

	<b><u>Agenda Item: 6</u></b>
<b>Report to:</b>	<b>Birmingham Health &amp; Wellbeing Board</b>
<b>Date:</b>	<b>31 January 2017</b>
<b>TITLE:</b>	<b>AIR POLLUTION AND HEALTH IN BIRMINGHAM</b>
<b>Organisation</b>	<b>Birmingham Health and Wellbeing Board</b>
<b>Presenting Officer</b>	<b>Adrian Phillips/Wayne Harrison</b>

<b>Report Type:</b>	<b>Decision</b>
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<b>1. Purpose:</b>
1.1. To update the Board of the threat posed by poor air quality due to outdoor air pollution in Birmingham on health as well as to the local economy.

2. Implications:		
BHWP Strategy Priorities	Child Health	Y
	Vulnerable People	Y
	Systems Resilience	Y
Joint Strategic Needs Assessment		Y
Joint Commissioning and Service Integration		Y
Maximising transfer of Public Health functions		Y
Financial		
Patient and Public Involvement		
Early Intervention		Y
Prevention		Y

<b>3. Recommendation</b>
It is recommended that the Board:
3.1 Consider adverse outdoor air quality as a theme in its strategy.
3.2 Supports the improvement of air quality by reducing air pollution as a collective priority
3.3 Receives an update in future meetings

## **4. Background**

### **4.1 Outline of the problem**

- 4.1.1 Man-made outdoor air pollution in Birmingham causes just under 900 deaths per year. It is second only to tobacco-smoke as an avoidable cause of early mortality. Most deaths are due to Stroke and Coronary Heart Disease. It has a harm profile remarkably similar to that caused by tobacco smoke.
- 4.1.2 Unlike the “smogs” of the 1950s, today’s air pollution is mainly unnoticed without special equipment or in extremes. It is caused by two main factors. The first are the very small particles in the air – like smoke but smaller. They are measured in microns and are less than 10 µm in diameter and are known as Particulate matter or PM. The two most common measures are PM 10 and PM2.5. The other main pollutant is oxides of Nitrogen, NO<sub>x</sub>, especially NO<sub>2</sub>.
- 4.1.3 Both these pollutants are mainly created from the internal combustion engine, especially those powered by diesel fuels. Vehicular road traffic causes the greatest effect. Electric cars as well as other vehicle types do not produce such pollutants.
- 4.1.4 Outdoor air pollution has attracted attention due to increased evidence of its negative health impact. Five areas in the United Kingdom (UK), including Birmingham, exceed European Union (EU) legal limits. The result is a risk of a financial fine, a requirement upon the City Council to declare itself an Air Quality Management Area and implement an action plan to reduce air pollution in a timely manner.
- 4.1.5 Birmingham City also performs poorly according to its Public Health Outcome Framework. Pollution undoubtedly also affects Respiratory Health, an area which all Birmingham CCGs have as an adverse indicator.
- 4.1.6 Birmingham City Council is developing an action plan in line with the requirements but the scale, severity and nature of the threat requires a coordinated, multiagency response.

### **4.2 Defining the threat of air pollution**

- 4.2.1 Birmingham City Council must coordinate a local response to reduce levels of NO<sub>2</sub> to a yearly average of less than 40µg/m<sup>3</sup> to deliver compliance with the EU Air Quality Directive. Whilst this target is consistent across the EU, some regions, Scotland for instance, have set much lower – less than half that for England - targets for some gases.
- 4.2.2 The most evidence exists for PM<sub>2.5</sub>, which is why Public Health England currently benchmark on this measure; in the most recent reporting period Birmingham had an average PM<sub>2.5</sub> of 11.4µg/m<sup>3</sup> compared to an England average of 9.9µg/m<sup>3</sup>.
- 4.2.3 A UK expert panel investigating the health impact (‘COMEAP’) has declared there are no safe limits for PM<sub>2.5</sub> and NO<sub>2</sub>; every 10µg/m<sup>3</sup> increase in PM<sub>10</sub> is

associated with a 6% increase in all-cause mortality and every  $10\mu\text{g}/\text{m}^3$  increase in  $\text{NO}_x$  is associated with a 2.5% increase in all-cause mortality.

- 4.2.4 The EU targets and Air Quality Index advice are not representative of the full impact on health or the cost of not reducing levels below the current thresholds.

### 4.3 Impact on health

- 4.3.1 In Europe air pollution is the biggest environment risk factor for premature death. While other components of air pollution mentioned above damage health, particularly at high levels of exposure, the strongest evidence for harm caused by lower levels is the effect of long-term population wide exposure to  $\text{PM}_{2.5}$  and  $\text{NO}_2$ .
- 4.3.2 In the UK,  $\text{PM}_{2.5}$  is responsible for 29,000 premature deaths annually and  $\text{NO}_2$  is associated with 23,500 deaths, based on current outdoor air pollution. A  $10\mu\text{g}/\text{m}^3$  reduction in  $\text{PM}_{2.5}$  pollution alone would have a larger impact on life expectancy in England and Wales than eliminating road traffic accidents or passive smoking.
- 4.3.3 There is strong evidence for the impact of short and long-term exposure to  $\text{PM}_{2.5}$  on cardiovascular health, reduced lung function and heightened severity of symptoms in individuals with:
- Asthma
  - Chronic Lung Disease
  - Ischaemic Heart disease
  - Stroke
- 4.3.4 Emerging evidence also suggests an effect of  $\text{PM}_{2.5}$  on children if their mothers were exposed to higher levels during pregnancy, with links to adverse birth outcomes (low birth weight, preterm birth, premature, neurodevelopmental harm, small for gestational age), airway inflammation and increased susceptibility to respiratory infection.
- 4.3.5 Children living in more polluted environments based on measures of  $\text{PM}_{2.5}$  are more likely to experience asthma symptoms, have low lung function and are more vulnerable to Chronic Obstructive Pulmonary Disorder (COPD-a lung disease) in adulthood.
- 4.3.6 Long term exposure to  $\text{PM}_{2.5}$  throughout life has also been associated with increased risk of obesity, diabetes, cognitive function including Dementia and social isolation.

$\text{NO}_2$  is a part of the same air pollution that  $\text{PM}_{2.5}$  is found in and has a separate and additional impact on health; high acute levels are associated with respiratory morbidity, hospital admissions and emergency visits for cardiovascular and/or cardiac diagnoses and mortality. Chronic exposure has been associated with reduced lung function in children and adults, respiratory infections in early childhood including bronchitis, cancer and adverse birth outcomes.

4.3.7 The full extent of these impacts across a person's life such as the effect on quality of life, school attendance and absence from the workforce are not yet fully quantified but some studies have attempted to measure these wider impacts.

#### **4.4 Wider impacts of air pollution and potential benefits of addressing it**

4.4.1 Addressing outdoor air pollution is not only a matter of risk avoidance; there is health, social and economic benefits to doing so. There is strong evidence that reducing air pollution increases life expectancy, reduces health inequalities and reduces morbidity for people living with respiratory and cardiovascular conditions in particular.

4.4.2 Evidence also suggests benefits that include increased productivity (e.g. workforce productivity), improved school attainment (through reduced school absence, improved concentration, reduced behavioural disorders), reduced obesity and sedentary behaviour through increases in physical activity (children living with asthma and adults who are obese).

#### **4.5 Vulnerable groups**

4.5.1 There are some groups who are more exposed to outdoor air pollution and some that are more likely to experience ill health effects when exposed. Certain occupational groups have an increased exposure, including those who work outside close to traffic pollution. People who spend more time than average in environments with higher levels of air pollution such as long distance commuters, taxi, bus and lorry drivers. One study showed taxi and bus drivers are exposed to three times the levels of outdoor air pollution in their vehicles.

4.5.2 People living in areas of deprivation may not necessarily have increased exposure to outdoor air pollution compared to the general population, although this is the case in some areas. The major concern is that this population group experience a magnified effect as a result of often living in poor housing conditions with greater exposure to pollutants and also experience higher levels of chronic stress, which reduces the bodies resilience to toxicants.

4.5.3 Groups at higher risk of adverse health outcomes due to air pollution include:

- Pregnant women and the unborn child
- Children in high pollution areas are four times more likely to have reduced lung function when they become adults
- For older adults the risk of death from PM<sub>10</sub> exposure is twice that of younger populations
- Adults with pre-existing medical conditions are at increased risk of serious adverse health events such as asthma attack, stroke and heart attack.

#### **4.6 Options to progress the matter**

4.6.1 There are several different tactics which could be employed in addressing air pollution:

Immediate steps to cut local pollution include reducing internal combustion traffic, especially diesels.

4.6.2 Medium term options include reducing the number of polluting engines

4.6.3 Long term approaches depend on the above as well as rebalancing our society away from a reliance on the car and motorized transport

#### **4.7 Conclusion**

4.7.1 As described in a recent article in the British Medical Journal “The NHS has borne the brunt of costs associated with air pollution and will benefit directly from improved air quality. For that reason alone the health sector should take a more active role in the decision making process that drives change.” BMJ, 29<sup>th</sup> October 2016.

4.7.2 Air pollution is a major determinant of Health and Wellbeing and merits the attention of the Health and Wellbeing Board.

### **5. Compliance Issues**

#### **5.1 Strategy Implications**

##### **Health and Wellbeing Board priorities**

Vulnerable people:

- Improve the wellbeing of vulnerable children – potential impact on school attainment, evidence particularly for children living in poverty, reduce cases of asthma and ill health by those with the condition.
- Older people to remain independent, reducing hospital admissions.

Child Health:

- Reducing childhood obesity: there is some evidence that experiencing asthma reduces participation and enjoyment of physical activity for children with asthma. Reduces activity levels increases the risk of obesity.
- Reducing infant mortality: air pollution has been associated with low birth weight at term, small for gestational age and preterm birth, all of which are risk factors for infant mortality.

System Resilience

- Common NHS and Local Authority approaches: the matter of air pollution has impacts for health, welfare and social care usage as well as potential workforce productivity losses for both agencies and their supply chain, through working days lost and attendance at work when feeling unwell as well as reduced efficiencies because of road congestion impacting upon trade and staff mobility. In addition, both agencies have authorities to take action to

reduce road traffic and mitigate the impact such as standards for supply chain, implementation of local policy, public awareness raising, improving local infrastructure such as transport.
<b>5.2 Governance &amp; Delivery</b>
A legal requirement not to exceed statutory levels A representative of the CCG to be invited to the local Air Quality Board
<b>5.3 Management Responsibility</b>
Feedback to the HWBB through the DPH and Cabinet members (as a corporate council responsibility)

<b>6. Risk Analysis</b>			
Likelihood: 0 = will never happen; 4 = definite outcome Impact: 0 = no impact; 4 = death/legal challenge			
Identified Risk	Likelihood	Impact	Actions to Manage Risk
Premature mortality	3	4	
Morbidity among people with respiratory and cardiovascular conditions	4	3	
Morbidity among children living in poverty and children with respiratory conditions	3	3	

<b>Appendices</b>
Presentation Slides – Health Effects of Air Pollution in Birmingham

<b>Signatures</b>	
<b>Chair of Health &amp; Wellbeing Board (Councillor Hamilton)</b>	
<b>Date:</b>	

The following people have been involved in the preparation of this board paper:

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