

Putting NICE guidance into practice

Resource impact report: Air pollution: outdoor air quality and health (NG70)

Published: June 2017

Summary

This report looks at the resource impact of implementing NICE's guideline on [air pollution: outdoor air quality and health](#) in England. NICE worked with Public Health England to develop this guidance. The recommendations in this guideline are closely aligned to the DEFRA Clean Air Framework.

This report focuses on the recommendations that we think will have the greatest resource impact nationally, and will need the most additional resources to implement or potentially generate the biggest benefits. They are:

- planning
- development management
- clean air zones
- reducing emissions from public sector transport services and vehicle fleets
- smooth driving and speed reduction
- walking and cycling
- awareness raising.

We encourage organisations to evaluate their own practices against the recommendations in the NICE guideline and assess costs and benefits locally. Organisations can input estimates into the local resource impact template to reflect local practice and estimate the impact of implementing the guideline.

Implementing the guideline may result in the following benefits that may accrue over time. Reduction in:

- particulates such as PM_{2.5} and PM₁₀
- pollutants such as NO₂
- CO₂
- noise pollution
- congestion
- deaths from air pollution
- respiratory and circulatory emergencies and long-term health conditions
- fuel and vehicle fleet costs

Environmental services are commissioned by local authorities and provided by a range of organisations including transport authorities and other sectors including the private sector. Healthcare and public health services are commissioned by clinical commissioning groups (CCGs) and provided by NHS primary care organisations and hospital trusts. Commissioning and provider functions may also be conducted by Sustainability and Transformation Partnerships.

1 Introduction

- 1.1 The guideline offers best practice advice on how to tackle outdoor air pollution. NICE worked with Public Health England to develop this guidance. The recommendations in this guideline are closely aligned to the DEFRA Clean Air Framework.
- 1.2 This report discusses the resource impact of implementing our guideline on air pollution: outdoor air quality and health in England. It aims to help organisations plan for the financial implications of implementing this NICE guideline.
- 1.3 We encourage organisations to evaluate their own practices against the recommendations in the NICE guideline and assess costs, benefits and savings locally. Organisations can input estimates into the local resource impact template to reflect local practice and estimate the impact of implementing the guideline.
- 1.4 Environmental services are commissioned by local authorities and provided by a range of organisations including transport authorities and other sectors including the private sector. Healthcare and public health services are commissioned by clinical commissioning groups (CCGs) and provided by NHS primary care organisations and hospital trusts. Commissioning and provider functions may also be conducted by Sustainability and Transformation Partnerships.

2 Background

- 2.1 The major human sources of air pollution are the combustion of fuels for heat, electricity and transport. Road transport accounts for 31% of nitrogen oxides (NO_x), 18% of PM₁₀ and 19.5% of PM_{2.5} UK emissions. It frequently accounts for more than 64% of air pollution at urban monitoring sites. ([Road traffic's contribution to air quality in European cities](#) European Topic Centre on Air Pollution and Climate Change Mitigation). This comes from exhausts and other sources such as the wear of tyres, brakes and the road.
- 2.2 In 2008, the effect of human-produced (anthropogenic) particulate air pollution on mortality in the UK was estimated as equivalent to nearly 29,000 deaths at typical ages, and an associated loss of total life of 340,000 life years ([COMEAP: mortality effects of long-term exposure to particulate air pollution in the United Kingdom](#) Public Health England).
- 2.3 In 2010 the total mortality burden of anthropogenic PM_{2.5} in London was 52,630 life years lost and of long-term exposure to NO₂ was up to 88,113 life years lost (Understanding the health impacts of air pollution in London (King's College London). This figure assumes the World Health Organization value of up to a 30% overlap between the effects of PM_{2.5} and NO₂. The authors note that the figure for NO₂ is much less certain than that for PM_{2.5}.
- 2.4 The health impact of PM_{2.5} pollution from human activities in the UK is estimated to cost between £8.5 billion and £18.6 billion a year ([Ambient air quality](#) UK Parliament).
- 2.5 Over recent decades air pollutant emissions have reduced. But in 2013, UK levels of nitrogen dioxide (NO₂) exceeded the EU

directive limit in 38 of 43 geographical zones¹ ([Directive 2008/50/EC](#) European Commission).

2.6 Children (14 and under) and older people (65 and older) are more susceptible to the effects of air pollution ([Air quality and social deprivation in the UK: an environmental inequalities analysis](#) Department of Environment, Food and Rural Affairs).

2.7 Addressing air pollution by encouraging people to walk and cycle rather than drive can help people to become fitter and healthier. Changing the way we travel can also help reduce emissions of greenhouse gases that contribute to climate change.

2.8 Climate change is linked to increased risk of extreme weather and other events that have an adverse effect on health such as floods, heatwaves and the spread of some infectious diseases ([Climate change 2013: the physical science basis](#) Intergovernmental Panel on Climate Change Working Group I).

3 Assumptions made

3.1 The resource impact template makes the following assumptions:

- Unit costs of interventions, as well as the savings and benefits vary depending on current service provision, the design of new interventions and local air pollution levels.

3.2 The resource impact template includes worksheets to calculate unit costs and to estimate benefits. It also gives details of tools and interventions that could be used to estimate local benefits and other local impacts.

¹ The UK is divided into 43 zones for assessing air quality and reporting compliance with EU targets. These zones generally include more than 1 local authority ([Air quality plan for the achievement of EU air quality limit values for nitrogen dioxide \(NO₂\) in the UK, 2015](#) Department for Environment, Food and Rural Affairs.)

- 3.3 Some unit costs are included as indicative examples. Use the references for the unit costs to assess the applicability of the unit cost locally. Unit costs can be amended.
- 3.4 Health economic modelling used a set of inputs and assumptions to calculate cost-benefit ratios for some interventions. Some ratios are included in the resource impact template. The local inputs and assumptions will vary from those used in the health economic modelling and therefore affect the ratios. The ratios can be amended in the resource impact template where necessary to suit local circumstances.
- 3.5 The resource impact template allows both capital costs and ongoing revenue costs to be defined separately.
- 3.6 It may be possible to get a grant for some interventions or to part-fund activities. The resource impact template includes details of several grant schemes to help estimate local unit costs. Eligibility should be assessed locally.

4 Recommended actions with a potential resource impact

Planning

- 4.1 It is anticipated that 3 planning activities that have been recommended could have a potential resource impact.
- Providing charge points for electric vehicles in workplaces, commercial developments and residential areas (recommendation 1.1.1)
 - Supporting car sharing schemes or car clubs (recommendation 1.1.1)
 - Consider developing local guidance if the local plan does not address air pollution (recommendation 1.1.3).

Background

- 4.1.1 Providing charge points for electric vehicles and support for car sharing schemes or car clubs may lead to less polluting and less motorised traffic.
- 4.1.2 Including a target in local plans to reduce or mitigate air pollution makes it possible to reject a proposal that would make road-traffic-related air pollution worse.

Assumptions made

- 4.1.3 It is assumed that different types of charge points will be installed in workplaces, commercial developments and residential areas.

Costs

- 4.1.4 Unit costs for the different types of charge points will vary. The resource impact template refers to sources of data that could be used to make a local assessment.
- 4.1.5 Installing a charge point in a residential area may incur adjustments to the highway and pavements and incur street work costs.
- 4.1.6 The cost of supporting a car sharing scheme or car club must be assessed locally.
- 4.1.7 If local air pollution planning guidance is needed this may incur a cost if there is a lack of air pollution specialist knowledge within the local authority.

Development management

- 4.2 It is anticipated that one recommended action associated with development management has a potential resource impact:
 - Managing street trees and vegetation to reduce the risk of restricting street ventilation, where this may contribute to poor air quality (recommendation 1.2.1).

Background

- 4.2.1 Sensitive use of physical features such as street trees and vegetation can positively influence the way air pollution moves and disperses.

Assumptions made

- 4.2.2 The use of urban trees and greenery can provide a number of benefits, including health benefits.

Costs

- 4.2.3 Unit costs for managing street trees and vegetation will vary. It may be possible to use the community infrastructure levy. Upfront implementation costs and ongoing revenue costs should be assessed locally.

Clean air zones

- 4.3 It is anticipated that 7 recommended activities to create clean air zones will have a potential resource impact:
- Consider introducing a clean air zone (recommendation 1.3.1).
 - Identify classes of vehicles to restrict or charge (recommendation 1.3.2).
 - Work across local authority boundaries (recommendation 1.3.3).
 - Consider support for zero- and low-emission travel (recommendation 1.3.4).
 - Consider taking action to reduce emissions within the clean air zone (recommendation 1.3.5).
 - Where traffic congestion is contributing to poor air quality, consider incorporating a congestion charging zone within the clean air zone (recommendation 1.3.6).
 - Consider monitoring outside the zone to identify whether its implementation is causing problems in terms of traffic composition and flow (recommendation 1.3.7).

Background

- 4.3.1 [Economic modelling](#) suggested that low-emission zones could be cost effective.
- 4.3.2 A wide geographic approach involving cooperation across local boundaries is better than simply addressing localised 'hotspots' and moving the problems elsewhere.
- 4.3.3 Infrastructure needs to be put in place to encourage uptake of zero- or low-emission vehicles.
- 4.3.4 Congestion charging could be used as part of the package of interventions to address air pollution where congestion is identified as a significant cause.
- 4.3.5 Monitoring outside the zone is needed to identify whether traffic is moving elsewhere and leading to poorer air quality in those areas.

Assumptions made

- 4.3.6 Health economic modelling estimated a cost-benefit ratio of 27. For every £1 spent, potential benefit of £27 may be received. Based on studies, an indicative cost of £2 per head of population was estimated to be cost effective.
- 4.3.7 Cost components included in a clean air zone will vary depending on current infrastructure and the ways in which air pollution is addressed. Items that may be needed include: a feasibility study, an engagement exercise, a communications plan, a low emission zone, street works, drop-off zones, consolidation centres, new vehicles, a park and ride scheme, automatic number plate recognition cameras, staffing and specialist advice.
- 4.3.8 Charging schemes may be part of the package in a clean air zone.

Costs

4.3.9 Unit costs will vary. Upfront capital costs and ongoing revenue costs should be assessed locally. Although large-scale schemes, such as city-wide clean air zones, may be expensive to set up, they can deliver substantial benefits. They target a large population meaning that the cost per head of population may be relatively low. The resource impact template uses an indicative cost of £2 per head to provide an indicative cost for your selected population.

Reducing emissions from public sector transport services and vehicle fleets

4.4 It is anticipated that the following 3 recommendations to reduce emissions from public sector transport services and vehicle fleets will have a potential resource impact.

- Consider training staff drivers to reduce their vehicle emissions (recommendation 1.4.2).
- Consider using 'in-vehicle' elements, for instance to ensure vehicles display real-time information and telematics technology (recommendation 1.4.3).
- Consider making low vehicle emissions (NO_x and particles) one of the criteria when making routine procurement decisions (recommendation 1.4.6).

Background

4.4.1 Changes to driving style may be used to lower levels of local pollution by offering driver training courses and using in-vehicle technology.

4.4.2 Procurement of less polluting vehicles will help public sector organisations reduce road-traffic-related air pollution. Because the public sector fleet is substantial this could have a big impact on traffic-related air pollution.

Assumptions made

4.4.3 It is assumed that public sector organisations have a replacement programme for their vehicles. Procurement of less polluting vehicles could be implemented as part of that programme. Or vehicle fleets could be retrofitted or converted to produce fewer emissions and particulates.

Costs

4.4.4 Unit costs will vary. A local assessment of upfront capital costs and ongoing revenue costs is needed. A product that measures fleet composition, fuel management and driver skills could possibly provide the figures needed to assess costs. This includes any savings on fuel costs.

Smooth driving and speed reduction

4.5 It is anticipated that the following recommendations to improve driving and reduce speed will have a potential resource impact.

- Consider promoting a smooth driving style (recommendation 1.5.1).
- Where physical speed reduction measures are used to reduce road danger and injuries (20mph zones), consider using them to encourage drivers to maintain a reduced, steady pace along the whole stretch of road (recommendation 1.5.2).

Background

4.5.1 Encouraging drivers to avoid sharp accelerations and sharp braking (except in an emergency) while reducing the speed limit on residential roads could help reduce emissions of air pollutants.

Assumptions made

4.5.2 Driving steadily at the optimum speed can improve fuel consumption, reduce congestion and air pollution. Physical speed reduction measures including highway changes, signage and real-time information may be needed.

Costs

- 4.5.3 Unit costs will vary. The larger the reduction in traffic congestion, the larger the reduction of emissions.

Walking and cycling

- 4.6 It is anticipated that one aspect of the walking and cycling recommendations will have a potential resource impact.
- Provide a choice of cycle routes, including routes that avoid highly polluted roads (recommendation 1.6.2).

Background

- 4.6.1 A shift from motor to active travel will reduce air pollution and cycle routes are part of the solution. But it's also important to minimise cyclists' exposure to traffic-related air pollution. This may be achieved by offering a choice of routes. Including cycle paths at the planning stage of new developments may minimise costs.

Assumptions made

- 4.6.2 [Health economic modelling](#) estimated a cost-benefit ratio of 14 for off-road cycle paths.

Costs

- 4.6.3 Unit costs will vary. Length of routes, existing infrastructure and route specifications will all affect the cost.
- 4.6.4 Maintenance costs for cycle paths are lower than for conventional roads.

Awareness raising

- 4.7 It is anticipated that 4 activities associated with the awareness-raising recommendations could have a potential resource impact.
- Ensure healthcare professionals are aware that information on air quality is available, what it means for patients and what actions are recommended (recommendation 1.7.2).

- Consider providing information on air quality (using the Daily Air Quality Index) with weather forecasts and the pollen index. This could be provided through local, national and social media (recommendation 1.7.3).
- Consider public awareness initiatives such as car-free days (Recommendation 1.7.5).
- Consider giving businesses information on how they can reduce road-traffic-related air pollution and improve fuel efficiency (recommendation 1.7.6).

Background

- 4.7.1 Understanding the impact of air pollution on health, and how to combat it, gives the public, health professionals and businesses a chance to reduce their contribution to it by changing their behaviour.
- 4.7.2 Awareness-raising also gives people a chance to protect themselves from the ill effects.
- 4.7.3 Using social media to disseminate information about air pollution may help reach vulnerable groups.

Assumptions made

- 4.7.4 It is assumed that developing an effective awareness-raising strategy for the public and business would have a cost. But increasing healthcare professionals' awareness as part of their continuing professional development would be cost-neutral.

Costs

- 4.7.5 Unit costs of awareness-raising will be variable.

Benefits and savings

- 4.8 The resource impact template includes a benefits template can be used to assess the benefits of local interventions.

- 4.9 Benefits will vary depending on the number and type of interventions and local pollution levels. Benefits will be monetary and non-monetary.
- 4.10 Marginal gains from individual interventions may be better viewed together to assess the overall benefits.
- 4.11 The resource impact template includes details of various tools that can be used to:
- quantify the benefit of each intervention to reduce air pollution
 - estimate the financial benefit of each intervention
 - estimate the non-financial benefits of each intervention.
- 4.12 Both the financial- and non-financial benefits can be split or attributed to multiple organisations in the transport and healthcare sectors.
- 4.13 Health economic modelling estimated a cost-benefit ratio of 27 for low emission zones and 14 for off-road cycle paths. These ratios are included in the benefits template. Assess them locally and amend as necessary.
- 4.14 Key potential benefits are shown in table 1.

Table 1 Key potential benefits

Potential benefit	Sector potentially benefiting
Reduction in particulates such as PM _{2.5} and PM ₁₀	Local authorities
Reduction in pollutants such as NO ₂	Local authorities
Reduction in CO ₂	Local authorities
Reduction in noise pollution	Local authorities
Reduction in congestion	Local authorities, businesses
Reduction in deaths from air pollution	NHS
Reduction in respiratory and circulatory emergencies and long-term health conditions	NHS
Reduction in fuel and vehicle fleet costs	Public sector organisations, businesses

Other considerations

- 4.15 Monitoring and reporting on the impact of interventions on air pollution is key to quantifying benefits and taking effective future action.
- 4.16 Many individual interventions will include measures to calculate impact.
- 4.17 The costs of monitoring and reporting may be included in individual project or intervention budgets, or within tranches of funding.
- 4.18 A geographic systems-wide view may be needed to calculate the overall impact of a variety of interventions and this may need a specialist resource.

5 Implications for commissioners

- 5.1 A reduction in air pollution will contribute to indicator 3.01 – Fraction of mortality attributable to particulate air pollution of the [Public Health Outcomes Framework](#).
- 5.2 Improvements in respiratory health falls under the following programme budgeting categories:
- PBC02D ‘Cancer, Lung’
 - PCB11B ‘Asthma’

- PBC11X 'Problems of the respiratory system'.
- 5.3 Improvements in cardiovascular health come under programme budgeting category PBC10X 'Problems of circulation'.
- 5.4 A reduction in deaths related to air pollution will contribute to a range of local public health plans and targets.
- 5.5 It may be necessary to monitor and report on interventions. If a specific resource is needed to do this locally, include the costs in the resource impact template.

About this resource impact report

This resource impact report accompanies the NICE guideline on [Air pollution: outdoor air quality and health](#) and should be read in conjunction with it. See [terms and conditions](#) on the NICE website.

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