KENT PUBLIC HEALTH OBSERVATORY

Air Quality

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1.1 Introduction

Air pollution is a serious public health issue. Although Air quality in the UK has improved significantly over recent decades, there is growing evidence that air pollution is a significant contributor to preventable ill health and early death.

1.2 Key Findings

Of the mortality indicators made available for comparison by Public Health England, in relative terms, air pollution (particulate matter) is a contributory factor in far fewer deaths per year in the under 75 population of Kent than cancer and cardiovascular disease. However, it is linked with an approximately similar rate of death attributed to respiratory disease and liver disease. It is associated with more deaths than suicide, and communicable diseases.

2. Introduction & Objectives

2.1 Introduction[1]

Air pollution is a mixture of particles and gases that can have adverse effects on human health. Air quality is impacted by vehicle emissions and a range of other everyday activities such as industrial processes, farming, heating homes and generating energy.

The most significant pollutants are Particulate Matter (PM) and oxides of nitrogen (NOX). Much of the PM in urban pollution hotspots, particularly those close to roads, come from traffic sources. Additionally, around 80% of oxide of nitrogen (NOx) emissions in areas where the UK is exceeding NO2 limit values are due to transport.

Air pollution is a serious public health issue. Although air quality in the UK has improved significantly over recent decades, there is growing evidence that air pollution is a significant contributor to preventable ill health and early death. Long-term exposure to everyday air pollutants over several years contributes to the development of cardiovascular disease (CVD), lung cancer and respiratory disease.

The effect of air pollution is inequitable across communities. Air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with (in)equality, because areas with poor air quality are often the less affluent areas. This is supported by the Kent picture. Further, these less affluent areas are also disproportionately affected by other long-term conditions which may increase vulnerability to air borne pollutants. Consequently, improving air quality will support reduction in health inequalities.

District and Borough councils have a statutory duty to periodically review air quality within their area – a process known as Local Air Quality Management (LAQM). Further, Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective, and there is relevant public exposure. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) setting out measures it intends to put in place in pursuit of the objectives.

At a strategic level, Public Health England (PHE) and the Department for Environment Food and Rural Affairs (Defra) have advised local authorities to assess and appropriately prioritise air pollution in their area. The first step in completing the assessment is to conduct an analysis comparing rates of mortality attributable to air pollution with other mortality rates.

[1] Based on a summary of Air Quality: A Briefing for Directors of Public Health, Defra, March 2017.

2.2 Objectives

This report completes the first level analysis described in the introduction above. It also sets out a proposal for further, more detailed, analytical work to be completed by Kent Public Health Observatory in 2018.

3. Ranking of Public Health Outcomes Framework (PHOF) mortality indicators

3.1 Method summary

Local mortality attributed to air pollution was ranked against local mortality due to other sources of disease.

3.2 Method

Public Health England have compiled an air pollution indicator as part of their Public Health Outcomes Framework (PHOF).[2] Indicator 3.01 is *the fraction of mortality attributable to particulate air pollution*.[3]

Indicator 3.01, which is expressed as a percentage of the adult mortality in a given year, was converted into the same statistical units as most of the other mortality indicators in the PHOF. That is age-standardised premature (under 75 years) mortality per 100,000 population per year. This conversion was completed by multiplying the 3.01 indicator by the age-standardised premature mortality rate per 100,000 population (held by Kent Public Health Observatory, 5 years of mortality used, 2012 -2016).

This simple method is suitable to set the burden of air pollution in the context of other mortality indicators in the PHOF (all other mortality indicators are based on 3 years of data collection). However, it is important to note that unlike the other indicators that are based on recorded mortality data for specific causes of death, the figures for air pollution are estimates of mortality attributable to a risk factor. Deaths cannot individually be attributed to air pollution, rather, air pollution is considered a contributory factor in many of these deaths

Overall premature mortality rates (all causes of death) have been presented for each District Council to provide context. Mortality rates are only available at District level in the PHOF, so it is not possible for analysis at a lower geographical level.

[2] The Public Health Outcomes Framework *Healthy lives, healthy people: Improving outcomes and supporting transparency* sets out a vision for public health, desired outcomes and the indicators that will help us understand how well public health is being improved and protected. https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

[3] https://fingertips.phe.org.uk/search/particulate%20matter#page/6/gid/1/pat/6/par/E12000004/ati/102/are/E06000015/iid/30101/age/230/sex/4.

3.3 Results

Table 1: Ranking of PHOF mortality indicators for District Councils in Kent[4]

Ashford		Canterbury		Dartford	
Indicator in PHOF	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**
Overall premature deaths	289.4	Overall premature deaths	321.0	Overall premature deaths	353.3
Preventable cancer <75(4.05ii)	70.6	Preventable cancer <75(4.05ii)	73.1	Preventable cancer <75(4.05ii)	100.7
Preventable CVD <75(4.04ii)	37.1	Preventable CVD <75(4.04ii)	37.6	Preventable CVD <75(4.04ii)	47.7
Mortality attributable to PM <75 (3.01)	**14.7**	Preventable respiratory disease <75(4.07ii)	18.9	**Mortality attributable to PM <75 (3.01)**	**19.4**
Preventable respiratory disease <75(4.07ii)	13.7	**Mortality attributable to PM <75 (3.01)**	**15.7**	Preventable respiratory disease <75(4.07ii)	17.0
Suicide rate	10.5	Preventable liver disease <75(4.06ii)	13.7	Preventable liver disease <75(4.06ii)	11.3
Preventable liver disease <75(4.06ii)	9.6	Suicide rate	11.0	Suicide rate	11.9
Mortality from communicable diseases	8.0	Mortality from communicable diseases	6.1	Mortality from communicable diseases	9.8

[4] Indicators cover 2014-2016, other than indicator 3.01 which is for 2015.

Dover		Gravesham		Maidstone	
Indicator in PHOF	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**
Overall premature deaths	340.9	Overall premature deaths	322.1	Overall premature deaths	288.8
Preventable cancer <75(4.05ii)	86.0	Preventable cancer <75(4.05ii)	86.5	Preventable cancer <75(4.05ii)	68.7
Preventable CVD <75(4.04ii)	41.9	Preventable CVD <75(4.04ii)	44.9	Preventable CVD <75(4.04ii)	38.6
Preventable respiratory disease <75(4.07ii)	24.6	**Mortality attributable to PM <75 (3.01)**	**16.6**	**Mortality attributable to PM <75 (3.01)**	**15.9**
Mortality attributable to PM <75 (3.01)	**17.0**	Preventable liver disease <75(4.06ii)	16.5	Preventable respiratory disease <75(4.07ii)	15.3
Preventable liver disease <75(4.06ii)	11.4	Preventable respiratory disease <75(4.07ii)	15.3	Preventable liver disease <75(4.06ii)	11.5
Mortality from communicable diseases	10.5	Suicide rate	12.0	Mortality from communicable diseases	10.6
Suicide rate	9.9	Mortality from communicable diseases	10.5	Suicide rate	8.8

Sevenoaks		Shepway		Swale	
Indicator in PHOF	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**
Overall premature deaths	248.7	Overall premature deaths	355.4	Overall premature deaths	350.0
Preventable cancer <75(4.05ii)	55.2	Preventable cancer <75(4.05ii)	87.2	Preventable cancer <75(4.05ii)	78.7
Preventable CVD <75(4.04ii)	28.7	Preventable CVD <75(4.04ii)	42.7	Preventable CVD <75(4.04ii)	46.1
Preventable respiratory disease <75(4.07ii)	16.4	Preventable liver disease <75(4.06ii)	18.3	Preventable respiratory disease <75(4.07ii)	24.7
Mortality attributable to PM <75 (3.01)	**12.5**	Preventable respiratory disease <75(4.07ii)	17.8	**Mortality attributable to PM <75 (3.01)**	18.7
Preventable liver disease <75(4.06ii)	7.6	**Mortality attributable to PM <75 (3.01)**	**17.3**	Preventable liver disease <75(4.06ii)	15.4
Suicide rate	9.5	Suicide rate	13.5	Suicide rate	13.0
Mortality from communicable diseases	5.0	Mortality from communicable diseases	10.5	Mortality from communicable diseases	10.8

Thanet		Tonbridge & Malling		Tunbridge Wells	
Indicator in PHOF	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**	**Indicator in PHOF**	**Mortality rate per 100,000**
Overall premature deaths	395.6	Overall premature deaths	267.5	Overall premature deaths	267.9
Preventable cancer <75(4.05ii)	96.6	Preventable cancer <75(4.05ii)	68.6	Preventable cancer <75(4.05ii)	64.2
Preventable CVD <75(4.04ii)	54.1	Preventable CVD <75(4.04ii)	29.2	Preventable CVD <75(4.04ii)	32.2
Preventable respiratory disease <75(4.07ii)	26.6	**Mortality attributable to PM <75 (3.01)**	**14.6**	Preventable respiratory disease <75(4.07ii)	14.7
Mortality attributable to PM <75 (3.01)	**20.1**	Preventable liver disease <75(4.06ii)	11.9	Preventable liver disease <75(4.06ii)	14.6
Preventable liver disease <75(4.06ii)	17.9	Preventable respiratory disease <75(4.07ii)	11.6	**Mortality attributable to PM <75 (3.01)**	**14.1**
Suicide rate	16.0	Suicide rate	10.2	Suicide rate	13.8
Mortality from communicable diseases	7.4	Mortality from communicable diseases	7.7	Mortality from communicable diseases	4.0

Source: Public Health England - Public Health Outcomes Framework, Kent Public Health Observatory

4. Conclusions

4.1 Conclusions

Of the mortality indicators made available for comparison by Public Health England, in relative terms, air pollution (particulate matter) is a contributory factor in far fewer deaths per year in the under 75 population of Kent than cancer and cardiovascular disease. However, it is linked with an approximately similar rate of death attributed to respiratory disease and liver disease. It is associated with more deaths than suicide, and communicable diseases.

4.2 Next steps

Further, more detailed, work is currently being completed by Kent Public Health Observatory with 3 District Councils[5] (Maidstone, Tunbridge Wells and Canterbury) to map locally collected data for nitrogen dioxide and to overlay disease and vulnerable population data. The aim of this second piece of analysis will be to identify correlations with high numbers of sufferers of symptoms which may be caused or made worse by chronic exposure to poor air quality.[6]

Detailed information on nitrogen dioxide concentrations are available from a high volume of locations across the County, supporting this type of mapping work. Unfortunately, particulate matter is very expensive to measure, and is only monitored in a handful of locations in Kent, so will not be included in this follow-up analysis. A further report will be available in summer 2018.

[5] Three District Councils at the time of writing

[6] This work will need to be caveated with the note that there are multiple contributors to these health effects.