaged people who smoke
3. Pregnant women and their partners who smoke

Implementation of the Strategy is led by the Public Health Agency with oversight by the Tobacco Strategy Implementation Steering Group. This group was established to provide multidisciplinary oversight and drive the implementation of the policy.

It was agreed that a review would be undertaken at the mid-point of the Strategy. A Mid-term Review Group was established in 2018 and several strands of work were agreed as part of the review. These included an evidence review, a stakeholder engagement report, reporting progress on the Strategy actions and updated figures on Strategy indicators based on analysis of government surveys.

1.2 Evidence review

At the request of the Department of Health, the Institute of Public Health in Ireland (IPH) agreed to undertake a review of the evidence published since the Strategy was launched in 2012. The overall aim of the evidence review was to support evidence-informed decision-making to inform the mid-term review of the Tobacco Control Strategy and the direction of future implementation of the Strategy.

The specific research aims were:

1. To conduct a policy-focused rapid review which highlights significant high-level developments in evidence of effectiveness in defined elements of tobacco control policy addresses evidence emerging within the last 6 years.
2. To synthesise the review findings to propose strategic recommendations for consideration by the group overseeing the mid-term review.

2 Methods

Methods

A rapid evidence review was undertaken to inform the mid-term review of the Ten Year Tobacco Control Strategy for Northern Ireland. A review protocol was developed by IPH, refined in line with the needs and preferences of policy leads and subsequently approved by the Department of Health and Mid-term Review Group.

The evidence review focused on exploring evidence to enhance the existing approaches set out in the Strategy and its action plans, as well as developing insights on innovative new approaches. The review focused principally on areas where devolved decision-making applied. Therefore, issues of tobacco taxation, product manufacturing and certain components of broadcast marketing/advertising, and in relation to some licensing issues, were not included in the review. Due to the limited time frame for this review and in line with the specified needs of health policy decision-makers, the literature search was limited to 'review level evidence' only.

A Project Initiation Document was developed which detailed the approach and research questions. A Review Protocol was produced which specified the review methodology in detail. The evidence review was structured according to the three key objectives and priority groups identified within the Ten Year Tobacco Control Strategy for Northern Ireland.

The evidence review was undertaken according to the three key objectives of the Ten Year Tobacco Control Strategy and sought to address the policy questions outline in Table 1.

Table 1: Objectives of the Tobacco Control Strategy for Northern Ireland

Tobacco Control Strategy Objectives	
Fewer people starting to smoke	What evidence-informed approaches should be considered to further reduce the number of people in Northern Ireland starting to smoke? In particular, what evidence-informed approaches should be considered in respect of the Strategy's priority groups? • Children and young people • Disadvantaged people who smoke • Pregnant women, and their partners, who smoke
More smokers quitting	What evidence-informed approaches should be considered to further support engagement with stop smoking services delivered under the Strategy?

	What evidence-informed approaches should be considered to further improve the quit rate achieved through engagement with stop smoking services delivered under the Strategy? In particular, what evidence-informed approaches should be considered in respect of the Strategy's priority groups? • Children and young people • Disadvantaged people who smoke • Pregnant women, and their partners, who smoke
Protecting people from tobacco smoke	What evidence-informed approaches should be considered to further reduce exposure to tobacco smoke in NI? In particular, what evidence-informed approaches should be considered in respect of the Strategy's priority groups? • Children and young people • Disadvantaged people who smoke • Pregnant women, and their partners, who smoke

2.1 Databases searched

The following databases were searched:

- Cochrane Library
- Health Systems Evidence
- Centre for Reviews and Dissemination
- NHS Evidence
- National Institute for Health and Care Excellence
- Public Health Well
- UK Centre for Alcohol and Tobacco Studies
- Lenus
- OpenGrey

2.2 Dates of search

The data search covered literature published between 1 January 2012 and 30 June 2018. This time period was selected as it reflected the beginning of the Strategy up until the commencement of the mid-term review.

2.3 Search strings

Database search terms were developed in agreement with the Department of Health and relevant advisory groups. The search strings included individual terms and combinations of the terms overleaf:

- Smoking
- Tobacco
- Smoking prevention
- Smoking cessation
- Environmental tobacco smoke exposure
- Second-hand smoke exposure
- Tobacco control policies

2.4 Search strategies

The search strategies were undertaken using combinations of the search strings and free-text terms (the latter restricted to the title or abstract fields). Hand-searching of reference lists was not undertaken.

There was some variation in the way in which database searches were undertaken; this was related to the search functions within specific to each database. As a minimum requirement, the search terms were applied to the title, keywords and abstract. In some databases, search terms were applied to the whole document, resulting in a large number of irrelevant records returned. Where search options permitted, the review team searched for review level evidence only.

Under the direction of the Department of Health, the literature search focused on evidence relating to smoking cessation published within the Cochrane Library. Cochrane Reviews are a key informant of UK policy decisions with regards to public health and the development of NICE guidelines which informs service delivery across health and social care in Northern Ireland.

2.5 Inclusion criteria

The following inclusion criteria were applied to the database searches:

- Systematic review level evidence only (international literature)
- Selected grey literature relating to the implementation and delivery of tobacco control policies in Northern Ireland, other UK jurisdictions and the Republic of Ireland
- Studies in English language only and published in the period January 2012 to June 2018.

On the request of the Department, the search criteria were broadened to include reviews outside of the Cochrane Library that specifically addressed smoking cessation interventions among disadvantaged groups (ie lower socioeconomic groups). The findings are reported in Chapter 4.

2.6 Exclusion criteria

Evidence relating to electronic cigarettes and nicotine inhaling devices was not included in this review. NICE is currently developing new guidance and advice 'Tobacco: preventing uptake, promoting quitting and treating dependence' which is expected to be published in 2020. The new NICE guidance will include advice on the use of e-cigarettes in harm reduction and treating tobacco dependence. In addition, the Department of Health in the Republic of Ireland has commissioned the Health Research Board to produce an evidence review on e-cigarettes for completion in 2020. In light of these developments, it was decided to exclude e-cigarettes from this particular review.

The evidence review did not include literature relating to non-devolved matters such as tobacco taxation, product manufacturing, product manufacturing and broadcast marketing/advertising of tobacco products and some issues in relation to licensing.

2.7 Conflict of interest

Funding sources and potential conflicts of interest were considered as part of the inclusion criteria.

Research known to be funded by the tobacco industry was not included in line with UK commitments to the World Health Organization Framework Convention on Tobacco Control with specific reference to Articles 5.3 and 20. Reviews funded by, and reviews featuring studies funded by, the pharmaceutical industry were included.

2.8 Selection process

Inclusion and exclusion criteria were applied to title and abstracts of each citation returned. Where necessary, full text reports were obtained as part of the screening process. A sample of returns was screened independently by two reviewers at several stages during the screening process to identify any potential differences in interpretation of the criteria.

2.9 Screening

Screening of the returned citations was undertaken in a phased approach:

1. Initial screening of the citations showed that one database (NHS Evidence) returned a large number of citations with limited relevance to smoking or tobacco control. Based on screening of the title, a large number of citations were not considered eligible for inclusion and therefore screened out at an early stage.
2. At this stage, citations were also categorised as 'Review level evidence' or 'Policy, strategy and guidance documents' and saved as separate files.
3. The second stage of screening involved removal of duplicates and data cleaning which was undertaken through manual checks.
4. All review level evidence was then assessed for eligibility based on the inclusion criteria and a pre-determined coding system to facilitate data synthesis.

2.10 Coding

The review level evidence comprised systematic reviews, evidence reviews and summaries and meta-analyses. A set of codes was developed to extract and synthesise relevant information from the citations. The review level evidence citations were compiled in an excel file and coded using the following headings:

- Objectives
- Primary and secondary outcomes
- Intervention type and description
- Date of last literature search and number of studies included in review
- Results
- Population and priority groups
- Tobacco control policy category (ie smoking prevention, smoking cessation, protection from second-hand smoke)
- Effect size estimates
- Quality of evidence for the included reviews
- Policy implications
- Review included or excluded
- Reason for exclusion

Quality of the evidence, as determined by the authors, was recorded; no additional quality assessment was undertaken by IPH review team.

The initial coding process was undertaken collectively by IPH policy team and a sample verified by the Director of Policy. From the coding process, citations were identified as being included or excluded from the final evidence review.

2.11 Data synthesis

Following the coding of individual citations, data were synthesised according to the objectives and priorities of the Strategy. Evidence was collated according to the Strategy priority groups:

- Fewer people starting to smoke
- More smokers quitting
- Protecting people from tobacco smoke

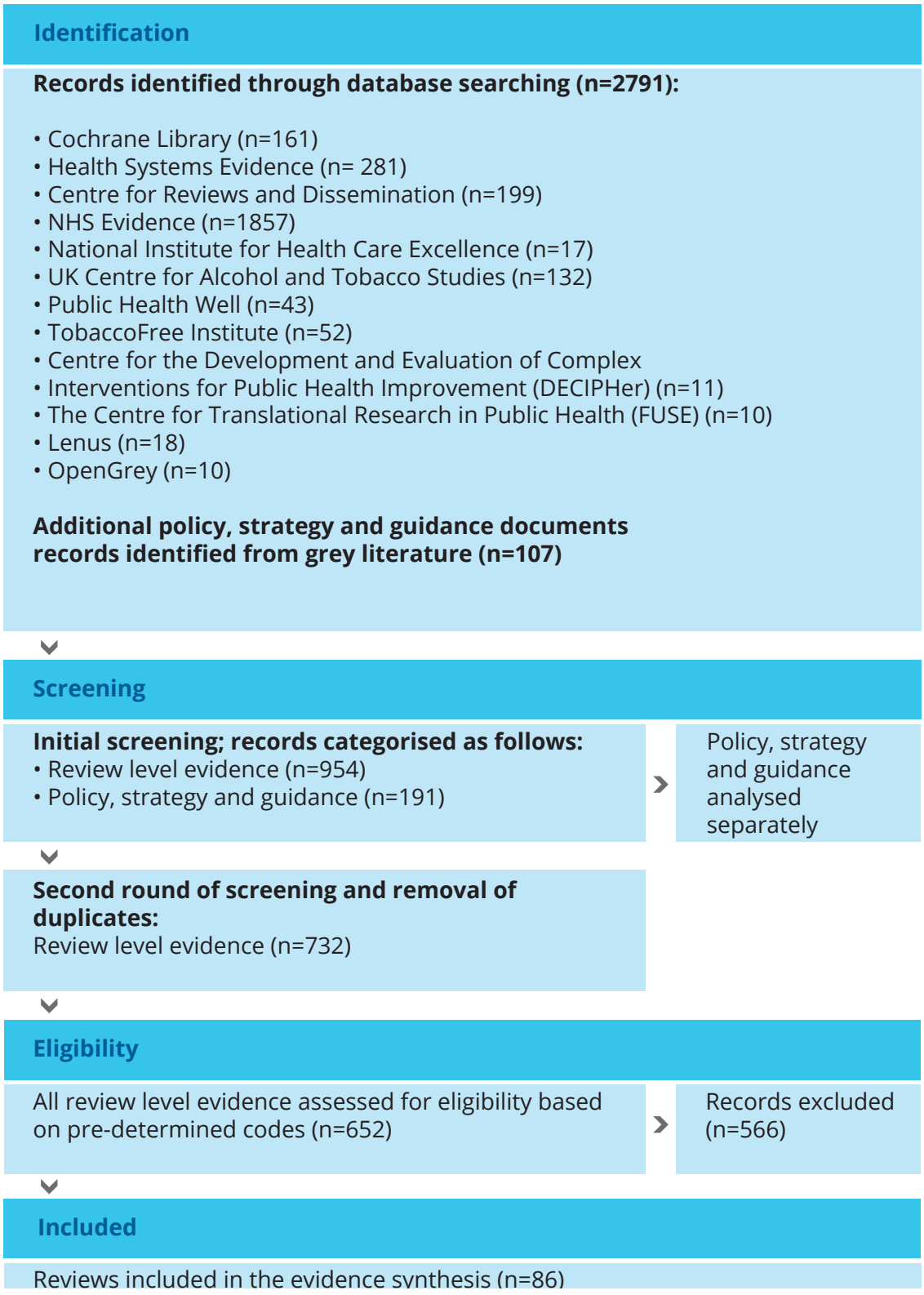
At the end of each section a summary of how the evidence relates to the various priority groups is presented. Where relevant, the evidence from relevant interventions has been summarised by setting. The largest body of evidence related to smoking cessation. This evidence has been presented by intervention type (Pharmacological; Behavioural; Combined Pharmacological and Behavioural approaches; and Legislation and Regulation).

The effectiveness of interventions is reported as either Relative Risk (RR) and Odds Ratio (OR). Relative Risk is the ratio of the probability of an event occuring in the intervention group versus the control group. The Odds Ratio represents the odds that an outcome will occur as a result of an intervention versus the odds of the outcome occuring in the absence of an intervention.

2.12 Data management

Microsoft Excel and EndNote software were used to collate and manage the database records as well as citation and reference lists. Figure 1 summarises the search strategy and processes involved in identifying the final number of records included in the review.

Figure 1. Chart illustrating categorisation of evidence relating to smoking cessation.



3 Evidence – Fewer people starting to smoke

Evidence – Fewer people starting to smoke

3.1 General Commentary

There have been a number of important legislative developments since the commencement of the Ten Year Tobacco Control Strategy for Northern Ireland in 2012. The legislation is closely aligned to the objectives of the Strategy and is summarised in Table 2:

Table 2. Overview of key legislative developments since the commencement of the Tobacco Control Strategy for Northern Ireland

Table 2. Overview of key legislative developments since the commencement of the Tobacco Control Strategy for Northern Ireland

Year	Legislation	Implementation
2007	The Smoking (Northern Ireland) Order 2006	Legislation restricting smoking in public places has been successfully implemented in Northern Ireland with one, three- and five-year reviews. The evaluations demonstrate high levels of compliance with the legislation.
2008	The Children and Young Persons (Sale of Tobacco etc.) Regulations (Northern Ireland) 2008	This legislation raised the minimum purchase, consumption and possession age from 16 to 18 years of age.
2012	The Protection from Tobacco (Sales from Vending Machines) Regulations (Northern Ireland) 2012	The Protection from Tobacco (Sales from Vending Machines) Regulations (Northern Ireland) 2012 prohibits the sale of tobacco products from vending machines. In 2016, evaluation of the legislation showed a high level of compliance with no recorded breaches of the ban.
2012	Tobacco Advertising and Promotion (Display) (Northern Ireland) Regulations 2012	The Tobacco Advertising and Promotion (Display) (Northern Ireland) Regulations 2012 ban tobacco advertising and the display of tobacco products in most retail stores.
2014	Tobacco Retailers Act (Northern Ireland) 2014	The Act aims to reduce smoking prevalence among children and young people by restricting their access to tobacco products. Under the Tobacco Retailers Act (Northern Ireland) 2014, all retailers of tobacco products in Northern Ireland must be registered.

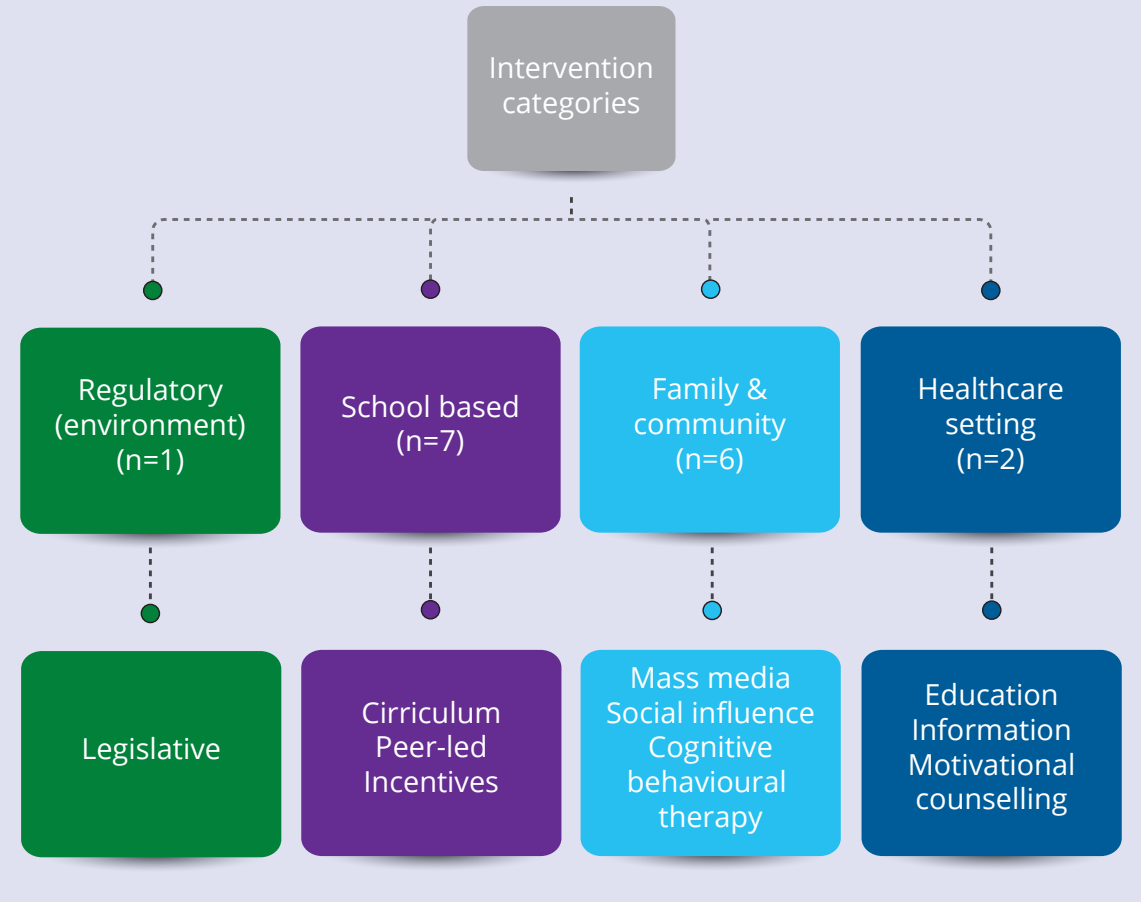
2016	Standardised Packaging of Tobacco Products Regulations 2015	This legislation regulates for retail packaging of tobacco, and herbal products for smoking. The rules include, for example, minimum sized health warnings on all retail tobacco packaging, and herbal products for smoking. They also require standardised packaging, or plain packaging, for individual cigarette sticks, cigarette packs and hand rolling tobacco packs for retail.
2016	Tobacco and Related Products Regulations 2016	The UK Tobacco and Related Products Regulations 2016 implement the EU Tobacco Products Directive (2014) in the UK and came into force on 20 May 2016.
2016	The Health (Miscellaneous Provisions) Act (Northern Ireland) 2016	The Health (Miscellaneous Provisions) Act (Northern Ireland) 2016 gives the Department of Health the power to prohibit the sale of e-cigarettes to persons under the age of 18 and by vending machines.
2017	Regulations Restricting the Age of Sale for Nicotine Inhaling Products to Over Eighteens	A consultation was conductted between September and October 2017. A consultation report was published July 2018. These regulations have not yet become legislation.
2018	Regulations restricting smoking in private vehicles when children are present	This piece of legislation has not been approved by the Northern Ireland Executive due to the dissolution of the Northern Ireland Assembly in January 2017.

3.2 Overview of main interventions

Sixteen systematic reviews relating to smoking prevention were identified. Interventions included school policies, family, community and school-based programmes, incentives, use of mass media, educational computer games, school curriculum and healthcare based programmes.

The following diagram illustrates how the evidence on smoking prevention has been categorised and has been designed to help navigate the review findings throughout this chapter.

Figure 2. Chart illustrating the categorisation of evidence relating to smoking prevention



3.3 Smoking prevention interventions

Within Chapters 3 to 5, a summary of each systematic review is provided and presented according to the outline in Figure 2.

Regulatory (environment)

Legislative

Papanastasiou et al. (2018) reviewed qualitative evidence relating to tobacco control legislation aimed at preventing smoking uptake among young people, including:

- smoke-free legislation
- restrictions on the age of sale of tobacco
- standardised packaging of tobacco products
- restrictions on smoking in cars
- policies to prevent illicit tobacco trade.

There was limited qualitative evidence exploring the impacts of tobacco control on youth smoking in Europe. It was not possible to determine from the evidence how and why young people may comply with, adapt, resist or circumvent tobacco control policies, and impact on uptake of smoking. There was no clear evidence on how age, gender, ethnicity, or socioeconomic status, country or social context influences smoking prevention.

School-based policies and programmes

A review by Galanti et al. (2013) examined the effectiveness of anti-tobacco policies in preventing smoking among high school pupils. The quality of the evidence was considered to be very low and therefore it was not possible to determine the extent to which anti-tobacco policies prevent smoking uptake among young people in the school setting. Promising elements included tobacco bans or restrictions, clear rules against tobacco use and consistent enforcement; these measures were more often associated with decreased likelihood of smoking or decreased smoking prevalence at school level.

The Republic of Ireland is part of a collaborative European project (EU SILNE-R[7]) examining the effectiveness of smoking prevention programmes delivered among young people. Among the national recommendations there were calls for strengthening the role of schools in smoking prevention and harnessing expertise and resources to support those working with young people in tobacco-related education (Hanafin and Clancy, 2018).

Thomas et al. (2013) reviewed school-based programmes for preventing smoking. Interventions included any curricula used in a school setting to deter tobacco use (see Table 3). The primary outcome was preventing young people from starting smoking. Studies were classified into three groups: 1. Pure prevention cohort; 2. Change in smoking behaviour over time; 3. Point prevalence of smoking. Findings from the 'pure prevention' cohort showed no overall significant effect, with only the combined social competence and social influences curricula delivering positive results, with one year or longer follow-up. Interventions delivered by adults were more effective in the longer-term than peer-led programmes. Additional booster sessions in subsequent years did not change outcomes.

In the 'pure prevention' cohort there was a significant reduction (12%) in starting smoking (measured at longest follow-up) compared to the control groups. However, no overall effect was detected at one year or less. Combined social competence and social influences interventions had a significant effect on smoking prevention at one year and at longest follow-up. Social influences programmes, multimodal interventions and those with an information-only approach were similarly ineffective. Although studies reporting 'Change in smoking behaviour over time' did not show an overall effect, there were positive findings for social competence and combined social competence and social influences interventions. Social competence and social influence are important dimensions of school-based smoking prevention prorgammes.

7. Enhancing the effectiveness of programs and strategies to prevent smoking by adolescents: a realist evaluation comparing seven European countries

Table 3. Description of school-based smoking prevention curricula interventions outlined in the review by Thomas et al. (2013)	
School-based smoking prevention curricula	
Information only curricula	Interventions that provide information to correct inaccurate perceptions regarding the prevalence of tobacco use and oppose inaccurate beliefs that smoking is socially acceptable.
Social competence curricula	Interventions that help adolescents refuse offers to smoke by improving their general personal and social skills. Interventions teach problem solving, decision-making, cognitive skills to resist personal or media influences, increase self-esteem, coping strategies for stress and assertiveness.
Social influence curricula	Interventions that endeavour to overcome social influences to use tobacco by teaching adolescents to be aware of social influences that encourage substance use, teach skills to resist offers of tobacco, and deal with peer pressure and high-risk situations that might persuade an adolescent directly to indirectly to smoke.
Combined social competence and social influences curricula	As above.
Multimodal curricula	Programmes in schools and the community, involving parents and community members, initiatives to change school or state and policies about tobacco sales and taxes, and to prevent sales to minors.
Other	School antismoking policies, motivations to smoke, classroom good behaviour.

Source: Thomas et al. (2013)

Thomas et al. (2015a) published a subsequent review and meta-analysis on the effectiveness of school-based smoking prevention curricula. Cluster randomised control trials (c-RCT) (follow-up of a year or less) demonstrated no significant effect. Positive results were observed for combined social competence and social influence curricula. A 12% reduction in smoking uptake over 1+ year was achieved.

Coppo et al. (2014) reviewed school-based policies that regulate tobacco use inside and/or outside school property. One c-RCT and 24 observational studies were identified. Results were limited by the number of studies and low methodological quality. The observational

studies found that despite having highly enforced policies, outdoor smoking bans, involvement of teachers, sanctions for non-adherence, as well as assistance for quitting, there was no significant difference in smoking prevalence when compared to schools with less robust or no policies. The intervention did not significantly affect students' smoking behaviour. The authors concluded that there was insufficient evidence that school tobacco policies are effective for the reduction of smoking initiation among young people.

A review by Waller et al. (2017) explored factors affecting the implementation of tobacco and substance use interventions within a secondary school setting. This review focused on studies which used a process evaluation or assessment of programme fidelity. Normalisation Process Theory (NPT) was used as a framework to identify facilitators and barriers of implementation. Factors affecting implementation included context, support and training and provider perceptions. It was also noted that studies should include reflexive monitoring[8] around the appraisal and evaluation processes of implementing new tobacco programmes.

Langford et al. (2014) assessed the effectiveness of the WHO's Health Promoting Schools (HPS) Framework for improving the health and wellbeing of students and their academic achievement.

The review included studies relating to nutrition, physical activity, tobacco, alcohol, sexual health, violence, mental health, handwashing, multiple risk behaviours, cycle helmet use, eating disorders, sun protection and oral health. Interventions (of any duration) were based on the HPS framework and included health promotion activities in the following areas:

- School curriculum;
- Ethos or environment of the school or both; and
- Engagement with families or communities or both.

Participants included children and young people aged 4 to 18 years attending schools or colleges (including special schools).

Of the 67 eligible studies, five studies focused specifically on preventing tobacco use among students; only two countries implemented a programme that met the HPS criteria. All studies used 'self-report' by students to assess tobacco use. The authors reported good evidence from tobacco only and multiple risk behaviour interventions as being effective in reducing smoking in school-aged children. Among studies that examined tobacco use only, students were 23% less likely to smoke at follow-up compared to students in control groups. Where tobacco was addressed along with other health outcomes in a multiple risk behaviours intervention, positive results were reported, but the effects were smaller than those reported for social competence curricula and combine social competence and social influences programmes. The authors also noted that seven multimodal programmes in the review by Thomas et al. (2013) which resembled the HPS programme were not found to be effective. Several study limitations were identified, including study design, sample size, follow-up and attrition.

Hefler et al. (2017) assessed the effectiveness of incentives on preventing children and young people (aged 5-18 years) from starting to smoke. Incentives were defined as any tangible benefit externally provided with the explicit intention of preventing smoking

8. Reflexive Monitoring is the appraisal work that people do to assess and understand the ways that a new set of practices affect them and others around them.

and included contests, competitions, incentive schemes, lotteries, raffles and contingent payments to reward not starting to smoke. Rewards were made to third parties (ie schools, healthcare providers or family members) as well as interventions that directly rewarded children and adolescents.

One study included biochemical assessment of smoking status; the remainder used self-report. 'Smoking at follow-up' varied between studies, ranging from daily, weekly and experimental to monthly and six-monthly measures of smoking status. Most of the studies in this review were trials of the 'Smokefree Class Competition'[9] (SFC) where there is a commitment by classes not to smoke for a six-month period. The authors concluded that overall, there was no high-quality evidence that incentives aimed at children and adolescents prevent smoking initiation in the long term. In particular, there was no statistically significant long-term effect on smoking initiation of the SFC intervention and any short-term success dissipated over time. There was some preliminary evidence that the SFC intervention may reduce the risk of progression to smoking among experimental smokers.

Although outside of the scope of this literature search, an evidence review was commissioned by the Public Health Agency in 2016. Murray (2016) examined the effectiveness of post-primary school-based tobacco prevention programmes by examining the individual components contributing to the effectiveness. There were similarities in the findings of this report and that of Murray (2016) in that social influence and combined social influence and social competence were identified as effective elements of smoking prevention programmes. Murray (2016) reported that key programme elements included delivery over 2-3 years and the inclusion of booster sessions. The evidence also pointed to the importance of adequate training for delivery agents.

The review has also considered findings from the of the most recent evaluations of the Smokebusters programme for primary school children. A review of the 2015 and 2018 evaluation reports found teachers considered tobacco use an important topic to address (over and above other health education topics) and were supportive of the programme. Teachers reported a high level of pupil interest in the programme, but children's negative attitudes to smoking lessened over time. Challenges in ensuring fidelity in programme delivery was cited in both reports, identifying the need for guidelines on delivery to enhance programme effectiveness (Public Health Agency, 2015, Wilmot and Gorman, 2018).

Family and community programmes

Thomas et al. (2015b) reviewed family-based programmes to prevent smoking among children and adolescents. Family-based interventions were defined as any components to change parenting behaviour, parental or sibling smoking behaviour, or family communication and interaction. For standalone interventions, a family-based intervention may reduce new smoking behaviour (including experiments or trying 'just a puff') by between 16 and 32%. The authors note that findings should be interpreted with caution given that effect estimates do not include data from all studies. Where family-based interventions were used as an adjunct to school-based interventions, the estimated reduction in new smoking behaviour was between 4 and 25%. The authors concluded that there was more evidence that high intensity programmes were more likely to be effective; a common feature of these programmes was encouraging authoritative parenting (interest in and care for the adolescent, often with rule setting).

9. A European school-based smoking prevention programme

Carson et al. (2012a) conducted a review of interventions for tobacco use prevention in indigenous youth in Native American Communities. No statistically significant differences were observed between intervention and control groups. The authors concluded there was a paucity of evidence relating to tobacco prevention initiatives in indigenous youth.

Rodriguez et al. (2014) reviewed serious educational computerised games (SEGs) about alcohol and other drugs for adolescents. The review sought to measure knowledge gained from participation in these games. One study examined the effect of SEGs on tobacco (among other drugs) and found significant increases in knowledge about drug abuse prevention, reduced frequency of smoking, drinking and marijuana use with greater effects demonstrated within the intervention group. Results from this study do not definitively suggest SEGs lead to smoking prevention.

A review by MacArthur et al. (2015) sought to identify particular intervention models or components that could be used as the basis for new programmes to prevent harm from substance use among young people in the UK. Thirteen studies were identified, using a range of approaches including cognitive behavioral therapy and social influences model to prevent or reduce smoking. Peer-led interventions appear to have a role in preventing tobacco use. Peer-led interventions for tobacco use were conducted in schools as part of the curriculum; it has been suggested by the authors that interventions in this particular setting may be appropriate. However, the quality of evidence included in this review was rated by the authors as low. MacArthur et al. (2015) identified the need for robust, rigorously conducted studies with longer-term follow-up in a range of settings.

Although outside of the search period for this review, the ASSIST (A Stop Smoking in Schools Trial) programme was rolled out to children aged 12-13 in 59 schools in 2002[10] in England and Wales as part of a randomized controlled trial. The 10-week programme involved peer supporters who undertook informal conversations with their peers when travelling to and from school, during break and lunch time and after school in their free time; conversations were logged in a simple pro-forma diary. The intervention also comprised four follow-up school visits by trainers to meet with peer supporters to provide support, trouble shooting and monitoring of peer supporters' diaries. The primary outcome measure was smoking prevalence. Results showed the ASSIST programme was effective achieving a sustained reduction in uptake of regular smoking in adolescents for 2 years after its delivery. There were several successful components of this intervention which are highlighted in the table below (Table 4). Based on the success of the trial, the authors concluded that if implemented on a UK-wide basis, this programme could potentially reduce the number of 14-15 year olds taking up regular smoking by 43,289 (Campbell et al., 2008).

10. Baseline data collected (Sept 20, 2001–Feb 12, 2002), immediately after the intervention (Jan 30, 2002–May 27, 2002), at 1-year follow-up (Nov 28, 2002–May 15, 2003), and at 2-year follow-up (Nov 18, 2003–May 12, 2004).

Table 4. Successful elements of the ASSIST (A Stop Smoking in Schools Trial) programme

Successful elements of the ASSIST programme
• Asking students rather than staff to name influential students seemed to aid the credibility of the peer supporters with their peer group • Use of external trainers rather than teachers to deliver the training programme • Delivery of training in venues outside of school was valued and appreciated by students and school staff • The intervention was underpinned by a theoretical approach that was proven to be effective when applied to other health-promotion domains other than smoking

Carson-Chahhoud et al. (2017) assessed the effects of mass media interventions on preventing smoking in young people, and whether it can reduce smoking uptake among young people (under 25 years), improve smoking attitudes, intentions and knowledge, improve self-efficacy/self-esteem, and improve perceptions about smoking, including the choice to follow positive role models. Common features in the successful campaigns included multiple channels for media delivery (eg newspapers, TV, radio, posters etc), combined school and media components, repeated exposure to campaign messages consecutively delivered for the same cohort of students over a three-year period. Two of the three successful campaigns were based on the 'social influences' or 'social learning theory' approach which incorporated the 'health belief model'[11]. The other successful campaign used provocative messages to prompt effective personal reactions. The authors concluded that whilst there is some evidence that media campaigns can be effective in preventing smoking uptake in young people, the evidence is not strong and contains methodological limitations and findings should be interpreted with caution.

Gould et al. (2013) summarised the evidence on culturally targeted anti-tobacco media messages for Indigenous populations. Studies evaluated anti-tobacco TV or radio campaigns, websites, mobile phone interventions, print media, CD-ROM, video and an edutainment intervention. Outcomes measured included cultural suitability, awareness and recall of the anti-tobacco message as well as attitudes and behaviour towards smoking and quitting. The review focused mainly on outcomes relating to cognition, awareness, recall, intention to quit and quit rates and included a study which examined outcomes relating to smoking prevention. This study used a soap opera-style drama interspersed with humorous vignettes and multimedia effects and incorporated cultural cues, mannerisms, dress, and values consistent with Asian and Pacific Islander youth culture. Evaluation of this intervention indicated that the drama influenced audience knowledge, attitudes and intended behaviour including future intention to smoke.

Healthcare setting

Peirson et al. (2016) examined evidence on the efficacy and harms of interventions to prevent and treat tobacco smoking in school-aged children and adolescents in primary healthcare or related settings. The study also examined evidence on child/youth/parent preferences for such interventions and child/youth preferences for being asked about personal smoking behaviours. The review was undertaken to inform the development of new guidelines on the prevention and treatment of tobacco smoking by school-aged children and adolescents by the Canadian Task Force on Preventive Health Care.

11. Health Belief Model focuses on cognitive factors that motivate healthy behaviour (Becker 1974 and Rossenstock et al., 1988).

Moderate quality evidence suggested targeted behavioural interventions in primary care settings can prevent smoking among school-aged children and youth; pooled data from seven studies showed that intervention participants were 18% less likely to initiate smoking at least six months post intervention. Findings of the studies which showed a significant effect are summarised in Table 5. The authors concluded that targeted behavioural interventions can reduce the likelihood of young people from trying or taking up smoking and can assist those have already started to quit, without any reported harms. However, the authors acknowledged that the evidence does not provide clarity regarding the long-term impact of these interventions in preventing smoking during adulthood.

Table 5. Description of behavioural based interventions effective in preventing smoking uptake.

Study	Fidler et al., 2001	Hollis et al., 2005
Intervention components	Education/information (information sheets addressing smoking related topics, dangers and health risks from smoking; posters; certificates of non-smoking status)	Education/information, counselling/ advice, motivational interviewing, boosters (primary care professionals deliver a 30-60 second message about not starting smoking; multi-media, interactive computer programme assesses stage of readiness to begin smoking then delivers tailored advice and encouragement; brief motivational counselling sessions with health counsellors).
Mode of delivery	Printed materials, postal delivery	Face-to-face and phone interactions, multi-media interactive computer programme and printed materials.

A systematic review for the US Preventive Services Task Force examined interventions to prevent smoking uptake or encourage cessation among children or adolescents (Patnode et al., 2012). Primary care interventions comprised face-to-face, print and telephone advice as well as family involvement and time spent interacting with a healthcare provider. Collective results from nine out of the ten studies examining smoking initiation demonstrated a 19% reduced relative risk of smoking uptake at 6 to 36 months follow-up. Two trials showed effects beyond 12 months; a study by Hollis et al. (2005) (see Table 5) found the intervention significantly reduced smoking initiation among non-smokers at 12 months, but the prevention effect was no longer statistically significant after two years.

The authors concluded that primary care interventions among children and adolescents can have small, positive effects on smoking initiation among children and adolescents who have not yet become regular smokers. In addition, health care settings provide an opportunity to reach children and adolescents who are at risk of initiating tobacco use as well as those who have already begun experimenting with, or are regular users of, tobacco products.

3.4 Summary of evidence

The evidence from smoking prevention studies has been drawn mainly from school, family/ community and healthcare-based interventions with children and young people as the primary target group. Table 6 provides an overview of the evidence for preventing uptake of smoking among children and young people.

Table 6. Summary of the effectiveness of interventions designed to prevent smoking initiation among children and young people

Intervention	Outcome	Outcome Type (end/ proximal)	Results	Reference
School-based anti-tobacco policies	Prevention of smoking uptake	E	Decreased likelihood of smoking or decreased smoking prevalence at school level.	Galanti et al. (2013)
School-based programmes	Prevention of smoking uptake	E	Pure prevention studies (social competence) with 1+ year follow-up prevented smoking uptake among the intervention group. Interventions delivered by adults were more effective in preventing smoking uptake than peer-led programmes.	Thomas et al. (2013)
			Adding booster sessions in subsequent years did not change outcomes.	

Incentives for smoking prevention (most studies used Smoke-free Class Competiton (SFC)).	Prevention of smoking uptake	E	There was no high-quality evidence that incentives prevented smoking initiation in the long term. There was no significant long-term effect from the SFC.	Hefler et al. (2017)
Community-based interventions with indigenous youth in native American Communities	Prevention of smoking uptake	E	Paucity of evidence relating to tobacco prevention initiatives in indigenous youth.	Carson et al. (2012a)
School-based policies to regulate tobacco use inside outside school property.	Reduction of smoking initiation	E	Insufficient evidence that school tobacco control policies are effective for reduction of smoking initiation.	Coppo et al. (2014)
Serious educational computerised games	Prevention of smoking uptake	E	Results do not definitely suggest SEGs lead to smoking prevention.	Rodriguez et al. (2014)
School-based prevention smoking curricula	Prevention of smoking uptake	E	12% reduction in smoking uptake over 1+year	Thomas et al. (2015a)

Family based progammes (change in parenting behaviour, parental or sibling smoking behaviour, or family communication or interaction.	Prevention of smoking uptake	E	Standalone family-based intervention may reduce new smoking behaviour by 16 to 32%.	Thomas et al. (2015b)
Mass media (TV, radio, newspapers, billboards, posters, leaflets and booklets)	Prevention of smoking uptake	E	There is some evidence that mass media can be effective in preventing smoking uptakes; there are methodological limitations.	Carson-Chahhoud et al. (2017)
Programme fidelity of interventions within secondary school setting	Prevention of smoking uptake	P	Factors affecting implementation included context, support, training and trainer perceptions.	Waller et al. (2017)
Development of guidelines on prevention and treatment of tobacco use.	Prevention of smoking uptake	E	Targeted interventions on healthcare settings can prevent smoking with participants 18% less likely to initiate smoking.	Peirson et al. (2016)
Smoke-free legislation	Prevention of smoking uptake	E	Limited qualitative evidence exploring the impacts of tobacco control on youth smoking in Europe.	Papanastasiou et al. (2018)

Primary care interventions: face-to-face, print and telephone advice; family involvement and interaction with healthcare professional	Prevent uptake and encourage cessation of smoking	E	Primary care based interventions can have small, positive effects on smoking initiation among children and young people who have not yet become regular smokers.	Patnode et al. (2012)
Health Promoting Schools Framework	Prevention of smoking uptake	E	Positive effects were noted in several health promotion domains including tobacco use, with students 23% less likely to smoke.	Langford et al. (2014)
Identification of intervention models or components that could be used as the basis for prevention programmes among young people	Prevention of smoking uptake	E	Peer-led interventions have a role to play in preventing tobacco use. Evidence was rated as low quality.	MacArthur et al. (2015)

3.5 Conclusions

Evidence on fewer people starting to smoke

School-based policies and programmes

There is limited evidence that school-based tobacco control policies are effective in preventing the uptake of smoking among young people. The critical components of effective school-based policies appear to be comprehensive whole school approaches that incorporate school-based tobacco control policies or restrictions, clear rules and consistent enforcement.

- Implementation of tobacco control policies in schools are influenced by context, training and support as well as perceptions of programme providers.
- Curriculum based interventions appear to be more effective in preventing smoking uptake among young people, particularly those with a focus on problem solving, decision making and coping strategies (social competence) as well as dealing with peer pressure and developing skills to resist offers of tobacco (social influence).
- There was a lack of high-quality evidence about the effectiveness of incentives aimed at children and adolescents for preventing smoking uptake. Preliminary evidence from the Smokefree Class Competition[12] suggested a reduced risk of progression from experimental to regular smoking.
- There was a lack of high-quality evidence about the effectiveness of incentives aimed at children and adolescents for preventing smoking uptake. Preliminary evidence from the Smokefree Class Competition suggested a reduced risk of progression from experimental to regular smoking.
- The WHO Health Promoting Schools programme reported a positive effect on smoking prevention. However, study limitations exist, including sample size, post-intervention follow-up and socio-demographic impacts.
- Peer-led interventions may have some role in preventing uptake of smoking.

Family and community programmes

- Stand-alone family-based interventions[13] (and as adjunct to school-based programmes) were shown to be effective in helping prevent uptake of smoking among young people.
- Family-based interventions, with an encouraging authoritative parenting style, were effective in reducing the likelihood of young people starting smoking.
- There is insufficient evidence to draw any conclusions on the role of educational computer games in preventing smoking among young people.
- Successful mass media campaigns were based on the 'social influences' or 'social learning theory' and used provocative messages to prompt effective personal reactions. Mass media campaigns can be effective in preventing smoking uptake in young people, but there are substantial methodological challenges in assessing the impact of broad population level approaches like mass media public awareness campaigns on smoking prevention.

12. A European school-based smoking prevention programme.
13. Family-based interventions could include any components to change parenting behaviour, parental of sibling smoking behaviour, or family communication or interaction.

Healthcare based interventions

- Behavioural interventions delivered through primary care settings can be effective in preventing smoking uptake, but the long-term impact is unclear.
- Face-to-face, print and telephone advice provided in primary care, was shown to be effective in reducing smoking initiation up to three years after the intervention in children and young people who have not yet become regular smokers. Effect sizes were comparable with school-based programmes.

Regulatory and legislative measures

- Significant legislative developments introduced in the context of the current Strategy include increased tobacco taxation, removal of vending machines, standardised tobacco packaging and bans on point of sale display. These non-devolved legislative approaches were not examined in detail in the review but are significant in reducing the appeal, accessibility and affordability of tobacco products to children.
- Evidence from the introduction of more recent measures such as standardised tobacco packaging and limiting point of sale display are not yet well described in the review level literature.
- Legislative changes introduced under previous tobacco control strategies remain an important consideration in terms of legacy effects. Notably, restrictions on age of sale, advertising and smoke-free workplaces and public places are important levers in reducing the appeal and accessibility of tobacco products.
- Access to tobacco products is a key driver of consumption; policies to restrict access, particularly among young people, are critical in preventing uptake of smoking.
- Early evidence on legislation restricting smoking in cars where children are present suggest benefits in terms of partial protection from second-hand smoke and increased awareness among parents. There is no evidence to date that this legislation has helped prevent uptake of smoking among children.
- Use of other drugs including alcohol and cannabis are significant considerations in smoking prevention, but there is no clear guidance on how to address these in prevention efforts.

4 Evidence – More smokers quitting

Evidence – More smokers quitting

4.1 General Commentary

The largest body of evidence in this review relates to smoking cessation. Under the direction of the Department of Health, the literature search focused on evidence relating to smoking cessation published within the Cochrane Library. Cochrane Reviews are a key informant of UK policy decisions with regards to public health and the development of NICE guidelines which informs service delivery across health and social care in Northern Ireland.

In the Republic of Ireland, the Health Service Executive is currently preparing new clinical guidelines on the treatment of tobacco addiction. These guidelines are expected to be presented for consultation in 2020.

In March 2018, the National Institute for Health and Care Excellence published new guidance on stop smoking interventions and services (NG92) (NICE, 2018). This guideline updates and replaces NICE guidelines PH1 (March 2006) and PH10 (February 2008). The Department of Health in Northern Ireland has reviewed NG92 and has formally considered it for applicability in Northern Ireland. In July 2018, the Department of Health issued a circular to all health and social care services stating that all recommendations in 'NG92 - Stop smoking interventions and services' are to be taken into account in designing and delivering services which covers stop smoking interventions and services delivered in primary care and community settings for everyone over the age of 12.

The implementation of the new guideline is the responsibility of various health and social care agencies in Northern Ireland. The Department of Health has set out how these agencies should move forward with the new guideline:

- The Health and Social Care Board/ Public Health Agency should identify a Professional Lead who will consider the commissioning implications of the NG92 and co-ordinate with any other relevant commissioning teams.
- The Public Health Agency is required to identify other relevant stakeholders and networks with which they must disseminate details of NG92.
- The Health and Social Care Board has responsibility for ensuing the guidance is disseminated to GPs.
- Health and Social Care Trusts will proceed with targeted dissemination, agree a clinical/ management lead to coordinate implementation and consider what has to be done to achieve implementation using a risk-based assessment and baseline review as appropriate to support planning.
- The Regulation and Quality Improvement Authority will disseminate the guideline to the independent sector as appropriate.
- Health and Social Care special agencies and Non-Departmental Public Bodies will take account of this Guideline in training and other developments as appropriate.

The Department of Health has stipulated various timeframes in which elements of the dissemination and implementation of the guideline must be undertaken. In July 2018, a 12-month period was allocated for full implementation the guideline.

This section of the report demonstrates the way in which evidence has been reviewed to inform the development of NG92.

The NICE guidance focuses primarily on what works in terms of smoking cessation interventions. It does not identify ineffective approaches to smoking cessation, nor does it explore what works for particular groups, such as children and young people and those living in disadvantaged communities. In this report the review team identified interventions which have not been effective (see Appendix) as well as highlighting the most effective approaches for specific population groups. In this way, the NG92 and this evidence review are complementary. This review has sought to consider the evidence in terms of effective tobacco control interventions based on the objectives and priorities of the Ten Year Tobacco Control Strategy as opposed to considering the evidence for all population groups.

It is important to note that the evidence does not include e-cigarette usage as set out in the methods chapter.

4.2 Overview of main interventions

The following diagram (Figure 3) illustrates how the evidence on smoking cessation has been categorised in this chapter. Table 7 provides a description of the type of interventions reviewed.

Figure 3. Chart illustrating categorisation of evidence relating to smoking cessation.

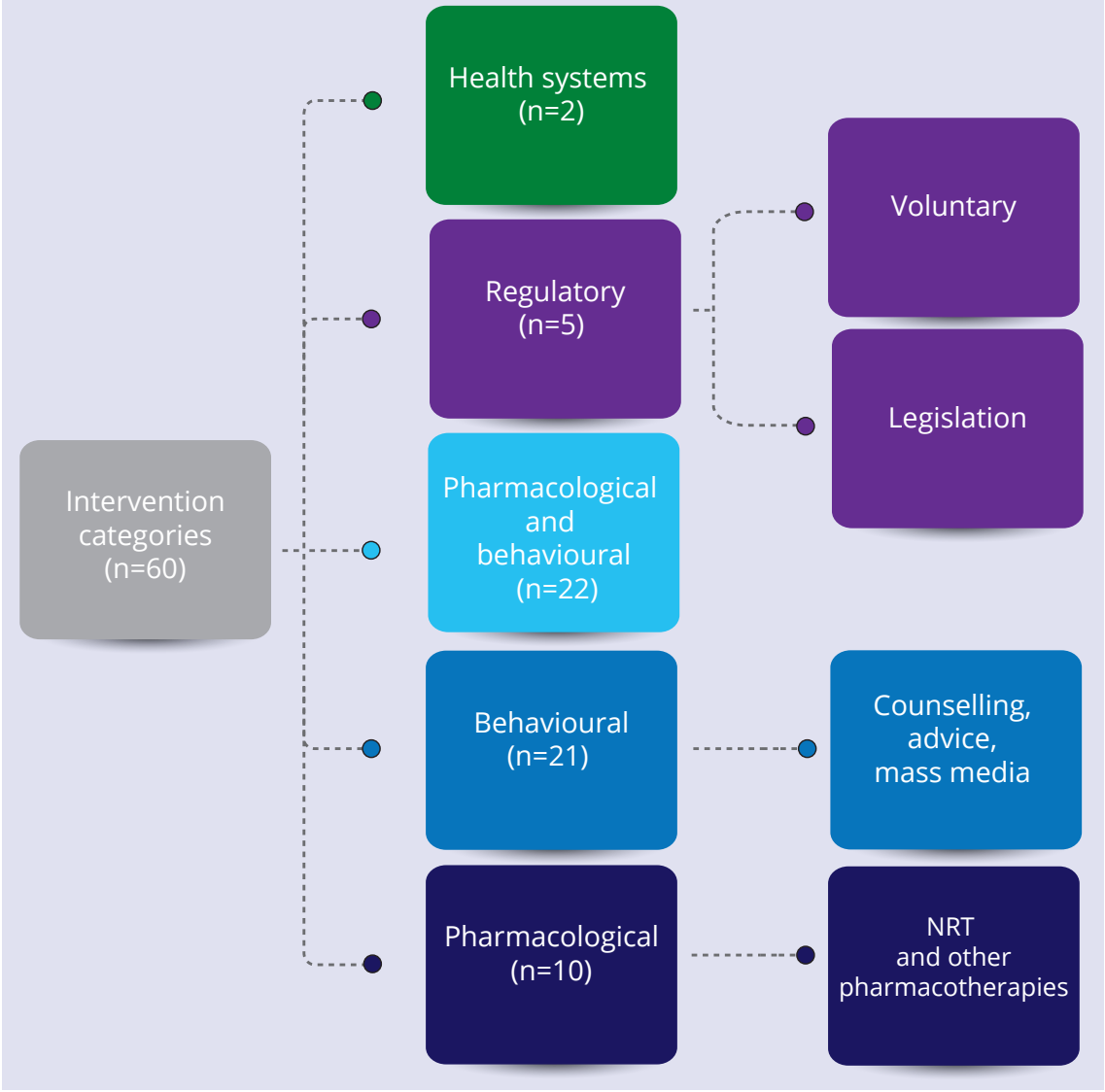


Table 7. Categorisation of smoking cessation interventions	
Categorisation of smoking cessation interventions	
Pharmacological only	Reviews discussed in this section cover several pharmacological interventions used in smoking cessation. The main therapies include nicotine replacement therapy, bupropion, varenicline and cytisine.
Behavioural approaches only	Multiple behavioural approaches were identified in the review and include approaches such as counselling (individual and group), psychosocial support programmes, cognitive behavioural therapy, brief advice by healthcare professionals, self-help materials, telephone/mobile phone support (including quitlines), incentives, mass media, motivational interviewing, and health system changes. This is not a definitive list but rather gives an overview of the types of behavioural approaches used in smoking cessation. Full details are provided in relation to each individual review.
Combined pharmacological and behavioural approaches	Reviews in this section report on a combination of pharmacological and behavioural approaches as defined above.
Legislative / regulatory approaches	Two reviews were identified in this category. The first relates to tobacco packaging design as an approach to reducing tobacco use; the second review relates to portion and package size and the effect on tobacco consumption.

4.3 Pharmacological interventions

This section provides an overview of the evidence on pharmacological therapies only used for smoking cessation. Ten Cochrane reviews were published between January 2012 and June 2018. In addition, two annual updates were published by the Cochrane Tobacco Addiction Group (Hartmann-Boyce et al., 2013, Hartmann-Boyce et al., 2014b).

This section covers pharmacological interventions used in smoking cessation; the main therapies include nicotine replacement therapy (NRT), bupropion, varenicline and cytisine[14]. The reviews report on one or a combination of therapies.

A review by Hollands et al. (2015a) assessed the effectiveness of interventions to increase adherence to medications for smoking cessation such as nicotine replacement therapy (NRT), bupropion, nortriptyline and varenicline (and combination regimes) among adults

14. Not licensed for use in UK

aged 18+ in comparison to control groups which received standard care. The review also sought to determine which interventions were most effective; the impact of interventions on potential precursors to adherence; and evaluate key outcomes influenced by prior adherence, principally smoking cessation.

Interventions typically provided additional information on the rationale for and emphasised the importance of, adherence to medication, and supported the development of strategies to overcome problems with maintaining adherence. In the control studies, behavioural support was provided in the form of a single 20-minute session up to seven weekly sessions. NRT was used in five studies, bupropion was used in two studies and varenicline in one study. Evidence suggests that adherence interventions may lead to a modest improvement in the proportion of participants achieving a specified satisfactory level of adherence (as measured by whether adherence was achieved or not achieved) and a small effect on aggregate levels of adherence (percentage medication consumed/ number of days medication consumed). In terms of NRT, the evidence suggests a 'dose response' relationship and that high levels of NRT are better than low levels in achieving smoking cessation. There was some evidence that adherence interventions led to improvements in smoking cessation, with the effects more pronounced at six-months or longer follow-up. The overall quality of evidence was moderate to low and there was a small number of interventions which were similar in nature therefore it was not possible to determine whether different types of intervention were more effective than others.

Schuit et al. (2017) assessed whether smoking cessation rates varied by genetically informed biomarkers using different pharmacological treatments. Data from 18 randomised controlled trials did not reveal any differential treatment effects of NRT, bupropion, varenicline and various combinations of these medications on genotype.

Hartmann-Boyce et al. (2018) undertook a review of the effectiveness and safety of NRT compared to placebo or 'no NRT' interventions. Most participants in the studies were adults who smoked at least 15 cigarettes per day. The evidence was high quality. The authors concluded that all forms of licensed NRT (gum, transdermal patch, nasal spray, inhibitor and sublingual tablets/lozenges) significantly increased the rate of smoking cessation compared to placebo or no NRT. There was a 55% greater chance of successfully quitting smoking with NRT compared to the control. The authors noted there was little evidence for individuals smoking 10 to 15 cigarettes per day.

Intensity of support, methodology or trial design did not influence the NRT effect. Similarly, there was no difference in the effect of NRT on participants with different recruitment settings and treatment. That said, participants recruited in primary care settings typically had lower-intensity support. In terms of gender differences, the authors concluded that there is insufficient evidence of clinically important differences between men and women to guide treatment matching. Although there is evidence that end-of-treatment rates may be quite high, many smokers relapse after the end of treatment. There was no way of distinguishing between those who had failed to quit using NRT and those had quit successfully but relapsed.

This review also examined the effects of NRT among pregnant women. At the closest follow-up to the end of pregnancy, there was a statistically significant benefit of using NRT consistent with a review by Coleman et al. (2015) (see Section 4.5). There was also evidence of that NRT offered some benefit to women at longest follow-up post-partum, but this finding was not significant. The evidence presented by Hartmann-Boyce et al. (2018) makes limited reference to the use of NRT among pregnant women, but rather, refers

to the review by Coleman et al. (2015) which provides comprehensive evidence on the effectiveness of NRT in pregnancy.

For the general population, Hartmann-Boyce et al. (2018) concluded that the form of NRT used is unrelated to its effectiveness, therefore personal preference, availability or cost might determine the form of NRT used. It was also reported that it is unlikely that additional support offered any additional benefit in facilitating smoking cessation.

Cahill et al. (2016) reviewed the evidence relating to the efficacy of nicotine receptor partial agonists[15], including cytisine[16], varenicline and dianicline[17] for smoking cessation. Smoking abstinence was measured at longest follow-up and where possible and biochemically verified cessation rates were used.

Cytisine

Two trials using cytisine found more participants stopped smoking at longest follow-up when taking cytisine compared to the placebo (RR 3.98; low quality evidence). One study comparing cytisine and NRT found cytisine to be beneficial for smoking cessation at six months (RR 1.43), with continuous abstinence rates of 21.8% and 15.3% respectively. Cytisine did not have any more adverse effects than control trials.

Varenicline

Thirty-nine studies examined the effectiveness of varenicline compared to placebo, bupropion and NRT as well as dosage effects and usage among disease-specific subgroups. When compared with placebo, varenicline increases the chances of smoking cessation two- to three-fold; long term use (24 and 52 weeks) demonstrated varenicline to be effective when compared with placebo, without an increase in adverse or serious adverse events. In five studies, varenicline was shown to be more effective than bupropion in increasing the likelihood of quitting. Similarly, eight studies found varenicline to have a modest, but clear benefit over nicotine patches. The most reported side effect of varenicline was nausea, which subsided over time. There was a 25% increase in the chance of experiencing a serious adverse effect[18] among people using varenicline during or after active treatment. More smokers successful quit smoking with varenicline compared to bupropion or NRT, with some evidence that varenicline may have a role to play in relapse prevention. In the past, concerns have been raised about varenicline and adverse psychiatric events in people without a history of psychiatric disorders; evidence from this review does not confirm a causal link between varenicline and neuropsychiatric disorders (including suicidal ideation and suicide behaviour). The evidence is less well established for people with past or current psychiatric disorders.

Hartmann-Boyce et al. (2013) produced an overview of new and updated reviews from the Cochrane Tobacco Addiction Group published in 2012. Seven new reviews and 13 updated reviews were published in 2012. Of these 20 reviews, five were identified through the database searches as pharmacotherapy only based interventions. The summarised Cochrane findings noted that currently three pharmacotherapies are licensed to aid smoking cessation: nicotine replacement therapy, varenicline and bupropion. Cytisine and nortriptlyine are licensed for use in several countries but are not licensed as smoking cessation medications in the UK. Earlier Cochrane reviews found these therapies, as well other medications (including anxiolytes, opioid antagonists and other antidepressants) be effective aids to smoking cessation. One additional review by Hartmann-Boyce et al. (2012)

15. Nicotine receptor partial agonists may help people to stop smoking by a combination of maintaining moderate levels of dopamine to counteract withdrawal symptoms (acting as an agonist) and reducing smoking satisfaction (acting as an antagonist).
16. Not licensed for use in the UK
17. Dianicline is no longer in development therefore results are not presented for this medication.
18. These events include comorbidities such as infections, cancers and injuries, and most were considered to be unrelated to the treatments.

assessed the efficacy of nicotine vaccines for smoking cessation and for relapse prevention, as well as the frequency and type of adverse events associated with the use of nicotine vaccines. Whilst nicotine vaccines were not licensed for use at the time of this review, the hypothesis is that nicotine vaccines may help people to stop smoking or to prevent relapse by reducing the amount of nicotine reaching the brain when a person smokes. None of the studies in this review found a statistically significant difference in long-term smoking cessation between those receiving the vaccine and those receiving placebo. Two studies reported higher quit rates in those with higher levels of nicotine antibodies. Rates of adverse effects were low. An updated review of silver acetate for smoking cessation included no new studies and the conclusions remained unchanged in that there was no evidence that this medication aided long-term smoking cessation (Lancaster and Stead, 2012).

Hartmann-Boyce et al. (2014b) published a subsequent update in 2014 covering new and updated reviews by the Cochrane Tobacco Addiction Group from 2013. In 2013, the Group published two new reviews and updated 11 others. The new reviews included work by Cahill et al. (2013) (Pharmacological interventions for smoking cessation: an overview and network meta-analysis) and van der Meer et al. (2013) (Smoking cessation interventions for smokers with current or past depression)[19]. The review by Cahill et al. (2013) included a wide range of pharmacotherapies for smoking cessation; in particular the network meta-analysis covered three licensed treatments: NRT (in single and combine forms), varenicline (nicotine receptor agonist) and bupropion (antidepressant). The network meta-analysis[20] of these three treatments all were associated with increased likelihood of quitting smoking compared to the placebo. Single forms of NRT and bupropion were found to equally effective and varenicline was found to superior to both. Whilst significant differences were not detected between combination NRT and varenicline; combination NRT was found to be more effective than bupropion and single forms of NRT. In relation to serious adverse events from these treatments, NRT was not associated with an increase in serious adverse events; no excess in neuropsychiatric or cardiovascular events was found in trial of bupropion, nor was an excess detected among those taking varenicline.

Other treatments were found to increase the chances of quitting smoking, but there are concerns about two of the three of these treatments. Cytisine was found to significantly increase quit rates compared to the control, with no evidence of serious adverse events; nortriptyline (antidepressant) was also associated with significantly higher quit rates but may be linked to an increase in serious adverse events. Clonidine also increased quit rates, but side effects were reported. Mecamylamine and NRT combined may increase smoking cessation, but the evidence is inconclusive.

This overview also summarised evidence from the review by Hughes et al. (2014) which looked at the use of antidepressants for smoking cessation. Twenty-four new studies were added to this review and included the following treatments: bupropion, selegiline, St John's Wort, nortripyline, fluoxetine and the dietary supplement S-Adenosyl-L-Methionine (SAMe). There was high quality evidence surrounding the efficacy of bupropion and moderate quality evidence for the efficacy of nortriptyline compared to the placebo/control. Whilst there was evidence effectiveness as a sole pharmacotherapy, there was insufficient evidence to determine if antidepressants increased quite rates when used in conjunction with NRT. The authors also examined the effects of antidepressants on serious adverse events. A marginal and statistically non-significant excess of serious adverse events was

19. Findings from this review will be discussed in Section 4.4 in the context of behavioural interventions for smoking cessation.
20. Takes into account direct and indirect comparisons of the treatments.

detected when bupropion was used for smoking cessation; no serious adverse events occurred during treatment with nortriptyline.

A review by David et al. (2013) examined the use of opioid antagonists for smoking cessation and found the treatment naltrexone had no effect on smoking cessation regardless of whether the treatment was used a sole medication or in addition to NRT.

White et al. (2014) sought to determine the effectiveness of acupuncture and related interventions of acupressure, laser therapy and electro-stimulation in smoking cessation in comparison with no intervention, sham (placebo) treatment or other interventions. This review has been grouped along with other pharmacological interventions as it represents a physical intervention for the smoker. All acupuncture studies used a traditional approach to acupuncture in choosing points nominated for smoking cessation (five studies used facial acupuncture and ten used auricular acupuncture alone). A further five studies used acupressure alone, three used laser therapy and seven studies used various forms of electro-stimulation. All studies used a traditional Chinese acupuncture approach in regarding the point location of stimulation as significant and regarding non-acupuncture points as a control intervention.

The key findings from this review are as follows:

Table 8. Key findings from a review of acupuncture and related interventions of acupressure, laser therapy and electro-stimulation for smoking cessation

Findings related to interventions of acupressure, laser therapy and electro-stimulation
• Inconsistent evidence as to the effectiveness of acupuncture for smoking cessation compared with no intervention. • No evidence that acupuncture was no more or less effective than behavioural interventions used for smoking cessation. • The combined results of two large studies found acupuncture less effective than NRT (in one study acupuncture was only administered on one occasion which may have been insufficient). • There was evidence of the efficacy of acupuncture compared with sham acupuncture immediately after the intervention, however there was no effect at long-term follow-up. • Continuous stimulation offered promising results (either acupuncture or acupressure when compared with sham stimulation), but no long-term effects were reported. • Evidence relating to the effectiveness of acupressure is inconsistent. • In one study, laser stimulation was strongly associated with positive short and long-term outcomes; however, these results do not support findings from two other studies due to differences in participant numbers and dosage. • There was no evidence that electro-stimulation was effective in smoking cessation.

The authors concluded there is no consistent evidence that acupuncture, acupressure, laser stimulation or electro-stimulation are effective interventions for smoking cessation.

Summary of evidence relating to pharmacological interventions

Table 9. Summary of evidence relating to pharmacological interventions used in smoking cessation

Intervention	Outcome	Outcome Type (end/ proximal)	Results	Reference
Enhanced compliance with medications	Quit success/ failure	E	Modest improvement in quit rate.	Hollands et al. (2015a)
Nicotine replacement therapy (NRT) compared to placebo or 'no NRT' interventions	Quit success/ failure	E	Significant improvement in quit rate for those smoking 15 or more cigarettes per day. No improvement in quit rate for those smoking less than 15 a day. All forms of licensed NRT significantly increased the rate of smoking cessation.	Hartmann-Boyce et al. (2018)
NRT (in single and combine forms), varenicline (nicotine receptor agonist) and bupropion (antidepressant).	Quit success/ failure	E	Significant improvement in quit rate compared to placebo.	Cahill et al. (2013)

			Single forms of NRT and bupropion equally effective and varenicline superior to both. Combination NRT and varenicline equally effective. Combination NRT more effective than bupropion and single forms of NRT.	Cahill et al. (2013)
Nicotine receptor partial agonists[21], including varenicline and cytisine	Quit success/ failure	E	Significant improvement in quit rate with varenicline compared to bupropion or NRT.	Cahill et al. (2016)
Nicotine receptor partial agonists, including varenicline and cytisine	Relapse prevention	E	Limited evidence suggests varenicline may have a role to play in relapse prevention.	Cahill et al. (2016)
Nicotine vaccines	Quit success/ failure	E	No improvement in quit rate.	Hartmann-Boyce et al. (2012)
Nicotine vaccines	Relapse prevention	E	No effect.	Hartmann-Boyce et al. (2012)
Silver acetate	Quit success/ failure	E	No improvement in quit rate.	Lancaster and Stead (2012)

21. Nicotine receptor partial agonists may help people to stop smoking by a combination of maintaining moderate levels of dopamine to counteract withdrawal symptoms (acting as an agonist) and reducing smoking satisfaction (acting as an antagonist).

Additional information on the importance of adherence to medication and supportive strategies for maintaining adherence	Compliance with medication	P	Modest improvement in compliance.	Hollands et al. (2015a)
Effectiveness of acupuncture and related interventions of acupressure, laser therapy and electro-stimulation in smoking cessation	Quit success/ failure	E	No bias-free, consistent evidence that acupuncture, acupressure, laser stimulation or electro-stimulation is effective interventions for smoking cessation.	White et al. (2014)

Conclusions

Evidence on more smokers quitting (Pharmacological approaches)

Effective smoking cessation agents

- Evidence from high quality studies, found all forms of Nicotine Replacement Therapy (NRT) (gum, transdermal patch, nasal spray, inhibitor and sublingual tablets/lozenges) significantly increased smoking cessation for those smoking at least 15 cigarettes a day.
- There was evidence to suggest that effectiveness of NRT is dose dependent with higher doses of NRT more effective than lower doses.
- There was some evidence that adherence to NRT interventions led to improvements in smoking cessation, with the effects more pronounced at six-months or longer follow-up.
- Varenicline was shown to be effective in smoking cessation and to some extent in relapse prevention.
- Single forms of NRT and bupropion were found to be equally effective for smoking cessation with varenicline found to be superior to both. Combination NRT was found to be more effective than bupropion and single forms of NRT.

Non-effective smoking cessation agents

- Pharmacological agents showing no effect on smoking quit rates include nicotine vaccines, silver acetate and opioid antagonists (ie naltrexone).
- There was no consistent evidence to support the effectiveness of acupuncture, acupressure, laser stimulation or electro-stimulation for smoking cessation.

Insufficient evidence

- There is some evidence that different genotypes and ethnic groups may react differently to pharmacological supports to quitting, but there is not enough evidence to guide clinical practice.
- There was insufficient evidence to determine if antidepressants increased quit rates when used in conjunction with NRT.

4.4 Behavioural interventions

Behavioural interventions comprise several different measures, delivered either individually or collectively. There are challenges in the interpretation of the evidence on behavioural interventions in that the interventions are often poorly described and delineated from each other.

Bize et al. (2012) undertook a review of evidence to determine the efficacy of biomedical risk assessment provided in addition to counselling, as an aid to smoking cessation. Studies included any intervention in which a physical measurement, such as exhaled carbon monoxide (CO), spirometry[22], atherosclerotic plaque imaging or genetic testing, was used as a way to increase motivation to quit either on its own or as an adjunct to another intervention such as counselling and the control group received all the components except for the reporting of such measurements. The main outcome measure was abstinence from smoking measured six months after the start of the intervention. Of the 15 studies included in the review, only two pairs of studies were sufficiently homogenous to pool the results. Results were pooled for carbon monoxide measurement in primary care (RR 1.06) and spirometry in primary care (RR 1.18) demonstrating an increase in smoking cessation rates. Of the remaining 11 studies, two studies detected statistically significant benefits:

- Spirometry in primary care detected a significant benefit in lung age feedback;
- Ultrasonography of carotid and femoral arteries detected a significant benefit, but participants were light smokers and so the study was judged to be at unclear risk of bias.

The authors concluded that there is limited good quality evidence to make definitive statements about the effectiveness of biomedical risk assessment as an aid for smoking cessation.

Nabhan and Aflaifel (2015) compared high feedback[23] versus low feedback[24] during prenatal ultrasound for reducing maternal anxiety and improving maternal health behaviours. The primary outcome measure in this review was maternal anxiety; secondary

22. Spirometry is a simple test used to help diagnose and monitor certain lung conditions by measuring how much air is inhaled and the rate at which it is exhaled.

outcome measures included cessation from alcohol and smoking and women's views of level of feedback. Only one study reported on the level of feedback on smoking cessation. Women who received high feedback during ultrasound were more likely to stop smoking during pregnancy (RR 2.95). There were a number of limitations within this review including low quality evidence and small sample size. The authors concluded that there was insufficient evidence to support high or low feedback during ultrasound scan in pregnancy to have a favourable influence on maternity anxiety or health behaviours during pregnancy.

A review by Cahill et al. (2015) assessed whether incentives and contingency management programmes[25] led to higher long-term smoking-cessation rates. This review included incentive schemes, lotteries, raffles and contingent[26] or non-contingent[27] payments to reward cessation and abstinence in smoking cessation programmes. The primary outcome measure was smoking cessation rates including point prevalence and sustained abstinence. Secondary outcomes included adverse effects or unintended consequences. Around half of the studies were conducted in clinics or health centres. Other settings included community, academic institutions and workplaces. This review also included nine trials conducted with pregnant smokers. The results from this review are presented according to population group:

Mixed population

Two of the most robust studies were conducted among the employees of large American companies (n=3,416). Participants were predominantly white with high levels of education and income. For these reasons the authors cautioned that the results may not be generalisable to other populations of mixed ethnicity, geography and socioeconomic status. The review included three studies which suggested that incentives can improve long-term smoking cessation whether conducted in healthcare setting, community or workplace. The largest of these studies (Halpren, 2015) provided strong evidence that substantial financial rewards (USD 800 for sustained abstinence at six months) delivered significantly higher quit rates than usual care; the same result was achieved for study-funded rewards and for rewards partly funded by the participants through a deposit-based scheme, however, the latter did not reach statistical significance at 12 months (longest follow-up). In a study by Volpp (2009) the incentivised group maintained a higher quit rate than the control group at six months. The authors have qualified these findings by stating that quit rates such as those achieved through incentivised schemes may only work in communities or situations where smoking cessation services are well resourced and high functioning. Although positive results emerged from this trial, negative feedback from employees and reluctance from the finance department to take on the scheme resulted in the incentive scheme being replaced with an annual surcharge being imposed on continuing smokers. One further study by White (2013) used community-based health workers to support smokers to quit in a region of Thai villages, using a deposit-refund intervention. Despite notable success at six months (44.3% in intervention group compared to 18.8% in control group) it has been suggested that these quit rates might represent 'easy quitters' and the findings are not readily generalisable to areas with longstanding,

23. High feedback is when women can see the monitor screen and receive visual and verbal explanations.
24. Low feedback was defined as women cannot see the monitor screen and are given a summary statement of the scan.
25. Contingency management (CM) is a type of treatment in which clients are rewarded (or, less often, punished) for their behavior, generally, for adherence to (or failure to adhere) to program rules and regulations or their treatment plan (Petry, 2000).
26. Payments made to reward a successful quit attempt
27. Rewards for attendance at the programme and at follow-up appointments, irrespective of subsequent smoking status

established tobacco control programmes. It was reported that deposit refund schemes have a lower uptake than reward-based schemes, but participants who sign up and contribute their own money achieve higher quit rates than reward-only participants. It is also important to note that the overall quality of evidence was rated low due to methods used and assumptions of older studies and data presentation.

Pregnant smokers

Pooled findings from eight studies demonstrated a benefit of incentives for intervention groups over control groups (OR 3.60). In six of the eight studies, smoking abstinence at or near the end of pregnancy yielded an OR of 3.79 indicating the benefit of incentives for smoking cessation in pregnancy. At longest follow-up, three studies demonstrated that contingent rewards were more beneficial than usual antenatal care in achieving smoking cessation. In one study, support from a 'significant other' who also received rewards vouchers in parallel wait the participants' success was found to achieve a 2-month postpartum quit rate of 24% compared with 5.9% in the control group. The largest study (n=612; CPIT[28], Tappin et al., 2015) demonstrated a high success rate for the incentivised group compared to the control group. Evidence relating to incentives for smoking cessation among pregnant women was of moderate quality. The authors concluded that rewards contingent on validated cessation may ensure sustained abstinence into the postpartum period; incentives for abstinence at the end of pregnancy boost cessation rates compared to routine antenatal care; however there was limited evidence that non-contingent rewards, for attendance and supplying a biological sample, do not lead to increased rates of smoking cessation.

Overall it was concluded that the use of incentives appears to boost smoking cessation rates while they are in place. Whilst deposit schemes may have a lower up-take, they appear to achieve high cessation rates than reward-only based schemes. Incentive schemes for pregnant smokers improved cessation rates, both at the end of pregnancy and at postpartum assessments.

A further review on incentives for smoking cessation was published by Notley et al. (2019), but was not included as part of the evidence base as it was outside of the search timeframe. However, as its conclusions are highly relevant to the further elucidation of the evidence, we have included top level findings here. There is good evidence that incentives improve smoking cessation rates at long-term follow-up in mixed population studies, with sustained benefits after incentives have ended. There is also moderate-certainty evidence, that incentive schemes improve smoking cessation rates for pregnant smokers, both at the end of pregnancy and post-partum (Notley et al., 2019).

Taylor et al. (2017) undertook a review to determine:

- the effectiveness of internet-based interventions for smoking cessation;
- whether intervention effectiveness is altered by tailoring or interactive features; and
- if there is a difference between adolescents, young adults and adults.

The main outcome measure was smoking cessation at least six months after the start of the intervention. Interventions were broadly categorised as follows and ranged from a list of websites for smoking cessation to highly intensive interventions consisting of internet, email and mobile phone delivered components:

28. Cessation in Pregnancy Incentives Trial

- Interactive and tailored interventions
- Non-tailored/ interactive interventions
- Internet inventions plus behavioural support

Among nine studies with adult smokers, interactive and tailored interventions were reported to be relatively effective when compared to usual care of printed self-help materials. The review included two studies which examined the intervention effect among adolescents and young adults; there was no evidence of an intervention effect when compared to non-active controls. A further five studies compared tailored or interactive internet interventions plus behavioural support with non-active controls; whilst there was some effect detected among the intervention group, the authors noted a high level of statistical heterogeneity among the studies. Comparison of tailored or interactive internet interventions with non-active and non-tailored internet interventions did not produced a detectable effect on smoking cessation at six months. Collective findings from three studies revealed tailored messaging was more effective in terms of smoking cessation, but the quality of the evidence was reported to be low.

Evidence from studies involving adults would suggest that interactive and tailored internet-based interventions (with or without additional behavioural support) are moderately more effective than non-active controls at six months. There was no evidence that internet-based interventions are more effective than other active smoking interventions. Treatment effectiveness in adolescents and young adults is unknown.

A review by Vodopivec-Jamsek et al. (2012) assessed the effects of mobile phone messaging (SMS or MMS)[29] interventions as a mode of delivery for preventive healthcare and on health status and health behaviour outcomes. For the purposes of this specific review, evidence relating to smoking behaviours will only be presented. One study on smoking cessation used personalised text messages providing smoking cessation advice, support, and distraction, by matching participant characteristics with a database of text messages.

Messages were personalized by incorporating participants' nicknames into the text messages. Five messages were sent each day in the week leading up to the quit day and for four weeks after. As time went on the messages became less frequent reducing from five per day to three per week until the 26-week follow-up. Findings showed that more participants in the intervention group reported not smoking compared to the control group at 6 weeks (RR 2.20) and 12 weeks follow-up (RR 1.55). This finding was consistent across sub-groups as defined by age, sex, income and location. At six months, there was no significant difference between control and intervention group participants. A small sample of those who reported to have to quit smoking participated in a biochemical assessment of salivary cotinine to verify smoking status. Results showed a high level of over-reported quitting by both those in the control and intervention groups. This study was considered by the authors to be of high quality.

Whittaker et al. (2016) undertook a review to determine whether mobile phone-based smoking cessation interventions increase smoking cessation in people who smoke and want to quit. The interventions were mostly text-messaging based, whilst pre-paid phones were provided to participants in two studies (one for low-income HIV positive populations; one for phone counselling). The main outcome measure was smoking cessation at six months or longer from the start of the intervention. Biochemical verification of smoking cessation was used where available. Pooled results of all 12 studies, using the most

29. SMS – Short Message Service; MMS – Multimedia Message Service

rigorous measures of abstinence, gave a RR 1.67; two studies were under-powered and when removed from the analyses, produce a RR of 1.81. In terms of continuous abstinence, pooled results produced a RR of 1.72; point prevalence data at six months produced a marginally significant effect for intervention programmes over control programmes (RR 1.18). Studies using biochemical verification produced a RR of 1.83. The studies (in high income countries with good tobacco control policies) were of reasonable quality and so it was concluded that text message-based mobile phone interventions appear to be effective in helping smokers to quit.

A review by Lindson-Hawley et al. (2015) examined the evidence relating to motivational interviewing[30] and its role in promoting smoking cessation. Motivational interviewing was conducted in one to six sessions varying in duration from 10 to 60 minutes. Interview sessions were delivered by primary care physicians, hospital clinicians, nurses or counsellors. When compared to brief advice or usual care, motivational interviewing led to a significantly greater increase in smoking cessation (RR 1.26). Motivational interviewing delivered by a primary care physician was also more effective in terms of quit rates (RR 3.49) compared to other healthcare professionals. The authors noted that these findings are based on two relatively small studies and so the results should not be overstated. It was also observed that GPs are already familiar with their patients and may have an established rapport and so are better suited to this role. In terms of the number of sessions and interview duration, motivational interviewing conducted in sessions shorter than 20 minutes compared to the control resulted in a RR of 1.69; single interview sessions appear to be more effective than multiple sessions in increasing the likelihood of quitting, although both approaches produced positive outcomes. No follow-up calls appear to be associated with a greater effect size than providing them. The authors concluded that a single, short session of motivational interviewing could be enough to increase a person's motivation to quit smoking and that any extension of this may prolong the quit date and result in participants losing focus. In terms of the method of delivery, face-to-face counselling was no more effective than counselling delivered by telephone; both methods were more effective than brief advice or usual care. There was a high degree of heterogeneity among the studies; this could in part be because only one trial used a validated training tool. Although the findings of this review demonstrated higher rates of smoking cessation, the effect size is still lower than individual counselling (RR 1.39) and significantly lower than group behavioural therapy (RR 1.98). Further exploration of the motivation to quit was unable to fully explain this finding.

Overall, the authors report that motivational interviewing appears to be modestly successful in promoting smoking cessation compared to brief advice or usual care.

A review by Uthman et al. (2015) examined the effectiveness of multiple risk factor interventions (with or without pharmacological treatment) aimed at modifying cardiovascular risk factor for the primary prevention of cardiovascular disease in low- and middle-income countries. One study (2166 participants) reported smoking cessation as an outcome. In this study participants in the intervention group were counselled on risk factor control (tobacco cessation, diet, physical activity) at baseline, 4 months, 8 months and 12 months. No significant difference was found between the intervention and control groups in terms of the number of people who stopped smoking. Due to the limited results on smoking cessation in this review, it is difficult to draw firm conclusions.

Interventions delivered by nurses or health visitors were the focus of a review by Rice et al. (2017). The interventions included advice, counselling, and/or strategies to help

30. A directive patient-centred style of counselling, designed to help people to explore and resolve ambivalence about behaviour change.

people quit smoking. The main outcome measure was smoking abstinence at least six months after follow-up, using the most rigorous definition of abstinence and biochemically validated data where available. Based on moderate quality evidence, findings revealed that a nursing intervention increased the likelihood of smoking abstinence at six months (RR 1.29) when compared to a control or usual care. There was no evidence that high-intensity interventions were more effective than low-intensity interventions. Participants were recruited from hospitals and included patients with cardiovascular disease as well as patients from primary care settings with no specific health problem. There is no evidence that healthcare setting influenced smoking cessation or that smoking cessation was more or less likely in participants with or without a tobacco-related illness. There was insufficient evidence to assess whether more intensive interventions, those incorporating additional follow-up or those incorporating pathophysiological feedback are more effective than one-off support. The authors emphasised study limitations such as publication bias and heterogeneity between studies may influence the suggestion that interventions in any clinical setting and with any type of participants are equally effective.

Barth et al. (2015) examined the efficacy of psychosocial interventions for smoking cessation in patients with coronary heart disease in the short term (6 to 12 months) and long term (12 months). Psychosocial interventions use counselling, motivational support and advice with or without the provision of written educational materials about strategies for smoking cessation. Interventions could be provided in group or individual settings.

Findings demonstrated that psychosocial smoking cessation interventions were effective in achieving smoking abstinence in patients with coronary heart disease (CHD) when compared to usual care. Patients receiving a specific psychosocial intervention had more than a 20% higher chance of quitting. Due to differences between studies, results should be interpreted with caution, with abstinence rates ranging from 26.5% to 100%. There was no evidence that any treatment was more effective than another; however, behavioural therapeutic interventions showed a significant effect on smoking abstinence (RR 1.23), with telephone support also effective (RR 1.21). The authors acknowledged that as most behavioural support also used telephone support, it was difficult to separate out the effects of these two types of interventions. In contrast when patients with CHD were treated with interventions which involved follow-up within one month of initial contact, the chances of quitting smoking increased substantially (RR 1.28). There was some preliminary evidence for the efficacy of interventions with long-term follow-up, where completer analysis was conducted (RR 1.16).

The authors found evidence of the efficacy of smoking cessation interventions with more than one-month duration. Whilst there was no evidence for the efficacy of interventions in long-term follow-up studies (over 12 months), studies with completer analysis showed some benefit from psychosocial interventions.

Hartmann-Boyce et al. (2014a) undertook a review to determine the impacts of print-based self-help smoking cessation interventions. Self-help interventions were defined as any manual or programme to be used by individuals to assist a quit attempt not aided by health professionals, counsellors or group support. Whilst this review primarily covers written materials, information could have been provided via audio or video tape of similar medium. Interventions with a single session of minimal face-to-face contact for the purpose of supplying self-help materials were regarded as self-help alone. Where a face-to-face meeting included a discussion about the programme, this was considered brief advice and categorised as an addition to self-help. According to the authors, there was moderate

quality evidence that print-based self-help materials, used on their own and compared with no interventions, marginally, but significantly increased the number of people able to quit smoking. In studies where mailed materials were compared with no intervention, there was a 20% increase in quit rates. There was no evidence of a significant effect on smoking cessation when materials were distributed face-to-face, but without advice on smoking cessation.

Stead et al. (2017) reviewed group behaviour therapy programmes in achieving long-term smoking cessation. Studies included in this review related to scheduled meetings for smokers where some form of behavioural intervention, such as information, advice, encouragement or cognitive behavioural therapy was delivered over at least two sessions. The main outcome measure was abstinence from smoking at least six months after the start of the programme. The overall findings from this review demonstrate that behavioural therapy delivered in a group format aids smoking cessation. The effectiveness of group support was most apparent when compared to self-help programmes; the authors estimated that if 5% of smokers could quit assisted by written materials, 8 to 12% could quit when given support. It was also noted that group support was more effective than brief advice from a physician or nurse, but the quality of this evidence was low. Furthermore, the combined results of five studies did not detect a significant increase in smoking cessation when group therapy and pharmacotherapy were combined compared with pharmacotherapy alone. The authors noted that the review by Lancaster and Stead (2017) (also discussed in this Chapter) found that individual counselling did not have any additional benefit when used in conjunction with NRT. Furthermore, another review by Stead et al. (2015) (which assessed additional behavioural support as an adjunct to pharmacotherapy for smoking cessation, also presented in this section) reported that increasing the amount of behavioural support is likely to increase the chance of smoking cessation by 10 to 25%. Stead et al. (2017) reached the conclusion that behavioural interventions and pharmacotherapies independently contribute to successful smoking cessation.

Furthermore, when individual and group counselling was compared in six studies, irrespective of whether the number of sessions matched, there was no evidence that group counselling was more effective that individual counselling. Nonetheless, Stead et al. (2017) point out that it may be most cost-effect to deliver group counselling sessions, but presently there is insufficient evidence about comparative efficacy.

The authors reported that despite taking a broad approach to group programmes, there is limited evidence about which elements of group counselling are effective in smoking cessation. Whilst there are few studies comparing different programmes, most compare acquisition of skills within programmes which aim in increase motivation and confidence without any focus on cognitive or behavioural skills. It has been suggested that evidence for programmes with additional skills-based components is weak; where small benefits have been identified these are not without their limitations in terms of pooled analyses. Similarly, there is insufficient evidence to support one programme type over another for smokers with different characteristics.

Overall, the authors concluded that group therapy is more effective that self-help approaches in smoking cessation but may be no better than advice from a healthcare provider. Group therapy may also be valuable as part of a comprehensive intervention which includes pharmacotherapy.

Stead et al. (2013a) aimed to assess the effectiveness of advice from physicians in promoting smoking cessation. The authors compared minimal and more intensive interventions, to assess the effectiveness of various aids in promoting smoking cessation and sought to determine the effect of stop smoking advice on disease-specific or all-cause mortality. Physician advice was defined as verbal advice from a physician with a 'stop smoking' message irrespective of whether information was provided about the harmful effects of smoking. The main outcome measure was smoking cessation using the strict definition of abstinence with a minimum six-month follow-up. A secondary outcome was the effect of smoking advice on subsequent mortality and morbidity.

Pooled results from 17 studies demonstrated a significant increase in quit rates (RR 1.66). When more intensive interventions (longer consultation / additional visits / self-help manual) were compared to no advice, the effect was increased (RR 1.86) despite moderate heterogeneity between studies. There was insufficient evidence to establish a significant difference in the effectiveness of physician advice depending on the intensity of the intervention. When compared to minimal advice, there was a small but significant advantage in using more intensive advice (RR 1.37). When the addition of further follow-up was compared with minimal intervention, a marginally significant increase in quit rates was found (RR 1.52). Only one study reported on the health outcomes of stop smoking advice; at 20 year follow-up, total mortality was 7% lower, fatal coronary heart disease was 13% and lung cancer (death plus registrations) was 11% lower among the intervention group, but these results were not statistically significant. After 33 years of follow-up, rates for most causes of death were not significant, but there was a significantly smaller number of deaths from respiratory conditions. The authors concluded there is potential benefit from physician advice for smoking patients, but long-term success will depend on whether physicians are prepared to systematically identify smoking patients and offer them advice as a matter of routine.

A review by MacKay-Lyons et al. (2013) sought to determine the effectiveness of multi-modal programmes of non-pharmacological interventions compared with usual care for secondary stroke prevention. Non-pharmacological interventions for this group of patients included physical activity and dietary advice / education on risk factor modification / lifestyle counselling. Primary outcome measures included a second stroke/ myocardial infarction or vascular death. Only one study was identified in this review (48 participants) which showed small improvements in lower blood pressure and reducing vascular events in the intervention groups. This study also had a high attrition rate. Due to the limited evidence, no conclusions could be reported.

Posadzki et al. (2016) conducted a review of the evidence relating to the effectiveness of automated telephone communications systems (ATCS) for preventing and disease and managing long-term conditions on behavioural change, clinical, process, cognitive, patient-centred and adverse outcomes. ATCS incorporate a specialised computer technology platform to deliver voice messages and collect information from consumers using either touch-tone telephone keypads or voice recognition software. There are three types of ATCS:

1. Unidirectional ATCS enable one-way, non-interactive voice communication eg automated reminder calls to take medication or perform other actions.
2. Interactive ATCS enable two-way real-time communication, for example asking questions and receiving responses and individualised interventions (eg Interactive Voice Response (IVR) systems).

3. ATCS Plus interventions are also interactive systems but include additional functions such as access to an advisor to request advice (e.g. 'ask the expert' function), scheduled contact with an advisor (eg telephone or face-to-face meetings), and peer-to-peer access (eg buddy systems) and supplementary functions for example email or short messaging service.

The primary outcomes included changes in health-enhancing behaviour (eg physical activity, adherence to medications/uptake of recommended laboratory or other testing) and risk-taking behaviour (eg tobacco consumption). Participants included patients and carers, who received ATCS for prevention or management of one or more long-term conditions. The evidence suggests that compared with various controls or usual care, ATCS interventions may have little or no effect on maintenance of smoking abstinence. However, it is important to note the authors rated the evidence as generally low quality and there was moderate heterogeneity of the meta-analysed studies. ATCS Plus interventions may increase abstinence at six months, but the effects of IVR and ATCS Plus at longer time points appear in-consistent. It was observed that ATCS Plus interventions may improve cessation programme enrolment, with little or no effect on adherence to medications, but the certainty of the evidence was variable (moderate to low).

Chamberlain et al. (2017) assessed the effects of psychosocial smoking cessation interventions[31] during pregnancy on smoking behaviour and perinatal outcomes. Psychosocial interventions are defined as non-pharmacological strategies that use cognitive-behavioural, motivational and supportive therapies to help women to quit, including counselling, health education, feedback, financial incentives, social support from peers and/or partners and exercise. A number of other secondary objectives relating to the different components, intensity, impact on health outcomes, women's perception of the interventions and effect of family functioning/relationship were also reported on but are not included in this summary of findings.

This was a complex review with multiple comparisons. For clarity, results are summarised in Table 10:

31. Interventions that aim to motivate and support women to stop smoking in pregnancy or prevent smoking relapse among women who have spontaneously quit.

Table 10. Effectiveness and outcomes of smoking cessation interventions in pregnancy

Effective elements of psychosocial smoking cessation interventions in pregnancy
• Psychosocial interventions can support women to stop smoking in pregnancy and reduce the proportion of babies born low birthweight or admitted to neonatal intensive care after birth • Feedback was an important feature of psychosocial support • No evidence of negative psychological consequences from the delivery of individual smoking cessation interventions in pregnancy. • Counselling was effective when provided in conjunction with other strategies or tailored to individual women • Financial incentives had a notable effect on smoking cessation compared to non-contingent incentives • Increasing intensity of support did not necessarily lead to greater success in terms of smoking cessation among pregnant women; but rather the timing of intensive support is important in relation to nicotine withdrawal
Outcomes of smoking cessation interventions in pregnancy
• There was a 17% reduction in the proportion of babies born low birthweight (<2500g) and a significant increase in mean birthweight (56g) among women who received psychosocial support for smoking cessation. • Some studies showed that psychosocial support can improve women's psychological wellbeing, with notable benefits for mother, infant and the whole family. • Findings from this review support the recommendation that pregnant women may need more than just brief advice or health education. • Smoking cessation during pregnancy continued into the postpartum period, up until approximately 18 months, though the smaller effect size shows many women who quit during pregnancy relapse postpartum, with many women 'suspending' their smoking during the pregnancy period as opposed to quitting altogether. One study reported a high proportion of women abstaining from smoking during their hospital stay; this may be an opportunity to reduce the risk of postpartum relapse.
Other observations
• Women prefer individual personal contact, particularly by telephone, despite evidence that telephone support was not significantly more effective • Results regarding exercise interventions for smoking cessation were unclear • Whilst partner and peer support may be important factors influencing smoking behaviour, eliciting partner and peer support that is positive and can actually support women to stop smoking in pregnancy may not always be possible

Based on moderate to high quality evidence, the authors concluded there was demonstrable evidence that psychosocial interventions can support women in stopping

smoking in pregnancy and reduce the proportion of infants born with low birthweight or admitted to neonatal intensive care after birth. Results from 30 studies showed that counselling influenced stopping smoking compared with usual care.

It was noted that health education alone is not enough, and psychosocial interventions should include counselling, feedback or incentives. The authors noted there is a paucity of evidence relating to peer or partner support; given that some peer/partner support may be unhelpful and potentially expose vulnerable women to increased risk, these support components should be carefully considered. Given that women often resume smoking after pregnancy, it was advised that consideration should be given to messages than reinforce the benefit of not smoking for mother rather than focusing specifically on the infant.

Stead et al. (2013a) undertook a review of evidence to evaluate the effect of proactive and reactive telephone support via helplines and in other settings to help smokers quit. The intervention included the provision of reactive or proactive telephone counselling to assist smoking cessation to any population. The primary outcome measure was smoking cessation at least six months after the start of the intervention. It was reported that this updated review continues to provide evidence that proactive telephone counselling is beneficial for smokers who initiate contact with quitlines. Smokers who received one or more additional calls increased their chances of quitting smoking by 25 to 50%. The authors noted that evidence of dose response effect is unclear, and that one study suggested fewer shorter calls could as be effective as more and longer calls. In relation to proactive calling, estimates from pooled studies would suggest an increase of 20 to 36% in quit rates. The telephone intervention was associated with significantly higher quit rates in groups which received mailed self-help materials and brief face-to-face advice, but the effect was less certain when participants had access to pharmacotherapy. Overall, it was concluded that proactive telephone counselling aids smokers who seek help from quitlines; telephone quitlines were reported to be an important route of access to support for smokers and call-back counselling enhances their usefulness.

Lavender et al. (2013) reviewed the evidence relating to the effects of telephone support during pregnancy and the first six weeks post birth, compared with routine care, on maternal and infant outcomes. The review also considered the effect of different types of telephone support on maternal and infant outcomes. All interventions aimed at supporting women by using telephone, whether for general support/information or for a specific medical/social reason (eg diabetes, smoking). This review did not specifically look at smoking cessation, but rather sought to determine maternal satisfaction with the support provided and maternal anxiety as well as the impact on maternal and infant health outcomes.

Of the 27 studies included in the review, all compared telephone support versus usual care; no studies used different modes of telephone support. Results from this review are based on one to two studies leading the authors to conclude that the results were inconsistent and inconclusive, although there was some evidence that telephone support may be a promising intervention. Findings from a limited number of studies suggested that telephone support may increase women's overall satisfaction with their care during pregnancy and in the post-natal period. Data relating to maternal anxiety was more complex and there was no consistent evidence that telephone support reduces maternal anxiety. The authors also concluded there was no firm evidence that women receiving telephone support were less likely to smoke at the end of pregnancy or during the post-

natal period. There was little evidence relating to infant health outcomes and no firm conclusions could be drawn.

Marcano Belisario et al. (2012) reviewed the evidence relating to the effectiveness of different strategies for recruiting smokers into cessation programmes and the impact on smoking cessation rates at least six months after enrolment into a cessation programme. Most included studies recruited participants from a community/primary care setting (n=13). Three studies were based in workplaces and three were based at schools or academic institutions. Several studies focused on recruitment of specific populations: adolescents; veterans; individuals from ethnic minority backgrounds low-income smokers; and pregnant smokers. The remaining studies were based in the general population. Studies were included regardless of the mode of recruitment, provided they compared two or more different recruitment methods. Recruitment strategies included internet, mobile phone, mass media, by telephone as well as personalised interactions. Due to differences in recruitment strategies, participants and reported outcomes the authors were unable to conduct a meta-analysis. Results were reported as a narrative synthesis. The evidence suggested that personalised, proactive and more intensive recruitment strategies, including financial incentives, may result in higher rates of recruitment than less intensive, less personal and reactive strategies. Intervention comparisons were grouped into three categories. These are set out in the Table 11 along with the respective findings:

Table 11. Summary of evidence by Marcano Belisario et al. (2012) on the effectiveness of strategies for recruiting smokers into cessation programmes and the impact on cessation

Intervention	Outcome	Outcome Type (End/ Proximal)	Results	Reference
Head to head comparisons of different recruitment strategies	Recruit smokers into smoking cessation intervention	P	Recruitment strategies with a higher degree of personal contact (ie phone calls and actively reading the consent form to participants) resulted in better recruitment of participants.	Lowe et al. (1987) McClure et al. (2006) Wadland et al. (1990)

			Proactive personal letters accounted for most visitors to a smoking cessation programme website and for most enrolees. Any potential benefit of personal contact on recruitment rates remains inconclusive. None of the studies in this category reported on smoking cessation.	
Same mode of delivery with different content or intensity	Recruit smokers into smoking cessation intervention	P	Studies which found a significant effect included those that delivered tailored messages through an interactive voice response system that could be transferred to a quitline enroller nurse; messages of scarcity were also shown to improve recruitment of participants. Making additional attempts to contact potential participants seems to increase recruitment.	Bloom et al. (2006) Carlini et al. (2012) Free et al. (2011) McClure et al. (2009) Schnoll et al. (2011) Park et al. (2007)

			The type of recruitment strategy did not affect the likelihood of smoking cessation at six months or longer in participants who enrolled in the programme.	
Adding an additional mode to an existing strategy	Recruit smokers into smoking cessation intervention	P	Where a proactive measure was added, recruitment to smoking cessation programme was improved.	Emont et al. (1992) Free et al. (2010a, b, c) Harris et al. (2003)
		P	There was no evidence that the recruitment strategy had any long-term effect on smoking cessation among those enrolled in the programme.	Henrikus et al. (2002) Holtrop et al. (2005) Peltier et al. (1982) Volpp et al. (2006 & 2009)

Due to differences between studies, no firm conclusions regarding effective recruitment strategies could be drawn. Nonetheless, personal, tailored messages recruitment strategies that are proactive and intensive may enhance recruitment of participants to smoking cessation programmes.

Mass media

A review by Bala et al. (2017) examined the effectiveness of mass media interventions in reducing smoking among adults aged 25 and over. In this review mass media was defined as channels of communication such as television, radio, newspapers, billboards, posters, leaflets or booklets intended to reach large numbers of people which are not dependent on person-to-person contact.

Outcome measures included tobacco cessation (as determined by prevalence and quit rates) and tobacco reduction in terms of changes in the number of cigarettes purchased or smoked, prevalence of daily smoking and quit attempts. Across seven studies, a reduction in smoking prevalence was observed in state-wide progammes when compared with the

rest of the US; in one of the programmes (California) a significant decrease was observed, but only during the early period of the campaign, before cuts in funding. Findings from a programme in Massachusetts reported a significant decrease in population level smoking prevalence as well as for men. Significant decreases in tobacco consumption were observed in three out of seven studies. Of the eight studies examining the effect of mass media campaigns on smoking abstinence and quit rates, four showed positive effects, although one study looked at the combined effect of cutting down and quitting. Of the three studies that did not show a significant effect, one study reported a significant effect on abstinence rates among smokers and ex-smokers combined at 18 months.

The authors of this review acknowledge that mass media campaigns may change smoking behaviour in adults, but the quality and scale of studies varies and the extent to which mass media contribute to changes in smoking behaviour is unclear. It was also noted that the duration and intensity of mass media campaigns is likely to impact on smoking behaviour and so follow-up periods need to be enough to detect the changes. The authors also noted there was no consistent relationship between campaign effectiveness and age, education and gender.

Mosdøl et al. (2017) examined the effects of mass media interventions targeting adult ethnic minorities with messages about physical activity, dietary patterns, tobacco use or alcohol consumption to reduce the risk of non-communicable diseases. Other contemporary mass media channels such as the internet, social media and mobile phones were also included. All studies were conducted in the US and targeted at people of African, Latino and Chinese descent. Three studies were targeted at women only; one study looked at pregnant women. Little or no difference was reported in self-reported smoking behaviour among ethnic minorities compared to the general population; a small difference in smoking behaviour was reported for those who received a culturally specific smoking cessation booklet versus a booklet for the general population (very low quality evidence). Two studies compared the relative effects of a targeted mass media intervention versus no intervention, resulting in increased calls to smoking quit lines, but the effect on smoking behaviour is unclear. Other studies reported increased calls to quit lines, but the quality of evidence was rated low to very low.

An evaluation of the Public Health Agency 'Stop Smoking' campaign (January - March 2017) collected feedback on TV, radio, press, outdoor and digital advertisements. Face-to-face interviews were conducted with smokers and ex-smokers. Evaluation findings revealed a high level of awareness of smoking cessation support services and products available to help smokers quit (in particular, NRT). There was good recall of TV advertisements (80%), but radio (48%), posters and newspapers (33%) and online (Facebook) (18%) were less well recognised. Two thirds of smokers (67%) had not changed their smoking behaviour after seeing or hearing the campaign advertising. Of those who reported behaviour change, the most common response was attempting to reduce the number of cigarettes smoked (26%). Just under half (46%) of ex-smokers reported that campaign provided confidence and reassurance about their decision to remain smoke-free. Of those who responded to the campaign, the most common action was speaking to a pharmacist, followed by visiting the 'want2stop' website (Public Health Agency, 2017).

Conclusions

Evidence on more smokers quitting (Behavioural approaches)

Psychosocial

Psychosocial interventions comprise many different elements including counselling, motivational techniques and behavioural therapies. Key findings on these approaches are listed below:

- Motivational interviewing was shown to be modestly successful in promoting smoking cessation when compared to brief advice or usual care. This technique for smoking cessation was more successful when delivered by GPs in the primary care setting.
- The delivery of smoking cessation interventions is critically important to their success. Psychosocial interventions (counselling / advice / strategies) delivered by nurses increased the likelihood of smoking abstinence among primary and secondary care patients at six months.
- Duration of psychosocial interventions was also shown to be an important feature with interventions lasting longer than one month effective for smoking cessation.
- Psychosocial interventions (mostly telephone support) were effective in achieving smoking abstinence in patients with coronary heart disease demonstrating a significant effect on smoking abstinence.

Technological and tele-communications

- Mobile phone messaging (SMS or MMS[32]) can be effective in achieving smoking cessation on a short-term basis (up to 3 months), with mixed evidence reported for smoking cessation at longer follow-up (6 months).
- There was mixed evidence relating to telephone support and the use of quitlines. Some evidence showed telephone quitlines to be an important source of support; proactive telephone counselling was beneficial to smokers who seek help from quitlines, with call-back counselling enhancing their usefulness.
- Automated telecommunications systems do not appear to have an effect on maintenance of smoking abstinence. However, these findings are based on low quality evidence.
- There was no evidence that internet-based approaches are more effective than other active smoking interventions. There was no evidence of their effectiveness among adolescents and young adults.

Advice and information

- Print-based self-help materials, used on their own can be marginally, but significantly effective in smoking cessation.
- Long term success is dependent on doctors systematically identifying smoking patients and offering routine advice.

32. SMS – Short Message Service; MMS – Multimedia Message Service.

- Brief interventions are a low-cost way of identifying and signposting patients to relevant services. The evidence demonstrates that brief interventions of less than one month in duration, without support over time, were not effective.

Incentives

- Incentives for smoking cessation are based on various models including reward only, employer supported schemes and deposit schemes which smokers contribute to themselves. From the available evidence, incentives appear to boost smoking cessation rates while they are in place. Although deposit schemes[33] have a lower uptake, they appear to be more effective than reward-only schemes.

Objective measures

- There was insufficient evidence about the effectiveness of biomedical risk assessment[34] as an aid to smoking cessation.

Lifestyle changes

- No conclusions could be drawn from multi-modal interventions (diet/ physical activity/ education/ lifestyle counselling) for secondary stroke prevention.

Mass media

- There is mixed and insufficient evidence relating to the effectiveness of mass media in helping to change smoking behaviour at a population level. Although there is some evidence of increased calls to quitlines and some behaviour change in reviews of mass media campaigns, the extent of behaviour change is unclear. Duration and intensity are important considerations in mass media campaigns and follow-up periods need to be sufficient to detect changes in smoking behaviour.
- There was insufficient evidence to determine if mass media campaigns changed smoking behaviour among ethnic minorities; it was unclear if cultural adaption for ethnic minority groups was an effective element of the mass media campaigns.

Recruitment

- It was not possible to draw firm conclusions about the effectiveness of recruitment strategies to smoking cessation programmes. Nonetheless, personal, tailored messages recruitment strategies that are proactive and intensive may enhance recruitment to smoking cessation programmes.

Co-morbidities

- No clear evidence that brief interventions were effect for patients with coronary heart disease. Where patients were followed up one month after the initial contact, the chances of quitting where increased substantially, but the authors have cautioned about overestimation of the effects of psychosocial interventions.

33. Deposit schemes require the smoker to contribute the money they would otherwise have spent on tobacco.
34. Physical measurement of exhaled carbon monoxide as means of increasing motivation (with or without another intervention such as counselling) for smoking cessation.

4.5 Combined pharmacological and behavioural interventions

Lancaster and Stead (2017) undertook a review of evidence to determine if individual counselling was more effective than no treatment/ brief advice; self-help materials; or if intensive counselling was more effective than less intensive counselling. The main outcome measure was smoking cessation at follow-up at least six months after the start of counselling. Counselling was defined as face-to-face encounter between a smoker and smoking cessation trained counsellor.

There was consistent evidence that individual counselling increases the likelihood of smoking cessation compared to less intensive support. Individual counselling returned an estimated 3 to 5% increase in smoking cessation rates compared with brief intervention. Smokers' motivation to quit and the way in which cessation was defined influenced outcomes. For example, cessation rates were generally higher in trials using NRT and amongst those with cardiovascular disease. In contrast, cessation rates tended to be lower among hospital patients unselected for their readiness to quit. It was concluded that individual counselling can help smokers quit; there is added benefit to using counselling as an adjunct to pharmacotherapy; and more intensive counselling is more beneficial than brief counselling.

van der Meer et al. (2013) conducted a review relating to the effectiveness of smoking cessation interventions, with and without specific mood management components, in smokers with past or current depression. Interventions included pharmacological or psychosocial interventions or a combination of both. The primary outcome measure was abstinence from smoking at a minimum of six months from the quit day. For smokers with current depression, there was a significant effect for adding a psychosocial mood management component to a standard smoking cessation intervention when compared with standard smoking cessation intervention alone (RR 1.47). A similar effect was found for smokers with past depression (RR 1.41). Bupropion had a positive, but non-significant effect among smokers with current depression and appears to increase long-term smoking cessation for people with past depression, however the evidence is weak and is based on a small number of studies. One trial which compared NRT with placebo in smokers with current (RR 2.64) and past depression found a positive but non-significant effect (RR 1.17). Adding a psychosocial mood management component to a standard smoking cessation intervention increases long-term smoking cessation rates in smokers with current and past depression.

Lindson-Hawley et al. (2012) compared the success of reducing smoking to quit with abrupt quitting interventions among adult smokers. Interventions ranged from no behavioural support to extensive behavioural support along with pharmacotherapy. The main outcome measure was abstinence from smoking at least six months after the quit day. Secondary outcomes included the type and number adverse events. Quit rates were similar among reducing smoking to quit and abrupt quit approaches to smoking cessation, regardless of the intervention type (ie self-help (RR 0.98), behavioural support (RR 0.87) and NRT (RR 0.87). Smokers can be given a choice to quit either using smoking reduction or abrupt quit approaches, however, further research is needed to determine which methods of reduction before quitting are most effective and which category of smokers may benefit most from each method.

Stead et al. (2015) evaluated the effect of increasing the intensity of behavioural support for people using smoking cessation medications, the type of pharmacotherapy, and the amount of support provided. The main outcome measure was abstinence from smoking

after at least six months of follow-up. In the interventions, all participants had access to a smoking cessation pharmacotherapy (NRT, varenicline, bupropion and nortriptyline or a combination of these) and more intensive behavioural support than the control group. Providing more intensive behavioural support for people making a cessation attempt with the aid of pharmacotherapy typically increased success rates by 10 to 25% (RR 1.17). Most interventions provided four or more support sessions. When comparing personal contact (4 sessions) versus no personal contact in the control group, slightly larger effects (RR 1.25) were noted for the intervention group, but these were not significant. Telephone counselling also produced slightly larger effects (RR 1.28) when compared to the control group. In summary, behavioural support in person or by telephone, for people using pharmacotherapy to stop smoking has a small, but important effect. Increasing behavioural support is likely to increase the chance of successful smoking cessation.

Stead et al. (2016) assessed the effect of combining support and medication to aid smoking cessation, compared to a minimal intervention or usual care and whether there are different effects dependent on setting, intervention, population treated, or treatment uptake. The main outcome measure was abstinence from smoking after at least six months of follow-up. Interventions included behavioural support and pharmacotherapy. Results showed that combined behavioural support and pharmacotherapy was beneficial in aiding smoking cessation. The Lung Health Study (intensive intervention with 12 group-based sessions and free nicotine gum available for six months) showed a very strong intervention effect (RR 3.88). Due to the intensity of the Lung Health Study intervention, this study was not included in the pooled results.

The remaining 52 studies showed a benefit in combined pharmacotherapy and behavioural support compared to usual care, brief advice or intensive behavioural support (RR 1.83). There are important differences between the intervention arms in the studies featured in this review. For example, pharmacotherapy trials typically have a placebo control, but the control group also received identical behavioural support to the active therapy group; intensity of support may vary from brief advice on correct use of pharmacotherapy and the provision of self-help materials to multiple counselling sessions. Participants recruited in healthcare settings were significantly more likely to quit smoking than participants recruited in other settings. There was no evidence that motivation to quit had any effect on successful smoking cessation. No significant differences were found in relation to the effect of the provider on smoking cessation. Where more intensive behavioural support was offered, this did not significantly increase quit rates. Combined behavioural and pharmacotherapy support increased smoking cessation rates when compared to usual or minimal care but increasing the intensity of behavioural support (as measured by the number and duration of sessions) was not consistently associated with larger treatment effects.

A review by Ussher et al. (2014) examined whether exercise-based interventions enhanced the effectiveness of a smoking cessation programme. Smoking cessation was measured at longest follow-up (6+ months). Significantly higher smoking abstinence rates were noted in a physically active group versus a control group. Those with higher levels of exercise adherence were significantly more likely to have stopped smoking at the end of the intervention. Significantly higher abstinence rates were reported in the exercise plus NRT patches at the end of treatment and at 12-month follow-up. Two out of 20 studies provided evidence for exercise aiding smoking cessation in the long term. The remaining studies were considered too small to achieve an effect or may not have may not have been sufficiently intense to achieve the desired level of exercise.

A review by Rigotti et al. (2012) examined the effectiveness of interventions for smoking cessation initiated for hospitalised patients. Interventions included behavioural (brief advice, individual counselling, provision of self-help materials, group therapy) and pharmacotherapy (NRT, bupropion and varenicline). The main outcome measure was smoking abstinence at six months. Intensive counselling interventions (with follow-up support for at least one-month post discharge) increased smoking cessation rates by 37% at six to 12 months after hospital discharge. There was no evidence that less intensive counselling interventions, such as those delivered only during hospitalisation or those with less than one-month follow-up were effective in smoking cessation, highlighting the importance of post-hospitalisation follow-up. Pharmacotherapy was not systematically provided to all participants. When NRT studies were excluded from the analysis, counselling was still effective as an aid to smoking cessation. There was a 54% increase in smoking cessation rate when NRT was used an adjunct to counselling. Varenicline or bupropion with counselling did not significantly increase smoking cessation. In a sub-group of cardiovascular patients, intensive intervention with follow-up support increased smoking cessation rate (RR 1.42). It was concluded that high intensity behavioural interventions initiated in hospital with more than one-month supportive follow-up are effective in achieving successful smoking cessation in both acute and rehabilitation hospitals.

Thomsen et al. (2014) assessed the effect of pre-operative stop smoking intervention on smoking cessation delivered prior to surgery and 12 months postoperatively, and on the incidence of postoperative complications. Participants were smokers of any age, scheduled for elective surgery. Interventions included behavioural (n=11 studies; one did not report smoking cessation outcomes) (face-to-face or telephone counselling) and pharmacotherapy (n=2 studies) (NRT and varenicline) interventions delivered at least 48 hours prior to surgery. Of the behavioural interventions, two studies were intensive interventions, offering multi-session face-to-face counselling over a period of four to eight weeks before surgery; participants were provided with a quitline number and offered NRT. Eight studies provided brief behavioural interventions, of which six also offered NRT to some or all participants. The remaining three interventions comprised were based on the following:

- smoking reduction regime (in addition to an intensive behavioural intervention);
- a letter about the benefits smoking cessation before surgery and details of services; and
- brief advice.

One trial (counselling and NRT) achieved a large change in smoking behaviour in the intervention group and a lower incidence of postoperative complications. Four brief interventions had a modestly significant effect on smoking cessation at the time of surgery. Pooled results from eight studies showed a positive effect on smoking abstinence, but not on postoperative complications. Varenicline (administered one week preoperatively and 11 weeks postoperatively) and nicotine lozenges (administered the night before surgery as an adjunct to brief counselling) did not increase smoking cessation at the time of surgery; however, varenicline did have a significant effect on long-term smoking cessation. Preoperative interventions which included behavioural support and NRT increased short-term smoking cessation and may reduce post-operative morbidity. Only intensive smoking cessation interventions achieved long-term significant effect; there was no long-term effect following brief intervention.

Tsoi et al. (2013) reviewed smoking cessation among adults with schizophrenia. Interventions included pharmacological and behavioural and a combination of both.

Smoking cessations rates were significantly higher among smokers using bupropion (RR 3.03 at the end of treatment and RR 2.78 after six months). No significant differences were recorded in relation to positive or negative depressive symptoms between bupropion and placebo groups; no adverse effects were reported. Varenicline was also found to be effective in smoking cessation, with significantly higher rates compared to placebo at the end of treatment (RR 4.74).

Carson et al. (2012b) reviewed the evidence relating to the effectiveness of smoking cessation interventions in indigenous populations. The primary outcome measure was smoking cessation at least six months post intervention. Secondary outcomes included adverse effects of interventions. The studies included two Maori (New Zealand), one (Aboriginal) Australian and one Native American population. Pooled data revealed a significant effect for smoking cessation (RR 1.43). It was concluded that there is a paucity of evidence relating to smoking cessation among Indigenous populations. The limited evidence indicates that smoking cessation is achievable with targeted interventions for Indigenous populations. Applicability and transferability to the local context warrants further consideration.

Carr and Ebbert (2012) assessed the effectiveness of interventions delivered by oral health professionals to cigarette smokers and smokeless tobacco users in the dental office or community setting. Interventions included brief advice, self-help materials, counselling, pharmacotherapy or a combination approach delivered by a dentist, dental hygienist, dental assistant or office staff in the dental practice or community setting. The outcome measure was smoking and tobacco cessation at least six months after the intervention. Dental interventions were more effective in achieving tobacco cessation than usual care, no contact, or less intensive treatment at follow-up between 6 and 24 months (OR 1.71). The authors advised that this result should be interpreted with caution due to unexplained differences between studies. Within the subgroup of adult smokers in the dental setting, there was clear evidence of benefit (OR 2.38). Interventions for tobacco users delivered by oral health professionals in the dental or community setting are effective for increasing tobacco cessation.

Apollonio et al. (2016) evaluated the effectiveness of interventions for tobacco cessation for people in concurrent treatment for recovery from alcohol and other drug dependence. Interventions included counselling only (brief or extended sessions and individual or group sessions) pharmacotherapy (NRT - gum, patch lozenge, or non-NRT pharmacology eg varenicline) and a combination of both. The primary outcome measure was tobacco abstinence. Pharmacotherapy increased tobacco abstinence (RR 1.88) as did combined counselling and pharmacotherapy (RR 1.74) at follow up of 6 to 18 weeks. The overall quality of evidence was rated low. Providing tobacco cessation interventions for people in treatment and recovery can result in successful outcomes.

Pool et al. (2016) assessed the effectiveness of interventions to motivate and assist tobacco cessation for people living with HIV/AIDS and risk of associated harms. Interventions included both pharmacological and behavioural approaches delivered by telephone, online or face-to-face. The primary outcome measure was smoking abstinence at a minimum of six months after the intervention. A secondary outcome was smoking cessation at 4 weeks but less than six months from the target quit date or start of the intervention. More intense combined interventions of pharmacotherapy and behavioural support were effective in increasing the likelihood of short-term smoking abstinence (4 weeks to less than 6 months) (RR 1.51), but this effect was not observed beyond six months. Studies which included only

willing or motivated participants showed a greater effect in terms of short-term outcomes, but this was not observed at long-term follow-up. The overall quality of evidence was considered low to moderate.

Tobacco cessation interventions for waterpipe users were evaluated in a review by Maziak et al. (2015). The interventions included pharmacological (eg NRT or bupropion), behavioural or both. Interventions were delivered individually or in group sessions. The main outcome measure was abstinence from any tobacco waterpipe smoking for six months or more. Two studies from the Middle East and one from the US were included. Smoking cessation rates were higher in the intervention groups compared to the control groups, with a significant difference noted in the US study. Limitations of the American study included sample size and the pilot nature of the study. Other limitations across the studies included sub-optimal length of follow-up, reliance on self-report and lack of standard definition of waterpipe smoking status. In one study, no additional benefit was demonstrated in the use of bupropion. Waterpipe smoking is more common among youth and young adults; but only one study was conducted with college students. Waterpipe users may be more likely to quit when using a smoking cessation intervention compared with usual care. Behavioural approaches provide a good starting point for tobacco cessation among this group, but interventions should be adapted to reflect the different social and contextual tobacco waterpipe use.

Coleman et al. (2015) looked at the evidence relating to pharmacological interventions for smoking cessation in pregnancy. The authors assessed the efficacy and safety of smoking cessation pharmacotherapies (including NRT, bupropion and varenicline) with or without behavioural support or cognitive behavioural therapy. Outcome measures included efficacy, safety and adherence to treatments as well as maternal and infant outcomes assessed during pregnancy, around childbirth and up to two years after. NRT and as an adjunct to behavioural support was effective for smoking cessation in pregnancy (RR 1.43), but not after childbirth. One study which monitored continuous cessation from a quit date set during pregnancy to postnatal time points, reported higher point prevalence cessation; rates of continuous cessation until two years after childbirth were low. Bupropion did not appear to be effective for smoking cessation in pregnancy. The quality of evidence was generally considered high. There was weak evidence that NRT with behavioural support is effective for smoking cessation in pregnancy, with no evidence that NRT has a positive or negative effect on pregnancy and infant outcomes.

van Eerd et al. (2016) evaluated the effectiveness of behavioural and/or pharmacological interventions, in smokers with Chronic Obstructive Pulmonary Disease (COPD). The primary outcome measure was continuous or prolonged abstinence over a period of six months or longer; secondary outcomes of point prevalence abstinence at six months or longer were also reported. Two high quality studies showed nicotine sublingual tablet and varenicline increased quit rates over placebo (RR 2.60 and 3.34 respectively). Bupropion was more effective than placebo in achieving smoking cessation (RR 2.03). High intensity behavioural treatment with pharmacotherapy was more effective compared to high intensity behavioural treatment plus placebo in achieving smoking cessation (RR 2.53). High intensity behavioural treatment compared to low intensity or behavioural treatment or usual care was more effective in smoking abstinence (RR 2.18). It can be concluded that a combination of pharmacotherapy and behavioural treatment is effective for helping smokers with COPD stop smoking. Based on the available evidence, it was not possible to definitively state which forms of behavioural treatment and pharmacotherapy were most effective.

Fanshawe et al. (2017) evaluated the effectiveness of strategies to help young people (<20 years) stop smoking. The primary outcome measure was change in smoking behaviour at six months follow-up or longer. The interventions ranged from pharmacotherapy to strategic programmes (eg enhancing self-efficacy/ developing skills to remain abstinent) targeting young people or organisations linked to young people. Interventions which used primarily individual counselling, reported a slightly increased effect on smoking cessation among the intervention group (RR of 1.07) with greater effects achieved through group sessions (RR 1.35). No significant improvements were observed where information or communication technology was used. Studies using NRT yielded a RR 1.11 (nicotine patch and gum RR of 1.02 and 1.74 respectively). One study which used standard dose bupropion did not detect an effect on smoking cessation (RR 1.49); another study which used bupropion as an adjunct to NRT patches versus patches alone failed to detect an effect (RR 1.05). Due to the small number of participants these studies appear to be underpowered. There is limited evidence that behavioural support or pharmacotherapies increase the proportion of young people quitting smoking in the long term. Group-based behavioural interventions showed some promise for smoking cessation among young people.

Carson et al. (2012c) examined the effectiveness of training healthcare professionals in the delivery of smoking cessation interventions and the effects of intervention content, delivery method and intensity. The primary outcome measure was smoking abstinence at six months or more after the start of the interventions assessed as point prevalence (defined as not smoking at a set period prior to the follow-up) or continuous prevalence (defined as not smoking for an extended or prolonged period at follow-up). The healthcare professionals included in the studies were doctors, dentists, pharmacists, nurse, health visitors, nurse practitioners, psychologists, physicians' assistants and interns. Interventions included a combination of counselling, NRT, self-help materials, reminder for doctors to ask about smoking as well as a monetary incentive for the doctor following study completion per successful smoke-free participant. Four studies reported a significant effect in training healthcare professionals to influence smoking in their patients; one study reported a significant effect on continuous abstinence. Collective results from 17 studies found a significant effect in favour of the intervention for point prevalence (OR 1.36) and continuous abstinence (OR 1.60). Healthcare professionals who received training were more likely to ask patients to set a quit date, make follow-up appointments, provide counselling and self-help materials and prescription of a quit date. There was no evidence of an effect for the provision of nicotine gum or NRT. Training healthcare professionals had a measurable effect on the point prevalence and continuous abstinence and professional performance.

Cahill and Lancaster (2014) reviewed the effectiveness of workplace interventions. Interventions were categorised as those aimed at helping individual smokers to quit and those aimed at the workplace. Programmes exclusively targeted smoking behaviour or multiple lifestyle risk behaviours and included individual and group counselling, self-help materials, pharmacological therapy, social and environmental support, incentives and comprehensive programmes. The main outcome measure was employee smoking behaviour for a minimum of six months. Intensive individual and group counselling were effective in helping smokers quit (OR 1.96 and 1.17 respectively). There was no evidence that self-help programmes were effective for smoking cessation. Pharmacotherapy was also effective (OR 1.98) whilst social support for not smoking had no benefit. Worksite-based environmental programmes showed no benefit in terms of smoking cessation. Incentive interventions demonstrated an effect for payment or reward schedule with an OR

of 1.60 over the control programme. Multiple interventions for smoking cessation showed a benefit for smoking cessation with (OR of 1.55). Interventions directed towards the individual smoker increased the likelihood of quitting. These included individual and group counselling, pharmacological treatment and multiple interventions targeting smoking as the primary or only outcome. Comprehensive programmes targeting multiple lifestyle behaviours did not reduce smoking prevalence. There was limited evidence that participant in programmes can be increased by incentives and competitions, although sustained effects were found in one study.

Hajek et al. (2013) assessed interventions for relapse prevention to reduce the number of recent quitters who return to smoking. Studies included behavioural interventions delivered in any format (group meetings, face-to-face sessions, written or other materials, proactive or reactive telephone support) and pharmacological interventions. Participants included people who had quit smoking on their own; people who were undergoing enforced abstinence, whether they intended to quit permanently; and smokers participating in treatment programmes to assist initial cessation. The preferred outcome was prolonged or multipoint prevalence abstinence at follow-up of at least six months. Behavioural interventions detected no benefit of brief and skills-based relapse prevention methods for women who had quit smoking because of pregnancy or for smokers undergoing a period of enforced abstinence during hospitalisation or military training. Similarly, behavioural interventions had no effect among smokers who had quit on their own or through a formal programme. Despite poor experimental design, interventions using skills-based training did not reduce relapse. In one study, varenicline significantly reduced relapse; bupropion had no significant effect on relapse prevention; and NRT and bupropion combined failed to demonstrate an effect on smoking relapse. The existing evidence does not support the use of behavioural interventions to prevent smoking relapse, but extended use of varenicline may prevent relapse. The evidence from this review is strongest for interventions focused on identifying and resolving tempting situations, as this was the focus of most interventions.

Smokeless tobacco use

Ebbert et al. (2015) reviewed the effect of behavioural and pharmacological interventions for the treatment of smokeless tobacco use. Participants in this review were users of any tobacco product that is placed in the mouth and not burned, including moist snuff, chewing tobacco, Swedish snus and Indian smokeless tobacco products (eg gutkha and pan masala). Interventions included pharmacological (NRT, bupropion, and varenicline) or behavioural and were delivered individually or in group sessions. The control condition as usual care, placebo or less intensive intervention. The preferred outcome measure was complete abstinence from all tobacco use six months or more after the intervention. Two trials of bupropion did not detect an effect; 12 trials of NRT (including gum, patches and lozenges) demonstrated a significant effect on tobacco use, driven by the efficacy of nicotine lozenges. The authors felt there was insufficient evidence to support the use of nicotine gum and patches. Two studies found varenicline increased abstinence rates by 34% compared to placebo; this could be due to low availability of treatment for smokeless tobacco users resulting in high efficacy in the behavioural arms of these studies. Mixed results were reported from the behavioural interventions possibly due to the methodological quality of the studies. In summary, nicotine lozenges and varenicline appear to be effective approaches for increasing tobacco abstinence among smokeless tobacco users. Behavioural interventions can increase tobacco abstinence among smokeless tobacco users, regardless of motivation to stop; telephone counselling may be a useful component of an intervention.

Weight gain and smoking cessation

A review by Farley et al. (2012) examined the effect of interventions targeting post-cessation weight gain on weight change and smoking cessation. The review also looked at interventions designed to aid smoking cessation that may also plausibly affect weight on post-cessation weight change. The authors found that weight management education may reduce smoking abstinence and is not effective in weight control therefore its use it not recommended. There was no strong evidence that personalised weight management programmes are effective or that they reduce smoking abstinence.

Conclusions

Evidence on more smokers quitting (Pharmacological and Behavioural approaches)

Effective combined interventions to smoking cessation

- Combined pharmacological and behavioural approaches are more effective than pharmacological alone or behavioural only approaches.
- Behavioural support either in person or by telephone, in addition to pharmacotherapy has a small but important effect on smoking cessation.
- Behavioural therapy delivered in a group format aids smoking cessation. Group therapy was shown to be more effective than self-help approaches, but not necessarily any more effective than advice from a healthcare provider.
- There is consistent evidence that individual counselling increases smoking cessation compared to less intensive support, such as brief intervention.
- There is some evidence that behavioural interventions can increase tobacco abstinence among smokeless tobacco users whether they are motivated or not to stop. Telephone counselling may be an important component of an intervention.
- Interventions directed towards the individual smoker increase the likelihood of quitting ie individual and group counselling, pharmacological treatment and multiple interventions targeting smoking as the primary or only outcome.
- Smokers can be given the choice to quit using either smoking reduction of abrupt quit approaches, but further research is needed to determine which methods of reduction are most effective and which categories of smokers benefit most.
- Successful smoking cessation was not dependent on the provider, with no differences noted between specialist and non-specialist providers.
- In the workplace setting, it was concluded that interventions (individual and group counselling, pharmacotherapy, and multiple interventions with smoking as the primary or only outcome) directed towards the individual smoker increased the likelihood of quitting. Comprehensive programmes targeting multiple lifestyle behaviours did not reduce smoking prevalence.
- There was some merit in the use of exercise-based interventions for smoking cessation in the short term (3 months). There was limited evidence of the effectiveness of exercise aiding smoking cessation at 12 months.

- Training healthcare professionals in the delivery of smoking cessation interventions delivered a measurable effect on smoking cessation. Healthcare professionals who received training were more likely to ask patients to set a quit date, make follow-up appointments, provide counselling and self-help materials and prescription of a quit date.
- Healthcare settings are an important environment for recruitment and successful smoking cessation, regardless of motivation to quit.
- High intensity behavioural interventions initiated in hospital, with more than one-month supportive follow-up, are effective in achieving successful smoking cessation.
- Intensive interventions (combined pharmacotherapy and behavioural), initiated at least four weeks prior to surgery, are effective in changing smoking behaviour in the long term and reducing the risk of post-operative complications.
- Combined pharmacological and behavioural approaches to smoking cessation are effective for patients with COPD.
- Interventions delivered by oral health professionals in the dental or community setting are effective in increasing smoking cessation.
- Combined pharmacological and behavioural interventions were shown to be effective in achieving short-term smoking abstinence among people living with HIV/AIDS.
- For smokers with current and past depression, there was significant benefit in adding a psychosocial component to a standard smoking cessation intervention. Bupropion had a positive effect on people with current depression; it was also beneficial in relation to long-term smoking cessation for smokers with past depression, but the evidence is weak.
- Bupropion is effective for smoking cessation in patients with schizophrenia without any adverse effect on mental health. Varenicline was also shown to be effective.
- Evidence for smoking cessation among people in treatment or recovery from alcohol or drug dependence was considered low quality, but there was evidence of their effectiveness in smoking cessation and reducing the health consequences of smoking.
- Behavioural approaches are a good starting point for tobacco cessation among water pipe users, but interventions need to reflect the different social and contextual use of water pipes.

Non-effective combined interventions

- Existing evidence does not support the use of behavioural approaches to prevent smoking relapse, but extended use of varenicline may reduce relapse.
- Comprehensive programmes targeting multiple lifestyle behaviours did not reduce smoking prevalence.

Insufficient evidence

- Paucity of evidence relating to smoking cessation among indigenous populations.
- Limited evidence that behavioural support or pharmacotherapies increase smoking cessation among young people in the long term. Group-based behavioural interventions showed some potential.

The Public Health Agency (November 2018) completed a review of workplace smoking cessation services. In 2011, the Public Health Agency established a Workplace Smoking Cessation Forum to share learning from current workplace smoking cessation services across Northern Ireland. The aim of the Forum is to ensure the most effective and efficient use of regional smoking cessation resources when targeting routine and manual workers in the workplace setting. Workplace smoking cessation programmes were delivered in four out of five Health and Social Care Trusts (HSCTs). The service models varied across HSCT areas. Findings from this evidence review may be useful in further developing workplace smoking cessation programmes in Northern Ireland (Public Health Agency, 2018).

4.6 Health systems interventions

Boyle et al. (2014) assessed the effectiveness of electronic health record facilitated (EHR) interventions on smoking cessation support actions by clinicians, clinics, and healthcare delivery systems and in-patient smoking cessation outcomes. The main outcome measure was abstinence from smoking at a minimum of six months from the date of the intervention. One study reported on quit rates between control and intervention groups based on changes in EHR documentation of smoking status. Significantly more smokers in the intervention clinics were recorded as non-smokers compared to the control clinics (5.3% vs 1.9%). According to two studies, there was a significant increase in documentation of smoking status after the intervention. Higher rates of advice (71.6% vs 52.7%) and assessment (65.5% vs 40.1%) were reported in one study when comparing intervention and control clinics. It was report in one study that significantly more smokers in intervention clinics were referred to cessation counselling compared to control clinics (4.5% vs 0.4%) as well making contact with a cessation counsellor (3.9% vs 0.3%); in addition smokers in intervention clinics were more likely to be prescribed cessation medication. Documentation of tobacco status and quit assistance to smokers appears to increase following the introduction of an electronic reminder for providing clinical support for patients who smoke.

Thomas et al. (2017) undertook a review to assess the effectiveness of system change interventions within healthcare settings for increasing smoking cessation on the provision of smoking cessation care, or both. System change interventions for smoking cessation were policies and practices designed by organisations to integrate the identification of all smokers and the subsequent offering of evidence-based smoking cessation treatments into the routine delivery of healthcare. The quality of evidence in this review was rated low or very low due to the small number of studies and inadequate study design. The primary outcome measure was smoking abstinence at longest follow-up; secondary outcomes included documentation of smoking status, number of health professionals trained to provide smoking cessation support as well as the number of smokers receiving different types of support. Due to the low-quality evidence available, the authors were unable to reach any firm conclusions about the effectiveness of system change on smoking abstinence. There was some evidence relating to the secondary outcomes; there were significant improvements in documentation of smoking status, quitline referrals and quitline enrolment. Positive effects were also reported in relation to asking about tobacco use and advising smokers to quit.

Conclusions

Evidence on role of healthcare systems

- The introduction of an electronic reminder in the clinical setting led to improved documentation of smoking status, provision of counselling and referral to smoking cessation services.
- No firm conclusions could be reached about the effectiveness of system change interventions within healthcare settings for increasing smoking cessation or the provision of smoking cessation care or both. This was largely due to low quality evidence.

4.7 Regulatory approaches

Legislation

Standardised packaging and smoking patterns

The Standardised Packaging of Tobacco Products Regulations came into effect in Northern Ireland on 20 May 2017. This an important piece of legislation in helping to denormalise smoking. It is likely to take some time for effects of the introduction of standarised packaging of tobacco products on smoking prevention and cessation to be fully realised. Internationally, the introduction of standardised packaging was associated with increased quit attempts, increases calls to helplines and reduced appeal by altering taste, health risk and product quality perceptions.

McNeill et al. (2017) undertook a review of the evidence relating to the effect of standardised packaging of tobacco on smoking uptake, cessation and reduction. The studies included in the review assessed the impact of changes in tobacco packaging such as colour, design, size and type of health warnings on the packs. The control condition was branded tobacco packaging but could include variations of standardised packaging. Studies from Australia and the UK examined changes in tobacco use (prevalence and consumption). No studies assessed smoking uptake, cessation or relapse prevention. In terms of smoking prevalence, one study reported a 3.66% reduction in odds when comparing smoking prevalence before and after the implementation of standardised packaging. There was a 0.5% reduction in smoking prevalence around the time of the change in packaging of tobacco products.

In relation to tobacco consumption, two Australian studies assessed self-reported tobacco consumption among current smokers. Using the 'National Tobacco Plain Packaging Tracking' survey, no significant changes were detected among 'daily' smokers, 'at least weekly smokers' or 'at least monthly' smokers; however, modest changes for all categories of smokers were detected. A cross-sectional survey found 42% of cigar smokers and 44% of cigarillo smokers, reported lower tobacco use. Two experimental studies from the UK found no significant difference in self-reported cigarette consumption in a 24-hour period and no difference in the volume of inhaled smoke[35] between branded and standarised packs. One study found lower self-reported consumption of cigarettes when using standardised packs compared to branded packs.

The review also found standardised packaging was associated with an increase in quit attempts and an increase in calls to the quitline was sustained for a longer period after the introduction of standardised packaging. There was observational evidence of increased

35. Volume of smoke inhaled is an more objective measure of tobacco exposure than number of cigarettes smoked.

avoidance behaviours (such as concealing the pack) post standardised packaging. There was mixed evidence of self-reported reduced smoking when using standardised packs (by forgoing cigarettes, stubbing out early, smoking less around others and examining the volume of exhaled smoke). Studies of eye-tacking showed increased visual attention towards health warnings on standardised packs compared to branded packs. Cue-related tobacco choices were significantly lower with standardised than with branded packs. Studies relating to pack selection suggested participants (youths and adults) were significantly more likely to choose branded packs. Evidence relating to quitting intentions was mixed; whereas the evidence on intention to smoke/ susceptibility to smoking among youth generally suggested that standardised packs were less likely to motivate young people to smoke. It was perceived that tobacco products in standarised packs had a worse taste than branded products. Colour was also an influence with products in brown packs perceived to have a worse taste than those in white packs; similarly, tobacco in standardised packs was deemed to be lower quality than branded packs. Health warnings were more salient on standardised packs than branded packs. Tobacco products in brown packs were considered to be more harmful than those in branded packs or lighter-coloured standardised packs. In one small study, craving to smoke was significantly lower with standardised versus branded packs

A review by Moodie et al. (2013) found strong evidence to support the role of plain packaging in helping reduce smoking rates. It was reported that plain packaging would reduce the attractiveness and appeal of tobacco products and increase the noticeability and effectiveness of health warnings. The review also showed that plain packaging is perceived by both smokers and non-smokers to reduce smoking initiation and increase cessation.

In a subsequent publication, Stead et al. (2013b) reported on consumer perceptions of plain/ standardised packaging of tobacco in terms of appeal, salience and effectiveness of health warnings and product strength and harm. Although the research was conducted before standardised packaging was introduced, there was consistent evidence that standardised packaging reduced the appeal of cigarettes and increased the salience of health warnings as well as addressing smokers' misconceptions about product strength and harms from branded packs.

Smoking bans and smoking patterns

Frazer et al. (2016b) reported inconsistent evidence on the impact of institutional smoking bans on reducing smoking prevalence and tobacco consumption. There was some positive impact on reducing smoking rates in hospitals and universities, however the findings are based on observational studies and therefore study quality was low.

Cigarette size and smoking patterns

Under the European Union Tobacco Products Directive (2016), a ban on packs containing fewer than 20 cigarettes was introduced to reduce affordability for young people in an attempt to prevent smoking initiation. This legislation was formally introduced in Northern Ireland on 21 May 2017. A review by Hollands et al. (2015b) examined the evidence relating to portion, package, tableware size for changing selection and consumption of food, alcohol and tobacco. The review included three studies relating to cigarette size, all of which were considered low quality. A meta-analysis of six independent comparisons within the three studies revealed no difference in the effect of cigarette length on tobacco consumption. There were several limitations, including the date of the research (1978 and

1980) and the small sample size. The authors did not identify any studies relating to pack size.

Conclusions

Evidence on more smokers quitting (regulation)
• Most evidence suggests that standardised packaging will reduce smoking. • There is consistent evidence that standardised packaging reduces the appeal of smoking. • There is a lack of good quality evidence on the effect of cigarette size on tobacco consumption.

4.8 Smoking cessation and health inequalities

On the request of the Department of Health, the search criteria were broadened to include reviews outside of the Cochrane Library that specifically addressed smoking cessation interventions among disadvantaged groups (ie lower socioeconomic groups). An additional nine systematic reviews/ evaluation reports were identified, and the findings are reported in this section.

Inequalities in tobacco use and exposure to second-hand smoke are complex and represent the accumulation of direct and indirect risks. Socio-economic disadvantage is associated with higher risk across the life course. As well as a higher risk of smoking and SHS exposure in general terms, social disadvantage is associated with a longer duration of smoking and a higher level of consumption.

Tobacco control regulatory measures

A review by Brown et al. (2014a) provides some insights into the effects on health inequalities of population level interventions and policies to reduce smoking in adults. This review included analyses of fiscal measures and failed to reach a firm conclusion on the equity impact of raising tobacco taxes, a conclusion later refuted in the Pricing Policies and Control of Tobacco in Europe (PPACTE) study (TobaccoFree Research Institute, 2013). A review by Hill et al. (2013) examined the impact of tobacco control interventions (namely taxation) on socioeconomic inequalities in smoking. The authors found strong evidence that increases in tobacco price have a pro-equity effect on smoking behaviour.

A small number of reviews examined the equity impact of regulatory interventions including smoking bans and marketing restrictions. There is mixed evidence on the equity impact of workplace and enclosed public place smoking bans. There is evidence of positive, neutral and negative equity impact (Brown et al., 2014a). The equity impact on marketing restrictions on tobacco is neutral, with no evidence of differential health effects in most reviews (Main et al., 2008). A review of health warnings on packaging also concluded that there were no differential effects by education.

Public awareness campaigns

Brown et al. (2014a) also found mixed evidence on the equity impact of mass media public health education campaigns. A review by (Niederdeppe et al., 2008) examining the effects of media campaigns to promote smoking cessation among disadvantaged populations also returned inconclusive results.

Smoking cessation services

A systematic review of socio-economic inequalities in smoking cessation interventions in the UK was recently published (Smith et al., 2018). This work included a consideration of the equity impact of services in Northern Ireland and recommended that the Department of Health in Northern Ireland recognise the value of targeted approaches to lower SES groups in the mid-term review of its 2012-2022 Tobacco Control Strategy. This report responds to this recommendation. The equity impact of various smoking cessation measures among disadvantaged smokers is discussed below.

A review by Brown et al. (2014b) examined the equity impact of individual-level smoking cessation interventions among adults across Europe. The interventions included pharmacological and behavioural approaches (including counselling, brief advice, quitlines, Quit and Win campaigns, text-based and internet-based interventions). Results showed that untargeted smoking cessation interventions may have contributed to reduced smoking prevalence, but on balance, increased inequalities in smoking. Smokers in lower socioeconomic groups were more likely to access services, but less likely to quit compared to smokers in higher socioeconomic groups. Findings from evaluations of the NHS stop smoking services showed that reducing inequalities in smoking could be achieved only through structured investment in increasing in engaging lower socioeconomic groups.

A systematic review and meta-analysis by Boland et al. (2018) assessed the methodological quality and effectiveness of technology-based (mobile phone and internet) smoking cessation interventions for disadvantaged groups. Results showed text messaging, internet-based and computer-delivered smoking cessation interventions were effective at increasing smoking cessation rates for up to 18 months. The authors found few methodologically rigorous studies, noting that further research is needed to address the role of technology-based interventions have in overcoming health inequalities to meet the needs of disadvantaged groups.

An evaluation of the quit4u intervention found this smoking cessation programme provided an effective and cost-effective model for engaging and supporting smokers in deprived areas to quit. The quit4u programme used a combination of behavioural support and pharmacotherapy with financial incentives, with the particular aim of increasing uptake of smoking cessation services in deprived areas (Ormston et al., 2012).

Ford et al. (2013) conducted a systematic review of peer-support programmes for smoking cessation among disadvantaged groups. Most interventions included NRT, information and behavioural skills training and varied in duration. The review demonstrated limited evidence for the efficacy of peer-support in smoking cessation for disadvantaged groups. Short- and medium-term improvements in smoking abstinence were achievable, but the authors noted that more work is needed to ensure the sustainability of peer-support beyond the formal intervention if longer-term smoking cessation is to be achieved.

Bull et al. (2014) examined the effectiveness of behavioural interventions targeting various lifestyle behaviours including smoking among low-income adults. The smoking cessation interventions had a small positive effect among the intervention group, but this was not maintained over time. It is also important to note that the time point at which smoking abstinence was measured varied from seven days to six months. The authors cautioned that although there were some small positive outcomes in terms of behaviour change among low-income groups, there was the risk of 'intervention-generated' inequalities.

Key findings - smoking cessation and health inequalities

Key findings - smoking cessation and health inequalities

- Inequalities in smoking rates have not reduced in the UK
- Fewer people are using stop smoking services
- Lower socioeconomic smokers were more likely to access UK NHS stop smoking services but less likely to quit compared with high socioeconomic smokers
- Scotland has reduced inequalities in smoking – this has mainly been achieved through a strategy of intensive targeting coupled with a service-based equity target and reporting mechanism
- Health services have an important role to play
- Innovative interventions can support lower socioeconomic smokers
- The full potential of stop smoking services have yet to be reached
- Motivation to quit and awareness of stop smoking services did not vary by socioeconomic status
- Motivation to quit and awareness of stop smoking services did not vary by socioeconomic status
- Lower socioeconomic smokers contacting services were less likely to commit to a quit date
- Loss to follow up was higher among lower socioeconomic smokers
- For most intervention/delivery types of services lower socioeconomic clients were less likely to quit

Source: Summarised from Smith et al. (2018)

4.9 Smoking cessation for strategic priority groups identified

CHILDREN AND YOUNG PEOPLE

Table 12. Summary of the effectiveness of interventions designed to aid smoking cessation among children and young people

Intervention	Outcome	Outcome Type (end/ proximal)	Results	Reference
Pharmacotherapy and strategic programmes targeting psychosocial determinants or programmes that focused on developing life skills in order to remain abstinent from smoking	Quit success/ failure	E	Limited evidence that behavioural support or pharmacotherapies increase smoking cessation in the long term. Group-based behavioural interventions showed the most promise in terms of smoking cessation among young people.	Fanshawe et al. (2017)
Portion, package or tableware size for changing selection and consumption of food, alcohol and tobacco	Tobacco consumption	E	No difference in the effect of cigarette length on consumption. Unable to highlight clear implications for tobacco or alcohol policy due to identified gaps in the current evidence base.	Hollands et al. (2015b)
Interactive internet-based interventions with behavioural support	Quit success/ failure	E	Treatment effectiveness in adolescents and young adults is unknown.	Taylor et al. (2017)

PREGNANT WOMEN

Table 13. Summary of the effectiveness of interventions designed to aid smoking cessation among pregnant women

Intervention	Outcome	Outcome Type (end/ proximal)	Results	Reference
Incentives and contingency management programmes for smoking cessation	Quit success/ failure	E	Incentive schemes improved cessation rates, both at the end of pregnancy and at postpartum assessments[36].	Cahill et al. (2015)
Psychosocial smoking cessation interventions	Quit success/ failure	E	Psychosocial interventions can support smoking cessation pregnancy and increase the proportion of women who stop smoking in late pregnancy.	Chamberlain et al. (2017)
Pharma-cotherapies, including NRT, bupropion and varenicline	Adherence to treatments	P	Some evidence that NRT with behavioural support is effective for smoking cessation in pregnancy.	Coleman et al. (2015)
Telephone support during pregnancy and six weeks post birth	Quit success/ failure	E	No firm evidence that women receiving telephone support were less likely to smoke at the end of pregnancy or during the post-natal period.	Lavender et al. (2013)

36. A review of financial incentives for smoking cessation was published by Notley et al. (2019) but was not included as part of the evidence base as it was outside of the search timeframe.

High feedback and low feedback during prenatal ultrasound for reducing maternal anxiety and improving maternal health behaviour.	Quit success/ failure	E	Insufficient evidence to support high or low feedback during ultrasound scan influencing health behaviours during pregnancy, including smoking cessation.	Nabhan and Aflaifel (2015)
Effects of NRT among pregnant women.	Quit success/ failure	E	There was eveidence that NRT was beneficial for smoking cessation at the end of pregnancy. No significant benefit of NRT at longest follow-up/ post-partum follow-up was reported.	Hartmann-Boyce et al. (2018)

Conclusions relating to pregnancy and smoking

Smoking cessation

- NRT helped reduce smoking among women at the closest follow-up to end of pregnancy. Evidence for smoking abstinence at longest follow-up postnatally was weaker.
- There is some evidence that NRT with behavioural support is effective for smoking cessation in pregnancy. There is no evidence that NRT had a positive or negative effect on pregnancy and infant outcomes.
- Psychosocial interventions can support women in stopping smoking during pregnancy and reduce the proportion of infants born with low birthweight or admitted to neonatal intensive care after birth. Education alone is not sufficient; psychosocial interventions need to include counselling, feedback or incentives.
- There was mixed evidence relating to telephone support and the use of quitlines. Some evidence showed telephone quitlines to be an important source of support; proactive telephone counselling was beneficial to smokers who seek help from quitlines, with call-back counselling enhancing their usefulness. In another review, there was no firm evidence that women receiving telephone support were less likely to smoke at the end of pregnancy or during the post-natal period.
- Studies of the use of incentives for pregnant smokers showed that smoking cessation at the end of pregnancy and following birth increased. There was some evidence for improved smoking cessation when support from a 'significant other' (who also received reward vouchers) was provided.
- There was insufficient evidence to support the use of high or low feedback during ultrasound scan on health behaviours during pregnancy.

Protection from second-hand smoke

- There is some evidence that clinical interventions (which included NRT, counselling by a physician, mid-wife or counsellor; brief advice and reminders by a physician for partners of pregnant women) can reduce the exposure of women to second-hand smoke during pregnancy.
- There is insufficient evidence to support an effect for peer or partner support for reduced exposure to second-hand smoke among pregnant women.

This evidence review has demonstrated the importance of NRT in smoking cessation in pregnancy. The evidence also suggests there is a role for psychosocial approaches (in additional to pharmacotherapy) in supporting pregnant women to stop smoking and remain abstinent. There is a growing body of evidence around the effectiveness of incentives for smoking cessation in pregnancy. In addition to the evidence presented in this review, a briefing paper was developed by McCullough et al. (2014) on behalf of the Public Health Agency which pre-dates the published evidence in this review. The paper by McCullough et al. (2014) comprised a review of evidence on effective smoking cessation services for pregnant women and the establishment of a working group to consider the implications of an approach for targeting hard to reach pregnant women who smoke (based on work undertaken in Scotland). The working group conducted a comparative review of the various service models employed within each of the Health and Social Care Trusts to determine regional differences, gaps in service and overall compliance with NICE guidelines.

McCullough et al. (2014) found limited evidence of effective interventions for smoking cessation in pregnancy; where evidence was available it was often weak and inconsistent. Their review reported inconsistent evidence in relation to the effectiveness of NRT in pregnancy (possibly due to variation in adherence to treatment). It is worth noting that several significant reviews have been published since 2014 and make an important contribution to the evidence base (Cahill et al., 2015, Chamberlain et al., 2017, Coleman et al., 2015, Hartmann-Boyce et al., 2018).

Consistent with the findings of this review, financial incentives (often in conjunction with behavioural support) were shown to be effective for smoking cessation in pregnancy. Northern Ireland is currently a site for The Cessation in Pregnancy Incentives Trial (CPIT III) funded by the National Institute for Health Research Health Technology Assessment programme. The findings of this trial will usefully inform future approaches to smoking cessation in pregnancy for policy makers and practitioners in Northern Ireland.

In terms of service provision, in 2014 pregnant women and their partners who wished to stop smoking could access smoking cessation services from a range of service providers. Tailored services have been developed incrementally and appear to be based on a local, rather than regional planning model, resulting in variations in service delivery and staffing levels across Health and Social Care Trusts. Considerable regional variation in the number of pregnant women enrolling in cessation services exists. A number of reasons have been suggested for this including differences in screening and identification protocols, variation in service models and referral pathways, as well as resource allocation. Six years on from this work by McCullough et al. (2014). there may be merit in revisiting some of these issues around engagement and uptake of smoking cessation services for pregnant women in Northern Ireland.

5 Evidence - protecting people from tobacco smoke

Evidence - protecting people from tobacco smoke

5.1 General commentary

Ten reviews provided evidence relating to protection from second-hand smoke (SHS) exposure using a recognised intervention/ policy approach, with clearly defined outcome measures and meaningful results reported. Interventions included:

- Regulatory approaches prohibiting smoking in certain environments (legislative bans as well as voluntary regulations)
- Non-regulatory approaches seeking to affect behavior change in smoking adults. Behaviour change interventions fell into two categories: 1. Enhanced smoking cessation for groups known to be significant agents of second-hand smoke exposure (parents, childcare workers etc); 2. Interventions supporting 'mitigation' behaviours (how and when smokers expose others in non-regulated environments – for example smoking outside rather than inside the home etc).

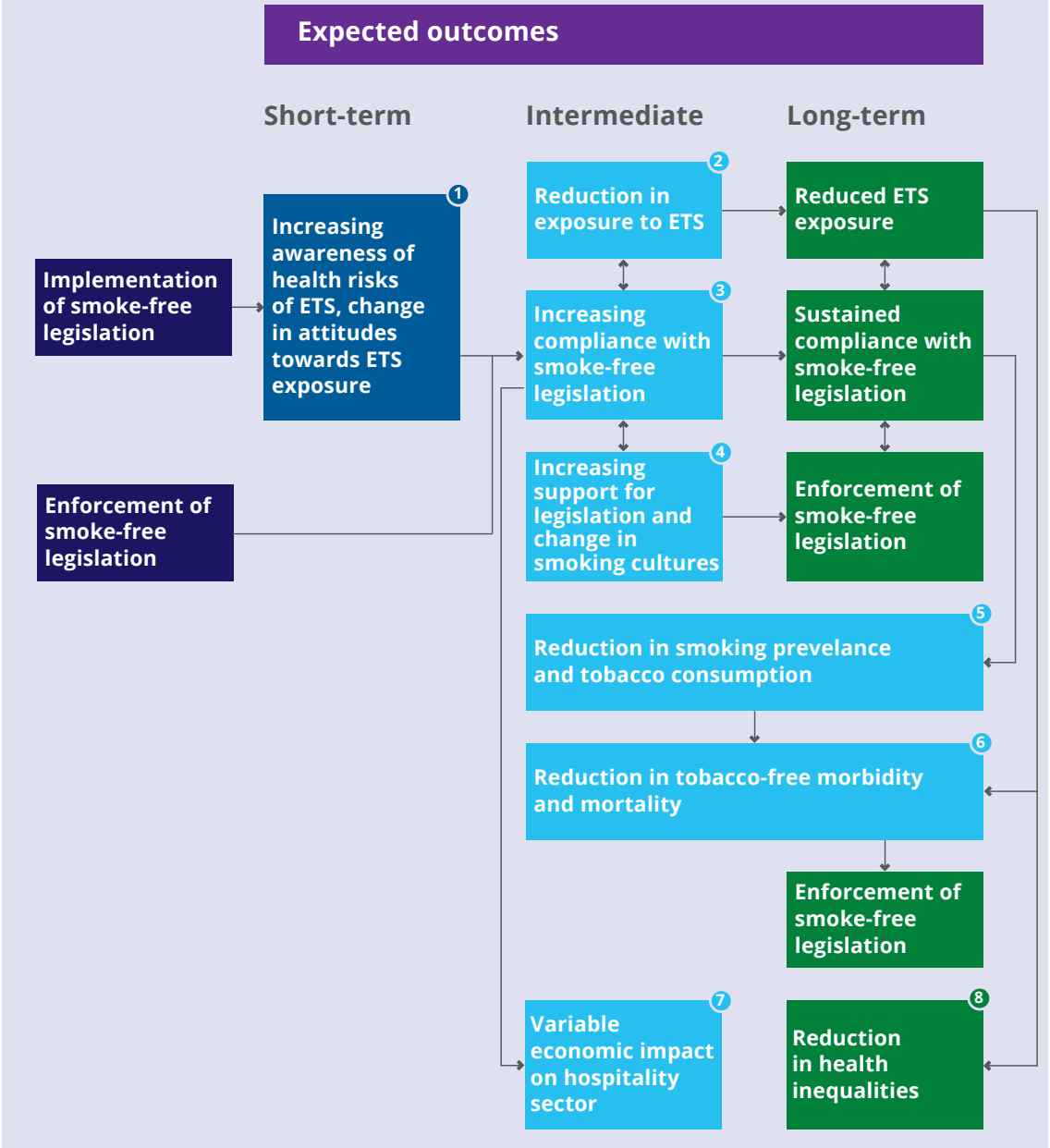
5.2 Smoke-free legislation in the UK

Smoke-free legislation has been comprehensively evaluated across the UK, based on the logic model reproduced below (Figure 4). The logic model sets out the expected outcomes of the legislation in terms of reduced second-hand smoke exposure, reduction in smoking prevalence and tobacco consumption, and reduction in tobacco-related morbidity and mortality.

An evidence review of the impact of smoke-free legislation in England by Bauld (2011) reported that a significant body of UK and international evidence now exists which demonstrates that smoke-free laws are effective in reducing exposure to second-hand smoke. Studies of bar workers (highest occupational exposure to second-hand smoke of any group of employees) found exposure reduced on average between 73% and 91% and measures of their respiratory health significantly improved after the introduction of the legislation (Semple et al., 2009). A study among children found that between 1996 and 2007, second-hand smoke exposure among children declined by nearly 70% (Royal College of Physicians, 2010). The evidence demonstrates second-hand smoke reductions were greatest in the period immediately before the introduction of smoke-free legislation, coinciding with national mass media campaigns around the dangers of second-hand smoke.

Since the publication of this report, voluntary smoking bans and introduction of smoke-free public spaces have been increasing, further enhancing efforts to reduce second-hand smoke exposure and denormalise smoking.

Figure 4. Logic model of expected outcomes from the evaluation of smoke-free legislation in the UK



Source: Haw et al. (2006)

5.3 Smoke-free legislation in Northern Ireland

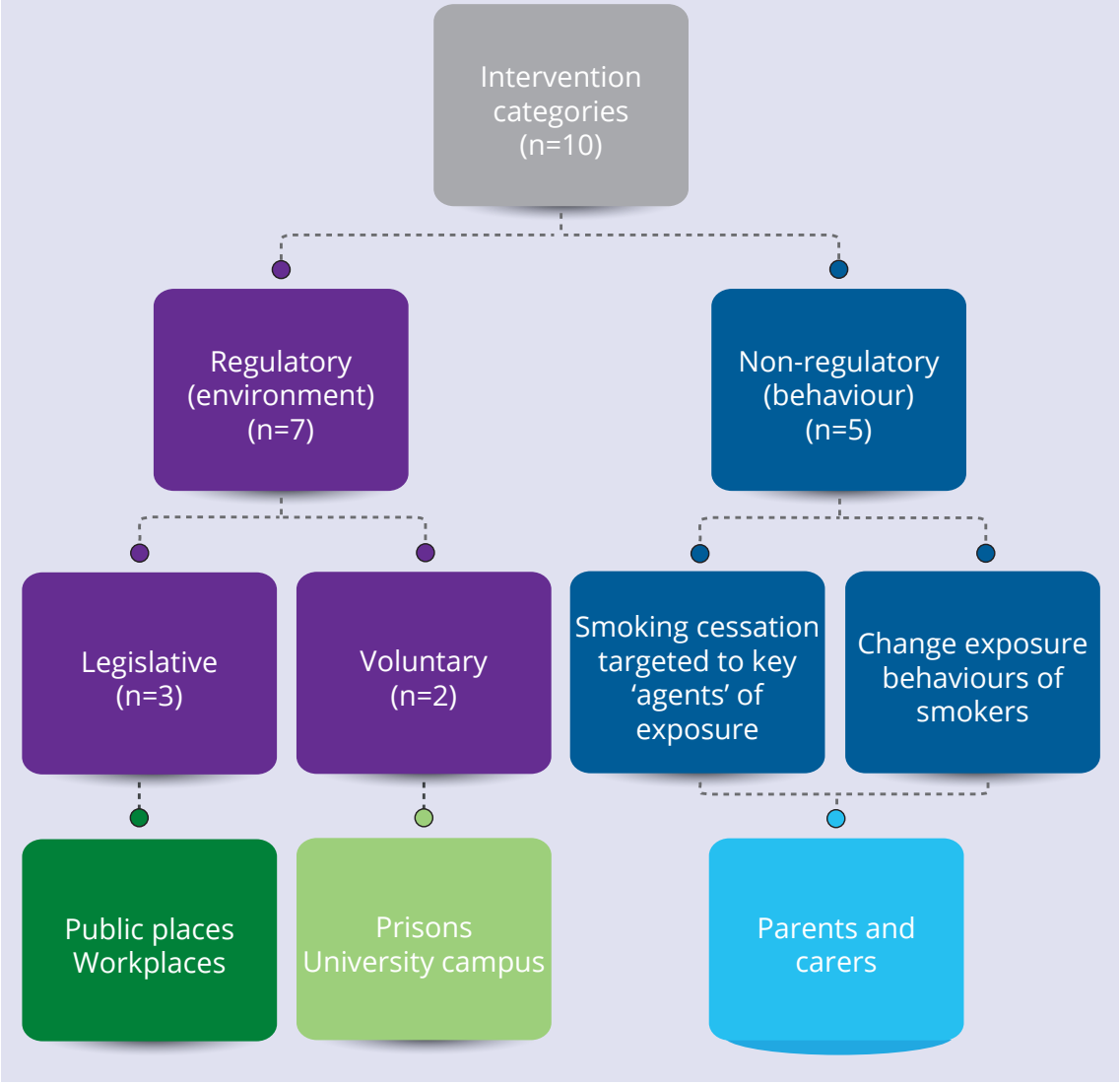
Within the UK, smoke-free legislation was first introduced in Scotland in March 2006. The legislation was introduced in Northern Ireland and Wales in April 2007, followed by England in July 2007. The legislation restricted smoking in the workplace and indoor public places in order to protect non-smokers from the harmful effects of second-hand smoke exposure.

Reducing exposure to second-hand smoke is a central component of the Ten Year Tobacco Control Strategy for Northern Ireland. Since the introduction of the legislation, there has been further work to establish of smoke-free public spaces; the most notable of which has been the roll out of smoke-free health and social care settings in 2016. There have been other developments in terms of smoke-free spaces in public playgrounds, at school gates and sports facilities (including smoke-free touch lines).

5.4 Overview of main interventions

Evidence relating to protection from second-hand smoke is based on the implementation of smoke-free legislation in the workplace and indoor public places.

Figure 5. Chart illustrating categorisation of evidence relating to protection from second-hand smoke



Regulatory approaches (legislative smoking bans)

Been et al. (2014) investigated the effect of smoke-free legislation on preterm births, low birthweight and hospital attendances for asthma. There was strong evidence to support the effectiveness of smoke-free legislation on these outcomes, with a 10% reduction in preterm births and paediatric hospital admissions for asthma, representing significant public health benefit at a population level.

A more recent review by Frazer et al. (2016a) assessed the effects of legislative smoking bans on (1) morbidity and mortality from exposure to second-hand smoke and (2) smoking prevalence and tobacco consumption (Section 4.7). Evidence relating to health outcomes and second-hand smoke exposure are summarised in Table 14. As the time since smoking bans lengthen, improvements in health benefits and outcomes have been maintained, with improved health outcomes for non-smokers in relation to cardiovascular and asthma health outcomes and reduced mortality rates.

Table 14. Summary of evidence relating to health outcomes and second-hand smoke exposure as reported in a review by Frazer et al. (2016a)

Health outcomes	Evidence
Cardiovascular	Consistent, temporal trends with evidence of significant reductions in acute myocardial infarction and acute coronary syndrome. There was a clear dose-response effect in several studies. The greatest reductions in heart disease following the legislation were in non-smokers and younger age groups. There was evidence of reductions in stroke and cerebral infarction admissions.
Respiratory	Reductions in COPD admissions were associated where legislative smoking bans were in place. There were consistent reductions in asthma hospital admissions amongst children (post-legislation), but not among adults. There was evidence of improved lung function with significant reductions in second-hand smoke exposure among hospitality workers following the legislation.
Perinatal	The emerging evidence identifies an association between smoking bans and reductions in active smoking among pregnant women and consequent reductions in foetal second-hand smoke exposure.

Mortality	This review reported evidence of reduced smoking-related mortality with consistent, temporal and dose-response associations observed.
Second-hand smoke exposure	Evidence of reduced second-hand smoke exposure was detected following the introduction of smoking bans.

Frazer et al. (2016b) reviewed the impacts of non-legislative smoking bans in prisons, third level education and hospital campuses. Observational studies found evidence of reduced smoking rates in hospitals and universities, with reduced mortality rates and reduced exposure to second-hand smoke reported in prisons. However, the evidence was considered low quality. Reduced exposure to second-hand smoke was reported, but there was no biochemical validation and inconsistencies in the implementation of smoke-free policies within prison settings. Evidence from two studies in this review observed reduced exposure to second-hand smoke on university campuses.

There were several comprehensive evaluations on second-hand smoke exposure pre- and post-implementation of the legislative smoking ban in Northern Ireland and across the UK. Findings from the One-Year and Three-Year Reviews of Smoke-Free Legislation in Northern Ireland clearly showed that smoke-free legislation in the workplace has been a success, with evidence of improved air quality in commercial premises based on pre- and post-smoking ban studies. In 2015, the Institute of Public Health in Ireland published a report on progress in reducing exposure to second-hand smoke in Northern Ireland, including a five-year review of smoke-free legislation. Whilst the review showed a temporary but unsustained decline in adult smoking prevalence, there was a reduction in the number of cigarettes smoked daily by both adult and child smokers pre- and post-smoking ban. Significant declines in smoking among pregnant women and among children in pre- and post-ban periods were noted. There was increased sensitivity to the harms caused by second-hand smoke among the general public, particularly in terms of respiratory and child health effects (Purdy et al., 2015).

The introduction of smoke-free legislation has been associated with changes in attitudes and behaviour that have positively affected smoking behaviour in home environments. Despite significant improvements over time, the prevalence of smoking inside the home remains high. There are concerns regarding the high proportion of pregnant women residing with a smoker and the high level of smoking among adults of child-bearing age, potentially exposing young children in domestic settings to second-hand smoke. Whilst there have been positive trends in relation to SHS exposure in the home, there was little evidence of similar trends in respect of SHS exposure in the car. Evidence on the health impacts of SHS exposure has grown significantly and highlights the extent and severity of the disease burden for all children, but particularly babies in utero, new-borns and under-fives (Purdy et al., 2015).

A multi-agency study assessed the impact of smoke-free legislation on indoor air quality in a sample of bars throughout Northern Ireland; the authors concluded that 12 months after the introduction of the legislation, air quality was classified as good or moderate in 97% of bars (CIEH NI, 2010).

The Changes in Child Exposure to Environmental Tobacco Smoke Wales study found that smoke-free legislation in Wales did not increase SHS exposure in homes of children aged 10-11 years. Whilst SHS exposure in public places fell significantly, the family home remained the main source of children's SHS exposure. The legislative had a positive effect on children's SHS exposure, but highlights the need for further action to protect those children most exposed to SHS (Holliday et al., 2009).

Regulatory approaches (voluntary smoking bans)

A review by Tan and Glantz (2012) found that smoke-free legislation was associated with lower risk of smoking-related cardiac, cerebrovascular and respiratory conditions; more comprehensive laws were associated with greater changes in risk. There was a 15% reduction in acute myocardial infarction hospitalisations. Decreases in hospitalisations for acute coronary syndrome, acute coronary events, ischaemic heart disease, angina, coronary heart disease, sudden cardiac death, stroke, asthma and lung infection were also recorded. There were reduced hospitalisations for coronary events, other heart disease, cerebrovascular accident and respiratory disease.

A study of smoke-free policies in American prisons and jails revealed that in 2007, 87% prohibited smoking indoors. Implementation of smoke-free policies was not consistent, but when enforced, policies dramatically reduced second-hand smoke. Despite limited research on US prisons and jails, the authors found that smoke-free policies positively impacted on the health of staff and prisoners. The authors reported that consistent implementation of smoke-free policies was an issue for a small number of prisons and concluded that effective implementation of policies has the potential to improve the health of both staff and prisoners (Kennedy et al., 2015).

Non-regulatory approaches

Five reviews provided evidence on non-regulatory approaches to protecting different population groups from exposure to second-hand smoke. The interventions included various approaches to support smoking reduction or cessation among parents; interventions delivered by healthcare professionals providing health care for children; and clinical interventions (NRT, counselling and brief advice).

Rosen et al. (2012) published a systematic review and meta-analysis of the effectiveness of interventions focused on parental smoking cessation to protect young children from exposure to second-hand tobacco smoke. Details of the intervention approaches are outlined in Table 15. The authors reported a 4% absolute difference in smoking quit rates between the control and intervention groups. In eight studies, the control group received some form of intervention (usual care or special to the trial) relating to smoking, cessation or risk to children from smoking; in a further four studies, the control group did not receive any information on cessation or reduction of child exposure, in usual care or as a special intervention. It was not possible to determine what support the control group received from the remainder of the studies. It was demonstrated that the interventions were more effective among parents of children aged 4 to 17 years, where NRT was available and with high follow-up rates. However, most parents did not stop smoking therefore additional strategies are needed to protect children from second-hand smoke. The review did not address whether the interventions also led to behaviour change in respect of parents becoming more likely to smoke at a distance from their children or mitigate the exposure of their children in any other way.

Table 15. Interventions to prevent exposure to second-hand smoke delivered in a range of healthcare settings as well as the family home.
Interventions to prevent exposure to second-hand smoke
• Self-help materials • Face-to face counseling • Telephone counselling • Smoking cessation medications • Cotinine feedback

Source: Rosen et al., 2012

A subsequent meta-analysis by Rosen et al. (2014) aimed to quantify the effects of interventions aimed at decreasing children's exposure to second-hand smoke. Interventions included self-help materials, face-to-face counselling, telephone counselling, nicotine replacement therapy, biochemical feedback and air cleaners[37] to help parents stop smoking. Although no significant differences were found for biomarkers, there was a trend towards improvements during the study period in both control and intervention groups. Benefits of interventions to help parents protect children from second-hand smoke were observed, but the effects were small.

A review by Behbod et al. (2018) examined the effectiveness of interventions designed to reduce exposure of children to second-hand smoke. Interventions included smoking prevention, smoking cessation, and any other programmes targeting the participants (ie health promotion, social-behavioural therapy, technology, and educational and clinical interventions). The primary outcome measures were children's exposure to tobacco smoke, child illness and health service utilisation, and the smoking behaviours of children's parents and carers. The evidence was low to very low quality although a small number of interventions were found to reduce children's exposure to SHS and improve children's health. Twenty-four (out of 78 studies) had a significant effect on reducing second-hand smoke exposure. Of those studies which had a significant effect, a range of interventions were used and included:

- In-person counselling or motivational interviewing
- Telephone counselling
- In-person and telephone counselling
- Multi-component counselling-based interventions
- Multi-component education-based interventions
- School-based strategies
- Educational interventions
- Smoking cessation interventions
- Brief interventions.

One study, which did not aim to reduce second-hand smoke exposure, but sought to reduce symptoms of asthma, found a significant reduction in symptoms among the group

37. High efficiency particle air (HEPA) cleaners are certified to remove >99% of airborne particles from of 0.3µm in a 1500-ft2 room.

exposed to motivational interviewing. This review did not show whether any particular interventions reduced parental smoking and child smoke exposure more effectively than others.

Daly et al. (2016) conducted a review of interventions (health promotion, educational, social, clinical or technological) delivered by healthcare professionals to reduce and/or cease parental smoking. The authors found no effects on children's exposure to second-hand smoke or parental smoking cessation. However, there was a significant overall effect on preventing maternal postpartum smoking relapse.

A review by Tong et al. (2014) reported on interventions (NRT, counselling by a physician, mid-wife or counsellor; brief advice and reminders by a physician) aimed at reducing second-hand smoke exposure among pregnant women. Four of the studies involved psychosocial interventions with various forms of counselling for pregnant women in the antenatal care setting, and the fifth study involved a psychosocial intervention plus medication to partners of pregnant women. All interventions provided information on the harms of second-hand smoke and made follow-up contact with participants. One intervention included enhancing negotiation skills for pregnant women, and two provided skill-building to implement smoke-free home rules. All interventions promoted partners or household members to quit smoking; however, only one provided direct assistance to partners and one provided educational materials to pregnant women targeted for household members. One intervention was of high-intensity, three of medium-intensity and one low-intensity. The outcomes were measured in the partners of pregnant women in one study, and of the four studies that measured the outcomes among pregnant women. Three of the five studies were based on self-reported SHS exposure and were not biochemically validated and thus were judged as poor quality. Of the two studies which used biochemical validation, one measured hair nicotine concentration and the other measured carbon monoxide (CO) exhalation in partners of non-smoking pregnant women. In the study which measured hair nicotine concentration, there was significantly difference at follow-up (one month prior to birth) in the intervention group compared to the control group and at baseline. Where CO testing was undertaken, 95.8% of the intervention group who self-reported quitting was verified as quitters compared to 66.7% of the control group. Targeting both pregnant women and their partners, delivered in prenatal care settings appears to reduce second-hand smoke exposure, but study weaknesses exist.

Evidence relating to reducing exposure to second-hand smoke is based mainly on the implementation of smoke-free legislation and institutional smoking bans. Other approaches focus on parental smoking cessation as means of reducing tobacco smoke exposure among children.

Although there are several important studies, there is not yet any conclusive review level evidence on the effectiveness of interventions to reduce second-hand smoke exposure in the following settings:

- Cars
- School grounds
- Outdoor playgrounds
- Outdoor public amenity spaces like beaches, parks and leisure facilities
- Stadia and outdoor public event spaces
- Public housing

Table 16. Summary of the effectiveness of interventions designed to protect children and young people from second-hand smoke exposure

Intervention	Outcome	Outcome Type (end/ proximal)	Results	Reference
Smoke-free legislation	Perinatal and child health outcomes.	E	Substantial reductions in preterm births and hospital attendance for asthma.	Been et al. (2014)
Smoke-free legislation	Perinatal health outcomes	E	Reductions in foetal exposure to SHS.	(Frazer et al., 2016a)
Reduction or cessation of parental smoking (self-help materials, counselling and medication)	Protection of children from SHS exposure	P	Most parents did not stop smoking, therefore additional strategies are needed to protect children from SHS.	Rosen et al. (2012)
Parental smoking cessation (self-help material, counselling, NRT, biochemical feedback, air cleaners)	Children's exposure to SHS	p	No significant differences were found for biomarkers. Trend towards improvements in control and intervention groups. Effects of protection from SHS small.	Rosen et al. (2014)
Effectiveness of interventions to reduce exposure to SHS: Health promotion, social behavioural therapy, technology, educational interventions and clinical interventions	Children's exposure to SHS; child illness; health service utilisation; smoking behaviours of parents and carers	P	Limited evidence showing some reduction in exposure to SHS and improved child health. Authors unable to identify effective features of interventions.	Behbod et al. (2018)

Health promotion, educational, social, clinical and technological interventions to reduce or cease parental smoking.	Reduce/ cease parental smoking	P	No effects on children's exposure to SHS or parental smoking cessation. Significant effect on preventing maternal postpartum smoking relapse.	Daly et al. (2016)

Table 17. Summary of the effectiveness of interventions designed to protect pregnant women from second-hand smoke exposure

Intervention	Outcome	Outcome Type (end/ proximal)	Results	Reference
Psychosocial interventions (including counselling) for pregnant women. Psychosocial interventions and medication for partners of pregnant women.	Quit success/ failure among partners of pregnant women.	P	Clinical interventions delivered in prenatal care settings appear to reduce SHS exposure.	Tong et al. (2014)

5.5 Conclusions

Protecting people from tobacco smoke

- Smoke-free legislation has been effective in reducing second-hand smoke exposure and improving health outcomes for children and adults.
- Smoking bans in institutions such as hospitals, universities and prison offer benefits for staff and students, patients and prisoners in terms of reduced exposure to SHS as well as some reduction in active smoking.
- In terms of non-regulatory approaches, most reviews assessed interventions aimed at changing parental behaviour to reduce second-hand smoke exposure for children in the context of parental smoking cessation.
- Supporting parents, including expectant parents to quit smoking is theoretically sound as a means to reduce second-hand smoke exposure among children but there is little evidence on 'what works' for this group.
- There is limited evidence of 'what works' in terms of interventions to support 'mitigation' behaviours around exposing others to second-hand smoke in non-regulated and domestic environments.

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7 Appendix

Appendix

Table 18 sets out the evidence for smoking cessation interventions shown to be ineffective. The table does not include interventions were the evidence was mixed or there was insufficient evidence.

Table 18. Interventions shown to be ineffective in smoking cessation

Strategy Objective – More people stopping smoking		
Authors and Year	**Review title**	**Intervention outcome**
Hartmann-Boyce et al. (2012) Lancaster and Stead (2012) David et al. (2013)	Nicotine vaccines for smoking cessation Silver acetate for smoking cessation Opioid antagonists for smoking cessation	Pharmacological agents showing no effect on smoking quit rates include nicotine vaccines, silver acetate and opioid antagonists (ie naltrexone).
White et al. (2014)	Acupuncture and related interventions for smoking cessation	There was no consistent evidence to support the effectiveness of acupuncture, acupressure, laser stimulation or electro-stimulation for smoking cessation.
Lavender et al. (2013)	Telephone support for women during pregnancy and the first six weeks postpartum	There was no firm evidence that women receiving telephone support were less likely to smoke at the end of pregnancy or during the post-natal period.
Posadzki et al. (2016)	Automated telephone communication systems for preventive healthcare and management of long-term conditions	Automated telecommunications systems do not appear to be have an effect on maintenance of smoking abstinence. This finding is based on low quality evidence as determined by the review authors.

Taylor et al. (2017)	Internet-based interventions for smoking cessation	There was no evidence that internet-based approaches are more effective than other active smoking interventions. Interestingly, there was no evidence of their effectiveness among adolescents and young adults.
Barth et al. (2015)	Psychosocial interventions for smoking cessation in patients with coronary heart disease	The evidence demonstrates that brief interventions of less than one month in duration, without support over time, were not effective. No clear evidence that brief interventions were effect for patients with coronary heart disease.
Thomas et al. (2017)	System change interventions for smoking cessation	No firm conclusions could be reached about the effectiveness of system change interventions within healthcare settings for increasing smoking cessation or the provision of smoking cessation care or both.
		This was largely due to low quality evidence.
Hajek et al. (2013)	Relapse prevention interventions for smoking cessation	Existing evidence does not support the use of behavioural approaches to prevent smoking relapse.

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