



Healthcare spending on disease and injury in Western Australia, 2012-13 to 2020-21

Introduction

Burden of disease studies assess the impact of diseases, injuries, and risk factors on a population. This quantifies the impact in terms of ‘years of healthy life lost’, commonly referred to as disability-adjusted life years (DALYs). DALYs encompass both premature death (fatal burden) and the consequences of living with disease (non-fatal burden). The Western Australian Burden of Disease Studies (WABoDS) conducted in 2015 and 2018 have generated estimates of this impact on the WA population. These estimates provide valuable insights into the human cost associated with various health conditions.

In addition to disease burden estimates, burden of disease studies also assess the financial implications of diseases and injuries. Previous Western Australian burden of disease studies have examined expenditure for a single year. This bulletin includes analysis of expenditure from financial years 2012-13 to 2020-21 which allows for a more comprehensive understanding of expenditure patterns as they relate to burden of disease, from broad disease group down to specific conditions.

Expenditure data has been disaggregated for a range of geographic, demographic, and spending areas. Breaking down data by these factors such as age, sex, health region and type of service provider gives insights into the drivers of health expenditure in WA. These insights can prove valuable in identifying trends over time and can assist in identifying priority areas that require interventions to address the current and future health needs of our population.

Methods

The Australian Institute of Health and Welfare (AIHW) provided healthcare expenditure data for WA for financial years 2012-13 through to 2020-21. The methodology used for estimating expenditure was based on the Australian Burden of Disease Study (ABDS) and employed a combination of ‘top-down’ approaches (in which analysis begins at a macro level and pertains to total amounts within the AIHW Health Expenditure database) and ‘bottom-up’ approaches (in which analysis initiates at a micro level and expands outwards) (1).

Healthcare expenditure encompasses various areas, including hospital services, primary health care services and referred medical services. Table 1 displays the categories of health expenditure included in this study. These expenditure categories were analysed for over two hundred conditions classified into seventeen disease groups. Costs such as capital expenditure (related to buildings and equipment), community and public health expenditure, and indirect healthcare costs are not included as they cannot be specifically allocated to a condition or disease group. Similarly, dental expenditure was only reported as a total and could not be further broken down by sex, age or

assigned to a specific disease group. Therefore, it has only been included as an overall total each year for the purpose of this report.

At the disease group level, injuries are classified by either the cause of injury (such as road traffic accidents), or the nature of injury (such as fractures), consistent with the Australian Burden of Disease Study (ABDS) conditions. The nature of injury classification is intended to identify the type of harm which happened to the patient, whereas the cause of injury (external cause) best describes the circumstances in which the injury occurred. Both classifications are included in the disease expenditure analysis, although to avoid over-estimation of costs, only one of the two should be used to assess total costs related to each episode of care. The external cause of injury is generally only reported in Public Hospital Emergency Departments.

Finally, it is important to note that not all data is available at sex and age level. As a result, total persons expenditure may not reflect the sum of male and female expenditure or that of the sum of individual age groups.

Table 1. Health expenditure main and subcategories.

| Hospital Services | Primary Health Care | Referred Medical Services |
|--|--|---|
| <ul style="list-style-type: none"> Private Hospital Services | <ul style="list-style-type: none"> Allied Health Services | <ul style="list-style-type: none"> Specialist Services |
| <ul style="list-style-type: none"> Public Hospital Admitted Patient | <ul style="list-style-type: none"> General Practitioner (GP) Services | <ul style="list-style-type: none"> Pathology |
| <ul style="list-style-type: none"> Public Hospital Emergency Department | <ul style="list-style-type: none"> Pharmaceutical Benefits Scheme (PBS) | <ul style="list-style-type: none"> Medical Imaging |
| <ul style="list-style-type: none"> Public Hospital Outpatient Services | | |

Current healthcare expenditure in 2020-21: Spending areas, disease groups and disease conditions

Total Health Expenditure

Healthcare expenditure for the 2020-21 financial year in WA totalled \$12.4 billion with an additional \$1.6 billion spent on dental expenditure. Females had a higher expenditure over the year compared to males (\$6.6 million to \$5.8 million, respectively). Amongst age groups 70 to 74-year-olds incurred the highest expenditure, \$1.2 billion. The lowest expenditure amount recorded was \$205.2 million amongst 5 to 9-year-olds (total persons). When examining expenditure by sex and age group, both males and females recorded the highest expenditure within the 70 to 74-year age group. When comparing males and females, males had relatively higher expenditure amounts within all age groups between 55 to 84-years, and in those aged 0 to 9-years. Females had relatively higher expenditure in all age groups between 10 and 54-years. The largest expenditure difference between sexes occurred within the 30 to 34-year-old age group with female expenditure more than twice that of male expenditure (\$503.9 million to \$213.4 million respectively).

Area of Expenditure

In 2020-21 more than 50 per cent of the \$12.4 billion spent (excluding dental expenditure) was attributed to public hospital admitted patient and private hospital services (\$6.6 billion combined). The lowest expenditure was within allied health services totalling \$222.9 million, 1.8 per cent of total expenditure for the year. In 2020-21, healthcare spending for males was higher in public hospital emergency department expenditure compared to females who recorded higher amounts in all other expenditure areas. The largest difference between male and female expenditure occurred within general practitioner services with female expenditure totalling \$537.5 million, \$149 million more than the recorded amount of \$388.5 million for males.

Disease Group Expenditure

Figure 1 displays expenditure by disease group in 2020-21 along with the contributing percentage towards total expenditure for the year. The highest expenditure, \$1.5 billion, was for cancer and other neoplasms. Second highest spending was for musculoskeletal conditions, \$1.4 billion, followed by cardiovascular diseases, \$1.3 billion. Oral disorders, infant and congenital conditions, and endocrine disorders contributed the least to total disease expenditure in 2020-21. For males, the highest disease group expenditure was for cancer and other neoplasms \$799.7 million. For females, reproductive and maternal conditions was the top disease group, with expenditure totalling \$909.1 million. Among older age groups, hearing and vision disorders expenditure was highest for females aged 70 to 74 during 2020-21 with the largest expenditure recorded at \$35.2 million. Kidney and urinary condition expenditure was highest in males of the same age group with an expenditure of \$32.4 million in 2020-21.

Disease Group by Expenditure Areas

When analysed by area of expenditure, mental and substance use disorders was the leading disease group contributing to allied health expenditure of \$123.8 million. Pharmaceutical Benefits Scheme (PBS) spending was the highest expenditure area attributed to cancer and other neoplasms totalling \$437.4 million. Injury (external cause) was the leading disease group associated with emergency department spending in males. In 2020-21, spending for males related to injury (external cause) totalled \$120.0 million, almost 2.5 times more than the second highest disease group infectious diseases, which totalled \$49.6 million. For females, reproductive and maternal conditions was the top disease group for expenditure for the areas of specialist services, public hospital admitted patient and public hospital outpatient expenditure. In 2020-21, spending on public hospital outpatient services related to reproductive and maternal conditions for females totalled \$111.1 million. Figure 2 displays the ten areas of expenditure included in this study and their top five contributing disease groups in millions for 2020-21 (total persons).

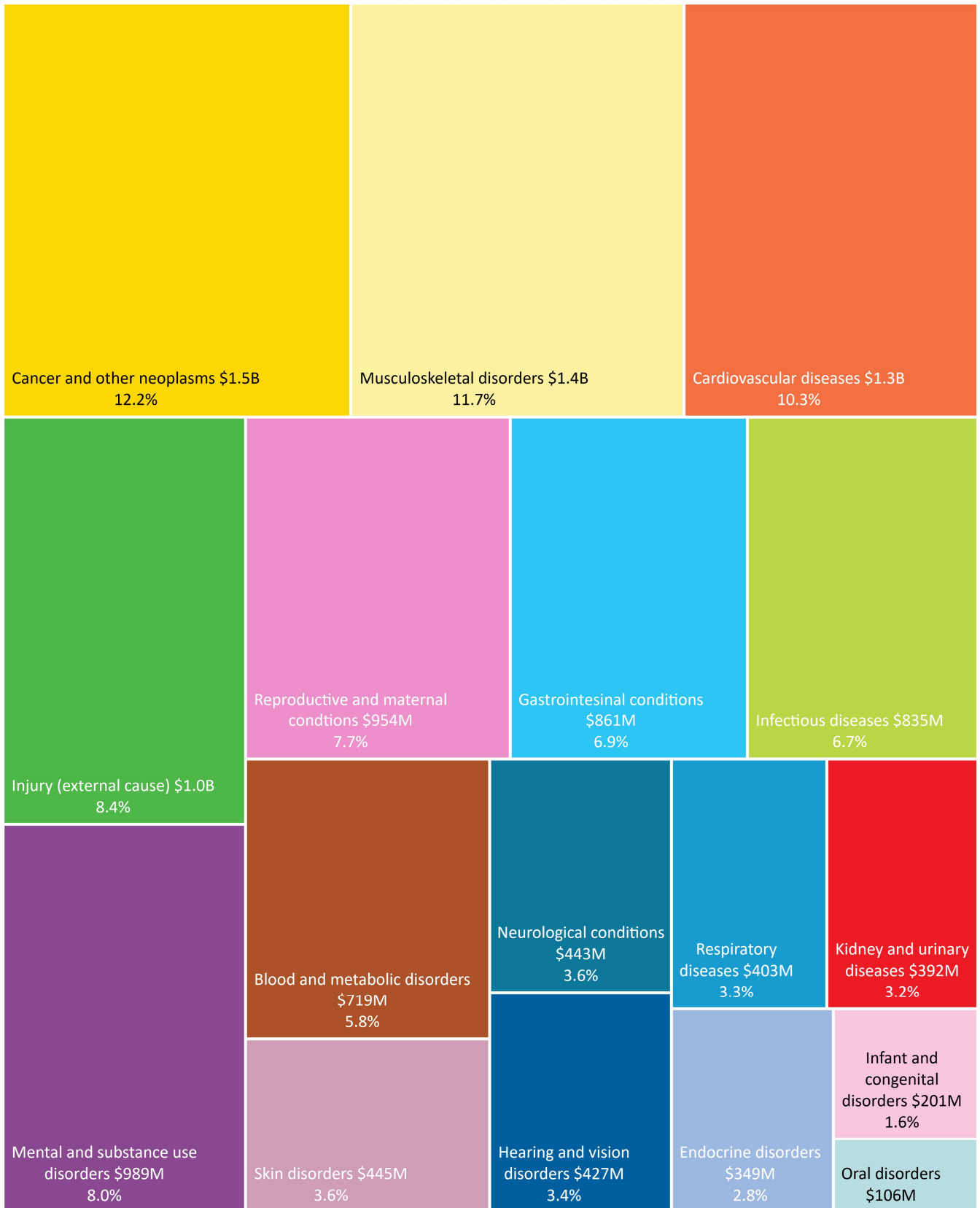


Figure 1. WA healthcare total expenditure and percentage of total expenditure by disease group (total persons), 2020-21.

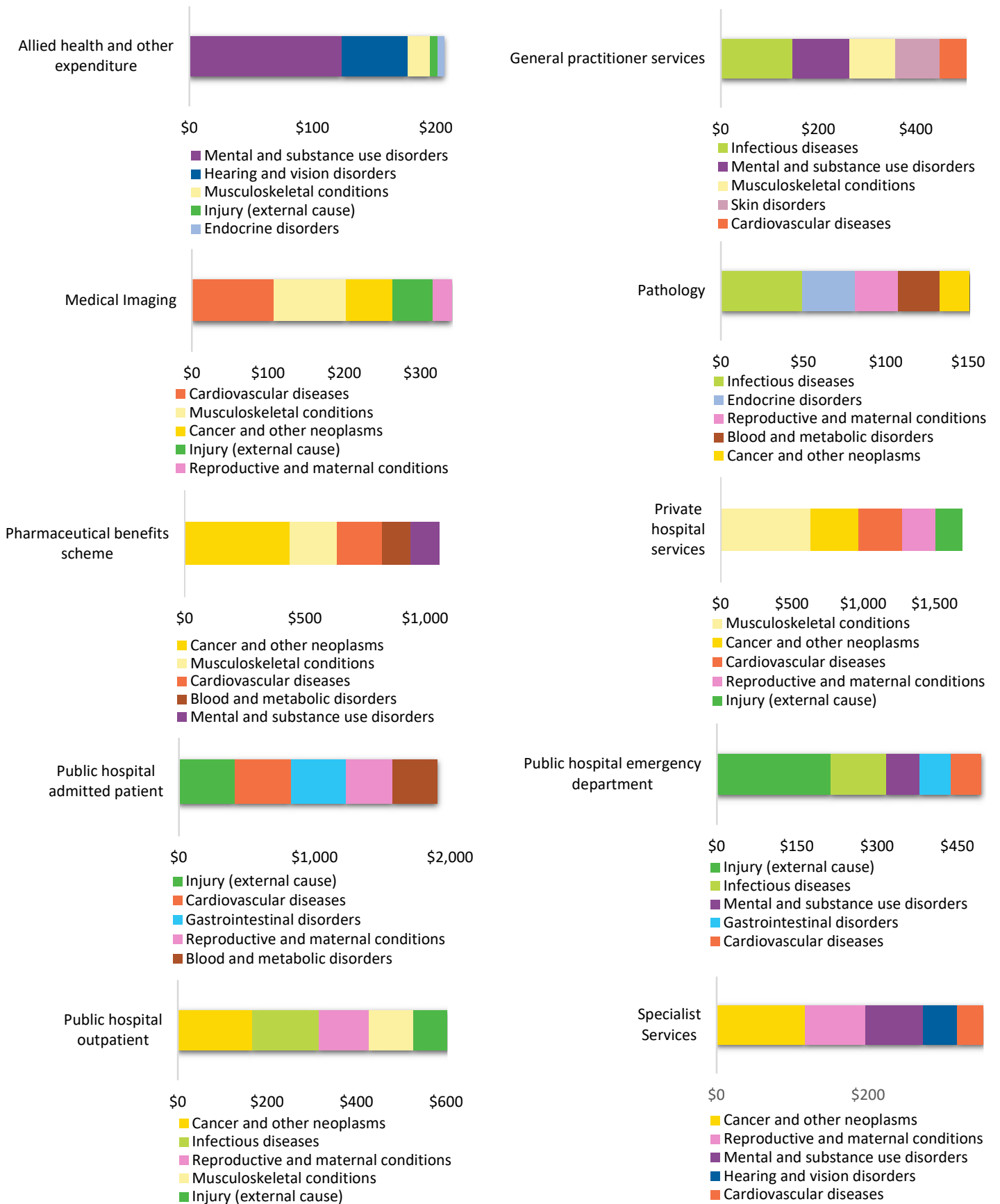


Figure 2. Top five disease groups in each area of expenditure 2020-21 in millions of dollars

Spending by Conditions

At the conditions level, osteoarthritis, falls, and back pain and problems ranked highest amongst both sexes in 2020-21. Compared to females, males displayed higher expenditure associated with type 2 diabetes with expenditure of \$81 per capita as well as non-melanoma skin cancer with expenditure of \$73 per capita. Coronary heart disease expenditure was \$113 per capita in males. In females, higher spending amounts were reported for mental health conditions, including depressive and anxiety disorders. Breast cancer spending was \$117 per capita whilst spending attributed to osteoarthritis totalled \$169 per capita.

COVID-19 Expenditure

COVID-19 expenditure was identified throughout this bulletin by examining clinic types specializing in COVID-19 treatment in outpatient hospitals, as well as utilising International Classification of Diseases codes to identify COVID-19 cases in admitted hospitals and emergency departments. Medicare Benefits Schedule descriptions were reviewed for general practitioner, pathology, and specialist services. It should be noted that this is an estimation and is intended to be indicative only. At a hospital level, these methods may give fractions of individuals and care should be taken when interpreting results. COVID-19 expenditure does not include all COVID-19 payments. Notable exclusions include National Partnership on COVID-19 Response and out of pocket expenditure (2).

WA recorded its first case of COVID-19 (SARS CoV-2 virus) on February 21, 2020 (3). On March 11, 2020, the World Health Organisation (WHO) officially declared COVID-19 to be a global pandemic (4). Spending related to COVID-19 was provided by the AIHW for the years 2019-20 and 2020-21. In response to the pandemic, COVID-19 related spending accounted for 0.3 per cent (\$37.9 million) of health expenditure in WA for 2019-20, increasing to 1.3 per cent (\$162.8 million) in 2020-21. Table 2 details expenditure amounts by sex and age for COVID-19 in 2020-21.

COVID-19 expenditure in 2020-21 was ranked ninth for males across all age groups (\$82.7 million), and ranked number one in the age group 30 to 34 years (\$7.7 million). The condition also ranked within the top five conditions for every age group from 20 to 49-year-olds. COVID-19 was the eighth highest ranked disease condition related to health care spending for females overall (\$79.6 million), ranking third for females aged 20 to 24 and 25 to 29 years, and ranking within the top five conditions for age groups 30 to 34 and 35 to 39 years.

COVID-19 expenditure was highest in the spending area of public hospital outpatient, totalling \$128 million in 2020-21. Pathology related expenditure totalled \$13.1 million, while emergency department spending related to the disease totalled \$3.8 million. The area of specialist services recorded the lowest amount of expenditure related to COVID-19 at \$2,986 for 2020-21. Table 3 details expenditure by spending area for COVID-19 in 2020-21.

Table 2. COVID-19 expenditure by sex and age, 2020-21.

| Age Group | Males | Females | Total Persons |
|--------------|---------------------|---------------------|----------------------|
| 0-4 | \$1,983,274 | \$1,706,147 | \$3,693,119 |
| 5-9 | \$1,535,695 | \$1,461,221 | \$3,001,100 |
| 10-14 | \$1,552,319 | \$1,421,075 | \$2,974,818 |
| 15-19 | \$2,624,149 | \$3,082,336 | \$5,710,244 |
| 20-24 | \$5,793,235 | \$6,291,375 | \$12,116,825 |
| 25-29 | \$7,866,444 | \$8,013,726 | \$15,909,039 |
| 30-34 | \$7,737,906 | \$7,674,749 | \$15,445,632 |
| 35-39 | \$7,498,014 | \$6,623,613 | \$14,151,416 |
| 40-44 | \$6,906,814 | \$6,087,595 | \$13,030,595 |
| 45-49 | \$7,239,996 | \$6,700,642 | \$13,983,299 |
| 50-54 | \$7,070,301 | \$6,423,193 | \$13,533,654 |
| 55-59 | \$6,800,488 | \$6,489,962 | \$13,329,676 |
| 60-64 | \$6,280,689 | \$5,955,233 | \$12,277,048 |
| 65-69 | \$4,578,760 | \$4,463,848 | \$9,069,268 |
| 70-74 | \$3,618,798 | \$3,298,544 | \$6,947,988 |
| 75-79 | \$1,915,338 | \$1,938,442 | \$3,870,059 |
| 80-84 | \$1,055,618 | \$1,102,155 | \$2,164,426 |
| 85+ | \$681,094 | \$913,459 | \$1,598,208 |
| Total | \$82,739,203 | \$79,647,823 | \$162,844,364 |

Table 3. COVID-19 expenditure by spending area, 2020-21.

| Area of Expenditure | Total Cost |
|--------------------------------------|----------------------|
| General practitioner services | \$17,877,726 |
| Pathology | \$13,104,365 |
| Public hospital admitted patient | \$38,518 |
| Public hospital emergency department | \$3,751,541 |
| Public hospital outpatient | \$128,069,228 |
| Specialist services | \$2,986 |
| Total | \$162,844,364 |

Trends in healthcare expenditure, 2012-13 to 2020-21

Total Health Expenditure

From 2012-13 through to 2020-21, healthcare expenditure (excluding dental expenditure) increased annually, rising from \$8.2 billion in 2012-13 to \$12.4 billion in 2020-21. Figure 3 displays the total expenditure recorded each year for males, females, and total persons (excluding dental expenditure). An additional \$1.1 billion was spent on dental expenditure in 2012-13 rising to \$1.6 billion in 2020-21. Figure 4 displays dental expenditure recorded each year for total persons. The largest growth in expenditure (excluding dental) appeared between 2014-15 and 2015-16 increasing by 9.0 per cent. The smallest growth occurred between 2016-17 and 2017-18, with spending rising by 0.3 per cent. Figure 5 displays expenditure growth between each financial year recorded for males, females, and total persons.

Overall, females recorded a higher expenditure for all financial years reported in this study. Females also experienced the largest expenditure growth by financial year reaching 9.6 per cent growth between 2014-15 and 2015-16, Figure 5. However, females also recorded the smallest growth by financial year with 0.2 per cent growth between 2016-17 and 2017-18. Over the nine-year period, total spending increased by \$2.3 billion for females and \$2.0 billion for males. Among age groups (total persons), 70 to 74-year-olds exhibited the largest rise in expenditure, with total spending increasing by 85.8 per cent over the nine-year period. 5 to 9-year-olds demonstrated the smallest expenditure rise with total spending increasing by 51.1 per cent over the nine-year period.

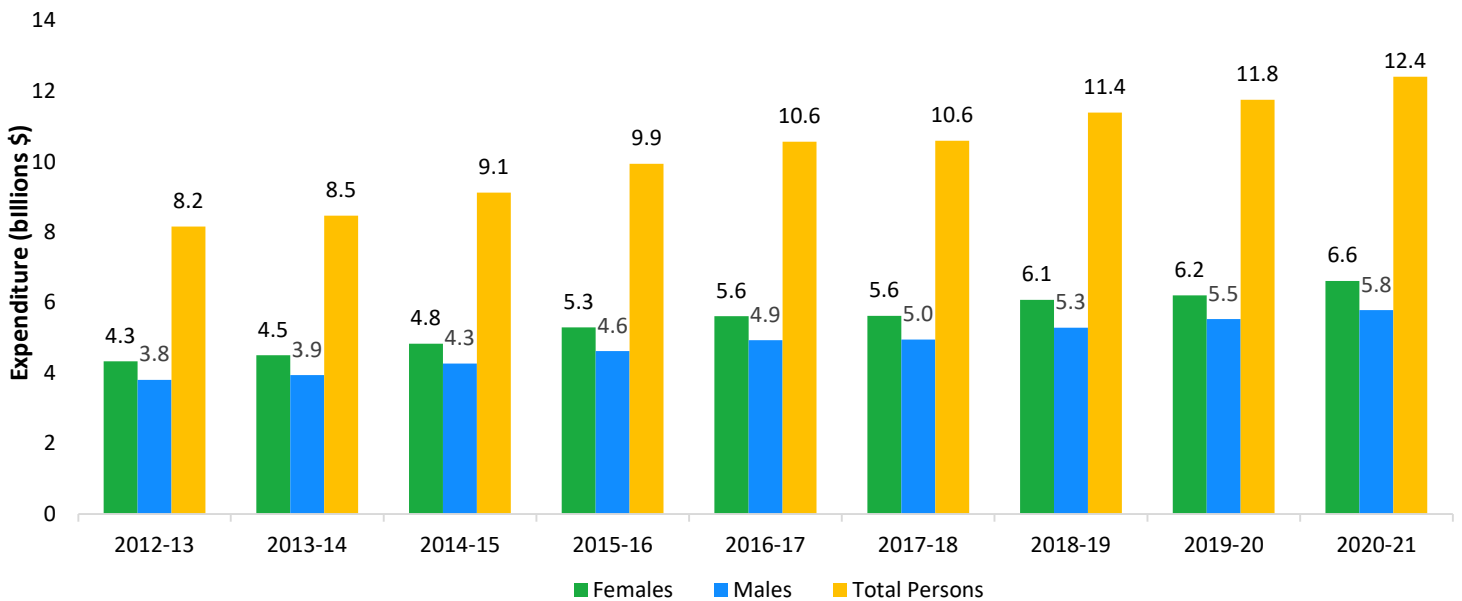


Figure 3. Total health care expenditure by sex 2012-13 to 2020-21, in billions of dollars, (excluding dental expenditure)

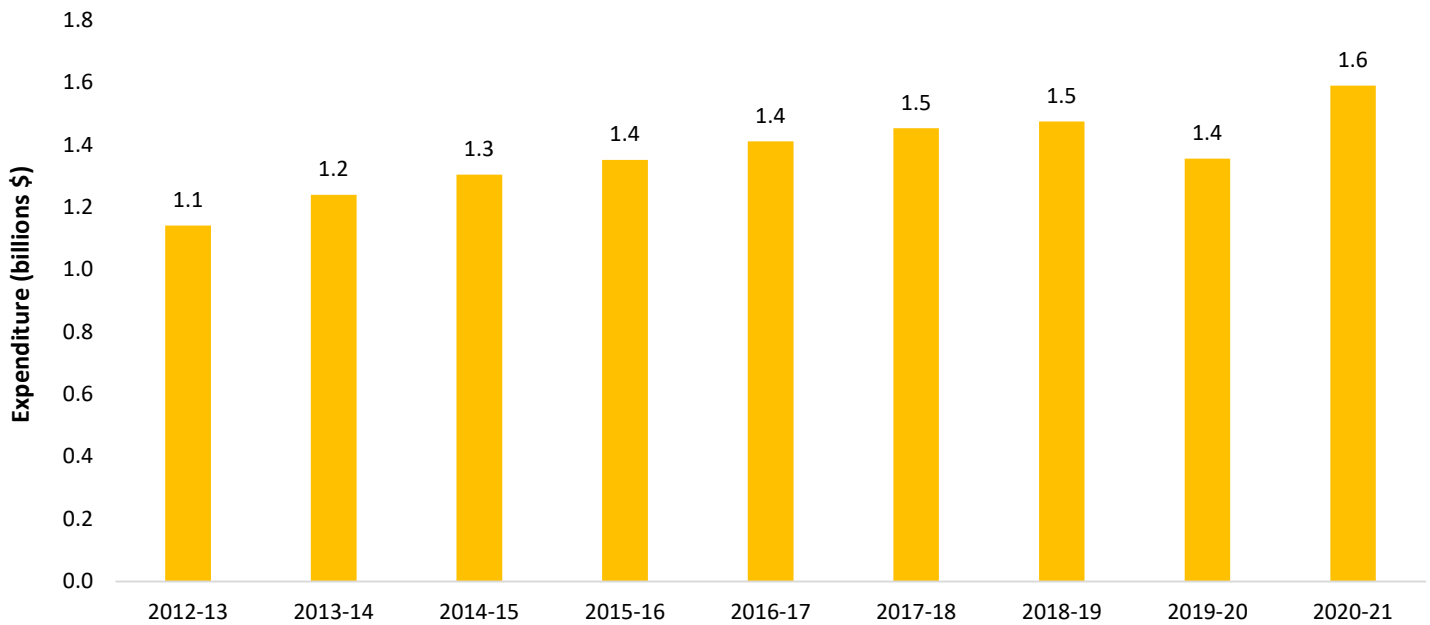


Figure 4. Dental expenditure 2012-13 to 2020-21, in billions of dollars

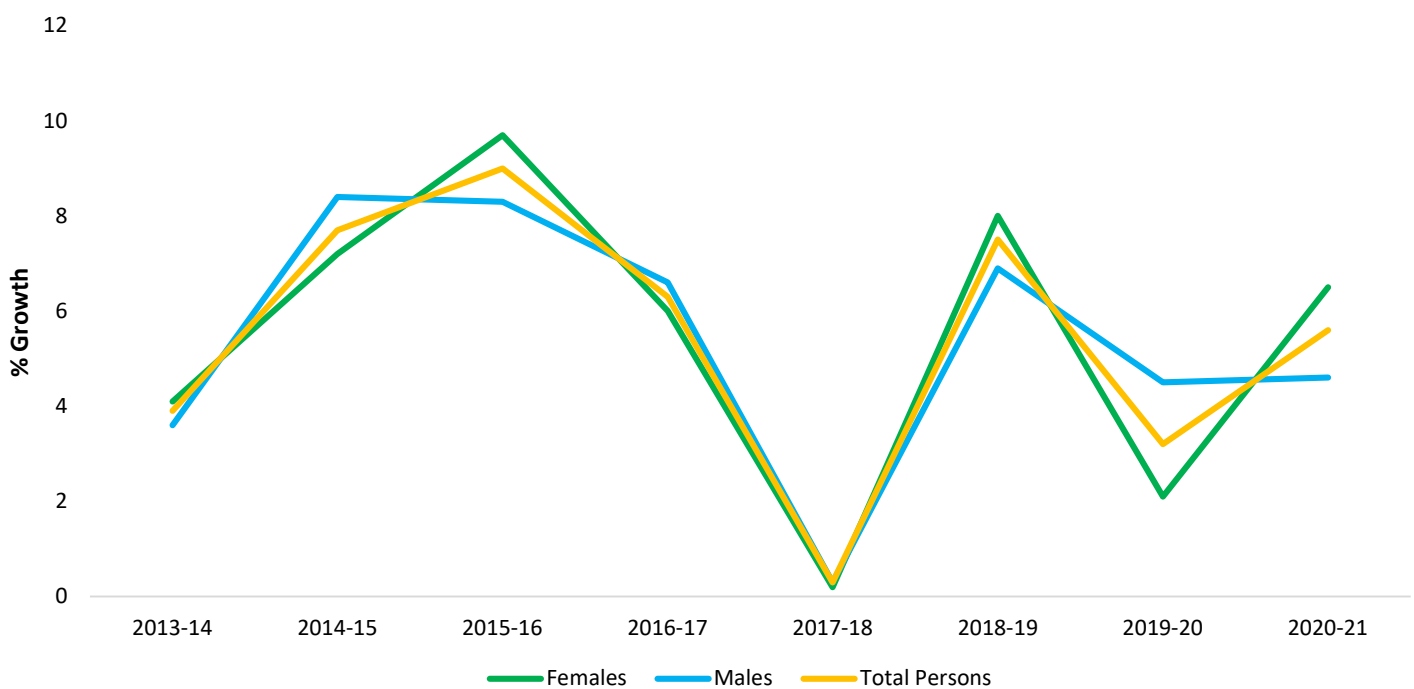


Figure 5. Year on year growth percentage (excluding dental persons)

Area of Expenditure

Hospital expenditure (including both public and private patient services) accounted for over half of total expenditure each year. Combined spending on allied health services, medical imaging, and pathology represented less than 10 per cent of expenditure throughout the period. Although spending has increased every year for public hospital services, Figure 6, the proportion of public hospital admitted patient expenditure has decreased, from 40.0 per cent of total expenditure in 2012-13 to 32.0 per cent in 2020-21. In contrast, the proportion of public hospital emergency department expenditure has increased over the nine-year period from \$300 million (3.0 per cent) in

2012-13 to \$700 million (6.0 per cent) for 2020-21. Spending related to specialist services has increased every year however its proportion of total expenditure has remained consistent at 4.0 per cent each year.

Over the nine-year period, private hospital service expenditure for males increased by \$489.2 million (63.8 per cent growth). Males also had an increase in pharmaceutical benefits scheme spending of \$332.9 million (66.0 per cent growth). Allied health spending for females increased by \$86.8 million (152.5 per cent growth) and medical imaging spending for females rose by \$89.1 million (74.9 per cent growth).

Overall, the largest expenditure increases each year were apparent in the older age groups of 65 to 69, 70 to 74, and 75 to 79 year-olds and was across all areas of expenditure except allied health services and public hospital emergency department expenditure. Allied health services and public hospital emergency departments experienced the greatest increases within the 30 to 34 and 35 to 39 year-old age groups. The 0 to 4 and 5 to 9 year-old age groups had the smallest expenditure increases in all areas, except for public hospital emergency department expenditure, where this age group had the highest increase totalling \$44.6 million (154.7 per cent growth) over the nine-year period. Additionally, 20 to 24 year-olds had the smallest expenditure increases in the areas of public hospital outpatient services, totalling \$19.4 million (88.8 per cent growth) and specialist services, totalling \$4.9 million (57.7 per cent growth).

Analysis of expenditure by spending area can help determine how the population is utilizing the health system to meet healthcare needs. It is also important to understand the health conditions that the population is facing, and the financial burden associated with treating these conditions.

Disease Group Expenditure

In 2019-20, cancer and other neoplasms surpassed musculoskeletal conditions as the disease group with the highest total expenditure. Over the nine-year period from 2012-13 to 2020-21, musculoskeletal conditions, cancer and cardiovascular diseases were the highest ranked contributors to disease expenditure. During this time, an additional \$716.9 million was spent on cancer and other neoplasms across all age groups, a growth of 90.3 per cent. Additional spending for musculoskeletal conditions totalled \$484.2 million (49.8 per cent growth) and cardiovascular disease spending increased by \$385.3 million (43.2 per cent growth).

For males spending by disease groups from 2012-13 to 2020-21 had a similar trend to that of total persons. The top three disease groups, cardiovascular diseases, musculoskeletal disorders, and cancer and other neoplasms remained consistent over the nine-year period with small variations in ranking. Notably, injury (external cause), gastrointestinal conditions, mental and substance use disorders, and infectious diseases all contributed significantly to male health expenditure over the nine-year period and ranked in the top five disease groups for males at various points in time.

For females, reproductive and maternal conditions have remained the top disease group by expenditure over the nine-year period with a growth of 23.0 per cent. The top five disease groups for females remained unchanged over the nine-year period and included reproductive and maternal conditions, musculoskeletal conditions, cancer and other neoplasms, cardiovascular diseases, and mental and substance use disorders.

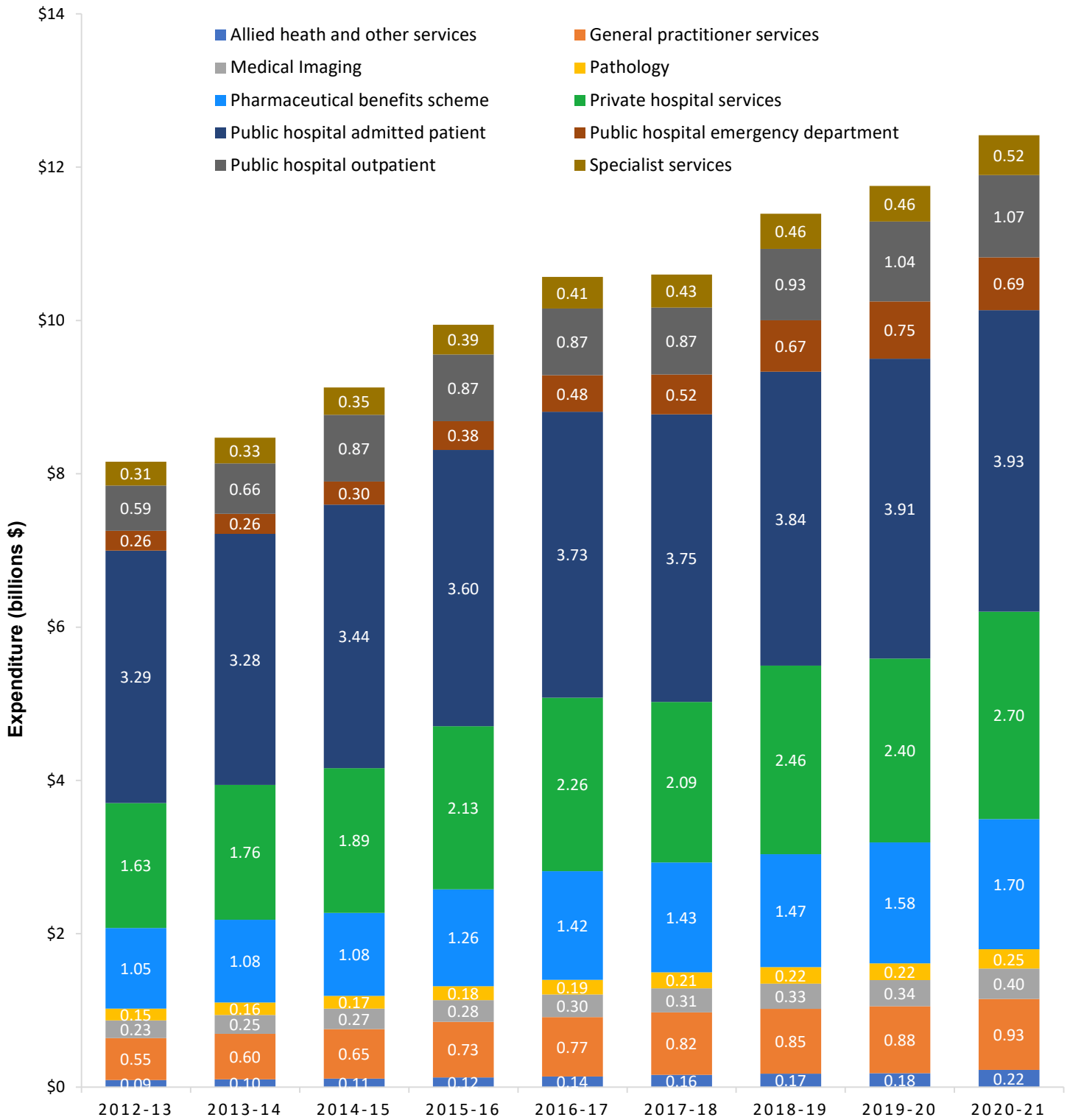


Figure 6. Healthcare expenditure by spending area 2012-13 to 2020-21, in billions of dollars

Mental and substance use disorders expenditure remained high for age groups (total persons) between 5 and 54 years over the nine-year period. The highest expenditure recorded for this disease group was \$88.0 million for 30 to 34 years in 2019-20. Injury (external cause) consistently ranked in the top five conditions for health spending across all age groups, except for 50 to 54, 70 to 74, and 75 to 79 years. Gastrointestinal disorders also featured prominently for age groups between 20 to 79 years.

Disease Groups by Expenditure Areas

Across the nine-year period 2012-13 to 2020-21, mental and substance use disorders remained the leading disease group contributing to allied health service expenditure for total persons. Spending within this area more than doubled with a growth of 129.3 per cent. Pharmaceutical Benefits Scheme (PBS) spending increased by 230.0 per cent since 2012-13.

Infectious diseases have remained the number one disease group attributed to both general practitioner and pathology expenditure, with increases in spending of \$56.5 million (62.7 per cent growth) and \$27.0 million (120.8 per cent growth) respectively since 2012-13. The musculoskeletal disorders disease group had the highest ranked expenditure associated with medical imaging from 2012-13 until 2016-17. From 2017-18 onwards, cardiovascular diseases remained the leading disease group attributed to this area of expenditure.

For males, injury (external cause) was the leading disease group associated with emergency department spending throughout the nine-year period, and has increased by \$71.0 million since 2012-13, a growth of 145.1 per cent. For females, reproductive and maternal conditions remained the top disease group for expenditure in the areas of specialist services, public hospital admitted patient expenditure and public hospital outpatient expenditure each year. It also remained the leading disease group for pathology expenditure until 2017-18 when it was overtaken by infectious diseases in 2018-19. Spending on public hospital outpatient services related to reproductive and maternal conditions for females has increased \$49.1 million over the nine-year period, a growth of 79.3 per cent since 2012-13.

Spending by Conditions

Osteoarthritis, falls, and back pain and problems ranked highest amongst both sexes each year over the nine-year period. Additionally, lower respiratory conditions and chronic kidney disease were among the top ten conditions for total persons each year. In males, higher expenditure amounts have been recorded each year since 2012-13 for type 2 diabetes and non-melanoma skin cancer. Prostate cancer also remained a top ten condition with spending almost doubling, increasing from \$67 per capita in 2012-13 to \$121 per capita in 2020-21 (Figure 7).

In females, mental health conditions, including depressive and anxiety disorders both appeared in the top ten conditions each year over the nine-year period. Expenditure increased by \$35 per capita for depressive disorders and \$34 per capita for anxiety disorders in females since 2012-13 (Figure 8). Breast cancer remained in the top five conditions over the nine-year period with spending increasing from \$72 per capita in 2012-13 to \$117 per capita in 2020-21. Spending attributed to osteoarthritis in females has increased 48.2 per cent.

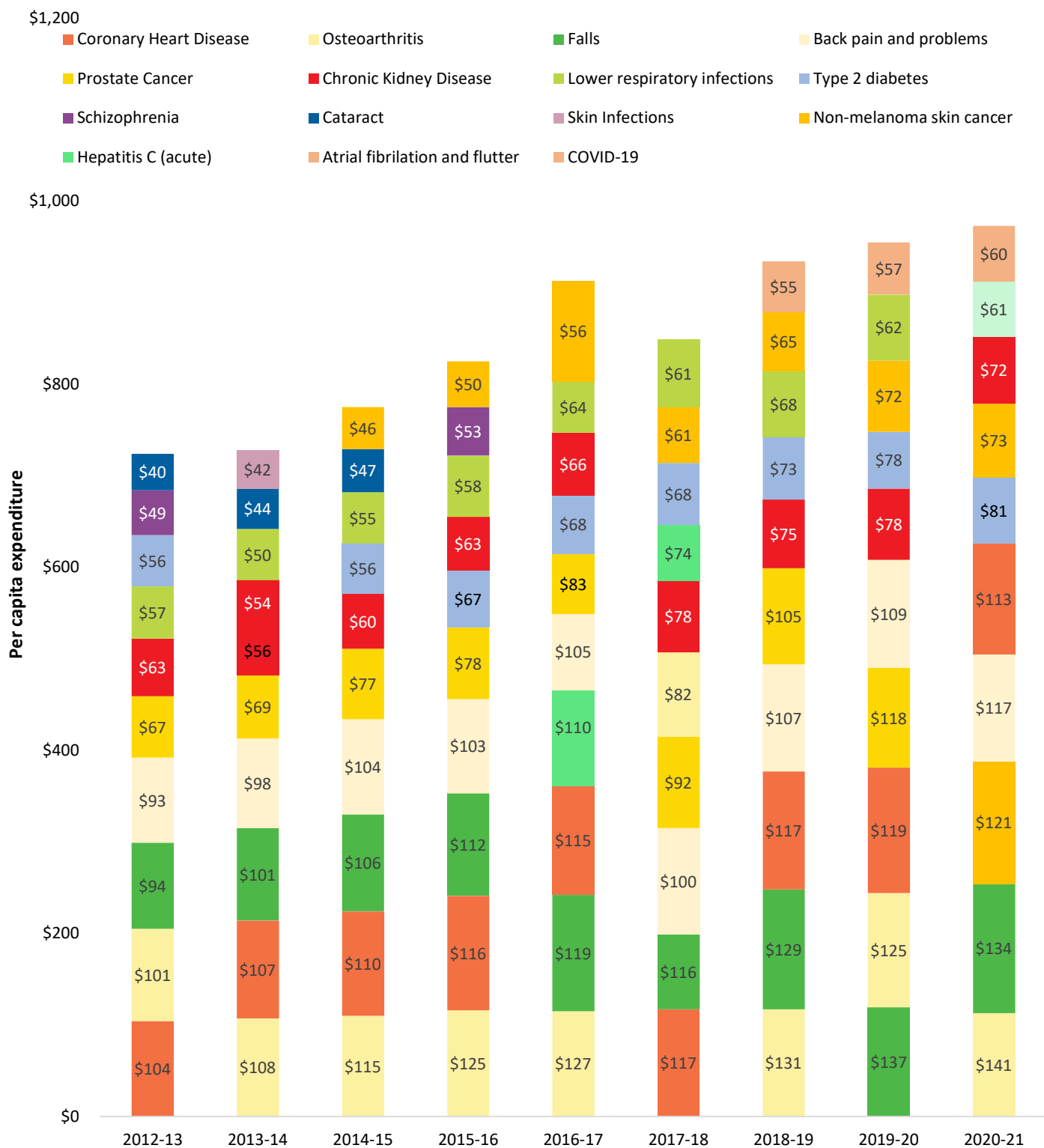


Figure 7. Top 10 conditions and associated per capita expenditure for males 2012-13 to 2020-21.

Note: 'other' or 'unknown' conditions, for example, other cardiovascular diseases, have been excluded from the ranking.

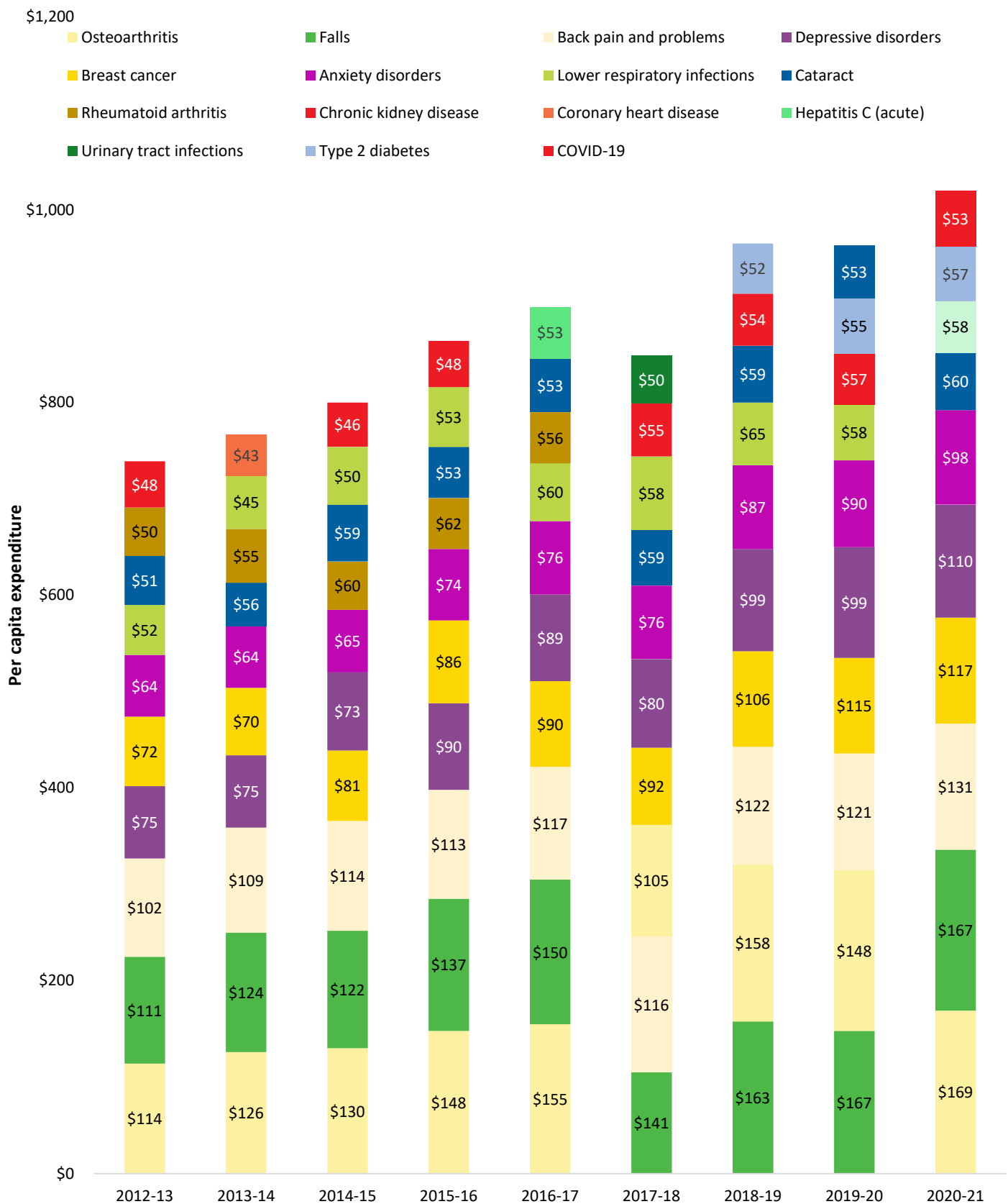


Figure 8. Top 10 conditions and associated per capita expenditure for females 2012-13 to 2020 – 21.
Note: 'other' or 'unknown' conditions, for example, other cardiovascular diseases, have been excluded from the ranking.

Mental health conditions including depressive and anxiety disorders, ranked in the top three disease conditions among the age groups 15 to 19, 20 to 24, and 25 to 29 years (total persons) over the nine-year period. Osteoarthritis ranked as the top disease condition across all nine years for the age groups 60 to 64, 65 to 69, 70 to 74, and 75 to 79-year-olds. Pre-term birth and low birth weight complications remained the leading disease group for expenditure among 0 to 4-year-olds, with spending remaining steady, increasing by less than \$10 million over the nine-year period.

Summary

Healthcare spending increased annually over the nine-year period, from \$9.3 billion in 2012-13 to \$14.0 billion (including dental expenditure) in 2020-21. During this nine-year period, over \$92 billion has been allocated to health services for the WA population. Public hospital admitted patient and private hospital services remain the top two contributing areas of spending, accounting for approximately half of total health expenditure each year. Emergency department expenditure has displayed an upward trend since 2012-13.

Cancer and other neoplasms, musculoskeletal disorders, and cardiovascular diseases has the largest amount of healthcare spending amongst all disease groups. In 2020-21, expenditure associated with these three disease groups exceeded \$1 billion each. Osteoarthritis, falls, and back pain and problems were the conditions with the highest total and per capita cost across all years and they have continued to exhibit high growth across both sexes each year. Coronary heart disease remains a costly burden among males whilst mental health conditions, including depressive and anxiety disorders, have experienced a twofold increase in expenditure among females over the nine-year period. In 2020-21, COVID-19 emerged within the top ten conditions for both sexes, with high expenditure observed among young adults aged 20 to 39 years.

The data presented in this report provides valuable insights into the trajectory of healthcare spending in WA that is attributable to specific disease groups. These findings will assist with informed decision-making and strategic resource allocation to enhance healthcare outcomes for all Western Australians. Understanding current health status and expenditure patterns can inform the development of future health policies and programs that contribute to a healthier WA population.

Acknowledgements

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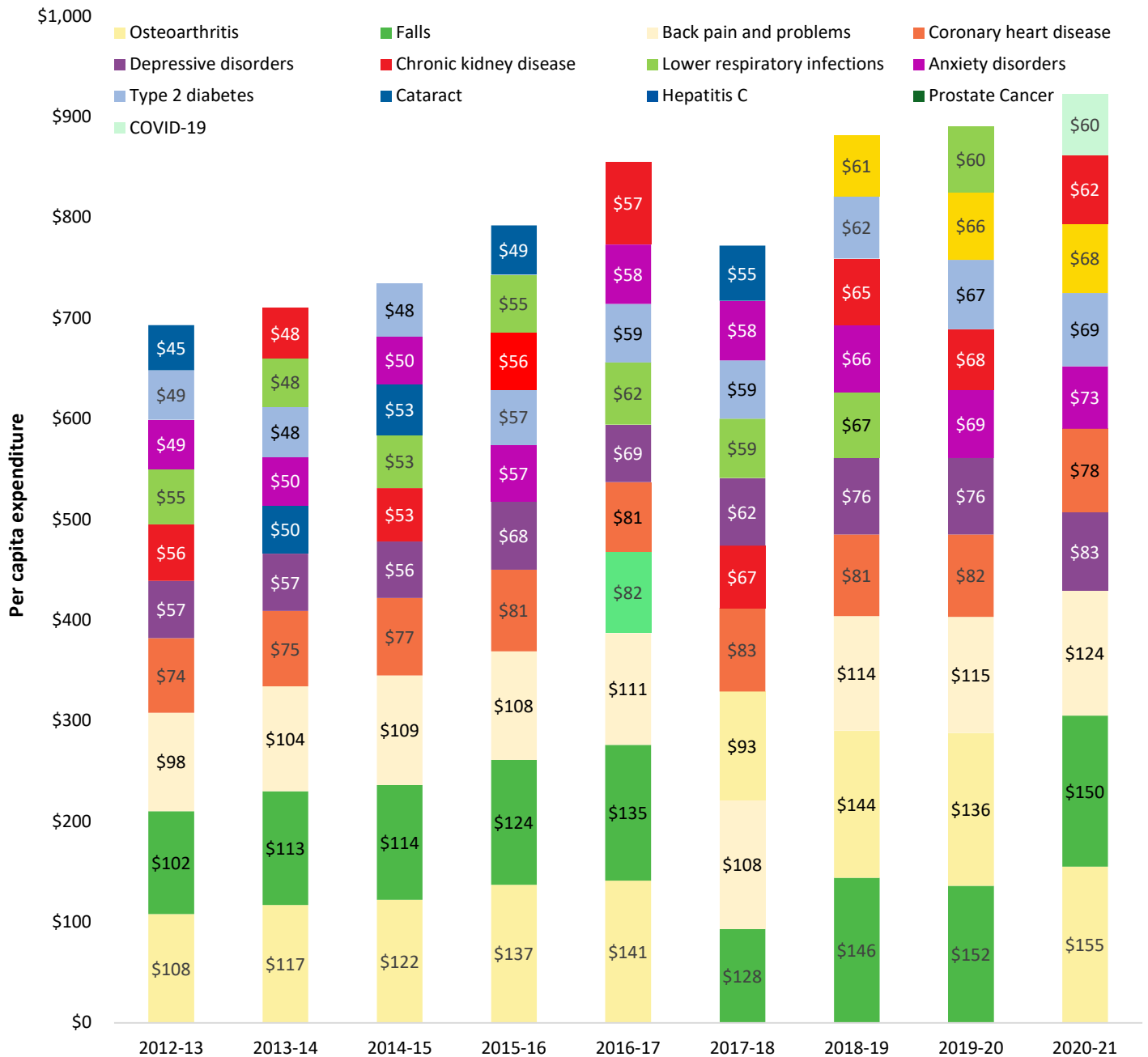
Enquiries

For any feedback or queries, or further analysis relating to this bulletin, contact epi@health.wa.gov.au

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Appendix



Appendix 1. Top 10 conditions and associated per capita expenditure for total persons 2012-13 to 2020-21. Note: 'other' or 'unknown' conditions, for example, other cardiovascular diseases, have been excluded from the ranking.