Appendix 3

Barking & Dagenham

Potential cancer cluster – small area study for Woodlands Avenue RM6 6EA

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Contents

Cancer Clusters

A cancer cluster occurs when there are more cases of the same type (or similar types) of cancer than expected are diagnosed in a group of people, geographic area and/or period of time. Although most cancer clusters occur by chance, it is not uncommon for people to be concerned that cancer clusters are caused by exposure to a cancer-causing agent in the environment.

Many apparent non-infectious disease clusters have no cause but in rare cases, clusters may be related to community based external sources (e.g. common environmental exposures). Real clusters that are proven to be associated with an environmental or occupational carcinogen are extremely rare. Even if there are more people with one type of cancer in a community than might be expected, this does not necessarily mean that they were all caused by a cancer-causing agent in the environment.

People who are born after 1960 have a one in two lifetime risk of cancer – this means that one in two people in this age group will develop cancer at some point in their life (before they reach 85)[1]. This risk can vary in people depending on their family history and lifestyle (e.g. occupation, smoking, diet, etc). In Barking and Dagenham, seeing cancer is not unusual, especially with our high smoking rates and industrial heritage. Barking and Dagenham has higher rates of prostate cancer, lung cancer and 'all cancers' when compared to England as a whole.

Investigating clusters

The Health and Social Care Act 2012 specifies that one of the public health duties of local authorities is the responsibility, led by their DPH, to investigate reports of non-infectious disease clusters. This is done by following the Public Health England guidance for investigating non-infectious disease clusters from potential environmental causes[2].

For this investigation, advice was sought on how to proceed with Stage 1 from a Consultant in Communicable Disease Control (CCDC) in the local Public Health England Health Protection Team and from the Public Health England National Cancer Registration and Analysis Service (PHE NCRAS).

The outcomes which can occur from Stage 1 are:

1. If contact with the reporter of the cluster results in both you and the reporter being satisfied that no further investigation is necessary, **STOP** further investigation, and prepare a summary report for the reporter and communicate your conclusions as appropriate to all parties involved.

[1] United Kingdom and Ireland Association of Cancer Registries (2017). Factsheet: Cancer Clusters. UKIACR, June 2017

[2] Public Health England (2019) Guidance for investigating non-infectious disease clusters from potential environmental causes. Crown Copyright 2019.

2. If the reporter is not satisfied, but the information suggests that the cluster is not of public health importance, **STOP** further investigation, and prepare a report, communicate your conclusions as appropriate to all parties involved.

3. If from public health point of view, **further investigation** is required, **PROCEED** to stage 2a.

Stage 1 investigation - Environmental Contamination

Following a report of a potential cancer cluster at Woodlands Avenue in Chadwell Heath, the Environmental Health team investigated possible land contamination and environmental pollution in the area (see Appendix 1 for full report).

This report concluded that there were no records suggesting that this land had been contaminated or was unsuitable for residential occupation, the land had previously been open fields before the houses were built between the first and second world wars.

The report also looked at 2020 modelled annual average concentrations of Nitrogen Dioxide (NO_2), and Particulate matter (PM_{10} and $PM_{2.5}$) and found that in the Woodlands Avenue area that the 3 major pollutants that are measured were not exceeding limits set in the UK. The modelled concentrations were 26.2µg m^{-3} of NO_2 (objective maximum 40µg m^{-3}), 22.5µg m^{-3} of PM_{10} (objective maximum 40µg m^{-3}) and 14µg m^{-3} of $PM_{2.5}$ (EU objective maximum 18µg m^{-3} by 2020[3]).

Oxides of Nitrogen (NOx) are formed by the combustion of fuels used in power generation, domestic heating and traffic. Combustion processes emit a mixture of nitrogen oxides, primarily nitric oxide (NO) which is quickly oxidised in the atmosphere to nitrogen dioxide (NO_2). Nitrogen dioxide has a variety of environmental and health impacts. It is a respiratory irritant which may exacerbate asthma and possibly increase susceptibility to infections.

Airborne particulate matter (PM) includes a wide range of particle sizes and different chemical constituents. Particulate matter can affect our health, and of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Air Quality Objectives are in place for the protection of human health for PM10 and PM2.5 – particles of less than 10 and 2.5 micrometres in diameter, respectively. The available evidence suggests that PM2.5, usually formed by combustion, are the main cause of the harmful effects of particulate matter. There is evidence that short- and long-term exposure to particulate matter cause respiratory and cardiovascular illness and even death.

[3] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. OJ L 152, 11.6.2008, p. 1–44 (BG, ES, CS, DA, DE, ET, EL, EN, FR, IT, LV, LT, HU, MT, NL, PL, PT, RO, SK, SL, FI, SV). Special edition in Croatian: Chapter 15 Volume 029 P. 169 - 212

Stage 1 investigation - Cancer rates

The most recent data from Public Health England's 'Fingertips' portal tells us that, when compared to England as a whole, the London borough of Barking and Dagenham has lower rates of breast cancer; similar rates of colorectal cancer; and higher rates of prostate cancer, lung cancer and all cancers[4].

To determine whether there is evidence of a cluster in the LSOA in question, Public Health England National Cancer Registration and Analysis Service (PHE NCRAS) has interrogated the national cancer registry data for the last 10 available years (2008 – 2018). Their findings from this exercise are shown in Table 1.

Table 1 – Crude and Age standardised cancer incidence per 100,000 person years in LSOA, Barking and Dagenham, and England (2008 – 2018)

Geography	Number of cancers	Population-years	Crude rate per 100,000 person-years (95% Confidence Interval)	Age standardised rate per 100,000 person-years (95% Confidence Interval)
LSOA of interest	79	21,507	367.3 (290.8, 457.8)	650.9 (510.9, 816.5)
NHS Barking and Dagenham CCG	8,234	2,137,780	385.2 (376.9, 393.6)	635.3 (621.2, 649.6)
England	3,236,192	593,089,021	545.7 (545.1, 546.2)	602.7 (602, 603.4)

Without age standardisation, the actual (crude) rates of cancer in the LSOA of interest (at 367.3 cases per 100,000 person years) are lower than the England average of 545.7 cases per 100,000 person-years, as the population in this LSOA is younger than on average in England.

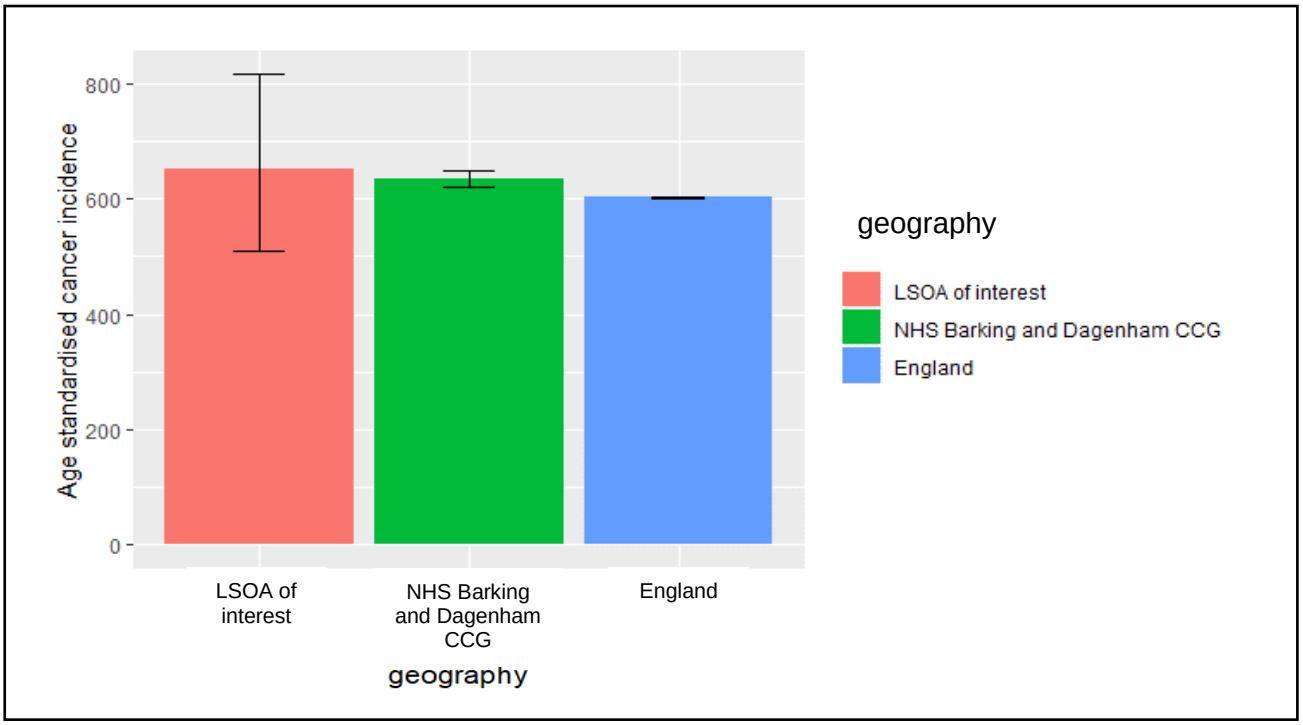
Person years take into account both the number of people in the area population and the amount of time each person spends in that area. For example, if you were looking at data for a period of 10 years and there were 1000 people in the population of that area, it would be 10,000 person years of data. Person years allow you to compare the cases of cancer of different sized populations by turning the number of cancers into a rate per 100,000 person-years.

An age-standardised rate (ASR) is a summary measure of the rate of cases of cancer that a population would have if it had a standard age structure (a 'reference population' is usually used for this standard age structure – this is often the population of England for data in England). Since cancer rates increase strongly with age, age standardisation of the rates takes into account whether a community's population is older or younger than the population that they are being compared to, and allows for a proper comparison.

[4] rates for 2012-2016

The age standardised rates are higher in the LSOA of interest (at 650.9 per 100,000 person-years) than the age standardised rate in Barking and Dagenham (at 635.3 per 100,000 person-years), but this difference is not statistically significant. This means that it is very unlikely that the rates in the LSOA in question are actually higher or lower than the rates in Barking and Dagenham as a whole. A statistically significant difference would be a difference that we are confident does truly exist, rather than being seen by chance. The rates of cancer in this LSOA are therefore broadly similar to the rates in the rest of Barking and Dagenham.

Figure 1 – Age standardised cancer incidence per 100,000 person years in LSOA, Barking and Dagenham, and England (2008 – 2018)



Public Health England National Cancer Registration and Analysis Service also reviewed the distribution of types of tumour in this LSOA. The distribution that they found did not suggest a cluster. The most common cancers in this LSOA were breast, prostate, colorectal and lung, which are the four most common cancers in England as a whole. The distribution of these tumours broadly resembled the distribution of types of tumour that is expected in England as a whole.

Based on the analysis done, Public Health England National Cancer Registration and Analysis Service reported that the data suggests that there is no evidence of a cancer cluster in this Lower Super Output Area (LSOA)[5] and that cancer rates in this area were not significantly different to those of the rest of Barking and Dagenham. They recommended that further investigation was not necessary.

[5] The LSOA code is E01000112, which covers Woodlands Avenue

Discussion with reporter

These results have been discussed with the reporter of the potential cluster, including the similarity of the LSOA rates to those of Barking and Dagenham as a whole, the similar distribution of cancer types to that of England as a whole, the rarity of cancer clusters, and the Public Health England National Cancer Registration and Analysis Service conclusion that the data does not suggest a cancer cluster and recommend no further investigation. Agreement has been reached that this investigation will STOP following this stage 1 investigation, as suggested in the Public Health England guidance for investigating non-infectious disease clusters from potential environmental causes.

Appendix 1 - Environmental Health report on environmental contamination (land contamination and air quality)

"Resident advised that there is up to 5 residents with different types of cancer living on her road. She is concerned that the area or road is the cause of triggering the cancer for them and would like this investigated as it seems odd that this has happened".

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Possible land contamination.

Noted that that the historical maps indicate that Woodlands Avenue was open fields until developed for housing between the first and second world war. No records identified to suggest that area is not suitable for residential occupation.

Air Quality

The EU sets limits for several known air pollutants, that member states must meet these are set out below.

Pollutant	**Objective (UK)**	**Averaging Period**	**Date[1]**
Nitrogen dioxide - NO_2	200 µg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 µg m^{-3}	Annual mean*	31 Dec 2005
Particles - PM_{10}	50 µg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 µg m^{-3}	Annual mean*	31 Dec 2004
Particles - $PM_{2.5}$	25 µg m^{-3}	Annual mean*	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020
Sulphur Dioxide (SO_2)	266 µg m^{-3} not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
	350 µg m^{-3} not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 µg m^{-3} mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

***** Included in LAEI dataset (see below)

Barking and Dagenham is exceeding EU limits for the gas Nitrogen Dioxide (NO2) in parts of the borough, principally along major roads.

We are currently meeting the limits that are set by the EU for all other air pollutants, although we remain focused on Particulate Matter (PM10 and PM2.5) because these pollutants have detrimental impacts on health at any level.

To assist London local authorities to carry out their air quality management duties the Greater London Authority provide a range of templates and tools including the London atmospheric emissions inventory (LAEI). The LAEI includes modelled annual average concentrations of NO2, PM10 and PM2.5 at 20m grid level for the base year 2013 and projected forward to 2020, 2025, and 2030. The predictions include both background and local sources.

The environmental protection team has used the LAEI 2020 modelled concentrations to identify baseline concentrations for the Woodlands Avenue residential boundaries shown on the map below.

The LAEI modelled annual average mean concentrations of pollutants, for a 2020 model year, for the grid points within Woodlands Avenue residential boundaries, as shown in orange on the map are

Nitrogen dioxide - NO_2 26.2 µg m^{-3} (SD 3.5)
Particles - PM_{10} 22.5 µg m^{-3} (SD 0.82)
Particles - $PM_{2.5}$ 14 µg m^{-3} (SD 0.29)

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