

Subject: Air Quality in Southampton – Public Health Background information

Date: 18th September 2014

Recipient: Scrutiny Panel

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## **1. How does air pollution affect health?**

1.1 Air pollutants known to have effects on health are particles, sulphur dioxide, oxides of nitrogen, carbon monoxide and ozone. In the UK, these pollutants are mainly products of motor vehicle traffic combustion especially from diesel vehicles.

1.2 In a good state of health, short term exposure to moderate levels of air pollution is unlikely to have any serious short term effects. Short term exposure to high levels of air pollutants can cause a range of adverse effects such as exacerbations of asthma, effects on lung function and consequent increases in hospital admissions for respiratory and cardiovascular conditions.

1.3 Long term exposure to air pollution does increase the risk of deaths from cardiovascular and respiratory conditions, including lung cancer and existing lung and heart conditions. Chronic effects can be triggers of new disease, worsen severity of disease through increase in symptoms or accelerate progression of disease over time.

1.4 Children, the elderly and people with lung or heart conditions are more susceptible to the health effects of air pollution.

1.5 People with coronary artery disease are at greater risk of being affected by air pollution, especially particles, than people without such disease. Coronary artery disease, which can remain undetected, is common in older people.

1.6 Evidence of the long term effects of air pollution are most closely associated with levels of fine particulate matter (PM<sub>2.5</sub>). There is no evidence for a threshold below which health effects would not be expected. For NO<sub>2</sub>, studies have shown that both day to day variations and long term exposure to NO<sub>2</sub> are associated with mortality and morbidity.

1.7 Identifying the effects of individual air pollutants is difficult. Fine particles, nitrogen dioxide and carbon monoxide are all produced in urban areas largely by motor vehicles and they are closely correlated. The Department for Environment Food and Rural Affairs has produced a table showing the types of health effects experienced by the most common pollutants at elevated levels.

Pollutant	Health effects at very high levels
Nitrogen Dioxide, Sulphur Dioxide, Ozone	These gases irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases
Particles	Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases
Carbon Monoxide	This gas prevents the uptake of oxygen by the blood. This can lead to a significant reduction in the supply of oxygen to the heart, particularly in people suffering from heart disease

<http://uk-air.defra.gov.uk/air-pollution/effects>

## 2. Is it one of Southampton City Councils priorities?

2.1 Heart and lung diseases are significant health issues for our city. In Southampton there were 418 premature deaths from heart disease and stroke (ranked 11<sup>th</sup> worse of 15 similar local authorities) and 184 premature deaths from lung disease (ranked 14<sup>th</sup> worse of 15 similar local authorities) in 2010-2012 (<http://longerlives.phe.org.uk/>).

2.2 Air pollution is one of a number of risks for heart and lung disease. Stopping smoking has the largest impact on preventing risk and nearly one quarter of people within Southampton still smoke. Increased walking and cycling, and consequent reduced car travel, would not only reduce risk through reduction in air pollution, it would also benefit health through people being more physically active.

2.3 Reducing road traffic would reduce the number of road traffic accidents. There were 387 people 'killed and seriously injured on roads' from 2010-2012 (i.e. average of 129 per year) in Southampton City. There were an average of 5 deaths per year from land transport accidents.

2.4 Mapping of Chronic Obstructive Pulmonary Disease hospital admissions, asthma hospital admissions and cardiovascular hospital admissions against air quality management areas in Southampton City show close correlation. Those areas in Southampton with the highest pollution levels are also areas where hospital admissions for these indications are highest. These are also areas of significant deprivation and

where we would expect health outcomes to be worse. As previously described, air pollution exacerbates pre-existing conditions.

### 3. Impact of air pollution

3.1 Modelled estimates of mortality attributable to long term exposure to air pollution i.e. annual average concentrations of fine particulate matter (PM<sub>2.5</sub>) have been published by Public Health England (<https://www.gov.uk/government/news/estimates-of-mortality-in-local-authority-areas-associated-with-air-pollution>). This suggests that in Southampton 6.2% of deaths in 2010 were attributable to air pollution, with long-term exposure contributing 110 deaths amongst those aged 25 years and over and 1,280 life years lost.

3.2 Just 18 µg/m<sup>3</sup> PM<sub>2.5</sub> could be responsible for an average loss of life expectancy from birth of around 2-20 months (average of 7-8 months). This compares to an estimate of around 7 years if all the population were smokers (Department of Health 2001).

3.3 The public health benefit of a 1µg/m<sup>3</sup> reduction in national average PM<sub>2.5</sub> concentration is estimated as being an increase in average life-expectancy of around 20 days (range 3 to 40 days) COMEAP 2010 (<http://www.comeap.org.uk/documents/reports>).

3.4 It is likely that, compared with factors affecting individuals such as smoking, diet and lack of exercise, air pollution has a smaller impact, similar to that of passive smoking.

3.5 As the level of pollution increases, as does the health impact. It has been estimated that a 10µg/m<sup>3</sup> increase in a pollutant concentration e.g. PM<sub>2.5</sub> is associated with a 1.4% increase in the relevant cardiovascular health outcome. So, if 70 people die each day from cardiovascular causes, a 10µg/m<sup>3</sup> increase in PM<sub>2.5</sub> will increase daily deaths by about one, to 71 deaths (<https://www.gov.uk/government/publications/comeap-cardiovascular-disease-and-air-pollution>).

3.6 People with pre-existing conditions suffer more symptoms as a result of air pollution. Overweight and obese people with asthma experience more asthma symptoms with increase in NO<sub>2</sub> than those individuals who are not overweight. People who smoke are also at higher risk of the effects of air pollution.

3.7 Measures to reduce air pollution will have other benefits apart from reducing mortality rates overall. Encouragement of active travel i.e. walking or cycling will have wider public health benefits associated with increased physical fitness and reduced excess weight.

### 4. What are we doing about it?

4.1 As described in background information for meeting 1, previous air quality actions have focused on transport related projects to improve the efficiency of the road network and reduce congestion. Recent findings from a study of the City's Western approach

suggest that emissions from road transport are the most significant contributor, however emissions from the Port are far more significant than previously understood.

4.2 As a result of the report's recommendation, a City wide Low Emission Strategy (LES) is being developed. A working group from departments across the council has been established to promote the delivery of existing initiatives and identify new ones. A City-wide emission reduction strategy will be developed for passenger cars, freight, buses and taxis. Examples of projects and policies are described in the background information for meeting 1.

4.3 The air alert service enables people who are more vulnerable to air pollution to manage the health impact in the event of high pollution levels. This service is free and open to all. There are currently 201 subscribers and 96 air alerts have been issued since June 2010.

4.4 Southampton has adopted recommendations from the national Active Travel Strategy published by the Department for Transport and Department of Health through its 'My Journey' initiatives. As an example, 100% of schools in Southampton have school travel plans in place, aided by 'My Journey' including the development of STARS and Bike It programmes. This enables schools to encourage children and their parents to cycle or walk to school instead of driving.

4.5 The council's 'Cycle to Prosperity' scheme hopes to increase cycling levels in the population from 3% to 18% within 10 years. A 10 year cycling strategy has been produced in association with Sustrans to increase the provisions for cyclists throughout the city and make it safer to cycle.

4.6 Cleaner buses are being introduced into Southampton and the city was awarded £632,700 from the Clean Bus Technology Fund to fund 37 buses with Flywheel technology, which will reduce pollution levels coming from buses.

## **5. What is good practise?**

5.1 Interventions to combat air pollution are most effective when they are embedded in policy. The London Congestion Charging scheme has been attributed to gaining 26 per 100,000 life years in Greater London as a result of a 2.3% decrease in NO<sub>2</sub> emissions in this area.

5.2 According to the Asia-Pacific Economic Corporation's Best Practice report, Ports and Port Authorities should have the responsibility to reduce congestion around port terminals and provide on-shore power to ships at berth. This responsibility, whilst not mandatory, is a part of a port's Corporate Social Responsibility.

## 6. What does it cost us?

6.1 According to the national estimates, air pollution and its associated effects on society cost England £10 billion per year. This is expected to rise in future years as the number of cars on the roads increases.

## 7. Where can we improve?

7.1 Southampton City Council is already taking forward recommendations as endorsed by Public Health England i.e. implementation of recommendations for the Active Travel Strategy. To further improve, endorsement and adoption of actions resulting from the proposed City Wide Low Emission Strategy is required.

7.2. Findings from a recent MSc Public Health dissertation undertaken at University of Southampton (July-august 2014) suggest the following:

- To improve the public awareness, a clearer Council webpage should inform on progress since the last Air Quality Action Plan. A good example of this is Suffolk Coastal's website (<http://www.suffolkcoastal.gov.uk/yourdistrict/envprotection/airquality/>) which explains which Action Plan measures have been completed.
- To contribute towards reducing air pollution levels and promoting healthy lifestyles, the city should invest in appropriate infrastructure to encourage cycling. This requires continuous cycle lanes around the city and more stringent parking enforcement, to ensure that cyclists do not have to pull out into the road to avoid illegally parked cars.
- A strong working relationship with the Association of British Ports who run Southampton Docks is required, in order to develop interventions that mitigate the pollution resulting from ship engines and vehicle movements within the dock operations.
- Other cities have similar features to their AQAPs, although some have continuing actions that Southampton has discontinued. For example, Southampton's Cycle Challenge was stopped in 2011.
- Oxford has implemented fines for idling vehicles after implementing their Low Emission Zone strategy.

## 8. How do we compare nationally with other Local Authorities?

8.1 Since 2010, Southampton's estimated fraction of mortality attributable to particulate air pollution has declined, from 6.2% to 5.7%. This is in line with a national decrease.

8.2 2012 figures show that Southampton's fraction of mortality attributable to particulate air pollution (6.2%) is worse than both the England and South East average of 5.1%. Local cities are also rated better than Southampton, for example Portsmouth – 5.3%, Brighton and Hove – 5.0%, Oxfordshire – 5.1% Bristol – 5.2% and Bournemouth – 4.1%.