

HEALTH AND WELLBEING BOARD

11 June 2019

Title:	Global Burden of Disease Study Data 2017
Report of the Health and Wellbeing Board	
Open Report	For Information
Wards Affected: ALL	Key Decision: No
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Sponsor: Matthew Cole, Director of Public Health, London Borough of Barking and Dagenham	
Summary <p>This briefing on Global Burden of Disease Study data was requested by the Managing Director of Barking, Havering and Redbridge (BHR) CCGs to support the BHR Transformation Boards in their commissioning decisions. This briefing can help inform joint commissioning decisions across BHR by gaining an understanding of drivers of ill health and mortality.</p> <p>Premature mortality: Ischaemic heart disease and lung cancer have the highest age-standardised rate of years of life lost (YLL) across BHR followed by chronic obstructive pulmonary disease (COPD) in Barking and Dagenham and Havering, and lower respiratory infections in Redbridge. These need to be targeted to improve life expectancy.</p> <p>Ill health: the conditions with the highest rates of years lived with disability (YLDs) were low back pain, headache disorders and depressive disorders. These are therefore likely to be key conditions to target to improve healthy life expectancy.</p> <p>Risk factors: The main risk factors for ill health and premature death across BHR are tobacco, dietary risks (e.g. diet low in whole grains), high body mass index (excess weight), high fasting plasma glucose (indicative of diabetes/diabetes risk) and high blood pressure. These are key issues to target for prevention.</p> <p>A strength of the dataset is that it allows all health conditions causing ill health/disability and death to be quantified and compared. However, these are best estimates based on modelled available data and there remains a need to triangulate this with local data.</p>	

Recommendation(s)

The Health and Wellbeing Board is recommended to:

- (i) Note the findings of the report and the associated caveats and
- (ii) Provide any feedback and comments on how the findings of the report could be taken forward for prioritisation and resource allocation across BHR Integrated Health and Care System.

1. Introduction

- 1.1 The Global Burden of Disease Study (GBD) is an international collaborative project which provides authoritative modelled estimates on the amount of ill health, premature death and risk factors in a population.
- 1.2 These measures are comparable across time and different geographies with a list of conditions that is 'mutually exclusive and collectively exhaustive': that is, into which every condition can be placed without double counting.
- 1.3 The GBD therefore allows an understanding of the relative contribution of each condition as well as the collective burden. It is an ongoing, iterative project, with each modelling round refining the previous one.¹
- 1.4 England local authority level estimates were first published for the 2016 round in October 2018 and refreshed for the 2017 round in late December 2018.
- 1.5 The GBD also includes estimates of life expectancy and healthy life expectancy.² Life expectancy and healthy life expectancy in BHR have been rising over the last few decades (Appendix A), but the gap between the two measures has increased, such that BHR residents are living longer, but spending a greater period of time in ill health. Together with the human cost of years lived in ill health, this has implications for health services. Understanding YLLs and YLDs will help us to understand the drivers of life expectancy and healthy life expectancy respectively. This briefing has been brought to the Board to help inform joint commissioning decisions by gaining an understanding of drivers of ill health and mortality across BHR
- 1.6 A list of terms and abbreviations is included in Appendix B.

2. Years of life lost

Years of life lost (YLLs) are a measure of premature mortality; they estimate the years of potential life lost due to premature death by summing the remaining life expectancy of individuals dying in the period.³ Hence, deaths at a younger age correspond to more YLLs than deaths at an older age.

YLLs can be used in public health planning and commissioning to compare the relative importance of different causes of premature deaths, to set priorities for prevention, and to compare the premature mortality experience between populations.

¹ For more information, see: <http://www.healthdata.org/gbd/about/protocol>.

² Note: these are not the same as the Office for National Statistics life expectancies/healthy life expectancies.

³ Based on a theoretical highest possible life expectancy – see Appendix B.

What are the leading causes of premature mortality?

- 2.1 Based on age-standardised rates, the three leading causes of YLLs across BHR are ischaemic heart disease, lung cancer and COPD (Barking and Dagenham and Havering) and lower respiratory infections (Redbridge) (Table 1).⁴ Ischaemic heart disease on its own accounts for 12% of the YLL rate across all three boroughs.
- 2.2 The conditions in Table 1 are likely to be key ones to target to improve life expectancy, although they should be viewed in conjunction with the absolute burden discussed later in this section (see Figure 2).

Table 1: Top ten causes of YLL in BHR, age-standardised rate per 100,000, 2017⁵

Barking & Dagenham		Havering		Redbridge	
Causes	ASR	Causes	ASR	Causes	ASR
<i>All causes</i>	<i>9,491</i>	<i>All causes</i>	<i>8,513</i>	<i>All causes</i>	<i>7,321</i>
IHD	1,115	IHD	993	IHD	914
Lung cancer	792	Lung cancer	607	Lung cancer	458
COPD	548	COPD	416	LRIs	330
LRIs	420	Stroke	376	Stroke	322
Neonatal disorders	395	Dementia	369	Dementia	320
Stroke	382	LRIs	355	COPD	287
Dementia	348	Breast cancer	317	Neonatal disorders	267
Bowel cancer	276	Bowel cancer	283	Breast cancer	252
Breast cancer	266	Self-harm	281	Self-harm	236
Cirrhosis	259	Neonatal disorders	263	Bowel cancer	215

- 2.3 Barking and Dagenham has the highest all-cause age-standardised YLL rate (9,491 per 100,000) of the three boroughs, followed by Havering (8,513 per 100,000) and Redbridge (7,321 per 100,000).

How do the causes of premature mortality compare with London/England?

- 2.4 Barking and Dagenham has a significantly higher all-cause YLL rate than the England average (Table 2).⁶ Rates are also significantly higher than England for causes including ischaemic heart disease, lung cancer, COPD and lower respiratory infections.
- 2.5 In Havering, rates for lower respiratory infections, dementia, and breast cancer are significantly higher than the England average.
- 2.6 Most of the leading causes in Redbridge, and across London as a whole, have significantly lower rates than the England average.

⁴ Tracheal, bronchus, and lung cancer is referred to as lung cancer in this report.




⁵ See Appendix B for abbreviations/shortened terms used in table.

⁶ Significance is determined by non-overlapping confidence intervals.

Table 2: Leading causes of YLLs in BHR, London and England, age-standardised rate per 100,000, 2017⁷

Cause	B&D	Haverin g	Redbrid ge	London	England
<i>All causes</i>	9,491	8,513	7,321	7,603	8,521
IHD	1,115	993	914	838	928
Lung cancer	792	607	458	519	563
COPD	548	416	287	345	379
LRIs	420	355	330	308	317
Neonatal disorders	395	263	267	349	403
Stroke	382	376	322	320	396
Dementia	348	369	320	311	335
Bowel cancer	276	283	215	227	270
Breast cancer	266	317	252	228	259
Cirrhosis	259	218	199	225	244
Self-harm	251	281	236	232	314
Congenital birth defects	243	192	183	207	252
Pancreatic cancer	188	170	155	151	161
Drug use disorders	168	132	114	161	186
Road injuries	146	165	131	128	166

Key

	Significantly lower than the England average		Similar to the England average		Significantly higher than the England average
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2.7 This reiterates the need for tailored approaches to tackle premature mortality across the three boroughs; even accounting for different population sizes and age structures, there are fundamental differences in burden. Nonetheless, the leading causes are similar.

How does premature mortality vary by age and sex?

2.8 Males have a substantially higher age standardised YLL rate than females (around 40% higher than females in Havering and Redbridge and 65% higher in Barking and Dagenham). This compares with around 50% and 45% higher rates for London and England males respectively compared with females. In part this reflects what we already know about differences in life expectancy by sex, but it suggests male premature mortality in Barking and Dagenham is a particular cause for concern.

2.9 Ischaemic heart disease is a key contributor to this gap; males in Barking and Dagenham have 3.2 times the female rate of YLLs from ischaemic heart disease, while the male rate is around 2.7 times higher than the female rate in both Havering and Redbridge.

2.10 The top three causes of YLLs in males mirror the overall top causes across the three boroughs (ischaemic heart disease, lung cancer and COPD/lower respiratory infections). For females, lung cancer, breast cancer and ischaemic heart disease make up the three leading causes for all three boroughs but in different orders. The

⁷ The order of this table is based on Barking and Dagenham. Fifteen causes are shown to ensure the top ten are included for each borough. Drug use disorders are not in the top 15 leading causes for Havering or Redbridge

top causes are lung cancer in Barking and Dagenham, breast cancer in Havering and ischaemic heart disease in Redbridge.

- 2.11 The amount and causes of YLLs across different life stages vary substantially. These are summarised in Table 3 (as age-specific rates). Further data on YLLs by age group and sex is available in Appendix C.

Table 3: Top three causes of YLLs by age group, rate per 100,000, BHR, 2017

Age	All-cause YLL rate	Top cause	2 nd largest cause	3 rd largest cause
Under 5	<i>B&D:</i> 7,758 <i>H:</i> 5,656 <i>R:</i> 5,809	Neonatal disorders	Congenital birth defects	Sudden infant death syndrome
5–14	<i>B&D:</i> 565 <i>H:</i> 626 <i>R:</i> 573	Brain and nervous system cancer	Congenital birth defects	Other malignant neoplasms (<i>B&D</i>) Road injuries (<i>Havering</i>) Leukaemia (<i>Redbridge</i>)
15–49	<i>B&D:</i> 3,614 <i>H:</i> 4,176 <i>R:</i> 3,015	Self-harm	Drug use disorders (<i>B&D</i>) IHD (<i>Havering/Redbridge</i>)	IHD (<i>B&D</i>) Drug use disorders (<i>Havering/Redbridge</i>)
50–64	<i>B&D:</i> 20,489 <i>H:</i> 18,707 <i>R:</i> 15,530	IHD	Lung cancer	COPD (<i>B&D/Havering</i>) Breast cancer (<i>Redbridge</i>)
70+	<i>B&D:</i> 64,638 <i>H:</i> 56,222 <i>R:</i> 50,425	IHD	Dementia	COPD (<i>B&D/Havering</i>) LRIs (<i>Redbridge</i>)

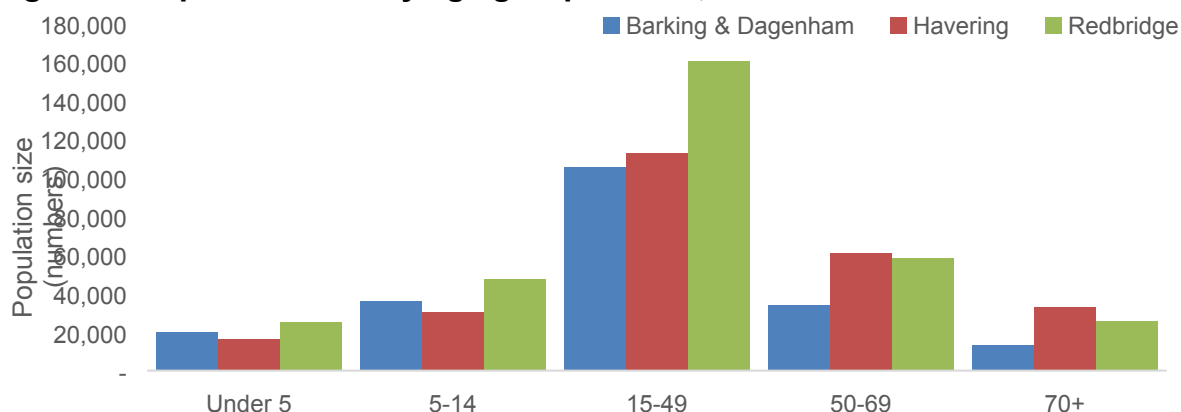
What is the total burden of premature mortality (crude YLLs, not standardised for age)?

- 2.12 Crude numbers show the burden of disease regardless of population size or structure. This may be useful for service provision, but caution is needed in the interpretation given the difference in populations across BHR (see below).
- 2.13 The highest crude number of YLLs (for all causes) was in Havering (35,677), followed by Redbridge (28,390) and Barking and Dagenham (20,997).
- 2.14 The differences between the boroughs are driven by both population size and structure. Redbridge has the largest population (315,800), followed by Havering (252,600) and Barking and Dagenham (208,300).⁸ Havering's higher crude number of YLLs than Redbridge – despite its smaller overall population size – reflects its older population; as seen in Table 3, the YLL rate increases dramatically with age.

⁸ 2017 population estimates within GBD.

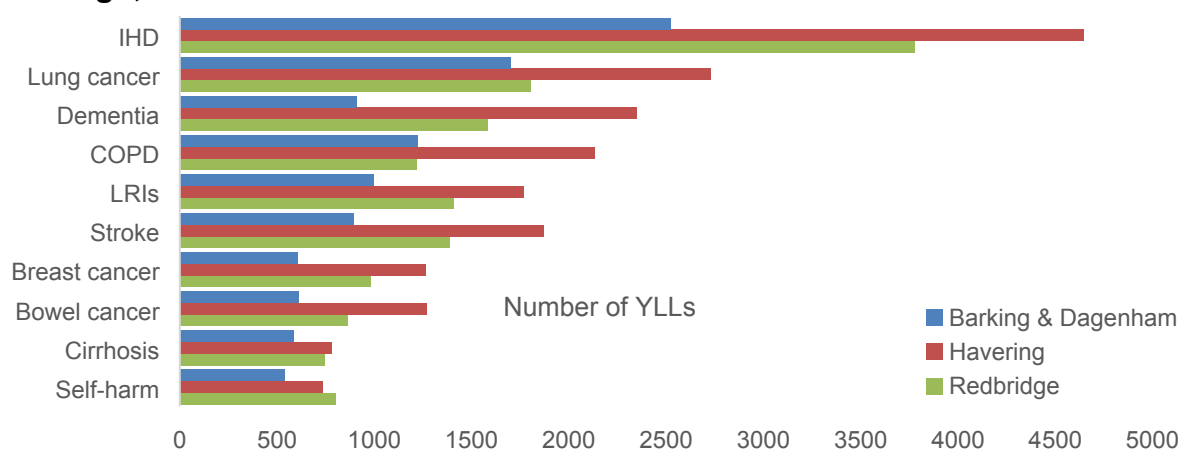
There are 32,900 people aged 70 and above in Havering: 7,500 more than in Redbridge and 19,800 more than in Barking and Dagenham.

Figure 1: Population size by age group in BHR, 2017



2.15 Figure 2 shows the top ten conditions contributing to the total crude YLL burden across BHR. These conditions account for half of YLLs across BHR (53%). Unlike the age-standardised rates, where dementia was the fifth (Havering and Redbridge) or seventh (Barking and Dagenham) leading cause, dementia is the third largest cause of crude YLLs.

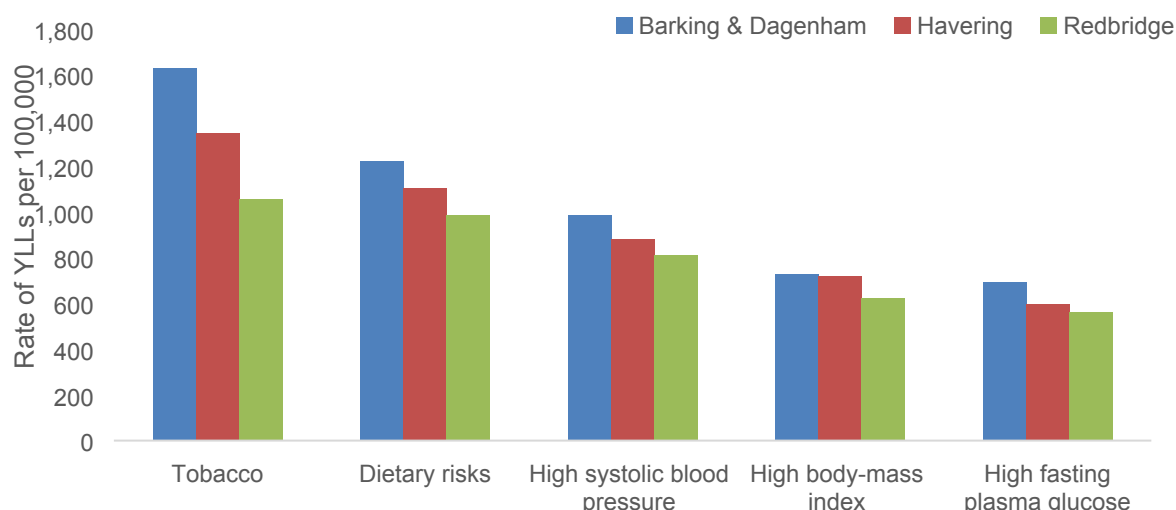
Figure 2: Top ten causes of YLLs based on total YLL burden across BHR by borough, 2017



What are the risk factors for premature mortality?

2.16 Tobacco (a category comprising smoking, passive smoking and chewing tobacco) is the single largest risk factor for YLL across the three boroughs, with a notably higher rate of YLLs attributable to tobacco in Barking and Dagenham, especially when compared with Redbridge. Other key risk factors include dietary risks (e.g. diet low in whole grains), high systolic blood pressure, high body mass index (excess weight) and high fast plasma glucose (indicative of diabetes/diabetes risk).

Figure 3: Age-standardised YLL rates per 100,000 – top five risk factors contributing to YLL in BHR



2.17 Analysis by condition group suggests that the largest burden of YLLs associated with these risk factors comes from cardiovascular disease and cancers for all three boroughs (Appendix D).

3. Years lived with disability

Years lived with disability (YLDs) are a measure of ill health. They are calculated by multiplying the prevalence of a condition by the short- or long-term loss of health associated with it (its disability weighting).⁹

What are the leading causes of ill health?

3.1 The three leading causes of YLD across BHR are low back pain, headache disorders and depressive disorders (Table 4). Addressing these is therefore likely to be important for improving healthy life expectancy.

Table 4: Top ten causes of YLDs in BHR, age-standardised rate per 100,000, 2017

Barking & Dagenham		Havering		Redbridge	
Causes	ASR	Causes	ASR	Causes	ASR
<i>All causes</i>	<i>11,511</i>	<i>All causes</i>	<i>11,401</i>	<i>All causes</i>	<i>11,304</i>
Low back pain	1,459	Low back pain	1,459	Low back pain	1,457
Headache disorders	844	Headache disorders	844	Headache disorders	839
Depressive disorders	625	Depressive disorders	625	Depressive disorders	623
Neck pain	491	Neck pain	491	Neck pain	490
Dermatitis	402	Falls	401	Falls	398
Anxiety disorders	397	Anxiety disorders	397	Anxiety disorders	395
Falls	397	Diabetes mellitus	378	Diabetes mellitus	378
Diabetes mellitus	384	Asthma	364	Asthma	363

⁹ Disabilities have different 'weights' that signify the severity of the disability (e.g. 0.061 for lower back pain, and 0.594 for blindness).

Asthma	361	Neonatal disorders	357	Neonatal disorders	359
Neonatal disorders	361	Age-related and other hearing loss	316	Dermatitis	313

3.2 Barking and Dagenham had the highest age-standardised YLD rate (11,511 per 100,000) in BHR, although all three boroughs had similar rates. This relates to a limitation in the data available to model YLDs (outlined in Appendix E).

How do the causes of ill health compare with London/England?

3.3 Similarly, due to the data limitation outlined in Appendix E, rates across BHR for the leading causes of YLDs are similar to the England average (Table 5).

Table 5: Leading causes of YLDs in BHR, age-standardised rate per 100,000, London & England, 2017

Cause	B&D	Havering	Redbridge	London	England
<i>All causes</i>	<i>11,511</i>	<i>11,401</i>	<i>11,304</i>	<i>11,393</i>	<i>11,385</i>
Low back pain	1,459	1,459	1,457	1,462	1,441
Headache disorders	844	844	839	840	838
Depressive disorders	625	625	623	623	623
Neck pain	491	491	490	490	489
Dermatitis	402	314	313	316	319
Anxiety disorders	397	397	395	396	395
Falls	397	401	398	398	405
Diabetes mellitus	384	378	378	398	391
Asthma	361	364	363	367	330
Neonatal disorders	361	357	359	358	357
COPD	332	308	272	304	303
Age-related and other hearing loss	316	316	308	313	314
Drug use disorders	297	288	287	300	311
Other musculoskeletal disorders	275	264	265	269	271
Oral disorders	239	236	237	230	233

How does ill health vary by age and sex?

3.4 Unlike YLLs, where rates are higher in males, age-standardised rates of YLDs are higher for females, albeit to a lesser extent. Females experience 12–14% higher rates of YLDs than males in Barking and Dagenham, Havering and Redbridge. This is in line with London (12%) and England (14%).

3.5 YLDs by age group are summarised in Table 6 (as age-specific rates). Further data on YLDs by age group and sex is available in Appendix F.

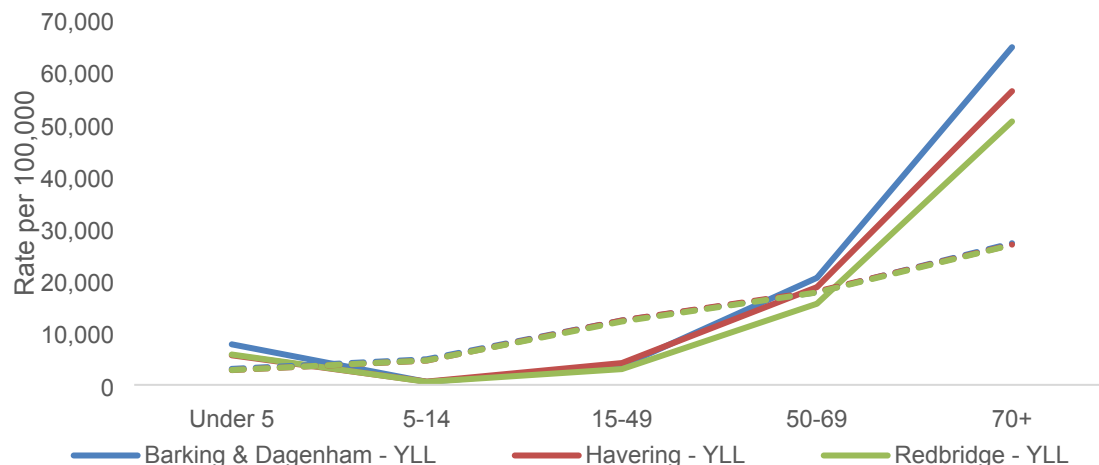
Table 6: Top three causes of YLDs by age group, rate per 100,000, BHR, 2017

Age	All-cause YLL rate	Top cause	2 nd largest cause	3 rd largest cause
Under 5	B&D: 3,057 H: 2,822 R: 2,839	Dermatitis	Neonatal disorders	Asthma (B&D/Havering) Congenital birth defects (Redbridge)
5–14	B&D: 4,902 H: 4,641 R: 4,675	Dermatitis	Neonatal disorders (B&D) Asthma (Havering/Redbridge)	Asthma (B&D) Neonatal disorders (Havering/Redbridge)
15–49	B&D: 12,315 H: 12,337 R: 12,128	Low back pain	Headache disorders	Depressive disorders
50–64	B&D: 17,726 H: 17,871 R: 17,689	Low back pain	Neck pain	Headache disorders
70+	B&D: 27,116 H: 26,845 R: 26,784	Low back pain	Age-related and other hearing loss	COPD

What is the total burden of ill health (crude YLDs, not standardised for age)?

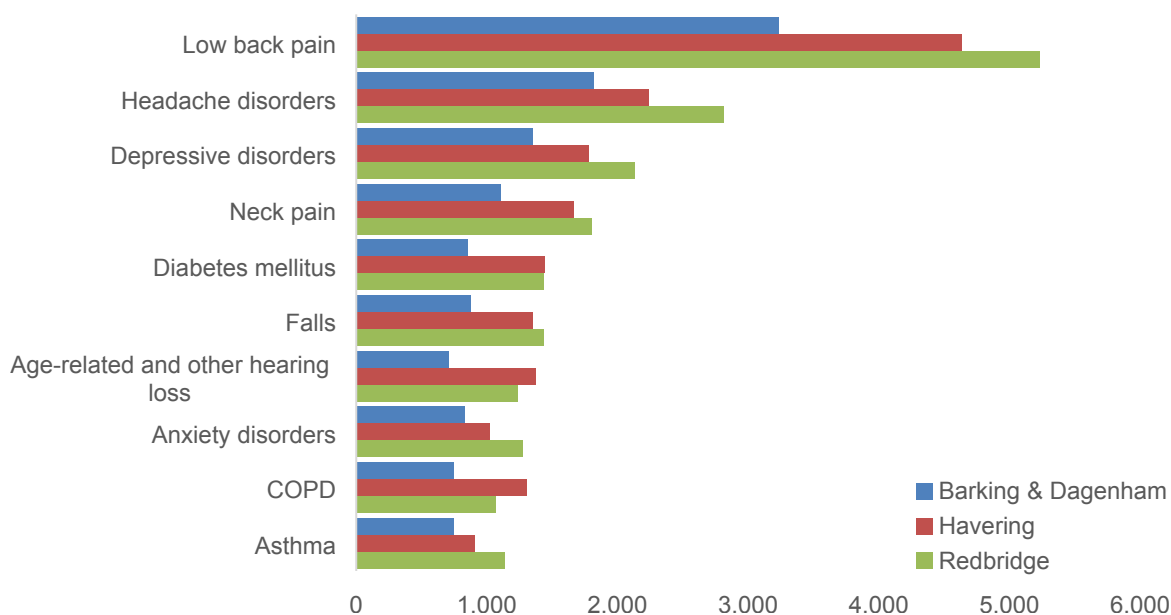
- 3.6 Across all conditions, the highest crude burden of YLDs was in Redbridge (39,415), followed by Havering (35,449) and Barking and Dagenham (24,936). This is in contrast to YLLs, where Havering had the largest burden of the three boroughs.
- 3.7 This is because ill health exists across the life course, whereas death only happens once and generally occurs in older age. This is evident in the shallower gradient between YLDs and age (dashed lines in Figure 4) compared with YLLs (solid lines). This explains why Havering's older population was more influential on YLLs than YLDs. There nonetheless remains a strong relationship between YLDs and age and this will also vary by condition (e.g. age-related and other hearing loss, neonatal disorders).

Figure 4: Age-specific rates of YLLs (solid lines) and YLDs (dashed lines), BHR, 2017



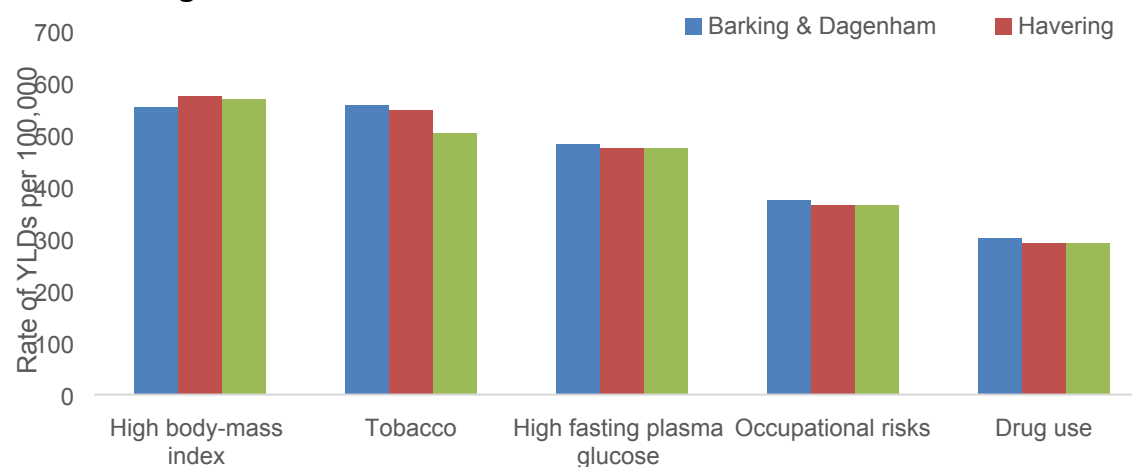
3.8 Figure 5 shows the ten conditions contributing the most to the YLD burden across BHR. These account for half of YLDs across BHR (50%). As with the age-standardised rates, the three conditions contributing the most to this were low back pain, headache disorders and depressive disorders.

Figure 5: Top ten causes of YLDs based on total YLD burden across BHR by borough, 2017



What are the risk factors for ill health?

Figure 6: Age-standardised YLD rates per 100,000 – top five risk factors contributing to YLD in BHR



3.9 High body mass index (excess weight) is the leading risk factor for YLDs in BHR (except for Barking and Dagenham, where tobacco is the leading risk factor). ‘Occupational risks’ is a group of work-related causes of ill health, with the main contributor to YLDs being low back pain caused by work.

3.10 Analysis by condition suggests that the condition groups with the largest preventable burden are diabetes and chronic kidney disease, and musculoskeletal disorders for all three boroughs (Appendix G).

4. Disability-adjusted life years

Disability-adjusted life years (DALYs) are a composite measure summarising the number of healthy years of life lost in a population due to both ill health and deaths. They are created by summing YLLs and YLDs.

4.1 DALYs are an additional measure created from YLLs and YLDs. They are reported on only briefly here (with more details in Appendix H), but the value of looking at DALYs (in addition to YLLs/YLDs) is that they quantify all ill health and preventable mortality into one summary measure and allow comparison between conditions largely causing one or the other.

4.2 The leading causes of DALYs in BHR are low back pain and ischaemic heart disease, followed by COPD for Barking and Dagenham and headache disorders for Havering and Redbridge.

Table 7: Top ten causes of DALYs in BHR, age-standardised rates per 100,000, 2017

Barking & Dagenham		Havering		Redbridge	
Causes	ASR	Causes	ASR	Causes	ASR
<i>All causes</i>	<i>21,002</i>	<i>All causes</i>	<i>19,914</i>	<i>All causes</i>	<i>18,624</i>
Low back pain	1,459	Low back pain	1,459	Low back pain	1,457
IHD	1,171	IHD	1,046	IHD	973
COPD	880	Headache disorders	844	Headache disorders	839

Headache disorders	844	COPD	724	Neonatal disorders	626
Lung cancer	804	Depressive disorders	625	Depressive disorders	623
Neonatal disorders	756	Neonatal disorders	619	COPD	560
Depressive disorders	625	Lung cancer	618	Neck pain	490
Stroke	501	Stroke	497	Lung cancer	466
Neck pain	491	Neck pain	491	Falls	461
Falls	475	Falls	473	Diabetes mellitus	439

5. Strengths and limitations

- 5.1 A key strength of the GBD dataset is that the burden from all conditions is estimated and hence the relative contribution of conditions can be assessed, which is valuable for prioritisation. This is not novel for causes of death but is new for ill health. It also means that the morbidity and mortality from a condition can be considered together (as DALYs), which may provide a different perspective for assessments about where health gains can be made.
- 5.2 However, it is worth noting that all outputs are modelled, including where there is good data coverage. All measures are based on a wide variety of sources and it is not straightforward to see how any given figure has been arrived at and what the limitations of the individual data sources may be.
- 5.3 One of these limitations is the lack of local data available to inform estimates for some conditions (see Appendix E). This is reflected in the lack of variation of YLD estimates for some conditions at local authority level.¹⁰
- 5.4 A further limitation is that the risk factors modelled are generally proximate, physiological risk factors. More upstream factors, such as unemployment or poverty, do not appear here, yet we know, for example, that there is a strong relationship between deprivation and life expectancy. The risk factor analysis should therefore be used to guide discussions around prevention, but not to limit such strategies from thinking more broadly.
- 5.5 To summarise, the GBD is a tool for understanding the likely distribution of ill health in our population rather than a direct source of data. It will need triangulation with local data sources to build a more nuanced picture, especially around risk factors – but is nonetheless extremely valuable in the absence of local data.

6. Conclusions

- 6.1 This briefing includes data on YLLs, YLDs, DALYs and risk factors for BHR from the 2017 Global Burden of Disease Study to present a picture of the causes of premature mortality and ill health and its preventable components across the three boroughs.

¹⁰ See: Steel N, Ford JA, Newton JN, Davis ACJ, Vos T, Naghavi M, et al. [Changes in health in the countries of the UK and 150 English Local Authority areas 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016](#). *Lancet* 2018;392(10158):1647–61.

- 6.2 The data suggests that common chronic conditions such as low back pain and headache disorders (migraines and tension-type headaches) contribute to a substantial burden of disease across BHR, together with more high-profile conditions such as ischaemic heart disease, lung cancer and COPD. These are likely to be key conditions to target to improve life expectancy and healthy life expectancy, especially given that many of the leading conditions have substantial preventable components.
- 6.3 As age-standardised rates, the burden of YLLs is highest in Barking and Dagenham, while the burden of YLDs is similar across BHR due to the modelling methods. As crude numbers (i.e. ignoring population size and structure), the YLL burden is highest in Havering, reflecting its older population structure, and the YLD burden is highest in Redbridge, the borough with the largest population.
- 6.4 Understanding what the Global Burden of Disease Study is and what it is not is important; it is not a replacement for all local data analysis, but it is a framework for understanding the overall burden of disease across BHR and how any given condition fits into this, using modelling to provide best estimates based on the available data. A key next step will be to triangulate this against local data, but in the absence of other data, the GBD is likely to be a valuable tool for resource prioritisation and allocation. The GBD data analysis has the potential to inform the joint commissioning decisions and policy development by the HWBB by gaining an understanding about the factors responsible for ill health, mortality and the preventable risk factors across BHR to tackle these effectively as a joint health and care system.

7. Mandatory Implications

Joint Strategic Needs Assessment

The findings within the GBD analysis generally correlate with those in the Joint Strategic Needs Assessment (JSNA) 2018. Additionally, the data suggests that common chronic conditions such as low back pain and headache disorders (migraines and tension-type headaches) contribute to a substantial burden of disease across BHR, which will be considered for the next JSNA as the likely key conditions to target to improve healthy life expectancy.

Joint Health and Wellbeing Strategy

- 7.1 The three priority themes for the Joint Health and Wellbeing Strategy 2019–2023 are
- Best Start in Life
 - Early Diagnosis and Intervention
 - Building Resilience
- 7.2 The GBD data analysis will add value to our existing JSNA and the local data analysis to help implement the Joint Health and Wellbeing Strategy and action plan.

Integration

- 7.3 The GBD data analysis was requested by the BHR CCGs to support the implementation of the Financial Recovery Plan across the health and social care

system. The GBD analysis highlights the causes of premature mortality and ill health and its preventable components across the three boroughs that need to be targeted within the integrated health and social care system to manage demand, realise efficiencies and to improve the quality of care.

Financial Implications

- 7.4 Implications completed by Murad Khan – Group Accountant:
- 7.5 This report is largely for information and sets out to seek the Health and Wellbeing Board's feedback and comments on how the findings of the report could be applied for prioritisation and resource allocation across BHR Integrated Health and Care System. As such, there are no financial implications arising directly from the report.

Legal Implications

- 7.6 Implications completed by Dr Paul Feild – Senior Governance lawyer:
- 7.7 The Health and Social Care Act (2012) conferred the responsibility for health improvement to local authorities. In addition, as a best value authority under the Local Government Act 1999 there is a duty on the Council to secure continuous improvement. The Health and Wellbeing Board terms of reference establish its function to ensure that the providers of health and social care services work in their delivery in an integrated manner.
- 7.8 This report is an information item and sets out to support the Health and Wellbeing Board in evidence-based decision making required as a function of the Board. As such, there are no legal implications arising directly from the report.

Public background papers used in the preparation of the report:

- Global Burden of Disease FAQ, including simple definitions of measures: <http://www.healthdata.org/gbd/faq>
- Global Burden of Disease Study protocol: <http://www.healthdata.org/gbd/about/protocol>
- Data visualisation tool: <https://vizhub.healthdata.org/gbd-compare/>
- Data download tool: <http://ghdx.healthdata.org/gbd-results-tool>
- Published GBD articles in the Lancet: <https://www.thelancet.com/gbd>.

Appendices

Appendix A: Life expectancy (LE) and healthy life expectancy (HLE), BHR, 1990-2017
Appendix B: Key terms and abbreviations
Appendix C: Years of life lost (YLL) by sex and age group
Appendix D: Risk factors for YLLs by cause
Appendix E: Limitations of modelled data for ill health
Appendix F: Years lived with disability (YLD) by sex and age group
Appendix G: Risk factors for YLDs by cause
Appendix H: Additional DALY analysis