



Government of **Western Australia**
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Western Australian Burden of Disease Study 2015

Summary report for Health Regions

Western Australian Burden of Disease Study 2015 – Summary report for Health Regions

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- South Metropolitan Health Service
- Western Australian Country Health Service
- Cancer Council of Western Australia
- Injury Matters
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- Busselton Health Study

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At epi@health.wa.gov.au for any enquiries or further details on the WABoDS.

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Introduction

Burden of disease studies provide a comprehensive assessment of the impact of diseases, injuries and risk factors on a population. This impact is measured as ‘disability-adjusted life years’ (DALY); that is, the sum of ‘years of life lost prematurely’ (YLL) and ‘years lived with disability’ (YLD). The Western Australian Burden of Disease Study (WABoDS) 2015, is a collaboration between the AIHW and the Epidemiology Branch of the WA Department of Health. The study aimed to provide disease group- and disease-level data for the whole state, health regions and the Aboriginal population. This report focuses on the ten health regions in Western Australia (WA) and comparisons between them.

Methods

The method of deriving burden measures was the same as those for the whole of WA (Department of Health Western Australia 2020). Both the YLL (fatal burden) and the YLD (non-fatal burden) calculations utilised the disability weights (Salomon 2015) (see examples in Box 1) which made the comparison of the two measures possible. The weights enable comparison of effects of diseases and injuries using the same scale – from 0 (perfect health) to 1 (death).

Box 1. Use of disability weights

The disability weight for any deaths is 1 and the life expectancy in Australia is 88 (according to theoretical life tables). If a person died at age of 50, the YLL is 38.

The disability weight for severe multiple sclerosis is 0.65. The YLD at age 50 at the population level equals to number of people living with severe multiple sclerosis (prevalence) at age of 50 in 2015 multiple by 0.65.

At regional level, the deaths data were readily available to calculate the fatal burden, whereas the disease prevalence by age and gender was less frequently available to calculate the non-fatal burden. Disease prevalence was sourced directly from routine data collections in the WA Department of Health, such as the Hospital Morbidity Data Collection, Cancer Registry, WA Notifiable Infectious Diseases Database and the WA Health and Wellbeing Surveillance System, for most of gastrointestinal, cardiovascular, maternal, respiratory, endocrine diseases, cancers, infant and congenital conditions, infections and injuries. When prevalence data were not directly available at regional level, modelling approaches were taken. Such modelling methods include:

- Stratifying WA data from the National Health Survey 2014-15 by Australian Bureau of Statistics (ABS) remoteness areas. Figure 1 show the alignment between the two sets of geographical boundaries. If an ABS remoteness area covered multiple health regions (e.g. remote areas), health region population proportions were used to allocate data in that remoteness area to the relevant health regions. This method was mainly used for musculoskeletal, hearing and vision, oral and neurological conditions.
- For majority of ‘other’ residual conditions from each disease group, for example, ‘other cardiovascular diseases’, YLL to YLD ratios obtained from AIHW were applied to YLLs to derive YLDs.
- For the remaining diseases (85 diseases across 13 disease groups), state estimates were apportioned to regions based on proportions derived from hospital data or population distributions.

Regional Characteristics

Many factors contribute to the variation in the burden of disease across health regions. These include demographic, socioeconomic, environmental and industrial factors, as well as access to services and facilities in regional centres and the metropolitan area (Australian Institute of Health and Welfare 2019). Demographic factors are shown in table 1. There are some notable differences between regions. For example, the median age varies between 31 years in the

Kimberley and 42 years in the Wheatbelt.

The proportion of the population over 65 years of age for the Kimberley, Goldfields and Pilbara was less than 10% compared to 19% in the Great Southern. All health regions except the Pilbara have similar proportions of males and females. In the Pilbara, 36% of the population are females and 64% are males. There is also significant variation in the distribution of the Aboriginal population by region, ranging from 1% in the North Metropolitan region to 46% in the Kimberley.

Table 1. Demographic characteristics of population, by health region, in Western Australia, 2015

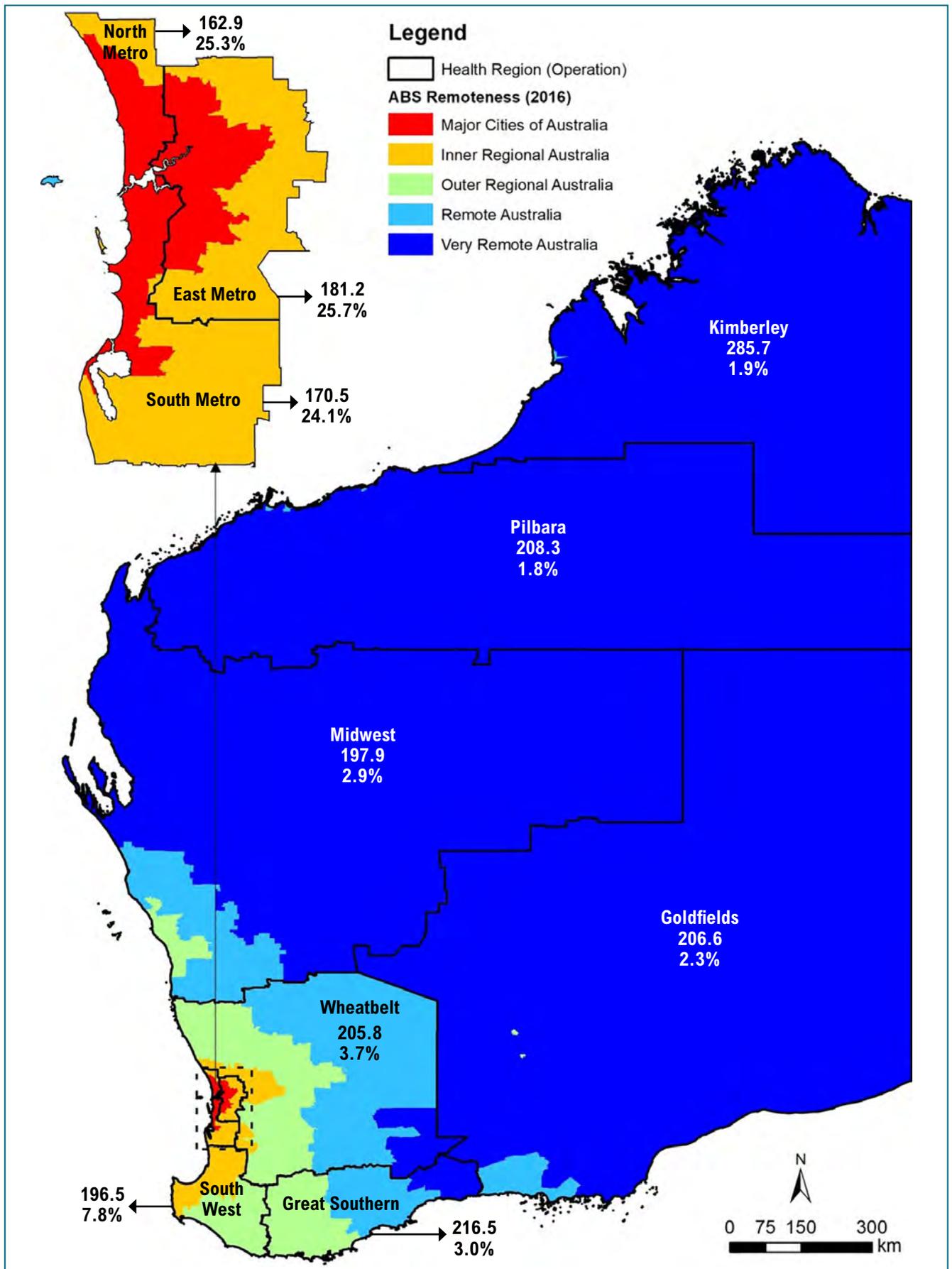
Health region	Population (% of total)	Median age (years)	Proportion of Population			
			Male %	aged<15	aged>=65	Aboriginal
East Metropolitan	681 479 (26%)	34	51%	18%	12%	3%
North Metropolitan	724 753 (28%)	35	50%	19%	13%	1%
South Metropolitan	637 016 (25%)	36	50%	19%	14%	2%
Goldfields	60 536 (2%)	33	54%	21%	9%	12%
Great Southern	60 165 (2%)	41	49%	20%	19%	5%
Kimberley	38 801 (1%)	31	52%	23%	6%	46%
Midwest	67 878 (3%)	38	51%	20%	14%	13%
Pilbara	65 859 (3%)	33	64%	17%	3%	16%
South West	175 949 (7%)	38	49%	21%	15%	3%
Wheatbelt	77 823 (3%)	42	52%	19%	18%	6%

Note: The health region and Aboriginal populations were derived by the Epidemiology Branch based on Statistical Areas Level 2 population (Australian Bureau of Statistics 2015).

Results

From the age-standardised DALY rate per 1000 population from Australian Bureau of Statistics, the lowest burden was seen in the North and South Metropolitan areas followed by the East Metropolitan area. The burden was highest in the Kimberley at 1.7 times the WA state rate (Figure 1). The burden in other country areas ranged from 196.5 per 1000 population in the South West to 216.5 per 1000 population in the Great Southern.

Figure 1. Age-standardised DALY rate per 1000 population (ASR) and proportion (%) of total DALYs, by Health Region, in Western Australia, 2015 (ASR for WA = 179.9 per 1000 population)



Note: Proportion may not add up to 100% due to modelling and rounding.

Figure 2 compared the age-standardised rate (ASR) for DALY by region and disease group. This showed that:

- Cancer, mental and substance use disorders, cardiovascular diseases and injury were among the five top ranking disease groups in all health regions.
- The cancer burden appeared to be relatively evenly distributed between regions, but slightly higher in the Kimberley (ASR=43.5) and relatively lower in the Pilbara (ASR=19.8).
- Mental health burden was highest in the Great Southern, followed by the Kimberley and Wheatbelt.
- Cardiovascular burden was highest in the Kimberley and Goldfields, and lowest in the North Metropolitan.
- Musculoskeletal burden peaked in the South West.
- The injury burden was highest in the Kimberley followed by the Wheatbelt then the Great Southern and Midwest.
- Rates of endocrine and kidney diseases in Kimberley were particularly high in comparison to other regions.
- The burden from infant and congenital conditions was highest in the Wheatbelt and Great Southern while the burden from gastrointestinal diseases peaked in the Pilbara.

Figure 2. Leading causes of total burden (proportion %, age-standardised rate per 1000 population), by disease group and health region, in Western Australia, in 2015

Rank	WA	East Metro	North Metro	South Metro	Goldfields	Great Southern	Kimberley	Midwest	Pilbara	South West	Wheatbelt
1 st	Cancer (17.4%, 30.8)	Cancer (17.4%, 31.8)	Cancer (17.5%, 28.1)	Cancer (18.2%, 30)	Cardiovascular (16.8%, 37.6)	Mental (19.4%, 52.9)	Injury (17.8%, 39.2)	Cancer (18.6%, 34.2)	Injury (16.9%, 22.1)	Cancer (18.6%, 33.4)	Cancer (19.6%, 32.9)
2 nd	Mental (13.3%, 24.6)	Cardiovascular (12.9%, 23.6)	Mental (14.2%, 23.8)	Cardiovascular (12.9%, 21)	Cancer (15.8%, 34.2)	Cancer (18.8%, 35)	Mental (15.1%, 34.9)	Mental (13.4%, 29.3)	Mental (16.5%, 24.8)	Musculoskeletal (16.6%, 32.5)	Mental (13%, 34.2)
3 rd	Cardiovascular (12.6%, 22.4)	Mental (12.9%, 23.1)	Musculoskeletal (13.4%, 21.7)	Musculoskeletal (12.5%, 21.5)	Mental (15.4%, 27.8)	Cardiovascular (11.8%, 20.1)	Cancer (13.6%, 43.5)	Injury (12.8%, 27.7)	Cardiovascular (12.8%, 31.2)	Cardiovascular (12.4%, 22.7)	Injury (12.2%, 33.0)
4 th	Musculoskeletal (12.3%, 22.0)	Musculoskeletal (12.5%, 22.5)	Cardiovascular (11.9%, 19.1)	Mental (12.1%, 22.3)	Injury (13.1%, 23.9)	Injury (11%, 29.0)	Cardiovascular (12.9%, 37.9)	Cardiovascular (11.7%, 22.1)	Musculoskeletal (12.2%, 28.2)	Mental (11.9%, 27.0)	Cardiovascular (11.9%, 20.4)
5 th	Injury (11.2%, 20.6)	Injury (10.5%, 18.6)	Injury (9.6%, 15.8)	Injury (10.8%, 19.6)	Musculoskeletal (9.4%, 18.4)	Musculoskeletal (7.8%, 16.7)	Musculoskeletal (7.4%, 22.5)	Musculoskeletal (9.2%, 17.9)	Cancer (8.1%, 19.8)	Injury (10.3%, 23.0)	Respiratory (8.7%, 15.8)
6 th	Respiratory (7.9%, 14.2)	Respiratory (8.0%, 14.7)	Respiratory (8%, 13.1)	Respiratory (8.2%, 13.9)	Respiratory (7.2%, 15.8)	Respiratory (7.6%, 14.9)	Respiratory (7%, 21.6)	Respiratory (8.7%, 16.7)	Respiratory (6%, 11.5)	Respiratory (7.6%, 14.1)	Musculoskeletal (8.3%, 16.7)
7 th	Neurological (6.3%, 11.3)	Neurological (6.3%, 11.6)	Neurological (6.7%, 10.8)	Neurological (6.8%, 11.1)	Neurological (4.3%, 10.7)	Neurological (5.2%, 9.9)	Endocrine (5.2%, 17.9)	Neurological (5.1%, 9.9)	Gastrointestinal (4.7%, 9.2)	Neurological (6.2%, 11.9)	Neurological (6.6%, 13)
8 th	Gastrointestinal (3.3%, 5.9)	Gastrointestinal (3.3%, 6.0)	Gastrointestinal (2.9%, 4.7)	Gastrointestinal (3.4%, 5.7)	Gastrointestinal (3.8%, 7.7)	Gastrointestinal (3.4%, 7.4)	Kidney/urinary (5.1%, 17.2)	Gastrointestinal (3.8%, 7.3)	Neurological (4%, 14)	Gastrointestinal (3.2%, 6.2)	Infant/ Congenital (3.6%, 8.5)
9 th	Endocrine (2.8%, 5.0)	Endocrine (3.0%, 5.4)	Endocrine (2.6%, 4.1)	Endocrine (2.7%, 4.5)	Endocrine (3.3%, 7.0)	Infant/ Congenital (2.7%, 7.1)	Neurological (4.6%, 17.5)	Endocrine (3.3%, 6.4)	Infant/ Congenital (3.6%, 4.9)	Endocrine (2.2%, 4.2)	Gastrointestinal (3.4%, 6.5)
10 th	Infant/ congenital (2.0%, 3.6)	Infant/ congenital (2.4%, 4.2)	Infectious Diseases (2.2%, 3.5)	Vision/hearing (2%, 3.2)	Infectious (2.2%; 4.4)	Endocrine (2.5%, 4.6)	Gastrointestinal (2.5%, 7.1)	Infectious Diseases (2.7%, 5.1)	Endocrine (3.1%, 8.3)	Vision/hearing (2%, 3.7)	Endocrine (3.3%, 6.0)

Note: 1. Disease groups were ranked by proportion of burden within each health region. The age-standardised rates take into account the age structure of the population. Therefore, a disease such as injury in Kimberley may have the highest proportion of burden but a lower ASR than cancer. 2. ASRs were used for health region comparison.

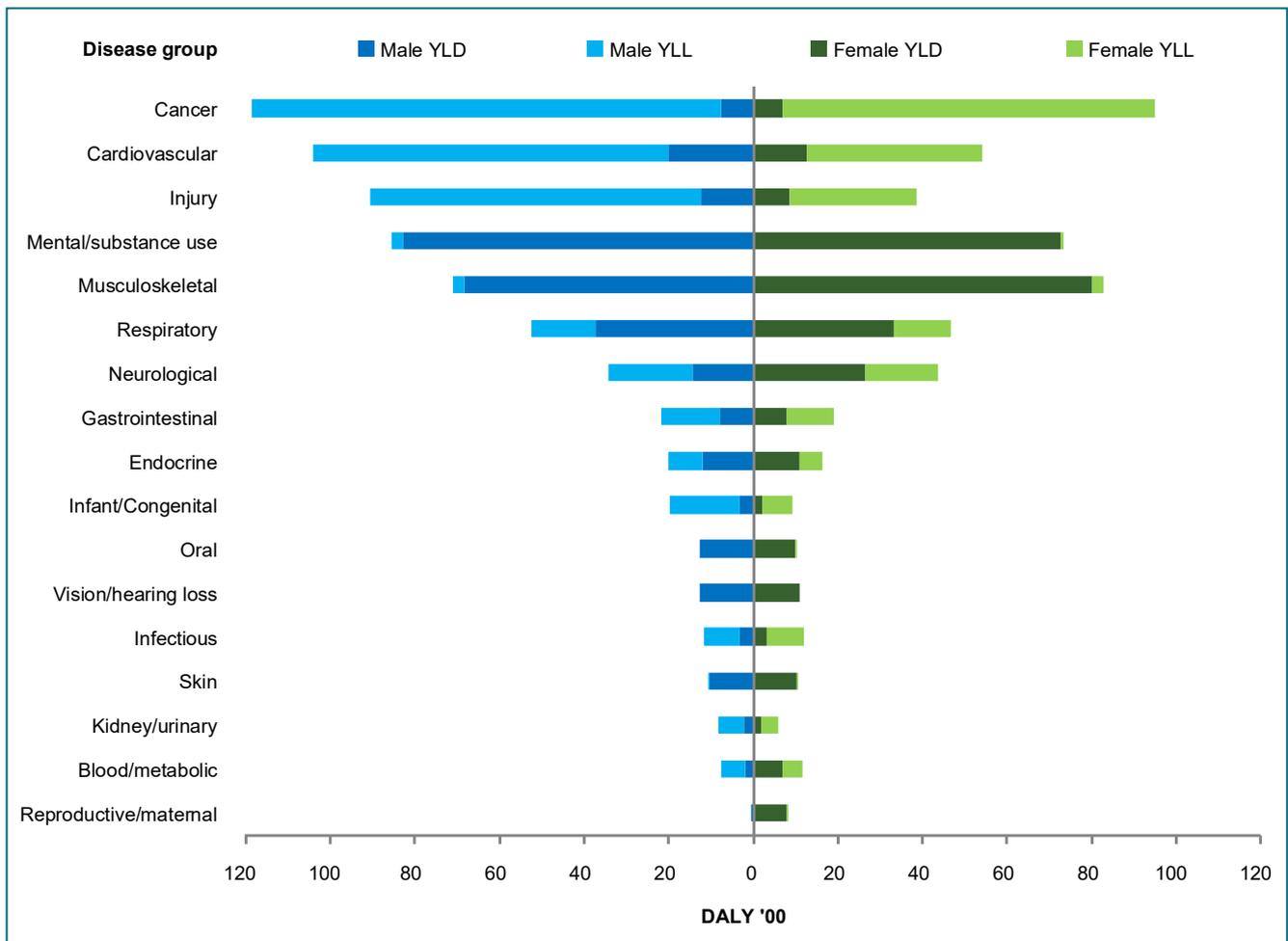
East Metropolitan Region

Overall burden

- The East Metropolitan region accounted for 26% of total WA DALYs (Figure 1), and the ASR ranked 3rd lowest of all the regions.
- The disease groups contributing the most to the total burden (DALY) in 2015 among males were cancers (17%), cardiovascular diseases (15%), injury, and mental and substance use disorders (13% each). Among females, cancer (17%), musculoskeletal conditions (15%) and mental and substance use disorders (13%) were the top contributors (Figure 3).
- Cancer (33%), cardiovascular diseases (21%) and injuries contributed (18%) together made up 72% of the fatal burden (YLL) in the region, whereas mental and substance use disorders (25%), musculoskeletal (24%) and respiratory conditions (11%) were the highest contributors to the non-fatal burden (YLD).

- Overall, males experienced a higher proportion of total burden than females (55% vs 45%). However, this varied by disease group. For example;
 - Males had a greater share of the total burden from injuries (70%), infant and congenital conditions (68%) and cardiovascular diseases (66%).
 - Females had a greater share of the total burden from reproductive and maternal conditions (95%), blood and metabolic disorders (60%), neurological conditions (56%) and musculoskeletal conditions (54%).

Figure 3. Non-fatal (YLD) and fatal (YLL) burden, by disease group and sex, in the East Metropolitan region, 2015



Leading causes of burden by disease

- The leading cause of disease burden in the East Metropolitan region for males was coronary heart disease, and for females was back pain and problems.
- The 15 highest ranking diseases contributing to the health burden were similar in men and women, although their actual rankings differ (Table 2).
- Males had higher rates for coronary heart disease, suicide and self-inflicted injuries, chronic obstructive pulmonary disease (COPD), lung cancer, type 2 diabetes and stroke. Females had higher rates for anxiety disorders, depressive disorders and asthma.
- Alcohol disorders, poisoning, drug use disorders and prostate cancer were ranked in the leading 15 causes of burden for males, but not for females. Breast cancer, osteoarthritis, rheumatoid arthritis and bowel cancer were ranked in the leading 15 causes of burden for females, but not for males.

Table 2. Leading 15 causes of burden¹ (DALY, proportion % and rates) by sex, in the East Metropolitan region, 2015

Male					Female			
Rank	Condition	DALY	%	ASR ²	Condition	DALY	%	ASR ²
1	Coronary heart disease	6233	8.1	19.7	Back pain/problems	2697	4.6	7.9
2	Suicide/self-inflicted injuries	3243	4.2	8.9	Coronary heart disease	2512	4.3	6.8
3	COPD ³	3090	4.0	9.8	COPD ³	2345	4.0	6.8
4	Back pain/problems	2582	3.3	7.5	Anxiety disorders	2239	3.8	6.7
5	Lung cancer	2493	3.2	7.7	Dementia	2221	3.8	5.6
6	Depressive disorders	1689	2.2	4.9	Depressive disorders	2181	3.7	6.5
7	Type 2 Diabetes	1649	2.1	5	Lung cancer	1889	3.2	5.3
8	Anxiety disorders	1516	2.0	4.4	Breast cancer	1708	2.9	5
9	Dementia	1508	2.0	5.4	Asthma	1708	2.9	5.1
10	Alcohol use disorders	1493	1.9	4.2	Osteoarthritis	1616	2.8	4.7
11	Stroke	1428	1.9	4.6	Rheumatoid arthritis	1601	2.7	4.6
12	Asthma	1410	1.8	4.1	Suicide/self-inflicted injuries	1268	2.2	3.8
13	Poisoning	1321	1.7	3.6	Type 2 diabetes	1254	2.1	3.6
14	Prostate cancer	1200	1.6	4	Stroke	1129	1.9	3.1
15	Drug use disorders	1165	1.5	3.1	Bowel cancer	891	1.5	2.7

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² ASR: age-standardised rate per 1000 population.

³ COPD: chronic obstructive pulmonary disease.

Specific age groups

- Disease burden varied throughout the life course (Figure 4).
- For children under age of 5, the burden was mainly due to infant and congenital diseases (data not shown).
- Mental health conditions such as anxiety and depressive disorders caused a high proportion of burden for people from age 5 through to age 44.
- Suicide and self-inflicted injuries were the number one leading cause of burden among males aged 15 to 44 years.
- People aged 45 years and older experienced substantial burden from cancers and cardiovascular diseases.
- Dementia ranked second in females 65+ years and fourth in their male counterparts. COPD ranked third in females in this age group and second in their male counterparts.

Figure 4. Leading 5 causes of burden¹ (DALY, proportion %) by age group and sex, in the East Metropolitan region, 2015

		Age group (years)				
		5-14	15-24	25-44	45-64	65+
Female	1 st	Anxiety disorders (153, 12.9%)	Anxiety disorders (352, 9.5%)	Back pain/problems (1011, 8.9%)	Lung cancer (1077, 6.9%)	Coronary heart disease (2123, 9.8%)
	2 nd	Asthma (148, 12.5%)	Asthma (340, 9.2%)	Anxiety disorders (929, 8.2%)	Breast cancer (931, 6.0%)	Dementia (2116, 9.8%)
	3 rd	Depressive disorders (133, 11.2%)	Depressive disorders (312, 8.4%)	Depressive disorders (872, 7.7%)	Back pain/problems (881, 5.7%)	COPD ³ (1398, 6.5%)
	4 th	Conduct disorder (71, 6.0%)	Back pain/problems (284, 7.7%)	Suicide/self-inflicted injuries (620, 5.4%)	COPD ³ (779, 5.0%)	Stroke (934, 4.3%)
	5 th	Acne (66, 5.6%)	Suicide/self-inflicted injuries (267, 7.2%)	Asthma (554, 4.9%)	Osteoarthritis (694, 4.5%)	Rheumatoid arthritis (809, 3.7%)
		Age group (years)				
		5-14	15-24	25-44	45-64	65+
Male	1 st	Asthma (214, 11.8%)	Suicide/self-inflicted injuries (668, 13.2%)	Suicide/self-inflicted injuries (1513, 10.4%)	Coronary heart disease (1985, 10.1%)	Coronary heart disease (3597, 14.5%)
	2 nd	Anxiety disorders (176, 9.7%)	RTI ² -motor vehicle occupants (452, 9.0%)	Back pain/problems (846, 5.8%)	COPD ³ (1047, 5.3%)	COPD ³ (1920, 7.8%)
	3 rd	Conduct disorder (117, 6.4%)	Alcohol use disorders (319, 6.3%)	Alcohol use disorders (836, 5.7%)	Lung cancer (932, 4.7%)	Lung cancer (1474, 6.0%)
	4 th	Depressive disorders (116, 6.4%)	Back pain/problems (314, 6.2%)	Depressive disorders (784, 5.4%)	Suicide/self-inflicted injuries (900, 4.6%)	Dementia (1421, 5.7%)
	5 th	Epilepsy (116, 6.4%)	Depressive disorders (234, 4.6%)	Poisoning (763, 5.2%)	Back pain/problems (813, 4.1%)	Prostate cancer (983, 4.0%)

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² RTI: road traffic injuries.

³ COPD: chronic obstructive pulmonary disease.

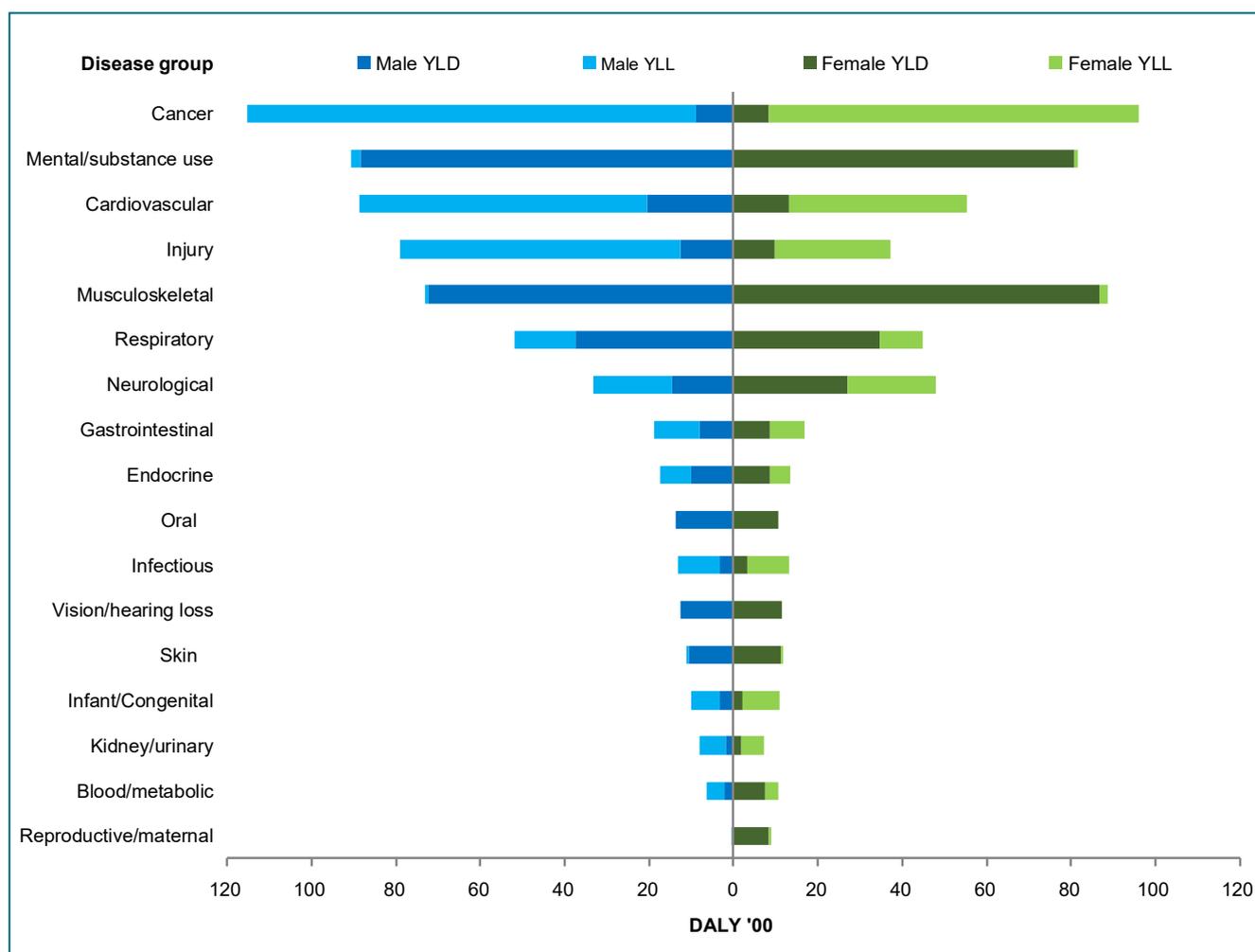
⁴ Data for children under 5 were not presented due to small numbers.

North Metropolitan Region

Overall burden

- The North Metropolitan region accounted for 25% of total WA DALYs (Figure 1) and had the lowest ASR of all the regions.
- The disease groups contributing the most to the total burden (DALY) in 2015 were cancers (18%), mental and substance use disorders (14%) and cardiovascular diseases (14%) for males. Among females, the top disease groups were cancer (17%), musculoskeletal conditions (16%) and mental and substance use disorders (14%) (Figure 5).
- Cancers, cardiovascular diseases and injuries accounted for 35%, 20% and 17% of the fatal burden (YLL) respectively.
- Mental and substance use disorders (26%), musculoskeletal (25%) and respiratory conditions (10%) were the highest contributors to the non-fatal burden (YLD).
- Overall, males experienced a higher proportion of disease burden than females (53% vs 47%). However, this varied by disease group. For example;
 - Males had a greater share of the total burden from injuries (68%), cardiovascular diseases (62%), endocrine diseases (56%) and oral disorders (56%).
 - Females had a greater share of the total burden from reproductive and maternal conditions (95%), blood and metabolic disorders (63%), neurological conditions (59%) and musculoskeletal conditions (55%).

Figure 5. Non-fatal (YLD) and fatal (YLL) burden, by disease group and sex, in the North Metropolitan region, 2015



Leading causes of burden by disease

- The leading cause of disease burden in North Metropolitan for males was coronary heart disease, and for females was back pain and problems.
- The 15 highest ranking diseases contributing to the health burden are similar in men and women, although their actual rankings differ (Table 3).
- Males had higher rates for coronary heart disease, COPD, lung cancer, type 2 diabetes and stroke. Females had higher rates for back pain and problem, dementia, anxiety disorders, depressive disorders and osteoarthritis.
- Suicide and self-inflicted injuries, alcohol disorders, poisoning, drug use disorders and prostate cancer were among the leading 15 causes of burden for males, but not for females.
- Breast cancer, rheumatoid arthritis, asthma, bowel cancer and falls were among the leading 15 causes of burden for females, but not for males.

Table 3. Leading 15 causes of burden¹ (DALY, proportion % and ASR²) by sex, in the North Metropolitan region, 2015

Male					Female			
Rank	Condition	DALY	%	ASR ²	Condition	DALY	%	ASR ²
1	Coronary heart disease	4745	6.6	14	Back pain/problems	2906	4.8	7.8
2	COPD ³	3110	4.3	8.9	Dementia	2730	4.5	6.0
3	Suicide/self-inflicted injuries	2681	3.7	7.5	Coronary heart disease	2590	4.3	5.9
4	Back pain/problems	2598	3.6	7.2	Anxiety disorders	2416	4.0	6.6
5	Lung cancer	2045	2.8	5.8	Depressive disorders	2390	4.0	6.5
6	Depressive disorders	1835	2.5	5.1	COPD ³	2287	3.8	5.7
7	Anxiety disorders	1636	2.3	4.6	Breast Cancer	1877	3.1	4.9
8	Alcohol use disorders	1556	2.2	4.3	Osteoarthritis	1821	3.0	4.7
9	Type 2 Diabetes	1468	2.0	4.2	Rheumatoid arthritis	1716	2.8	4.4
10	Stroke	1441	2.0	4.4	Asthma	1446	2.4	3.9
11	Dementia	1436	2.0	4.5	Lung cancer	1428	2.4	3.5
12	Poisoning	1301	1.8	3.7	Stroke	1385	2.3	3.2
13	Drug use disorders	1278	1.8	3.5	Bowel cancer	1055	1.7	2.6
14	Prostate cancer	1256	1.7	3.8	Falls	1018	1.7	2.4
15	Osteoarthritis	1184	1.6	3.3	Type 2 Diabetes	984	1.6	2.5

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² ASR: age-standardised rate per 1000 population.

³ COPD: chronic obstructive pulmonary disease.

Specific age groups

- Infant and congenital diseases were the leading causes of burden for both girls and boys under age 5 years (data not shown).
- Mental health conditions contributed to substantial burden for people from age 5 through to age 44. For females, they were also a leading cause in those aged 45 to 64 years (Figure 6).
- Suicide and self-inflicted injuries ranked the number one leading cause of disease burden for males aged 15 to 44, and ranked third for males aged 45 to 64 years.
- People aged 45 years and older experienced substantial burden from cancer, cardiovascular diseases and musculoskeletal conditions.
- Dementia, coronary heart disease and COPD were among leading causes of disease burden in men and women aged 65 and over.

Figure 6. Leading 5 causes of burden¹ (DALY, proportion %) by age group and sex, in the North Metropolitan region, 2015

		Age group (years)				
		5-14 ²	15-24	25-44	45-64	65+
Female	1 st	Anxiety disorders (165, 10.8%)	Anxiety disorders (380, 10.1%)	Back pain/problems (1026, 9.1%)	Back pain/problems (1013, 6.8%)	Dementia (2568, 10.8%)
	2 nd	Depressive disorders (146, 9.6%)	Depressive disorders (345, 9.2%)	Anxiety disorders (1003, 8.9%)	Breast cancer (808, 5.4%)	Coronary heart disease (2065, 8.7%)
	3 rd	Asthma (143, 9.4%)	Back pain/problems (289, 7.7%)	Depressive disorders (959, 8.5%)	Osteoarthritis (782, 5.2%)	COPD ³ (1387, 5.8%)
	4 th	Acne (80, 5.2%)	Suicide/self-inflicted injuries (269, 7.1%)	Asthma (527, 4.7%)	Anxiety disorders (735, 4.9%)	Stroke (1148, 4.8%)
	5 th	Interstitial lung disease (76, 5.0%)	Asthma (165, 4.4%)	Suicide/self-inflicted injuries (441, 3.9%)	Depressive disorders (716, 4.8%)	Rheumatoid arthritis (873, 3.7%)
		Age group (years)				
		5-14 ²	15-24	25-44	45-64	65+
Male	1 st	Asthma (208, 11.8%)	Suicide/self-inflicted injuries (373, 8.8%)	Suicide/self-inflicted injuries (1226, 9.1%)	Coronary heart disease (1684, 8.9%)	Coronary heart disease (2746, 11.2%)
	2 nd	Anxiety disorders (190, 10.8%)	Alcohol use disorders (342, 8.1%)	Alcohol use disorders (893, 6.6%)	COPD ³ (1076, 5.7%)	COPD ³ (1904, 7.7%)
	3 rd	Depressive disorders (126, 7.2%)	Drug use disorders (259, 6.1%)	Depressive disorders (859, 6.4%)	Suicide/self-inflicted injuries (884, 4.7%)	Dementia (1372, 5.6%)
	4 th	Conduct disorder (125, 7.1%)	Depressive disorders (254, 6.0%)	Back pain/problems (810, 6%)	Back pain/problems (878, 4.7%)	Lung cancer (1256, 5.1%)
	5 th	Autism spectrum disorders (95, 5.4%)	Back pain/problems (248, 5.9%)	Poisoning (795, 5.9%)	Lung cancer (744, 3.9%)	Prostate cancer (1060, 4.3%)

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² Data for children under 5 were not presented due to small numbers.

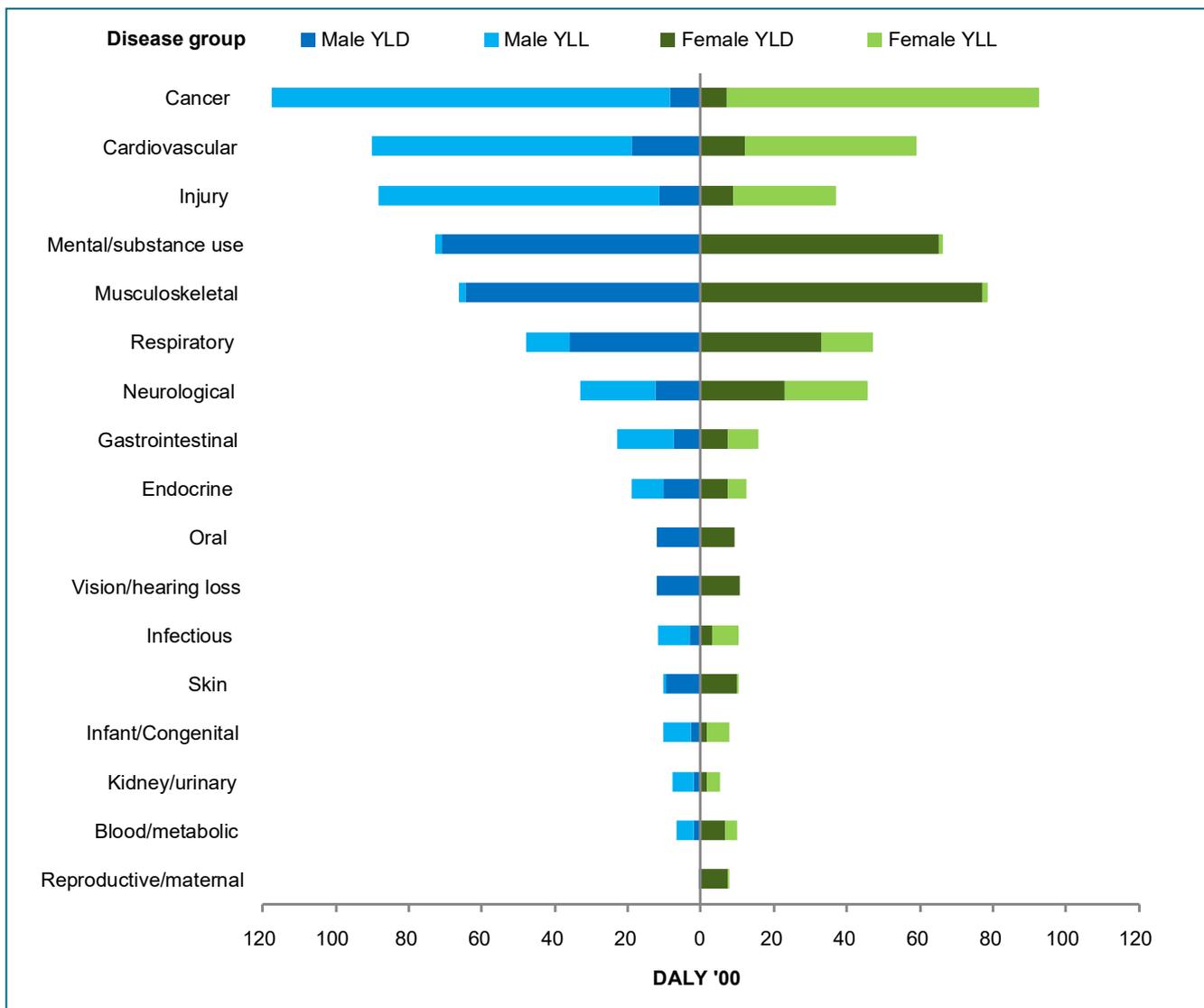
³ COPD: chronic obstructive pulmonary disease.

South Metropolitan Region

Overall burden

- The South Metropolitan region accounted for 24% of total WA DALY's (Figure 1), and the ASR ranked 2nd lowest of all the regions.
- The disease groups contributing the most to the total male disease burden (DALY) in 2015 were cancers (19%), cardiovascular diseases (14%) and injuries (14%). Disease groups contributing the most to total female burden were cancer (18%), musculoskeletal conditions (15%) and mental and substance use disorders (13%) (Figure 7).
- Cancers, cardiovascular diseases and injuries contributed 34%, 20% and 18% of the fatal burden (YLL) respectively.
- Mental and substance use disorders (24%), musculoskeletal (25%) and respiratory conditions (11%) were the highest contributors to the non-fatal burden (YLD).
- Overall, males experienced a higher proportion of disease burden than females (54% vs 46%). This varied by disease group. For example;
 - Males had a greater share of the total burden from injuries (70%), cardiovascular diseases (60%), endocrine disorders (60%) and gastrointestinal disorders (59%).
 - Females had a greater share of the total burden from reproductive and maternal conditions (94%), blood and metabolic disorders (61%), neurological conditions (58%) and musculoskeletal conditions (54%).

Figure 7. Non-fatal (YLD) and fatal (YLL) burden, by disease group and sex, in the South Metropolitan region, 2015



Leading causes of burden by disease

- The leading cause of disease burden in South Metropolitan was coronary heart disease for both males and females.
- Males had higher rates for coronary heart disease, suicide and self-inflicted injuries, COPD, lung cancer, stroke and bowel cancer whereas females had higher rates for back pain and problems, dementia, depressive disorders, anxiety disorders and asthma (Table 4).
- Poisoning, type 2 diabetes, prostate cancer and alcohol disorders were ranked among the leading 15 causes of burden for males, not for females. Breast cancer, osteoarthritis, rheumatoid arthritis and falls were ranked among the leading 15 causes of burden for females, not for males.

Table 4. Leading 15 causes of burden¹ (DALY, proportion % and rates) by sex, in the South Metropolitan region, 2015

Male					Female			
Rank	Condition	DALY	%	ASR ²	Condition	DALY	%	ASR ²
1	Coronary heart disease	5467	7.6	16.6	Coronary heart disease	2611	4.6	6.6
2	Suicide/self-inflicted injuries	3898	5.4	12.2	Back pain/problems	2559	4.5	7.8
3	COPD ³	3038	4.2	9.1	COPD ³	2510	4.5	6.7
4	Back pain/problems	2329	3.3	7.2	Dementia	2438	4.3	5.5
5	Lung cancer	2079	2.9	6.2	Depressive disorders	2088	3.7	6.6
6	Depressive disorders	1609	2.2	5.2	Anxiety disorders	1906	3.4	6.1
7	Poisoning	1535	2.1	5.2	Lung cancer	1802	3.2	4.9
8	Dementia	1496	2.1	4.7	Breast cancer	1733	3.1	4.8
9	Type 2 Diabetes	1495	2.1	4.4	Osteoarthritis	1676	3.0	4.6
10	Anxiety disorders	1290	1.8	4.1	Asthma	1577	2.8	4.9
11	Stroke	1280	1.8	4	Rheumatoid arthritis	1495	2.7	4.1
12	Bowel cancer	1280	1.8	3.8	Stroke	1379	2.4	3.4
13	Prostate cancer	1238	1.7	3.8	Suicide/self-inflicted injuries	1329	2.4	4.1
14	Alcohol use disorders	1204	1.7	3.9	Falls	1049	1.9	2.6
15	Asthma	1152	1.6	3.7	Bowel cancer	979	1.7	2.6

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² ASR: age-standardised rate per 1000 population.

³ COPD: chronic obstructive pulmonary disease.

Specific age groups

- Infant and congenital diseases were the dominant cause of burden for children under age 5 (data not shown).
- Both girls and boys aged 5 to 14 suffered substantial burden from anxiety, depressive and conduct disorders (Figure 8).
- Asthma was among the leading causes of burden for both girls and boys under age 15.
- In females aged 15 to 44, anxiety, depressive disorders, back pain and asthma were highly ranked diseases.
- In males aged 15 to 44, suicide and self-inflicted injuries was the leading cause of burden. Alcohol use, depressive disorders and back pain were also among the major causes of burden.
- For people aged 45 to 64, back pain, suicide and COPD were among the leading causes of burden in both males and females. Breast cancer, lung cancer were also the leading causes in females, and coronary heart disease and type 2 diabetes in males.
- Dementia, coronary heart disease, COPD and lung cancer were among leading causes of burden in men and women aged 65 and over.

Figure 8. Leading 5 causes of burden¹ (DALY, proportion %) by age group and sex, in the South Metropolitan region, 2015

		Age group (years)				
		5-14 ⁴	15-24	25-44	45-64	65+
Female	1 st	Anxiety disorders (130, 11.8%)	Anxiety disorders (300, 9.5%)	Back pain/problems (853, 9.5%)	Breast cancer (1014, 6.7%)	Dementia (2362, 10.2%)
	2 nd	Asthma (128, 11.6%)	Depressive disorders (299, 9.4%)	Depressive disorders (835, 9.3%)	Back pain/problems (908, 6.0%)	Coronary heart disease (1906, 8.2%)
	3 rd	Depressive disorders (127, 11.5%)	Back pain/problems (248, 7.8%)	Anxiety disorders (791, 8.8%)	Lung cancer (791, 5.3%)	COPD ³ (1598, 6.9%)
	4 th	Acne (70, 6.3%)	Suicide/self-inflicted injuries (242, 7.6%)	Asthma (460, 5.1%)	COPD ³ (744, 4.9%)	Stroke (1126, 4.9%)
	5 th	Conduct disorder (66, 6.0%)	Asthma (186, 5.9%)	Poisoning (381, 4.2%)	Suicide/self-inflicted injuries (727, 4.8%)	Lung cancer (967, 4.2%)
		Age group (years)				
		5-14 ⁴	15-24	25-44	45-64	65+
Male	1 st	Asthma (180, 12.2%)	Suicide/self-inflicted injuries (597, 14.6%)	Suicide/self-inflicted injuries (2081, 15.9%)	Coronary heart disease (1882, 10.5%)	Coronary heart disease (3139, 12.5%)
	2 nd	Anxiety disorders (150, 10.2%)	RTI ² -motor vehicle occupants (292, 7.1%)	Poisoning (1135, 8.7%)	Suicide/self-inflicted injuries (925, 5.2%)	COPD ³ (2030, 8.1%)
	3 rd	Depressive disorders (111, 7.6%)	Alcohol use disorders (256, 6.2%)	Depressive disorders (750, 5.7%)	COPD ³ (899, 5%)	Dementia (1316, 5.2%)
	4 th	Conduct disorder (110, 7.4%)	Depressive disorders (224, 5.5%)	Back pain/problems (677, 5.2%)	Back pain/problems (780, 4.4%)	Lung cancer (1306, 5.2%)
	5 th	Autism spectrum disorders (83, 5.6%)	Back pain/problems (218, 5.3%)	Alcohol use disorders (672, 5.1%)	Type 2 diabetes (648, 3.6%)	Prostate cancer (1074, 4.3%)

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² RTI: road traffic injuries.

³ COPD: chronic obstructive pulmonary disease.

⁴ Data for children under 5 were not presented due to small numbers.

WA Country Health Service

Overall burden

- The seven health regions that form the WA Country Health Service (WACHS) accounted for 25% of the total WA DALY (Figure 1) although they made up 21% of the WA population (Table 1).
- Kimberley and Goldfields had 1.9 and 1.4 times higher rates of fatal burden than the metropolitan regions (Table 5), respectively. Kimberley and Pilbara each had 1.4 times higher rates of non-fatal burden than the metropolitan regions.
- The Pilbara and South West regions experienced more non-fatal burden than fatal burden whereas other country regions experienced more fatal burden than non-fatal burden.
- The fatal burden, adjusted for age structure, ranged from 82.2 per 1000 population in the Pilbara to 159.1 per 1000 population in the Kimberley. This compared with 82.3 per 1000 population in the metropolitan area. Pilbara had the lowest proportion of the population aged 65+ (Table 1) and the lowest mortality rate in 2015 in WA (data not shown).
- The non-fatal burden ranged from 91.5 per 1000 population in the Midwest to 126.7 per 1000 population in the Kimberley, compared with 88.8 in the metropolitan regions.

Table 5. Fatal (YLL) and non-fatal (YLD) burden by health region in the WA Country Health Service, 2015

	YLL	%	ASR ¹	Rate ratio ²	YLD	%	ASR ¹	Rate ratio ²
Goldfields	5828	52.7	112.5	1.4	5279	47.7	94.9	1.1
Great Southern	7484	51.6	103.9	1.3	7017	48.4	112.6	1.3
Kimberley	5111	56.2	159.1	1.9	3991	43.9	126.7	1.4
Midwest	7670	54.7	106.4	1.3	6349	45.3	91.5	1.0
Pilbara	3912	45.7	82.2	1.0 ³	4656	54.3	126.1	1.4
South West	18 143	48.8	92.5	1.1	19 009	51.2	104	1.2
Wheatbelt	9950	55.6	109.1	1.3	7944	44.4	96.7	1.1
Metropolitan	174 085	48.4	82.3	–	185 252	51.6	88.8	–

¹ ASR: age-standardised rate per 1000 population.

² Rate ratio: the reference group was the combined metropolitan regions (East, North and South Metropolitan regions).

³ The number of deaths in Pilbara is relatively small, comparisons to other regions should be used with caution. Imputation of missing cause of death in the mortality data and/or using the average over 3 years may help to stabilise the number.

Leading causes of burden by disease

- The disease burden varied by health region (Figure 9).
- Chronic conditions ranked highly in both males and females. Males experienced a greater burden from injuries (e.g. suicide and road traffic injuries) whereas females experienced a greater burden from musculoskeletal conditions (e.g. back pain and problems).
- Coronary heart disease, and suicide and self-inflicted injuries appeared in all health regions in the leading five causes of burden in males, with COPD in most regions. Coronary heart disease appeared in all health regions in the leading five causes of burden in females, with COPD or asthma, depressive and/or anxiety disorders and back pain and problems in most regions.
- Road traffic injury, type 2 diabetes and chronic kidney disease were also among the leading causes in Kimberley females.
- Males in the Goldfields, Kimberley and Pilbara experienced substantial burden from alcohol use disorders.
- Lung cancer was among the top five causes of burden in males in the Goldfields, Midwest, South West and Wheatbelt and among females in the Midwest.
- Type 2 diabetes and chronic kidney diseases appeared in leading causes of burden in Kimberley, but not in other regions.

Figure 9. Leading 5 causes of DALY¹ (proportion %; age-standardised rate per 1000 population) by gender and health region in WA Country Health Service, 2015

	Goldfields	Great Southern	Kimberley	Midwest	Pilbara	South West	Wheatbelt	
Female	1 st	Coronary heart disease (7.0%, 10.9)	Depressive disorders (11.9%, 25.9)	RTI ² - motor vehicle occupants (8.7%, 14.7)	COPD ³ (6.5%, 9.4)	Depressive disorders (7.3%, 13.2)	Osteoarthritis (7.1%, 10.3)	COPD ³ (7.0%, 8.9)
	2 nd	Depressive disorders (6.6%, 9.3)	Anxiety disorders (5.7%, 12.9)	Coronary heart disease (8.5%, 21.1)	Back pain/problems (5.3%, 8.7)	Coronary heart disease (6.9%, 13.7)	Back pain/problems (6.1%, 10.6)	Coronary heart disease (6.6%, 8.9)
	3 rd	Back pain/problems (6.0%, 8.7)	Coronary heart disease (4.8%, 6.1)	Type 2 diabetes (7.4%, 20.9)	Coronary heart disease (5.2%, 7.5)	Back pain/problems (6.4%, 8.7)	Coronary heart disease (5.8%, 8.1)	Depressive disorders (6.2%, 12.4)
	4 th	COPD ³ (5.5%, 8.9)	COPD ³ (4.6%, 6.6)	Chronic kidney disease (5.8%, 18.7)	Lung cancer (5.2%, 7.5)	Anxiety disorders (4.5%, 6.8)	COPD ³ (5.1%, 7.1)	Dementia (5.1%, 6.0)
	5 th	Anxiety disorders (5.3%, 7.4)	Back pain/problems (4.5%, 8.8)	Suicide/self-inflicted injuries (4.4%, 8.2)	Depressive disorders (5.0%, 8.5)	Asthma (3.5%, 4.2)	Anxiety disorders (4.9%, 9)	Anxiety disorders (5.1%, 10.3)
Male	1 st	Coronary heart disease (13.8%, 32.1)	Coronary heart disease (9.4%, 16.7)	Suicide/self-inflicted injuries (10.6%, 22.6)	Coronary heart disease (6.9%, 13.6)	Coronary heart disease (11.0%, 15.4)	Coronary heart disease (7.6%, 13.4)	Coronary heart disease (7.6%, 12.9)
	2 nd	Suicide/self-inflicted injuries (5.1%, 9.2)	Depressive disorders (8.2%, 22.1)	Alcohol use disorders (9.5%, 19.9)	COPD ³ (6.5%, 12.6)	Suicide/self-inflicted injuries (7.8%, 8.4)	COPD ³ (5.6%, 9.4)	COPD ³ (6.4%, 10.6)
	3 rd	COPD ³ (4.9%, 13.1)	COPD ³ (5.5%, 9.8)	Coronary heart disease (8.2%, 22.5)	Lung cancer (5.2%, 9.9)	Back pain/problems (6.1%, 7.7)	Back pain/problems (4.9%, 9.7)	Lung cancer (5.9%, 9.9)
	4 th	Alcohol use disorders (3.8%, 7)	Suicide/self-inflicted injuries (4.9%, 13.3)	COPD ³ (6.1%, 18.7)	RTI ² - motor vehicle occupants (4.9%, 11.2)	Poisoning (5.1%, 6.3)	Suicide/self-inflicted injuries (4.6%, 10)	Suicide/self-inflicted injuries (5.7%, 16.8)
	5 th	Lung cancer (3.7%, 8.8)	Anxiety disorders (3.3%, 8.9)	Chronic kidney disease (5.7%, 15.4)	Suicide/self-inflicted injuries (4.8%, 11.3)	Alcohol use disorders (5.1%, 5.4)	Lung cancer (4.6%, 7.5)	RTI ² - motor vehicle occupants (4.8%, 13.1)

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'. The difference between rankings may not have any significance; for example, the proportions of total burden for females in Midwest ranged from 5-6.5%.

² RTI: road traffic injuries.

³ COPD: chronic obstructive pulmonary disease.

Specific age group

- Infant and congenital conditions, mental and substance use disorders and injuries were the leading causes of disease burden for those aged less than 14 years living in Goldfields, Great Southern, Pilbara, South West and Wheatbelt. In Midwest, instead of injury, infectious diseases were among the leading causes. In Kimberley, infectious disease and neurological conditions and injuries made up 53% of burden for this age group. Data were too small to split by individual diseases and not shown.
- Suicide and self-inflicted injuries was ranked as the number one cause of burden for people aged 15 to 24 living in Goldfields, Kimberley, Pilbara and Wheatbelt (Figure 10).
- Mental health disorders (e.g. anxiety disorders and alcohol use disorders) and injuries were the dominant causes of disease burden for people aged 15 to 44 years.
- Coronary heart disease and COPD were among the leading three causes of disease burden for people aged 45 years and over in all regions except for the Pilbara region.
- Type 2 diabetes and chronic kidney disease contributed more to the burden in those aged 45 years and over in the Kimberley than other health regions.
- Dementia was among the top three leading causes for those aged 65 years and over in all regions except the Kimberley.

Figure 10. Leading 3 causes of burden¹ (DALY, proportion %) by age group² and health region in WA Country Health Service, 2015

		15-24 ²	25-44	45-64	65+
Goldfields	1 st	Suicide/self-inflicted injuries (204, 20.5%)	Depressive disorders (199, 8.3%)	Coronary heart disease (578, 15.9%)	Coronary heart disease (467, 13.5%)
	2 nd	Alcohol use disorders (73, 7.4%)	Back pain/problems (163, 6.8%)	COPD ⁴ (204, 5.6%)	COPD ⁴ (284, 8.2%)
	3 rd	RTI ³ - motor vehicle occupants (73, 7.4%)	Poisoning (162, 6.7%)	Lung cancer (153, 4.2%)	Dementia (220, 6.4%)
Great Southern	1 st	Depressive disorders (179, 17.5%)	Depressive disorders (541, 19.4%)	Depressive disorders (364, 9.2%)	Coronary heart disease (670, 11.3%)
	2 nd	Anxiety disorders (82, 8.0%)	Anxiety disorders (239, 8.6%)	Coronary heart disease (280, 7.1%)	COPD ⁴ (502, 8.5%)
	3 rd	Brain malformations (73, 7.2%)	RTI ³ - motor vehicle occupants (172, 6.2%)	Chronic liver disease (177, 4.5%)	Dementia (408, 6.9%)
Kimberley	1 st	Suicide/self-inflicted injuries (331, 33.6%)	Alcohol use disorders (289, 12.3%)	Coronary heart disease (379, 11.3%)	COPD ⁴ (155, 9.4%)
	2 nd	Alcohol use disorders (132, 13.4%)	Homicide and violence (237, 10.1%)	Chronic kidney disease (251, 7.5%)	Chronic kidney disease (153, 9.3%)
	3 rd	RTI ³ - motor vehicle occupants (76, 7.7%)	RTI ³ - motor vehicle occupants (185, 7.9%)	Type 2 diabetes (206, 6.1%)	Type 2 diabetes (141, 8.5%)
Midwest	1 st	RTI ³ - motor vehicle occupants (197, 21.2%)	RTI ³ - motor vehicle occupants (283, 10%)	COPD ⁴ (266, 6.4%)	Coronary heart disease (609, 11.5%)
	2 nd	Suicide/self-inflicted injuries (132, 14.2%)	Suicide/self-inflicted injuries (281, 9.9%)	Lung cancer (258, 6.2%)	COPD ⁴ (539, 10.1%)
	3 rd	Alcohol use disorders (80, 8.6%)	Depressive disorders (208, 7.4%)	Back pain/problems (182, 4.4%)	Dementia (325, 6.1%)
Pilbara	1 st	Suicide/self-inflicted injuries (128, 13.2%)	Back pain/problems (234, 9.5%)	Coronary heart disease (460, 14.7%)	Coronary heart disease (90, 7.6%)
	2 nd	Alcohol use disorders (79, 8.1%)	Poisoning (189, 7.7%)	Back pain/problems (145, 4.6%)	Dementia (72, 6%)
	3 rd	Epilepsy (78, 8.0%)	Alcohol use disorders (174, 7.1%)	Type 2 diabetes (137, 4.4%)	Severe tooth loss (65, 5.4%)
South West	1 st	Anxiety disorders (176, 8.4%)	Back pain/problems (597, 8.1%)	Osteoarthritis (803, 7.2%)	Coronary heart disease (1478, 10.2%)
	2 nd	Back pain/problems (175, 8.4%)	Anxiety disorders (513, 7%)	Lung cancer (665, 6.0%)	COPD ⁴ (1148, 7.9%)
	3 rd	Alcohol use disorders (144, 6.9%)	Suicide/self-inflicted injuries (506, 6.9%)	Coronary heart disease (610, 5.5%)	Dementia (1008, 7.0%)
Wheatbelt	1 st	Suicide/self-inflicted injuries (203, 19.6%)	Suicide/self-inflicted injuries (384, 11.6%)	Coronary heart disease (408, 7.9%)	Coronary heart disease (697, 9.8%)
	2 nd	Depressive disorders (105, 10.1%)	Depressive disorders (317, 9.6%)	COPD ⁴ (391, 7.6%)	COPD ⁴ (651, 9.2%)
	3 rd	Anxiety disorders (80, 7.7%)	Poisoning (249, 7.6%)	Lung cancer (328, 6.3%)	Dementia (499, 7.0%)

¹ Disease ranking excluded 'other' residual conditions from each disease group; for example, 'other injuries'.

² Data for children under 15 were not presented due to small numbers.

³ RTI: road traffic injuries.

⁴ COPD: chronic obstructive pulmonary disease.

Conclusion

- The WABoDS provided summary measures of population health in 2015 from all available sources in WA. This is the first comprehensive study of all health regions to allow comparisons of 216 diseases.
- The health region level data were scarce – indirect methods were used to estimate the prevalence of certain leading causes such as COPD, depressive disorders, anxiety disorders, back pain and problems and dementia. The quality of data for these diseases was weaker than the data quality for cancers or cardiovascular diseases.
- WACHS regions had higher disease burden (ASR per 1000 population ranged from 196.5 to 285.7) than metropolitan regions (ASR per 1000 population ranged from 162.9 to 181.2).
- The age-standardised rates showed that the Kimberley region experienced the highest health loss per 1000 population in WA. Injuries ranked as the leading cause of disease in both males and females in the region.
- The health loss among younger populations was predominately due to mental health conditions and injuries whereas the health loss among older populations was predominately related to cardiovascular disease, cancer, COPD and dementia.
- Health service planning must consider the differences in disease burden experienced by each region.

References

- Australian Institute of Health and Welfare (2019). Rural and remote health. Cat no. PHE 255. Canberra, AIHW.
- Australian Bureau of Statistics (2015). Regional population by age and sex. Australian Bureau of Statistics, Australian Government. Retrieved October 21, 2018. <https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/latest-release>.
- Department of Health Western Australia (2020). Western Australian Burden of Disease Study 2015 – Summary Report: 2020. Perth: Department of Health WA. Retrieved from <https://ww2.health.wa.gov.au/Reports-and-publications/Western-Australian-Burden-of-Disease-Study-2015-Summary-report>.
- Salomon JA, Haagsma JA, Davis A, de Noordhout CM, Polinder S, Havelaar AH et al. 2015. Disability weights for the Global Burden of Disease 2013 study. *The Lancet Global health* 3:e712-e23.

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