

Making the case for prevention

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October 2021
Version 3.0

A commissioned report by Cambridge Public Health, University of Cambridge, for the Health Foundation

Executive summary

Over the past 160 years, we have witnessed the fastest improvements in mortality in the UK in history, with life expectancy almost doubling for men and women. Progress was driven initially by preventing childhood deaths and subsequently by the prevention of illness in older people. Prevention has also improved the quality of the lives we live by delaying chronic diseases until later life. Over the past ten years, improvements in life expectancy have stalled, although not equally across all parts of society.

Responsibility for prevention is spread across several different organisations in the UK, but a mainstay is through the Public Health Grant to Local Authorities. This grant funds vital services, such as smoking cessation, drug and alcohol services, children's health services and sexual health services, as well as broader public health support across the local authority and NHS. There has been a 24% real-term cut, equivalent to £1bn, in the grant from 2015/16 compared to 2021/22.

Previous research has already shown that the Public Health Grant represents good value for money, especially when compared to NHS spend or HM Treasury thresholds. One study found that the cost per additional year in good health from public health interventions was £3,800, compared to £13,500 for NHS clinical interventions.

There is now a considerable evidence base demonstrating the effectiveness of public health and preventative interventions, but not all interventions are equally effective or cost-effective. A granular approach is needed to disentangle the effects of different interventions, from smoking cessation to physical activity and sexual health services. Furthermore, public health interventions will impact health inequalities differently; some may inadvertently increase inequalities, whereas others may reduce the gap.

Here we review the effectiveness and cost-effectiveness of public health interventions paid for by the Public Health Grant. We use three methods: first, we build on a series of papers by Owen and colleagues that review public health interventions that NICE has evaluated; second, we undertake a high-level review to identify additional important studies; and third, we consider the inequalities impact of public health interventions based on research by Griffin and colleagues. We focus on the most cost-effective interventions – those below the £20,000 per additional year of healthy life threshold, which is the lower end of what the National Institute for Health and Care Excellence (NICE) judge to be cost-effective.

In total, we identified 134 public health interventions that were cost-effective. The largest group was smoking interventions (67), followed by physical activity (14), public health advice (diabetes and skin cancer prevention) (8), sexual health (8), children's services (8), health at work interventions (8), air pollution (6), substance misuse (6), public mental health (5), domestic violence and abuse (2) and weight management (2). In the case of fifty of these, the cost of implementing the intervention was cheaper and provided more health gain than the comparator of standard practice at the time of the research, which may be an alternative intervention, or no intervention (dominant Incremental Cost Effectiveness Ratio; ICER). The other 86 would be considered cost-effective because the health benefits outweigh the costs at a £20,000 per additional year of healthy life threshold.

The most significant impact on reducing health inequalities came from smoking and domestic violence interventions – the difference was 3-3.5 times more than any other interventions. Other public health inequalities-reducing interventions included population level and community diabetes programmes, hepatitis testing, support for looked after children, Sure Start programmes and workplace programmes. Public health interventions that were more likely to increase inequalities were straightforward advice and screening in primary care and A+E, walking buses and physical activity interventions.

We do not argue that interventions that increase inequalities should not be implemented at the expense of overall population health improvements. Instead, local planners need to understand the potential trade-offs between overall population health improvement and inequalities with evidence of how interventions could be modified to mitigate negative consequences. For example, by delivering services with a greater intensity in more disadvantaged areas, rolling out new initiatives first in more disadvantaged areas and ensuring services are culturally competent.

We only consider socioeconomic inequalities to reflect the majority of economic analyses, but more work is needed to understand the impact of public health interventions on other inequalities, such as ethnicity and the intersection of different aspects of disadvantage.

Investment in prevention represents excellent value for money compared to health care spend or HM Treasury willingness to pay values, as long as the funds are used for the evidence-based interventions. As the country emerges from an inequalities-compounding pandemic, there is good evidence that specific public health interventions, such as smoking and domestic abuse activities, will reduce the health gap. While there is currently much focus on addressing the backlog of NHS procedures, we must not lose sight of the public health backlog which is currently storing up future health problems.

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Prevention as the driver of mortality and morbidity improvements

Life expectancy has almost doubled over the past 160 years in England and Wales¹. In 1851, life expectancy was only 40 years for men and 42 for women. This trend continued for many years but, has stalled since 2011 with men expecting to live 79 years and women 82 years. The dramatic improvements are a consequence of primarily one factor – better prevention. Early gains until the mid-20th century were driven by the prevention of childhood deaths through childhood vaccinations programmes, improved sanitation and housing, education and economic development. Later improvements from the mid-20th century to the early 21st century, were mainly driven by better prevention for older adults, such as smoking cessation, in addition to better health care diagnostics and treatments.

Since 2011, life expectancy has stalled and even declined in some groups²⁻⁴. Women living in more deprived areas have experienced a reduction in life expectancy. For men in deprived areas life expectancy has stopped improving, while those living in more affluent areas have experienced further improvements, albeit at a slower rate than previously. The stalling of life expectancy has been witnessed in other high-income countries, but not universally, with the notable exceptions being primarily Scandinavian countries.

Prevention also helps to improve the quality of life and reduce the length of time spent in ill health. In 1980 Fries introduced the Compression of Morbidity Theory which proposed that if the onset of chronic illness in later life can be postponed, the overall lifetime burden of illness can be reduced⁵. The theory suggests that by implementing effective early interventions in midlife, such as smoking cessation, the period and cost of ill health are delayed until the very end of life. For example, in a recent review Dieteren and colleagues found that preventing people from smoking led to fewer years of ill health, relative to the total number of years lived, compared to smokers⁶. The Compression of Morbidity Theory is more of an aspirational theory to inform the strategic design and delivery prevention programmes, rather than a statement of fact. For example, the Global Burden of Disease dataset estimated that between 1990 and 2011 life expectancy increased by 4.9 years (from 75.9 to 80.8 years), whereas health-adjusted life expectancy, the expected number of years lived in full health, only increased by 4.6 years (from 65.4 to 69.0 years). This suggests that the life expectancy led to a small expansion of morbidity in later life. This is supported by Scott and colleagues who looked at the economic value of extending life compared to compressing morbidity and found that compressing morbidity is more valuable⁷. Since preventative measures are all different with different outcomes, it is better to focus on those preventative initiatives and programmes which focus on improving health and wellbeing in later life, rather than simply extending life.

Postponing ill health until later in life can have economic and social benefits. Dame Carol Black's Review of the health of Britain's working age population found that the cost to the economy of worklessness and sickness absence was over £100bn per year⁸. For every unemployed person who gains employment, Public Health England's Return on Investment tool estimated that it would save the government £11,410, the local authority £540 and the NHS £85 every year. Howdon and Rice found that higher health care costs are associated with proximity to death rather than age⁹. Other studies have found that health care costs in the final year of life are higher in younger age groups^{10,11}. However, the Office for Budget

Responsibility found that health care spend increases with age¹². Helping people to stay healthier for longer can also have wider benefits to society, such as volunteering and helping with caring and childcare.

Organisational responsibility for prevention

The responsibility for prevention is disseminated across national, regional and local organisations. The NHS Long Term Plan has a strong focus on prevention¹³. The new Office for Health improvement and Disparities (OHID) will take on national responsibility in Autumn 2021 for tackling the top preventable risk factors, including obesity lack of physical activity, smoking and alcohol consumptions, as well as working to address health disparities, after PHE is abolished. However, the mainstay of local prevention is delivered through the Public Health Grant allocated by DHSC to public health teams within local authorities. The grant funds a series of key services, such as smoking cessation, drug and alcohol services, children's health services and sexual health services, as well as broader public health support across the local authority and NHS (full details are shown in Appendix 1).

The Office for National Statistics (ONS) has calculated that prevention accounts for only 5% of government healthcare expenditure¹⁴. While real-term spending on curative and rehabilitative care and long-term health care has steadily increased, spending on preventive services has fallen compared to 2015/16 levels; the reduction is equivalent to a £1bn or a 24% real-term cut from 2015/16 compared to 2021/22.

Is prevention value for money?

Existing research suggests that PH interventions are excellent value for money. Martin and colleagues compared the cost-effectiveness of local authority public health services with NHS interventions by calculating the cost of one additional year of healthy life, using Quality Adjusted Life Years (QALYs)¹⁵. Based on 2013/14 data, they found that local authority public health spending is 3-4 times more cost-effective in terms of QALYs than NHS health care spending and 15 times more effective than the HM Treasury's current monetary willingness to pay value of a QALY (£60,000)¹⁶. This figure from the HM Treasury needs caution because it reflects the amount an individual would be willing to pay for one year of good health, not necessarily the willingness to pay in taxes for a year of good life for a member of the population. The cost per additional QALY was £3,800 for local public health budget services, compared to £13,500 for NHS services. This suggests that investing in local public health programmes would generate longer and more healthy lives than equivalent spend in the NHS and is a fraction of the willingness to pay value used by HM Treasury. These estimates are comparable to other international figures¹⁷. Despite the effectiveness of prevention, overall spend on prevention is only a fraction of what is spent on the NHS. Before the pandemic, funding to NHS England was £123bn¹⁸, compared to just over £3bn for the Public Health Grant¹⁹. However, when the NHS' preventative activities are taken into account, such as immunisations and screening, the government health spend on prevention is about 5%¹⁴.

Building the evidence base

In 2000, the Department of Health published a Research and Development Strategy²⁰. It identified several strategic aims, including building capacity in public health to produce evidence to support the improvement of the health of the population, bringing the principles of evidence-based medicine to public health, and supporting this with improved capacity to search the literature and synthesise evidence. There was a perceived deficit with public health evidence, and the publication of the strategy set in train several developments to remedy this. There is now a considerable public health evidence base of primary studies, which adhere to the best methodological techniques. The existence of NICE and its rigorous application of cost-effectiveness provides an invaluable platform for public health improvement. Most recently, the application of health economic principles to health inequalities begins to break new ground and helps shift the argument away from the debate about the inevitable disjunction between utility analysis and equity.

Understanding what works

It is not as simple as an investment in public health services will result in healthier lives because some public health services are more effective than others. Existing evidence allow us to determine, to an extent, what is effective and what is cost-effective. The Local Government Association reviewed 11 case studies and found that the cost-benefit (per £1 spent) ranged from £20.69 for a physical activity programme for 40-65-year-olds to £0.49 for supported employment²¹.

A granular approach is required to disentangle the merely aspirational interventions – things that seem self-evidently to be good ideas²² – from those that actually lead to population benefit. So, for example, while the epidemiological case for promoting physical activity in all age groups is sound and evidence-based, saying that we should encourage more physical activity is insufficient. We need to know what the most cost-effective ways are to achieve these ends. Not all efforts to promote physical activity will either work, or even if they do work, will not be cost-effective and good value for money. This is not merely an obtuse point of interest to economists, accountants or the Treasury. Given that resources to invest in public health are limited, and have declined in recent years, doing things that do not work, is not only money wasted, but it is money that cannot then be spent on something which might be more effective and better value for money. Therefore, the importance of taking a granular approach that considers the evidence from specific interventions and assesses them against and along with the evaluations of similar interventions, must be used, compared to general arguments about the importance of weight reduction programmes, increasing physical activity or reducing alcohol consumption for children for example.

Furthermore, the pandemic has changed what preventative services are needed. Positive changes include a reduction in sexual transmitted infections by 32% in 2020 compared to 2019 resulting 10% fewer consultations for sexual health services during the pandemic (although online consultations doubled to over a million and online testing has been expanded significantly)²³. While most of this reduction is likely due to changing of behaviour during the pandemic, there may also be some people who did not feel comfortable to come

forward for testing, even although online testing was available. However, alcohol deaths have risen by 19% between 2019 and 2020²⁴. Drug-related deaths are now at the highest levels since records began with a 3.8% increase between 2019 and 2020²⁵. Mental health problems have risen during the pandemic with one fifth of the population experiencing a sustained increase in poor mental health²⁶. There have also been decreases in physical activity and increases in sedentary behaviour during the pandemic²⁷.

Addressing inequalities

Further, there is a need to address widening health inequalities. The Government has committed to a programme of 'levelling up' which include ambitions on health, although details have not yet been forthcoming. The Public Health Grant presents an opportunity to reduce geographical inequalities across the country through its allocation by the Department of Health and Social Care and may also be used to reduce local inequalities through its use by local Public Health teams who understand their local inequalities. The Health Foundation estimates that levelling up public health across England would require an additional £2.6bn investment in the Public Health Grant²⁸.

In an innovative and important paper, Griffin and colleagues (2019) estimated the health inequality impact of implementing NICE public health guidelines²⁹. They estimated that eighteen (60%) public health guidelines increase total population health and reduced health inequality, four (13%) reduced total population health and increased health inequality, and eight (27%) involved a trade-off of either decreasing inequalities but also reducing total population health or increasing inequalities but improving total population health. Only four guidelines did not reduce inequality and worsened it; these included two unintentional injuries guidelines, exercise referral schemes, and preventing excess winter deaths.

Aims and approach

Ensuring the adequate funding for prevention is key to improving overall health and wellbeing and reducing inequalities. Existing research suggests that spending on the Public Health Grant represents good value for money^{15,29}. We examine in this report those interventions that have been found to work and be cost-effective, plus explore their impact on socioeconomic inequalities. The most comprehensive resource detailing cost-effective public health interventions is located in the NICE public health guidelines. These guidelines deal with many of the areas of responsibility of local authorities identified in the Public Health Grant either directly through the commission or provision of services (e.g. sexual health services) or indirectly through the wider actions of the public health teams (e.g. working across the local authority to reduce domestic violence).

We triangulated three primary sources of evidence. First, we draw upon three key studies published by Owen and colleagues that review the cost-effectiveness of the public health NICE guidance^{30–32}. The authors reviewed the economic evaluations of all the public health interventions considered by NICE to allow for comparison. In their paper published in 2019, the authors review 71 guidelines, of which 27 used a suitable approach to enable comparison across interventions (cost-utility analysis, CUA). We applied this body of literature to the Public Health Grant to identify those public health measures which represent the best value for money. We used a cut-off of a net benefit of £20,000 per year of healthy life (QALY).

Second, with the aid of an experienced information scientist (Isla Khun), we undertook a high-level literature search of an electronic database (MEDLINE). We screened 1518 titles and abstracts of published literature, reviewed 65 full papers and found 20 that were relevant. The purpose was to ensure that key articles were not overlooked rather than undertake a formal literature review. The papers identified from this search were integrated into the review of NICE guidelines.

Third, we used a study by Griffin and colleagues to understand the impact of different public health interventions evaluated by NICE on health inequalities²⁹. In their 2019 paper, the authors estimate the inequalities impact on Quality Adjusted Life Expectancy (QALE) across the socioeconomic gradient before and after public health interventions using the Slope Index of Inequality. This method allows for a comparison of the inequalities impact across different conditions.

There are three important caveats. First, the Public Health Grant provides funds for key services and local public health teams who influence local health and care systems in many ways. Responsibility is often shared across organisations, and there may be considerable local variation in who is responsible for which services. We have sought to include a breadth of interventions below, acknowledging that local public health teams may not have direct responsibility for decision-making in some areas. Second, the studies on which these analyses are based (Owen and Griffin papers) were both published in 2019. Since then, NICE guidelines may have been updated and not included below, although we do not believe this would have made a significant difference to the main findings. Third, the economic analyses reported here are based on rigorous NICE methodology; however, some are now more than

ten years old. This is important because the standard practice may have changed, perhaps due to the NICE guidelines themselves; therefore, the comparators used within the economic analyses may no longer reflect standard practice. Furthermore, we do not have data to show how each intervention compares to each other or which combination of interventions is likely to be most effective. However, NICE regularly review the guidelines to assess if any recently published evidence is likely to impact the recommendations.

What public health interventions are value for money and reduce inequalities?

This section provides detail of the most cost-effective interventions covered by the Public Health Grant. It also highlights those which are most likely to reduce or increase inequalities. Detailed tables of all the cost-effective interventions (using the cost-effectiveness threshold of £20,000 per additional year of good health (QALY)) are provided in Appendix 2.

Key definitions

Incremental Cost-Effectiveness Ratio (ICER) compares a new intervention with a suitable comparison to estimate the extra cost for one additional health unit when the intervention is implemented. The health unit we use below is the **Quality Adjusted Life Year (QALY)**, equivalent to one year of healthy life because it can be compared across different conditions. The ICER threshold for new drugs or interventions used by NICE is £20,000-£30,000 per additional QALY. An intervention that has an ICER of less than £20,000 is judged to be cost-effective because the costs of providing the intervention justify the health gains. However, an ICER of over £30,000 is generally considered not to be cost-effective because the costs do not justify the health gains, other than in some cancer treatments.

Dominance means that based on the ICER the intervention is cost-saving compared to standard care (i.e. the intervention is cheaper and provides additional health benefits than what is currently done). Standard care is judge by experts and may be another intervention or no intervention. However, it is important to note that the term 'cost-saving' here is used in a technical, economic sense to mean the intervention costs less than its comparator and delivers more health benefits. It does not mean that local authorities will be able to make financial savings in the short term if these are implemented.

Quality Adjusted Life Expectancy (QALE) estimates how long and well a specific group of people will live. It combines both life expectancy and quality of life.

The Slope Index of Inequality (SII) measures the steepness (or not) of the socioeconomic gradient for a particular outcome. The outcome used below in SII estimations is QALE. Inequalities are calculated using the estimated difference in QALE SII before and after an intervention is implemented. A positive difference means that the slope is less steep after the intervention and therefore, inequalities would decrease. A negative difference means that the slope is steeper and thus, inequalities would increase.

Smoking and Tobacco

Smoking cessation remains one of the most cost-effective and inequality-reducing public health interventions. We identified 67 cost-saving or cost-effective interventions across eight guidelines (see Table 1). Based on five guidelines (PH15, PH26, PH10, NG92 and PH45), 34 smoking interventions were cost-saving (dominant), such as rewards to stop smoking in

pregnancy, cut down to quit (CDTQ) interventions, smoke-free policies, pharmacological therapies and behavioural support. A further 33 smoking cessation interventions were cost-effective, with the cost of an additional year in good health being under £9,000, including mass media interventions, pharmacological therapies, behavioural support, pharmacist-based intervention, and incentives.

Smoking interventions were also among the interventions that were most likely to reduce inequalities. The difference in the slope index of inequality was high for the smoking intervention in coronary heart disease guideline (SII difference 0.15), harm reduction in people who smoke (0.01) and child smoking prevention (0.003). Specific smoking interventions were particularly effective in reducing inequalities, such as recruiting smokers from the community (SII difference 0.36), free phones for use in telephone counselling (0.31), pharmacy-based interventions in deprived areas (0.13), and recruitment to the "Quit to Win" programme (0.13).

Two additional papers were identified. Begh and colleagues 2011 found that using outreach workers was a cost-effective strategy for encouraging Pakistani and Bangladeshi smokers in the UK to use NHS smoking cessation services³³. Guerriero and colleagues concluded that Txt2stop, personalised smoking cessation advice and support by mobile phone message are beneficial for health and cost-saving to a health system³⁴.

Domestic violence and abuse

Tackling domestic violence was cost-effective and the most equitable of all public health interventions (see Table 2). Both harm reduction through cognitive therapy and incidence reduction through domestic violence advisors were cost-saving (dominant). Domestic violence guideline interventions had the largest decrease in health inequalities compared with other guidelines (SII difference 0.23), although individual smoking interventions within the smoking guideline, such as providing phones for counselling and recruiting smokers from the community, had the highest single impact on health inequalities. Both targeted approaches focused on specific disadvantaged groups and non-targeted interventions were effective in reducing inequalities, suggesting the need a multi-level approach.

Diabetes and skin cancer prevention (Public Health Advice)

Two diabetes-related guidelines and two skin cancer prevention guidelines were considered cost-effective public health interventions (Table 3). Large-scale region-wide multicomponent diabetes interventions were cost-saving and four other interventions were cost-effective (dietary interventions and low protein diets). Mass media to reduce sun damage was cost-saving, and parent advice and tailored messaging were cost-effective for reducing skin damage.

Population and community level diabetes interventions had a greater reduction in inequalities (difference in SII 0.07) than targeting high-risk people (difference in SII 0.0001).

Skin cancer prevention advice did not have an impact on health inequalities either positively or negatively.

Sexual Health Services

Several cost-effective sexual health interventions were identified (see Table 4). The most cost-effective was multisystemic therapy for problem sexual behaviours (dominant), but there were seven other sexual health interventions that were cost-effective.

Based on the equity analysis of Griffin and colleagues²⁹, the sexual health guidelines had a neutral impact on health inequalities.

One additional study was identified. Long and colleagues 2014 concluded that Annual HIV testing of key populations in the UK (men who have sex with men (MSM), people who inject drugs (PWID), and individuals from HIV-endemic countries) is very cost-effective³⁵. Further one-time testing of all other adults could identify the majority of undiagnosed people living with HIV.

Substance Misuse

Primary care nurse and GP screening plus brief intervention to reduce alcohol use disorders were cost-saving, and screening plus brief intervention in A+E was cost-effective (ICER = £0) (see Table 5). Life skills training to address substance misuse was also cost-effective (ICER = £3,492). Education of GPs about hepatitis B and C with paid targeting of ex-injecting drug users and testing of users of additional services were cost-effective (ICER = £13,877 and £14,632 respectively).

Griffin and colleagues found that the brief interventions were more likely to slightly increase inequalities (SII difference -0.001). This may be because practitioners are less likely to undertake brief interventions in lower socioeconomic groups because of other competing factors within a clinical consultation, such as complex health and care needs and addressing other social issues. However, they found that substance misuse interventions and hepatitis testing were likely to reduce inequalities (difference in SII 0.003 and 0.001 respectively).

Two additional studies were identified. Agus and colleagues (2019) evaluated the classroom-based intervention Steps Towards Alcohol Misuse Prevention Programme (STAMPP) in adolescents³⁶. They found that "STAMPP was a relatively low-cost intervention that successfully reduced heavy episodic drinking. STAMPP did not bring about clear public sector cost-savings; however, neither did it increase them or lead to any cost-shifting within the public sector categories. STAMPP can therefore be considered to dominate education as normal because it was both cost-neutral and more effective." Crawford and colleagues (2014) studied brief interventions for excessive alcohol consumption in sexual health clinics and concluded that this was not a cost-effective use of resources³⁷.

Children 5 – 19 Public Health Programme

Independent living programmes for looked after children and Sure Start programmes were cost-saving (dominant) (see Table 6). Dental counselling to parents of children in disadvantaged areas and oral health programmes for high-risk children were cost-saving (dominant) and programmes for average-risk children cost-effective (ICER = £14,408). Walking buses for children and young people and anti-bullying programmes in secondary schools were also found to be cost-effective (ICER = £4,007 and £9,600 respectively)

Interventions to support looked after children (difference in SII 0.0003) and Sure Start programmes (difference in SII 0.001) were associated with reducing inequalities. However, walking buses were more likely to slightly increase inequalities (difference in SII -0.001). Inequalities data were not available for oral health interventions.

Health At Work

Multicomponent workplace interventions and visits were found to be cost-saving (dominant) (see

Table 7). Physical activity and education for long term sickness and walking programmes, counselling and stress management interventions in the workplace were cost-effective (ICER £686 to £15031).

Workplace interventions were found to reduce overall inequalities (difference in SII 0.001) but will only reach those in work.

Public Mental Health

Friendship programmes for older people were cost-saving (dominant). Primary school social and wellbeing activities and walking programmes, and computer training for older people were cost-effective (ICER = £5,278 to £15,962) (see Table 8). For older people, friendship programmes were more likely to decrease inequalities and computer training to increase inequalities, although computer training improved overall population health. No data was available on the impact on health inequalities of school programmes.

We identified one additional paper. Coulton and colleagues found that community singing improved mental health in older people but was only marginally cost-effective compared to usual care³⁸.

Obesity

Mass media to promote healthy eating and weight management interventions in pregnancy were cost-effective (ICER = £87 and £9,096 respectively) (see Table 9). There was no data available relating to the impact on health inequalities.

Two additional studies were identified. Adab and colleagues (2015) investigated the longer-term outcomes of school-based interventions for the prevention of childhood obesity in 6-7-year-olds (the WAVES Study)³⁹. The intervention included a healthy diet and physical activity interventions. Results were reported by Canaway and colleagues 2019⁴⁰. They estimated a QALY value of £26,815, which they described as cost-effective. Fuller and colleagues 2014 found that referral to commercial weight loss programmes from primary care was cost-effective compared to usual care⁴¹.

Physical Activity

Fourteen physical activity interventions were found to be cost-effective (ICER ranged from £75 to £12,351), including intensive interviews, travel towns, cycling demonstrations, TravelSmart programmes, brief advice, pedometer interventions and multicomponent cycling interventions (see Table 10).

Griffin and colleagues found that physical activity interventions were more likely to increase inequalities (difference in SII -0.002), except for brief advice for which there were no data.

We identified two other studies. Campbell and colleagues did not find exercise referral schemes cost-effective (£76,000 per QALY)⁴². Frew and colleagues 2014 studied the city-wide activity programme ((Be Active) in Birmingham which gave free access to leisure facilities, such as gyms and swimming pools, at certain times of the day for local residents and found it cost-effective⁴³. Kelly and colleagues 2021 examined a Men on the Move (MOM) intervention, a 12-week community-based beginners physical activity programme for inactive men, and found that it achieves significant improvements in aerobic fitness, weight loss, and waist reduction⁴⁴. The total cost per participant (£125.82 for each of the 501 intervention participants), the QALYs gained (11.98 post-12-week intervention, or 5.3% health improvement per participant). They estimated an ICER of €3723 which represents a cost-effective improvement. In Ireland, "The analysis shows that the cost per QALY achieved by MOM is significantly less than the existing benchmarks of £20 000 and €45 000 in the UK and Ireland respectively, demonstrating MOM to be cost-effective."

NHS Health Check Programmes

We did not identify any NICE guidelines relating directly to the NHS Health Check programme. However, other studies have looked at the cost-effectiveness and equity of the programme. Kypridemos and colleagues undertook a microsimulation policy model based on Liverpool demographics and risk factors⁴⁵. The authors modelled the impacts of health checks over 20 years and found that the current programme appears to be neither equitable nor cost-effective. The authors suggest that implementation needs to be optimised with targeting the highest risk groups to achieve a cost-effective and equitable health check programme.

National Child Measurement Programme (NCMP)

We did not find any cost-effectiveness or equity-related evidence for the national child measurement programme.

Miscellaneous

The Public Health Grant funds public health experts to contribute and influence the wider functions of the local authority, such as local action on outdoor air pollution. One guideline (NG70) examined outdoor air pollution and found six cost-effective interventions, such as street washing, speeding restrictions, low-emission zones, cycle paths and bypass construction (ICERs range from £441 to £6,791). No data were available on the inequalities impact.

What does this mean?

There is strong evidence that investment in the Public Health Grant offers good value for money. Previous research from Martin and colleagues suggests that the health gains from public health interventions are 3-4 times that of health care and up to 15 that of the HM Treasury willingness to pay value for one additional year of healthy life (£60,000)^{15,16}. Both health care and public health benefit population health, so it is not a matter of one or the other but ensuring that public health investment is maintained or increased. Griffin and colleagues found that 60% of the NICE public health guidelines improved public health and reduced inequalities²⁹.

While the previous research shows that public health interventions are cost-effective and likely to reduce inequalities, it also shows considerable variation. Some public health interventions are not cost-effective, and others may increase inequalities. Here we have explored the evidence base to identify those public health interventions which offer the best value for money and reduce inequalities.

We found a total of 134 public health interventions that were cost-saving or cost-effective at the £20,000 per additional QALY threshold. The largest group was smoking interventions, but there were cost-effective interventions identified in every domain of the Public Health Grant except for the National Child Measurement Programme. A common theme was the need for multi-level, long term preventative programmes. There is a need to resist reaching for simple short-term solutions for complex problems. The relative success of a year-on-year reduction in smoking has been because of multi-level evidence-based actions which targets upstream structural determinants (e.g. pricing and availability), advertising, universal and targeted behaviour change campaigns, workplace interventions and treatment options.

While we only present interventions that are effective and cost-effective, there are public health interventions, which may not represent value for money and may increase inequalities. Owen and colleagues included a total of 221 public health interventions in their study³²; 67 were not cost effective at the £20,000 per additional QALY threshold and four were more expensive with less health benefit than the comparator (ICER dominated). For example, all the interventions in the NICE cold homes' guideline (15 interventions in total including improving energy efficiency and providing fuel subsidies for people with COPD or heart disease) were above the £20,000 per additional QALY threshold (ranging from £28,324 to £509,205). Although this may be due to the challenges of assessing the cost-effectiveness of housing interventions on health. Griffin and colleagues found that the cold homes' guideline was likely to increase inequalities (difference in SII -0.02)²⁹. This is not to say that other housing interventions are not beneficial or reduce inequalities. Gibson and colleagues undertook a review of housing and inequalities and found certain housing interventions were more likely to address inequalities, such as improving the local housing conditions and warmth of houses⁴⁶.

The greatest impact on health inequalities came from smoking and domestic violence interventions. The difference in the slope index of inequality for smoking and domestic

violence interventions was 3-3.5 times more than any other interventions. However, there was evidence that population-level and community diabetes programmes, hepatitis testing, support for looked after children, Sure Start programmes, and workplace programmes were also likely to reduce inequalities. However, there were public health interventions that were likely to increase inequalities. These so-called "intervention-generated inequalities"⁴⁷ included brief interventions and screening in primary care and A+E, walking buses and physical activity interventions. This is supported, in part, by a study of public health interventions that increase or decrease inequalities. Lorenc and colleagues in a review of reviews published in 2013, found that media campaigns and workplace smoking bans are more likely to increase inequalities, but structural workplace interventions, provision of resources, and fiscal interventions such as tobacco pricing are more likely to reduce inequalities⁴⁸. Although it should be noted that while we present individual SII estimates here, when combined together the overall SII for a programme of interventions may suggest a reduction in health inequalities.

We do not advocate that only those interventions which reduce inequalities should be implemented. If this were the case, and based on the evidence presented here, physical activity interventions would not be recommended. However, an awareness of the balance between overall population improvement and inequalities impact of different interventions is needed to inform local planning. For these types of interventions, modifications should be considered to mitigate worsening inequalities without compromising the population benefits. Griffin and colleagues have attempted to estimate the total population health impact²⁹. For example, they found that while walking and cycling interventions may increase inequalities, they have the third highest population impact of all the guidelines (after domestic abuse and coronary heart disease interventions).

A key problem facing local authorities since the move of responsibilities for public health to local government has been applying general guidance at local level^{49,50}. Unlike the NHS and NICE technology appraisals, local authorities do not have a statutory duty to implement NICE public health guidelines. In a scoping review, Kneale and colleagues found that local public health decision-makers tended to prioritise local evidence, local experts and local evaluation, despite the varying methodological rigour, over national public health guidance⁵¹. The use of local information had been compounded by the move of public health functions from the NHS to local authorities. While granular data on how local authorities spend the Public Health Grant does not exist, it appears that there is a lack of implementation and translation of evidence-based guidelines. The research-practice gap is due to both the way evidence is produced and presented, usually in a high-level, one-size-fits-all manner, and the lack of skills combined with a lack of capacity within local authorities to integrate the evidence with local information⁴⁹.

Leigh-Hunt and colleagues (2018) used the STAR tool of the Health Foundation to help in the prioritisation of resources locally in the face of budget reductions to local public health allocations⁵². They argued that local cost-effectiveness estimates could be made for most interventions, allowing comparison within and between programmes. In general, primary prevention interventions were the most cost-effective, for example, mass media campaigns

and trading standards to reduce smoking compared to specialist stop smoking services (see Health Development Agency Evidence Briefings which cover some areas not examined by NICE⁵³). STAR, they argued, helped inform commissioners as to how a more targeted and stratified approach may improve the overall cost-effectiveness of the public health budget. They concluded that estimates suggested existing services provided value for money with average cost-effectiveness ratios of below £15 000 per QALY⁵².

At a local level, every effort must be made to resist choosing to do that, which sometimes seems obvious, but there is little or no evidence of cost-effectiveness. Quick answers to complex problems are seldom the right answers, but the way to tackle these complex problems is to hand. We need to provide local decision-makers with access to the evidence and two other vital tools. The first is to help them determine the best way to tailor and tweak the interventions which are cost-effective for local use. The second is to help them find the optimal way to apply these interventions to get maximum traction for the health of the population locally and to reduce patterns of health inequalities. This will involve finding the optimal ways to work with communities to achieve these ends. It is perfectly possible to use the data reported here to make a real difference to the public's health and reduce inequalities. Reducing the spend will do precisely the opposite, ignoring what we have already corralled in the evidence base of effectiveness and cost-effectiveness.

Of course, there remains much to be done. Here we only focus on socioeconomic inequalities. The question of intersectionality in respect of health inequalities (the way social class, gender, ethnicity, geography, age, disability and sexuality interact⁵⁴) and the responses of different groups in the community to various interventions needs further work. The complexities of differential effectiveness and intersectionalities will be tricky to unravel, but in principle, further progress can be made based on what has already been achieved. Furthermore, we do not have a detailed picture of how local authorities spend the Public Health Grant and if spend aligns with current evidence. More work is needed to support local public health teams to integrate the evidence-based principles arising from national guidance with local intelligence. We must not squander the evidence-based premium, which is at our disposal.

Governments should do everything, not just to protect public health spending in real terms, but actively to increase it in absolute terms. The Public Health Grant represents excellent value for money when used on cost-effective interventions and has the opportunity to address health inequalities. COVID-19 has consumed much of the core public health functions during the pandemic at the same time that the need for prevention is changing; from more deaths from alcohol and drugs to fewer sexually transmitted infections and the proliferation of digital interactions. Adequate funding of core public health functions is imperative to avoid a public health backlog storing up future health problems.

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Appendix 1: Services funded through the Public Health Grant

- Sexual health services
 - STI testing and treatment (prescribed functions)
 - Contraception (prescribed functions)
 - Advice, prevention and promotion (non-prescribed functions)
- NHS health check programme (prescribed functions)
- Health protection - Local authority role in health protection (prescribed functions)
- National child measurement programme (prescribed functions)
- Public health advice (prescribed functions)
- Obesity
 - Adults
 - Children
- Physical activity
 - Adults
 - Children
- Substance misuse
 - Treatment for drug misuse in adults
 - Treatment for alcohol misuse in adults
 - Preventing and reducing harm from drug misuse in adults
 - Preventing and reducing harm from alcohol misuse in adults
 - Specialist drug and alcohol misuse services for children and young people
- Smoking and tobacco
 - Stop smoking services and interventions
 - Wider tobacco control
- Children 5–19 public health programmes
- Miscellaneous public health services
 - Children's 0–5 services (prescribed functions)
 - Children's 0-5 services - Other (non-prescribed functions)
- Health at work
- Public mental health
- Miscellaneous public health services

Appendix 2: Cost-effectiveness of public health interventions

Table 1: Smoking and tobacco

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH26: Quitting smoking in pregnancy (last updated 2010)	Rewards	No intervention (aggregate of controls)	Dominant	Direct responsibility: NHS professionals. Indirect responsibility: LA through the NHS Stop Smoking Services.
PH26: Quitting smoking in pregnancy (last updated 2010)	Other (includes referrals and provision of intensive support to quit smoking).	No intervention (aggregate of controls)	Dominant	Direct responsibility: NHS professionals. Indirect responsibility: LA through the NHS Stop Smoking Services.
PH45: Smoking: harm reduction (last updated 2013)	Temporary abstinence	No intervention	Dominant	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Reduce alone	No intervention	Dominant	Direct responsibility: Primary and secondary healthcare, Stop smoking services, subnational tobacco control organisations. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	CDTQ + generic support	No intervention	Dominant	Direct responsibility: Commissioners, Stop smoking services, subnational tobacco control organisations. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	CDTQ	No intervention	Dominant	Direct responsibility: Commissioners, Stop smoking services, subnational tobacco control organisations. Indirect responsibility: LA.
PH48: Smoking cessation secondary care (last updated 2013)	Total smoke-free policy, indoor and outdoor Gadomski	Indoor smoke-free policy	Dominant	Direct responsibility: Stop smoking services Health and social care practitioners, GPs, Health visitors and Maternity and mental health services. Indirect responsibility: LA.
PH48: Smoking cessation secondary care (last updated 2013)	Pharmacological for general inpatients	Low-intensity behavioural therapy	Dominant	Direct responsibility: Hospital pharmacists and managers. Indirect responsibility: LA.
PH48: Smoking cessation secondary care (last updated 2013)	Pharmacological for COPD Borglykke	Usual care	Dominant	Direct responsibility: publicly-funded secondary care services, tobacco control alliances, pharmacists and LA.
PH48: Smoking cessation secondary care (last updated 2013)	High-intensity behavioural therapy	Brief advice	Dominant	Direct responsibility: Health and social care practitioners, GPs, Health visitors and Maternity and mental health services. Indirect responsibility: LA through the drug and alcohol services.

PH48: Smoking cessation secondary care (last updated 2013)	High intensity behavioural therapy + pharmacological therapy	Brief advice/low intensity	Dominant	Direct responsibility: Stop smoking services, Health and social care practitioners, GPs, Health visitors and Maternity and mental health services. Indirect responsibility: LA through the drug and alcohol services.
PH48: Smoking cessation secondary care (last updated 2013)	Behavioural therapy+ pharmacological therapy for patients with PTSD	Usual care	Dominant	Direct responsibility: publicly-funded secondary care services, tobacco control alliances, pharmacists and LA.
NG92: Smoking cessation interventions and services	Sequence (varenicline, bupropion, SSRI) = 40.30%	No intervention = 2%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Bupropion and lozenge = 25.60%	No intervention = 2%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Lozenge = 14.38%	No intervention = 2%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Patch only = 11.00%	No intervention = 2.00%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Varenicline + brief advice = 25.00%	Brief advice = 6.60%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Bupropion (PP) = 47.33%	CBT (PP) = 38.20%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Bupropion and lozenge = 25.60%	Lozenge = 14.38%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Bupropion (PP) = 47.33% (pt prev)	Minimal intervention (PP) = 33.66%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	NRT (PP) = 41.30%	Minimal intervention (PP) = 33.66%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Varenicline + counselling = 27.90%	Placebo + counselling = 15.90%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff

NG92: Smoking cessation interventions and services	Varenicline + counselling = 30.50%	Placebo + counselling = 17.30%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Varenicline + counselling = 16.61%	Placebo + counselling = 5.91%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
NG92: Smoking cessation interventions and services	Self-determination intervention = 10.10%	Standard care = 3.51%	Dominant	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
PH10: Smoking cessation	Brief advice	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	Nicotine patch, pharmacy consultation	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	Nicotine patch, pharmacy consultation + behavioural programme	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	Brief advice plus self-help material	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	Less intensive counselling and bupropion, workplace	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	More intensive counselling and bupropion, workplace	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	Nicotine patch, group counselling	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH10: Smoking cessation	Nicotine patch, individual counselling	No intervention	Dominant	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors

NG92: Smoking cessation interventions and services	Patch and nasal spray = 27.00%	No intervention = 2.00%	£13	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
PH14: Preventing the uptake of smoking by children and young people	Mass media	No intervention	£49.00	Direct responsibility: Local authorities, NHS, criminal justice system, mass-media services, retailers
PH45: Smoking: harm reduction (last updated 2013)	CDTQ + specialist support	No intervention	£ 437	Direct responsibility: Health and social care practitioners, Stop smoking advisors. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	CDTQ + NCP	No intervention	£ 544	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH48: Smoking cessation secondary care (last updated 2013)	High-intensity behavioural intervention for pregnant women	Usual care	£ 634	Direct responsibility: publicly-funded secondary care services, tobacco control alliances, pharmacists and LA.
PH45: Smoking: harm reduction (last updated 2013)	CDTQ + NCP + generic support	No intervention	£ 668	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Temporary abstinence + generic support	No intervention	£ 706	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Reduce + generic support	No intervention	£ 706	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Temporary abstinence + NCP + generic support	No intervention	£ 765	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Reduce + NCP + generic support	No intervention	£ 765	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
NG92: Smoking cessation interventions and services	Patch and nasal spray = 27.00%	Patch only = 11.00%	£948	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff
PH10: Smoking cessation	Brief advice plus self-help material plus NRT	No intervention	£984.00	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors

PH14: Preventing the uptake of smoking by children and young people	Point of sale	No intervention	£1,690.00	Direct responsibility: Local authorities, NHS, criminal justice system, mass-media services, retailers
PH26: Quitting smoking in pregnancy (last updated 2010)	Feedback	No intervention (aggregate of controls)	£1,992	Direct responsibility: NHS professionals. Indirect responsibility: LA through the NHS Stop Smoking Services.
PH26: Quitting smoking in pregnancy (last updated 2010)	Pharmacotherapies	No intervention (aggregate of controls)	£2,253	Direct responsibility: NHS Stop Smoking Services.
PH45: Smoking: harm reduction (last updated 2013)	CDTQ + NCP + specialist support	No intervention	£ 2,294	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Temporary abstinence + NCP + specialist support	No intervention	£ 2,458	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Reduce + NCP + specialist support	No intervention	£ 2,458	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH26: Quitting smoking in pregnancy (last updated 2010)	Stages of change	No intervention (aggregate of controls)	£3,033	Direct responsibility: NHS Stop Smoking Services specialist advisers.
PH15: Risk of dying prematurely - smoking cessation general population (last updated 2008)	Pharmacist-based interventions (People at risk of CVD identified in Primary care and provided with statin)	No intervention	£ 3,151	Direct responsibility: local Pharmacist, Indirect responsibility: LA
PH48: Smoking cessation secondary care (last updated 2013)	Conditional incentives for pregnant women	Unconditional incentives	£ 3,306	Direct responsibility: Stop smoking services Health and social care practitioners, GPs, Health visitors and Maternity and mental health services. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Abrupt + NCP substitute + generic support	No intervention	£ 3,558	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
NG92: Smoking cessation interventions and services	CBT (PP) = 38.20%	Minimal intervention (PP) = 33.66%	£3,620	Direct responsibility: Commissioners and providers of stop smoking interventions or services; Health, social care and other frontline staff

PH15: Risk of dying prematurely - smoking cessation general population (last updated 2008)	Brief intervention, pregnant women	Usual care	£ 3,792	Direct responsibility: primary care. Indirect responsibility: LA.
PH26: Quitting smoking in pregnancy (last updated 2010)	Cognitive behaviour strategies	No intervention (aggregate of controls)	£4,005	Direct responsibility: NHS Stop Smoking Services specialist advisers.
PH15: Risk of dying prematurely - smoking cessation general population (last updated 2008)	Invitation for screening	No intervention	£ 4,260	Direct responsibility: primary care. Indirect responsibility: LA.
PH15: Risk of dying prematurely - smoking cessation general population (last updated 2008)	Pharmacist-based interventions (people identified in secondary care who are disadvantaged and need statin)	No intervention	£ 4,892	Direct responsibility: local Pharmacist.
PH23: School based interventions to prevent the uptake of smoking (last updated 2010)	Delay/delay	No intervention (or usual education)	£7,282	Direct responsibility: Primary and secondary schools and further education colleges.
PH45: Smoking: harm reduction (last updated 2013)	Abrupt + NCP substitute (nb. Source says includes brief advice)	No intervention	£ 7,388	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Temporary abstinence + NCP	No intervention	£ 7,843	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Reduce + NCP	No intervention	£ 7,843	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Temporary abstinence + specialist support	No intervention	£ 8,464	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.
PH45: Smoking: harm reduction (last updated 2013)	Reduce + specialist support	No intervention	£ 8,464	Direct responsibility: Health and social care practitioners, Stop smoking advisors and pharmacists. Indirect responsibility: LA.

CDTQ: cutting down to quit; COPD: chronic obstructive pulmonary disease; NCP: nicotine containing products; LA: Local authority.

Table 2: Domestic violence and abuse

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH50: Domestic violence and abuse: multiagency working (last updated 2014)	Harm reduction, cognitive trauma therapy, battered women	No intervention	Dominant	Direct responsibility: LA, Health and social care professionals, specialist domestic violence and abuse services, criminal justice agencies and police and crime commissioners.
PH50: Domestic violence and abuse: multiagency working (last updated 2014)	Incidence reduction, independent domestic violence advisors (IDVA)	No intervention (assuming a percent will access services without IDVA)	Dominant	Direct responsibility: LA, Health and social care professionals, specialist domestic violence and abuse services, criminal justice agencies and police and crime commissioners.

LA: Local authority.

Table 3: Diabetes and skin cancer prevention advice

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH35: Type 2 diabetes: pop and comm (last updated 2011)	Large-scale region-wide multicomponent	No intervention	Dominant	Direct responsibility: Commissioners and National Public health services. Indirect responsibility: LA through voluntary sector and not-for-profit and non-governmental organisations.
NG34: Sunlight exposure: risks and benefits	Mass media	No intervention	Dominant	Direct responsibility: Local authority; Commissioners, managers and practitioners with public health or social care as part of their remit working within the NHS
PH35: Type 2 diabetes: pop and comm (last updated 2011)	Multicomponent small scale	No intervention	£ 562	Direct responsibility: LA.
PH35: Type 2 diabetes: pop and comm (last updated 2011)	Broad dietary education/cooking skills	No intervention	£ 878	Direct responsibility: LA.
PH32: Skin cancer prevention (last updated 2016)	Verbal advice and print to parents–children at home (Turissi)	No intervention (current practice)	£ 6,700	Direct responsibility: Health and social care practitioners.
PH38: Type 2 diabetes, S Asians 25-39 (last updated 2017)	LPDs \geq 5.25, HbA1c \geq 6.0% (+intensive intervention)	Vascular checks (without intervention)	£ 11,273	Direct responsibility: LA, GPs and NHS.
PH38: Type 2 diabetes, high risk (last updated 2017)	LPDs \geq 4.75, HbA1c \geq 5.85% (+intensive intervention)	Vascular checks (with intervention)	£ 15,192	Direct responsibility: LA, GPs and NHS.
NG34: Sunlight exposure: risks and benefits	Tailored message	No intervention	£ 16,859	Direct responsibility: Local authority; Commissioners, managers and practitioners with public health or social care as part of their remit working within the NHS

LA: Local authority; GPs: general practitioners; NHS: National Health Service.

Table 4: Sexual health

Guideline topic and ID	Intervention	Comparator	ICER	Comments
NG55: Harmful sexual behaviour	Multisystemic therapy for sexual behaviours	Cognitive behavioural therapy	Dominant	Direct responsibility: Social workers, social and residential care practitioners and foster carers; Child and adolescent harmful sexual behaviour and mental health services; Neighbourhood and community support police officers and youth offending teams; Schools and youth services
NG55: Harmful sexual behaviour	Cognitive behavioural therapy	Play therapy	£ 2,685	Direct responsibility: Social workers, social and residential care practitioners and foster carers; Child and adolescent harmful sexual behaviour and mental health services; Neighbourhood and community support police officers and youth offending teams; Schools and youth services
PH3: Sexually transmitted diseases	Tailored skill session	Usual care, didactic messages	£3,200	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH3: Sexually transmitted diseases	Information and behaviour skills (women)	Usual care (information only delivered by counsellors in didactic style)	£10,286	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH3: Sexually transmitted diseases	Brief counselling	Usual care (didactic messages, information intervention to approximate treatment as usual)	£12,194	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH3: Sexually transmitted diseases	Accelerated partner therapy, doxycycline	Patient referral	£12,525	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH3: Sexually transmitted diseases	Information, motivation and behaviour skills	Usual care (information only delivered by counsellors in didactic style)	£14,143	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors
PH3: Sexually transmitted diseases	Accelerated partner therapy, azithromycin	Patient referral	£19,425	Direct responsibility: NHS and non-NHS professionals with responsibility for sexual health services in the public, community, voluntary and private sectors

NHS: National Health Service.

Table 5: Substance misuse

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH24: Alcohol use disorders: preventing harmful drinking (last updated 2010)	Screening and brief intervention by practice nurse at GP registration	No intervention	Dominant	Direct responsibility: Chief executives of NHS, LA, Commissioners of NHS healthcare services.
PH24: Alcohol use disorders: preventing harmful drinking (last updated 2010)	Screening and brief intervention by GP during appointment	No intervention	Dominant	Direct responsibility: Commissioners.
PH24: Alcohol use disorders: preventing harmful drinking (last updated 2010)	Screening and brief intervention at A&E	No intervention	£0	Direct responsibility: NHS professionals.
PH4: Substance misuse	Life skills training	Normal education	£3,492	Direct responsibility: LA
PH43: Hep B&C testing (last updated 2013)	GP education and paid targeted testing of ex-IDUs	No intervention	£ 13,877	Direct responsibility: GP and practice nurses and local community services serving migrant population.
PH43: Hep C testing (last updated 2013)	Dried blood spot testing in addiction services	No intervention (control not offering DBS, i.e., do nothing)	£ 14,632	Direct responsibility: NHS and National public health services. Indirect responsibility: LA.

LA: Local authority; GPs: general practitioners; NHS: National Health Service.

Table 6: Children's services

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH28: Looked after children, Transition support services (last updated 2015)	Independent Living (IL) program targeting foster youths men	Usual care/no intervention	Dominant	Direct responsibility: Children Services, LA, Ofsted and CQC.
PH28: Looked after children, Transition support services (last updated 2015)	Independent Living (IL) program targeting foster youths women	Usual care/no intervention	Dominant	Direct responsibility: Children Services, LA, Ofsted and CQC.
PH40: Social emotional wellbeing early years (last updated 2012)	Sure start, years 1, 3 and 5	No intervention	Dominant	Direct responsibility: LA Children services, Health visiting services and school nursing services.
NG30: Oral health promotion: general dental practice	One-to-one counselling to parents of children aged 5 years for high-risk caries in socio-economically deprived areas	Usual care	Dominant	Direct responsibility: Dentists, dental care professionals (dental hygienists, nurses, therapists, technicians and orthodontic therapists), dental practice owners and managers Indirect responsibility: Local authority
NG30: Oral health promotion: general dental practice	Dental hygienists OH prog for children aged 12 years at high risk	Usual care	Dominant	Direct responsibility: Dental hygienists Indirect responsibility: Local authority
PH17: Promoting physical activity for children and young people (last updated 2009)	Walking buses	No intervention	£ 4,007	Direct responsibility: Schools, Early years provider, parents and carers and community, voluntary and private sectors providing physical activities.
PH20: Social and emotional wellbeing in secondary education (last updated 2009)	Intervention to reduce bullying	No intervention	£9,600	Direct responsibility: secondary education and LA. Indirect responsibility: Primary care, Mental health services and Governors.
NG30: Oral health promotion: general dental practice	Dental hygienists OH prog for children aged 12 years at average risk	Usual care	£ 14,408	Direct responsibility: Dental hygienists Indirect responsibility: Local authority

LA: Local authority; CQC: Care Quality Commission; NHS: National Health Service.

Table 7: Health at work

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH19: Management of long-term sickness and incapacity for work (last updated 2019)	Multicomponent workplace interventions	Usual care for musculoskeletal disorders	Dominant	Direct responsibility: Employers. Indirect responsibility: GP and Secondary care specialist.
PH19: Management of long-term sickness and incapacity for work (last updated 2019 with reference ID: NG146)	Physical activity and education and workplace visit (PW)	Usual care for musculoskeletal disorders	Dominant	Direct responsibility: Employers. Indirect responsibility: GP and Secondary care specialist.
PH13: Physical activity in the workplace	Walking programme	No intervention	£686	Direct responsibility: Employers; professionals working in public health, human resources or occupational health; trade unions, business federations
PH13: Physical activity in the workplace	Counselling	Usual care (control group no details in abstract)	£864	Direct responsibility: Employers; professionals working in public health, human resources or occupational health; trade unions, business federations
PH19: Management of long-term sickness and incapacity for work (last updated 2019 with reference ID: NG146)	Physical activity and education (PA)	Usual care for musculoskeletal disorders	£ 2,758	Direct responsibility: Employers. Indirect responsibility: GP and Secondary care specialist.
PH22: Promoting mental wellbeing at work (last updated 2009)	Individual stress management, health coach	No intervention	£3,470	Direct responsibility: Employers and their representative, HR or Occupational health.
PH22: Promoting mental wellbeing at work (last updated 2009)	Individual stress management, six group sessions	No intervention	£4,998	Direct responsibility: Employers and their representative, HR or Occupational health.
PH22: Promoting mental wellbeing at work (last updated 2009)	Individual stress management, seven group sessions	No intervention	£15,031	Direct responsibility: Employers and their representative, HR or Occupational health.

GPs: general practitioners.

Table 8: Public mental health

Guideline topic and ID	Intervention	Comparator	ICER	Comments
NG32: Older people: independence and mental wellbeing	Friendship programme	No intervention (waiting list)	Dominant	Direct responsibility: Local authorities working in partnership with organisations in the public, private, voluntary and community sectors that come into contact with older people; NHS
PH12: Social and emotional wellbeing in primary schools	Universal intervention, emotion + cognition	No intervention	£5,278	Direct responsibility: Teachers and school governors; Local authority
PH16: Mental wellbeing of older people (last updated 2008)	Tri-weekly walking programme after 6 months.	Information and education	£ 7,400	Direct responsibility: LA, GPs, community nurses, leisure services, voluntary sector organisations, community development groups.
PH12: Social and emotional wellbeing in primary schools	Universal, emotion only	No intervention	£10,594	Direct responsibility: Teachers and school governors; Local authority
NG32: Older people: independence and mental wellbeing	Internet and computer training	No intervention (waiting list)	£15,962	Direct responsibility: Local authorities working in partnership with organisations in the public, private, voluntary and community sectors that come into contact with older people; NHS

LA: Local authority; GPs: general practitioners; NHS: National Health Service.

Table 9: Weight management

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH27: Weight management in pregnancy (last updated 2010)	Weight management interventions	Conventional postnatal care	£ 9,096	Direct responsibility: NHS and LA. Indirect responsibility: GPs, Dietitians.
PH6: Behaviour change	Mass media to promote healthy eating	No intervention	£87.00	Direct responsibility: Local authorities, national policy makers, commissioners, providers and practitioners in the NHS

LA: Local authority; GPs: general practitioners; NHS: National Health Service.

Table 10: Physical activity

Guideline topic and ID	Intervention	Comparator	ICER	Comments
PH2: Physical Activity	Intensive interviews	Brief advice from researcher at the baseline assessment	£75	Direct responsibility: LA.
PH2: Physical Activity	Intensive interviews with exercise voucher	Brief advice from researcher at the baseline assessment	£432	Direct responsibility: LA.
PH41: Physical activity: walking and cycling (last updated 2012)	Multicomponent sustainable travel towns	No intervention	£ 997	Direct responsibility: LA.
NG90: Physical activity	Active Living by Design	No intervention (before, after and no control)	£1,397	Direct responsibility: Local authority and metro mayors
PH41: Physical activity: walking and cycling (last updated 2012)	TravelSmart	No intervention	£ 1,400	Direct responsibility: LA and Transport planners.
PH44: Physical activity: brief advice for adults in primary care (last updated 2013)	Brief advice for 1 year	Usual care	£ 1,730	Direct responsibility: Primary care practitioners.
PH41: Physical activity: walking and cycling (last updated 2012)	Pedometer	No intervention	£ 1,763	Direct responsibility: LA, CCGs and organisations.
NG90: Physical activity	Cycling demonstration towns	Placebo (matched town)	£2,496	Direct responsibility: Local authority and metro mayors
NG90: Physical activity	Smarter Choices, Smarter Places	Placebo (matched control)	£4,423	Direct responsibility: Local authority and metro mayors
PH41: Physical activity: walking and cycling (last updated 2012)	Pedometer sustained	No intervention	£ 4,774	Direct responsibility: LA, CCGs and organisations.
PH41: Physical activity: walking and cycling (last updated 2012)	Multicomponent cycling demonstration	No intervention	£ 4,830	Direct responsibility: LA and organisations.

NG90: Physical activity	Connswater Community Greenway	Placebo (control group)	£7,652	Direct responsibility: Local authority and metro mayors
PH8: Physical activity and the environment	Trail	No intervention	£10,445	Direct responsibility: Local authority and metro mayors
PH41: Physical activity: walking and cycling (last updated 2012)	Pedometer 4 week	No intervention	£ 12,351	Direct responsibility: LA, CCGs and organisations.

LA: Local authority; CCG: Clinical Commissioning Groups.

Table 11: Air pollution

Guideline topic and ID	Intervention	Comparator	ICER	Comments
NG70: Outdoor air	Street washing and sweeping	No intervention	£441	Direct responsibility: Local authority
NG70: Outdoor air	Speed restrictions	No intervention	£1,293	Direct responsibility: Local authority
NG70: Outdoor air	Vehicle idling	No intervention	£1,572	Direct responsibility: Local authority
NG70: Outdoor air	Low-emission zones	No intervention	£2,465	Direct responsibility: Local authority
NG70: Outdoor air	Off-road cycle paths	No intervention (on road cycle)	£5,075	Direct responsibility: Local authority
NG70: Outdoor air	Bypass construction	No intervention	£6,971	Direct responsibility: Local authority