Small Area Local Health Indicators

Public Health Research Analytics and Methods for Evidence

March 2024

Acknowledgment of Country

Sydney Local Health District acknowledges that we are living and working on Aboriginal Land. We recognise the strength, resilience and capacity of Aboriginal people on this land. We would like to acknowledge all of the traditional owners of the land and pay respect to Aboriginal Elders past and present.

Our District acknowledges Gadigal, Wangal and Bediagal as the three clans within the boundaries of the Sydney Local Health District. There are about 29 clan groups within the Sydney metropolitan area, referred to collectively as the great Eora Nation. Always was and always will be Aboriginal Land.

We advise this resource may contain images or names of deceased persons, including photographs or historical content.

Small Area Local Health Indicators

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About us

Public Health Research Analytics and Methods for Evidence (PHRAME) is a collaboration between Sydney Local Health District and the University of Sydney. In 2022, the District and the University established PHRAME to embed research-informed epidemiological and data science methods to:

- support production of actionable evidence for decision-makers
- add value to a wide range of health and population data through novel uses
- create opportunities for capacity-building and training
- enable scalable research and collaboration by identifying applications within and outside the district

PHRAME's vision is to be an exemplar of excellence as a partnership with the University, supporting the district's strategic vision of excellence in health and healthcare for all. This will be achieved by:

- producing actionable evidence to inform decision-making across the district
- applying research-honed methods and analytics to address real-world questions

For additional information, please refer to the PHRAME strategic plan.

Acknowledgments

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Data sourced from the Public Health Information Development Unit (PHIDU), where labelled, has been released under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Australia licence (CC BY-NC-SA 3.0 AU). While data has been reformatted for the purposes of the current report, PHIDU remains the copyright holder of these data and all interpretation is PHRAME's own.

Data on diabetes services registrants was accessed via the National Diabetes Services Scheme (NDSS). The NDSS is an initiative of the Australian Government administered by Diabetes Australia. While data has been reformatted for the purposes of the current report, NDSS remains the copyright holder of these data and all interpretation is PHRAME's own.

Data from the Cause of Death Unit Record File (COD URF) is provided by the Australian Coordinating Registry for COD URF on behalf of Australian Registries of Births, Deaths and Marriages, Australian Coroners and the National Coronial Information System.

Record linkage in the Admitted Patient, Emergency Department Attendance and Deaths Register was carried out by the Centre for Health Record Linkage.

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Executive Summary

1.1 Executive summary

- The diversity of the Sydney Local Health District (SLHD) population in social, cultural, economic and demographic characteristics means there is potential for variation in health indicators, which may not be apparent if data is reported solely at the LHD level or larger areas.
- The Australian Institute of Health and Welfare (AIHW) publishes a biennial report on 45 broad indicators of health – at national and state levels – with only a limited number of estimates at a Primary Health Network level.
- The aim of Small Area Local Health Indicators (SALHIs) was to replicate the 45 health indicators at the sub-SLHD level at the smallest area for which valid estimates were available. NSW and SLHD overall estimates were used as a comparator to reflect potential variation within the district. This may be used to inform localised decision-making, planning and activities.
- Indicators defined in the Australian Health Performance Framework (AHPF) span three high-level domains of health:
    - Social determinants of health
        - The socioeconomic, behavioural and personal factors influencing health
    - Health System
        - Effectiveness, safety, continuity of care, accessibility and efficiency of the health system and services provided
    - Health Status
        - The incidence and prevalence of health conditions, human function and mortality
- Of the indicators:
    - 27 were populated using publicly available data sources
        - All but three were sourced at areas smaller than SLHD
    - 16 were manually calculated using NSW Health administrative data
        - Due to low numbers, one was reported at LHD level only while another was not reported due to sensitivity
    - Two could not be estimated at any level, due to lack of accessible data
- Social determinants often showed a socioeconomic gradient; areas of relative socioeconomic disadvantage had higher rates of smoking, overweight and obesity and failure to meet exercise and dietary guidelines. Conversely, areas of less disadvantage had higher rates of risky alcohol consumption.
- Indicators of the Health System within the SLHD revealed performance comparable to, or exceeding, the NSW overall level, with some fluctuations by year and indicator.
- Rates of antenatal care within the first trimester appeared to reduce considerably during COVID-19, while preventable hospitalisations increased during the same period.
- Socioeconomic gradients were observed among diabetes, psychological distress, and poor/very poor self-assessed health status, with generally higher prevalence in areas of higher socioeconomic disadvantage.
- Rates of other health conditions varied by year and indicator, with some conditions – such as sexually transmissible infections and blood-borne viruses, and mortality due to suicide – particularly high in the Sydney Inner City areas of the SLHD compared with NSW overall.
- Some indicators calculated using hospital admission data were notably affected by the COVID-19 pandemic and associated public health measures and should be interpreted with caution as they may be neither unexpected nor representative of 'business as usual' conditions.
- Data sources, workflows and methods underpinning this inaugural SALHIs report can be updated and repeated in future – if there is an interest in doing so – to track indicators over time.

2

Introduction

2.1 Background

The Australian Institute of Health and Welfare (AIHW) has published a biennial report ('Australia's Health') since 1988, spanning a variety of indicators across broad domains and providing an overall summary of Australia's health. These domains cover the individual biomarkers and behaviours that influence health, the rates of health system utilisation by the population, and the safety and efficiency of that health system.

In 2017, a major conceptual update was undertaken by the National Health Information and Performance Principal Committee and endorsed by state and territory health ministers. Specifically, it established an updated Australian framework, and agreement on its associated indicators and domains. This revision sought to better acknowledge both equity as a foundation of health and how a person's health may be intrinsically linked to a broader social context, within the constraints of a single, flexible, expansive and enduring framework (Figure 1). This framework was named the Australian Health Performance Framework (AHPF) and replaced the National Health Performance Framework that had been established in 2001[1]. It identified, for example, that factors such as socioeconomic status, educational attainment, employment opportunity, disability and access to health services – as well as the already recognised individual health behaviours and biomarkers – can work to both strengthen or undermine the health of individuals and communities[2].

The aim of the AIHW's Australia's Health series is to provide specific summary measures, and their definitions, by which different parts of the health system may be monitored 'to improve health outcomes for all Australians and ensure the sustainability of the Australian health system' [3]. The health indicators need to be clearly defined, measurable over time and not duplicate each other. Moreover, 'indicators selected generally reflect what is important to governments, service providers, funders of services (including taxpayers), and to patients and the broader Australian community.'

The AIHW has an understandably national-level focus, with some disaggregation by age group, sex, levels of socioeconomic disadvantage and geographic remoteness. In general, however, reporting of these indicators tends to be at the state level, or from broad regions based on rurality across the state. The most granular spatial unit at which a limited number of indicators is reported is the primary health network (PHN) level. For example, in Central and Eastern Sydney PHN – which comprises over 1.5 million people – only 12/45 indicators are reported, with values from 2016 onwards [4]. The Sydney Local Health District (SLHD) is home to a very diverse population across culturally and linguistically diverse groups, socioeconomic statuses, and age distributions, in a relatively small area.

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[1] AIHW (2018) Australia's Health 2018

[2] AIHW (2018) Australia's Health 2018

[3] AIHW (2018) Australia's Health 2018

[4] AIHW (2022) Australia's health performance framework

2.2 Aims of this report

Despite the diversity of the SLHD, estimates at the Local Health District level or higher could, for example, homogenise the population within the SLHD to the point where variability across health outcomes, behaviours and performance is not apparent in high-level, aggregated reporting. As such, there is a need for reporting to capture how specific aspects of health may vary across areas the district. Such information: 1) can be used to inform localised interventions that are sensitive to the diversity of a population within a given area with particular needs or where inequities are observed; or 2) may otherwise be important to know when reviewing SLHD's activities across its remit or when SLHD is asked to respond to agencies and stakeholders, among others.

Specifically, this report aimed to:

1. Replicate and leverage the AHPF and AIHW methods, to the greatest extent possible, using New South Wales (NSW) Health administrative and other data, at the most granular geographic level for which valid data was available for each indicator in SLHD
2. Identify, quality check and consolidate data already available on these metrics at the district into one cohesive, high-level report summarising the health of the district through established and validated metrics, and providing comparators for each indicator at the SLHD and NSW levels
3. Demonstrate a 'proof of concept' for reporting of health indicators at a sub-SLHD level – named Small Area Local Health Indicators (SALHIs) – that will establish workflows to underpin future reports and identify indicators to prioritise alternative data sources in subsequent reports

2.3 Context for this report

Many current and historical reports have been produced on different aspects of SLHD population health and/or system performance. These reports have been produced by, for example, the Planning Unit, Performance Unit, the Public Health Unit (Public Health Observatory and Epidemiology Unit) and the Health Equity Research and Development Unit (HERDU), among others[5]. Some of the indicators reported here are also reported in reports produced elsewhere. As such, this report is not intended to supersede or replace any existing reports, but rather to complement them by consolidating information, both publicly available and calculated using NSW Health data sources, mirroring the AIHW national indicator methods, and doing so at the finest level of sub-LHD granularity, subject to constraints in Aim 1 (above).

[5] Sydney Local Health District (2013) A Picture of Health: SLHD Health Profile 2013

3

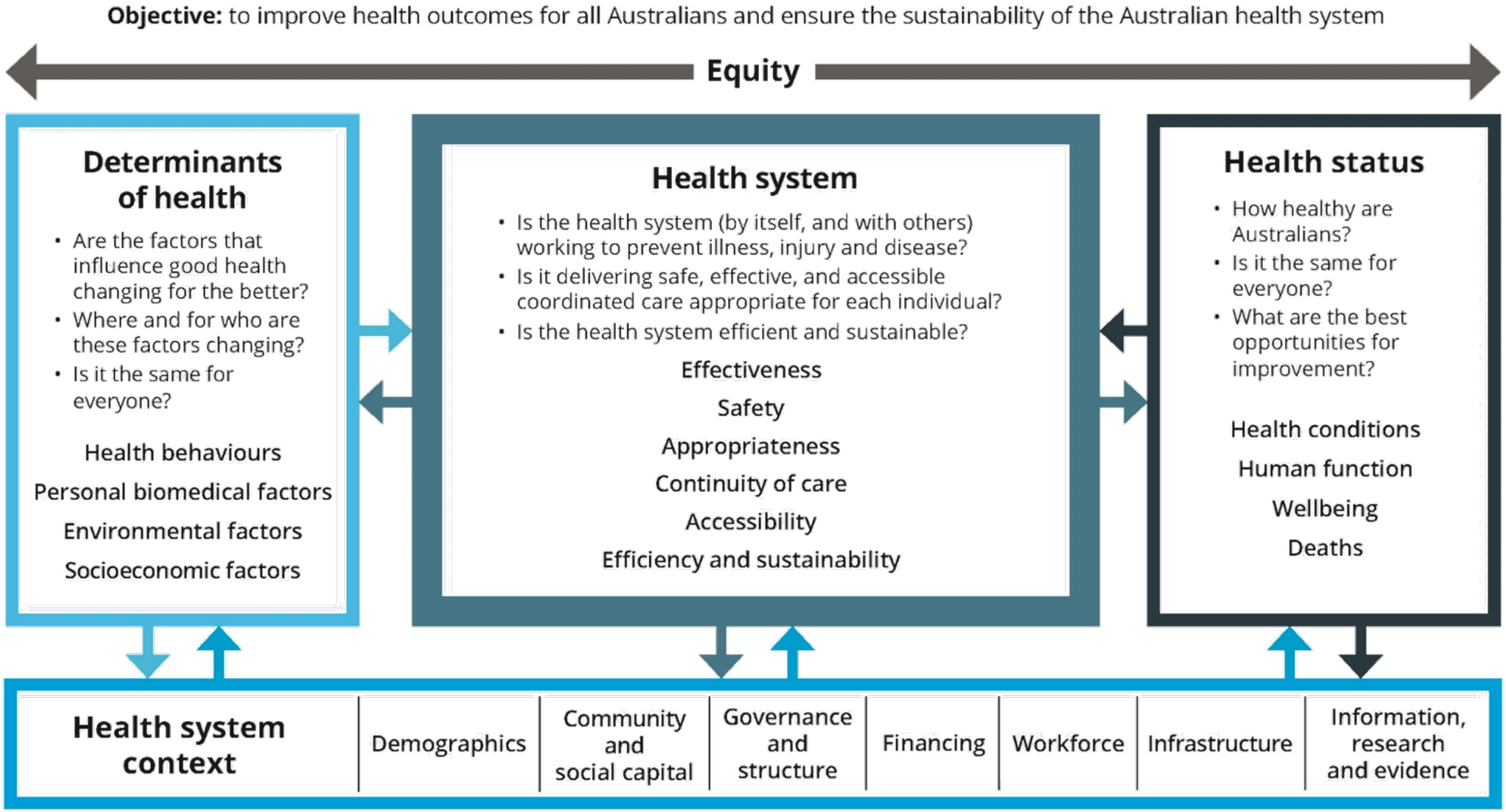
Indicators

3.1 Indicator definitions

We followed AIHW's high-level definition of indicators as 'a key statistical measure selected to help describe (indicate) a situation concisely so as to track change, progress and performance; and to act as a guide for decision-making. It may have an indirect meaning as well as a direct one; for example, Australia's overall death rate is a direct measure of mortality but is often used as a major indicator of population health.' Individual indicator definitions, and the grouping of indicators into domains of determinants of health, health status and health system, also followed the AHPF (Figure 1), which comprises a total of 45 indicators (Table 1). In the AHPF, the consultation process, indicator proposal, refinement, final definitions and approval by state and territory ministers in 2017 was an exhaustive one. This was to ensure the indicators can:

- offer insights into the health of Australians and the quality of the health system at a point in time (and allow different population groups, different regions and different countries to be compared)
- provide information on the effectiveness of changes to policies or new practices and programs (when measured consistently over time)
- improve accountability and transparency of service provision, and support consumer choices relating to health care
- encourage ongoing improvement in service delivery by highlighting areas of innovation and where better performance is needed[6]

[6] AIHW (2018) Australia's Health 2018



Note: See supplementary document S1.4 'Australian Health Performance Framework: detailed Health System Conceptual Framework' for a more detailed version of this figure <www.aihw.gov.au/reports/australias-health/australias-health-2018/related-material>.

Source: Adapted from National Health Information and Performance Principal Committee 2017.

Figure 1 Conceptual Australian Health Performance Framework. Source: AIHW Australia's Health Performance Framework.

Table 1 Assessment of ease of access to data sources, spatial unit and data quality of all indicators listed in the AIHW Health Performance Framework. NB: Grey fields are not reported in this report due to access or quality. *See also 'Identified data sources'. Source: AIHW Australia's Health Performance Framework.

Category	Subcategory	Indicator	Data Source*	Access	Data Quality	Spatial Unit	Calculated^
Determinants of Health	Socioeconomic factors	Proportion of people with low income	ABS			SA2	✓
		Educational attainment for selected school years & adults	ABS			SA2	✓
	Health Behaviours	Rates of current daily smokers	PHIDU			PHA	
		Children exposed to tobacco smoke in the home	NDSHS			NSW	
		Levels of risky alcohol consumption	PHIDU			PHA	
		Inadequate fruit & vegetable intake	PHIDU			PHA	
		Insufficient physical activity	PHIDU			PHA	
		Unsafe sharing of needles	IDRS			NSW	
	Personal Biomedical Factors	Prevalence of overweight & obesity	PHIDU			PHA	
Health System	Effectiveness	Immunisation rates for vaccines in the national schedule	AIR			LGA	
		Females with an antenatal visit in the first trimester of pregnancy	PDC			SA2	✓
		Cancer screening rates	AIHW			SA2/SA3	
		Selected potentially preventable hospitalisations	APEDDR			SA2	✓
		Survival of people diagnosed with cancer	APEDDR			SA2	✓
		Potentially avoidable deaths	CODURF			SA2/SA3	✓
	Safety	Adverse events treated in hospitals	APEDDR			Hosp	✓
		Healthcare-associated Staphylococcus aureus blood infections	AIHW			Hosp	
		Sentinel events	AIHW			NSW	
		Rate of seclusion	AIHW			Hosp	
	Continuity of Care	Unplanned hospital readmission rates	APEDDR			Hosp	✓
	Accessibility	Bulk billing for non-referred (GP) attendances	AIHW			SA3	
		Waiting times for elective surgery: waiting times in days	AIHW			Hosp	
		Waiting times for elective surgery: proportion admitted within clinically recommended time	AIHW			Hosp	
		Waiting times for elective surgery: percentage waited more than 365 days					
		Waiting times for emergency department care: proportion seen on time	AIHW			Hosp	
		Waiting times for emergency department care: waiting times to commencement of clinical care	AIHW			Hosp	
		Waiting times for emergency department care: percentage of patients whose length of emergency department stay is 4 hours or less	AIHW			Hosp	
		Waiting times for emergency department care: time spent in the emergency department	AIHW			Hosp	
	Efficiency & sustainability	Cost per weighted separation & total case weighted separations	APEDDR			SA2	✓
		Net growth in health workforce	ABS			SA2	✓
Health Status	Health Conditions	Incidence of heart attacks (acute coronary events)	APEDDR			SA2	✓
		Incidence of selected cancers	Cancer Institute			LGA	
		Incidence of sexually transmissible infections & blood-borne viruses	NCRES			SA2	✓
		Incidence of end-stage kidney disease					
		Hospitalisation for injury & poisoning	APEDDR			SA2	✓
		Proportion of babies born with low birthweight	PDC			SA2	✓
		Prevalence of type 2 diabetes	NDSS			POA	
		Notifications of selected childhood diseases	NCRES			LHD	✓
	Human Function	Severe or profound core activity limitation	ABS			SA2	✓
	Wellbeing	Proportion of adults with psychological distress	PHIDU			PHA	
		Self-assessed health status	PHIDU			PHA	
	Deaths	Infant & young child mortality rate	RBDM				✓
		Life expectancy	ABS			SA4	
		Major causes of death	CODURF			SA2/SA3	✓
		Mortality due to suicide	CODURF			SA3	✓

3.2 Feasibility assessment

In order to replicate the approach taken by AIHW in producing estimates of health indicators within the SLHD, the AIHW Metadata Online Registry (METEOR) was extensively consulted[7]. This was a key resource and included detailed information on the specific data sources used for each indicator, as well as the inclusions, exclusions, numerators and denominators used in the calculation of the point estimate.

Based on METEOR information for each indicator, they were first assessed for feasibility in the current SLHD-focused report by assigning an indicative score across three domains:

1. *Data access* – Whether the data source used by AIHW could be accessed, either via NSW Health-managed administrative datasets or via publicly available datasets. If estimates were already available at the required spatial unit, these were not recalculated. If the exact data source could not be accessed, and no calculated estimates were located, alternative data sources were explored and assessed for access. If no estimates could be found, and an available data source could not be located to allow for manual calculation of an indicator, available estimates at coarser spatial units were explored, and assessed for ease of access.
2. *Spatial units* – Whether the indicator could be replicated at the desired spatial unit (i.e. the most granular unit to identify valid estimates of within-SLHD variability). For most indicators, this was the Australian Bureau of Statistics Statistical Area level 2 (SA2) but for others, such as performance of hospitals, hospital-level reporting was more appropriate. Indicators with spatial units were also assessed on whether there were sufficiently high numbers of the condition or activity to allow for valid estimation at SA2 level. In the case where estimates calculated by other agencies and/or teams were the only option, then the assigned rating for spatial unit was based on these estimates. The subsequent section on 'Spatial units' in this report describes the approach for assigning indicators to spatial units in more detail.
3. *Data Quality* – Perceived quality of the data source, in terms of transparency, quality of data collection methods, accuracy, suitability and completeness of specific variables needed for indicator calculation. Where only previously calculated estimates could be found, data quality assessment was based on the transparency and perceived validity of the methods used to calculate these estimates.

NSW Health-managed data sources were preferred, although in some cases this was not the best approach. For example, admitted patient data was used to identify cancer incidence when cancer registry data was the data source used by the AIHW. However, cancer registry data is highly protected and not available via the main platform we used (NSW Health Secure Analytics for Population Health Research and Intelligence – SAPHaRI). As such, a pragmatic approach was adopted given available data sources, with specific approaches discussed in each indicator's section.

3.3 Assessment of indicators

The results of the indicator assessment, in which indicators were assessed in terms of their ease of access, spatial unit available, and perceived data quality, are summarised in Table 1. In each of these categories, an indicator was assessed as 'good', 'fair', or 'questionable'.

In terms of data access, an indicator was classed as 'good' if available data assets were easily assessable, either via NSW Health or via a publicly available data source. Data access was classed as 'fair' if an alternative dataset had to be substituted for a data source prescribed by AIHW. Finally, data access was classed as 'questionable' if a source could not be obtained without specialised access, usually carrying with it a cost.

In terms of data quality, an indicator was rated as 'good' if the dataset, or provided calculations, were deemed to be of good quality, with adequate documentation of methods to allow for

[7] AIHW (2022) Metadata Online Registry

assessment of quality. Data quality was classed as 'fair' if the methods employed carried caveats, likely introduced some bias in the estimation, or had identified limitations. Data quality was classed as 'questionable' if methods were unclear in the estimation or modelling methods.

In terms of spatial units, an indicator was classified as 'good' if the indicator could be reproduced at the desired geographical unit or, where this was not valid, at a suitable aggregated unit (e.g. SA3 instead of SA2). Spatial units were 'fair' if data could only be sourced at a spatial unit coarser than the desired spatial unit, such as when only SA3 or Local Government Area (LGA) level data was available. Spatial units were classed as 'questionable' if only NSW-level data could be sourced and reporting of this indicator would not represent any improvement on indicators already reported by the AIHW. Further details on the spatial units used in this report are detailed in 'Spatial units' below.

Data sources were found for sub-NSW level reporting for 40 of 45 indicators (89%). Eighteen of the indicators (38%) were calculated using NSW Health administrative data, indicated by a green tick in Table 1.

The five indicators (11% of all indicators) that could not be sourced at a sub-NSW level were:

- children exposed to tobacco smoke in the home
- unsafe sharing of needles
- sentinel events
- waiting times for elective surgery: percentage waited more than 365 days
- incidence of end-stage kidney disease

The first three of these could only be sourced at the NSW level and could not be approximated using NSW Health data sources. The fourth of these was not available via the MyHospitals Application Programming Interface (API), the AIHW managed data source for most of the other variables in the Health System category and Accessibility subcategory. However, given the results for related indicators on waiting times for elective surgery, the numbers are likely to be very low within the SLHD. The last of these – incidence of end-stage kidney disease – relies on registry databases detailing kidney transplants and dialysis recipients. While this could be partially approximated using hospital admission data, this could substantially bias the estimate and so it was decided to not pursue calculation of this indicator using hospital admissions data.

Two additional indicators were able to be calculated using available data sources, but numbers were too low at either the Statistical Area 2 or 3 levels to yield a stable and meaningful estimate. One of these, life expectancy, used SA4 data from the ABS instead, while the other (infant and young child mortality) was not presented due to the limitations detailed above. A further two, detailing cancer incidence and survival, were explored using SAPHaRI managed datasets but the approximation methods were deemed to be inadequate. Alternative methods are currently being explored for these indicators.

In summary, the SALHIs report includes estimates of 40 from 45 (89%) of the indicators in the AHPF at the sub-LHD level. Of the five that were not produced at the sub-LHD level, three are presented at the NSW level, while for the remaining two, no data sources could be found. In some instances, indicators were able to be approximated but these carried some important caveats that are described in the results section for a given indicator.

3.4 Identified data sources

The data sources identified for the calculation of indicators varied from NSW Health-managed datasets to other publicly available data sources, often managed by either AIHW or the Australian Bureau of Statistics. Specifically, data sources included:

- The Admitted Patient, Emergency Department Attendance and Deaths Register (APEDDR) – A NSW Health-managed linked data product containing hospital admissions, emergency department presentations and fact of death occurring in New South Wales. Data for the current report were available up to the end of 2021.
- Cause of Death Unit Record File (CODURF) – The NSW Health-managed database reporting coded cause of death for all registered deaths in NSW. Data for the current report were available up to the end of 2021.
- Perinatal Data Collection (PDC) – A NSW Health-managed statewide surveillance system that monitors patterns of pregnancy care, maternal outcomes and newborn outcomes. Data for the current report were available up to the end of 2021.
- Notifiable Conditions Records for Epidemiology and Surveillance (NCRES) – A NSW Health-managed database designed to capture, manage and report on medical conditions notifiable under the NSW Public Health Act 2010 from pathology laboratories, general practitioners and hospitals. Data to the end of 2022 were used in the current report.
- The Australian Bureau of Statistics Census of Population and Housing – A nationwide census covering all Australian residents and detailing key demographic variables. Data for the current report were available for census years 2011, 2016 and 2021.
- MyHospitals – An Australian Institute of Health and Welfare (AIHW)-managed database accessible via an Application Programming Interface (API), which holds data on Australia's hospitals, and details performance and utilisation metrics. Data were available for different time periods depending on indicators, but data were generally available up to the end of 2021.
- Australia's Health Performance Framework – An AIHW managed dataset detailing state-level estimates of all identified indicators, with limited disaggregation by sex, age and geographic area. Data availability varied by indicator, with some data available up to 2021.
- Public Health Information Development Unit (PHIDU) Social Health Atlas – A long-standing, partly Australian Government-funded research unit providing estimates of health behaviours and biomarkers, based on either direct calculation or modelled estimates.
- National Diabetes Services Scheme (NDSS) – A public record of registrants with the NDSS by diabetes type, with only current data available, presumably to 2022.
- The Cancer Institute Cancer Type Summaries – High-level reporting of cancer incidence and mortality by Local Health District and Local Government Area across cancer types and groups, calculated using unit record Cancer Registry data.
- Illicit Drug Reporting System (IDRS) – A reporting system managed by the National Drug and Alcohol Research Centre Drug Trends team, reporting annual, nationwide usage of illicit substances by a sentinel group of people who inject drugs. Data were available, by state, up to the end of 2022.

4

General Methods

4.1 Indicator calculation

While each indicator required a different approach, general approaches were adapted to the calculation and presentation of indicator information, increasing in complexity as the level data access increased. That is, when access to administrative data was possible, methods defined in METEOR needed to be recreated as exactly as possible.

In the simplest instance, where existing estimates were available at the required spatial unit or when original administrative data sources could not be accessed and pre-calculated estimates were used, estimates were presented as is. That is, estimates were reproduced exactly as they were reported in the source data, with no further validation or calculation. The only exception to this was in hospital performance datasets where minutes were converted to hours, to ease interpretation.

For administrative data sources managed via NSW Health, all data sources were accessed via the Secure Analytics for Population Health Research and Intelligence (SAPHaRI) platform, with all analysis done within this secure space. Only once data were aggregated were they exported from this platform for visualisation.

For indicators relying on hospital admissions, emergency department presentations or fact of death, APEDDR was used in the first instance. This dataset, from NSW Health, links three separate data sources, detailing hospital admissions, emergency department presentations and fact of death, via probabilistic linkage methods. As such, there is a 1-year delay on this data source while data are linked. However, it allowed for within- and across-dataset validation via the linkage of records. Additionally, it allowed for the calculation of admissions involving transfers, both within and across hospitals, which reduced double counting in administrative hospital admission data. In this way, hospital admissions were classified as unique hospital 'stays', and may comprise multiple transfers for an individual across different health campuses.

Indicators relating to performance and/or accessibility at the hospital level were readily available and pre-calculated by the AIHW and so these were accessed using the AIHW MyHospitals API and used 'as reported' and with minimal additional calculation.

Where estimates were manually determined, generally age-standardised rates were calculated; this was informed by the specific METEOR entry for the indicator. Age-standardised rates were generally calculated as rates per 100,000 in the population; however, this varied slightly for each indicator according to specifications in METEOR. Similarly, age groups used were informed by METEOR[8], except the smallest age group (i.e. 0–4), which was not separated into categories of 0 years and 1 year, as the vast majority of indicators had very low numbers in this age group.

4.2 Spatial units

The spatial unit over which each indicator was summarised varied by indicator. Although smaller unit geographies were preferred, for some indicators this was either not appropriate, not available or not valid.

In the first instance, the Australian Bureau of Statistics' Australian Statistical Geography Standard (ASGS) was preferred. This standard classifies Australia into distinct, non-overlapping, hierarchical regions based on geographic area and population size. A Statistical Area Level 2 (SA2) generally has a population between 3,000 and 25,000 with an average of about 10,000 people, with SA2s in remote and regional areas generally having smaller populations than those in urban areas. A Statistical Area Level 3 (SA3) is determined to have populations between 30,000 and 130,000 people, and usually consist of four-to-eight SA2s. As these spatial units are hierarchical, they map directly to one another. These boundaries are redrawn with census years to reflect changing population distributions. In most cases, the 2016 Statistical Area Boundary was used, as this was the most common boundary used in data sources. However, 2011 and 2021 boundaries were occasionally used, and these are visualised according to their specific boundaries, with no conversion between years performed. This is because conversion between years is imperfect, and areas may be

[8] AIHW (2005) Age-standardised rate

consolidated or divided across census years, and any conversion between years requires the exclusion of some data. Where boundaries from different years are visualised, this is noted in the methods for that indicator.

Other spatial boundaries that were used in the current report include:

- Public Health Areas (PHA) – These areas, calculated by the Public Health Information Development Unit (PHIDU) at Torrens University, are comprised of a combination of either whole or multiple SA2s. These were implemented to increase population size at small area estimations in line with the requirements of their modelling methods[9].
- Postal Area (POA) – Postal Areas are an ABS approximation of a general definition of Australian postcodes. Note that ABS approximations of administrative boundaries do not always match official legal boundaries and should only be used for statistical purposes.
- Local Health District (LHD) – NSW Health defines fifteen distinct local health districts that cover the state of NSW, with six of these located within the Sydney metropolitan region. Each LHD is responsible for managing public hospitals and health institutions and for providing health services within their defined geographical boundary.
- Local Government Area (LGA) – Local Government Areas refer to gazetted local government boundaries as defined by the NSW Government, representing the third level of government in Australia under State government.
- Hospital (Hosp) – Hospital-specific data, relating to hospital admissions and emergency department presentations at a given public hospital. Note that equivalent private hospital data is not available via the NSW Health administrative data source.
- New South Wales (NSW) – Whole-of-state level, representing the coarsest spatial unit reported.

Where the indicator related to the individual, preference was given to SA2 reporting where there was valid and calculable data. Where the indicator related specifically to hospital performance and/or accessibility, preference was given to hospital-level reporting.

As spatial units did not map directly to the Local Health District boundaries, spatial units were classified as being located within the SLHD if at least 50% of their area was wholly inside SLHD boundaries. This same threshold applied across all spatial units. The only exception to this was in one instance where Statistical Area 4 levels were reported. Due to the relatively large size of SA4s, a more generous threshold of 10% was applied, allowing for three SA4s to be classified as within the SLHD.

Finally, six sparsely populated SA2 areas located either within, or neighbouring, the SLHD were excluded from analysis. These included Centennial Park, Port Botany Industrial and Sydney Airport (all with fewer than 10 residents in 2021), Rookwood Cemetery (<30 residents in 2021), Banksmeadow (<250 residents in 2021) and Chullora (<2,000 residents in 2021). These represent areas with populations in the 2.5th percentile of population sizes across the SA2s neighbouring the SLHD. An opposing 'high tail' filter on densely populated SA2s in the 97.5th percentile range was not applied as it was determined these higher population SA2s would not distort the calculation of estimates.

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9 Population Health Areas: Overview – PHIDU

4.3 Comparison of indicators over time

To allow for meaningful comparisons and to achieve a reasonable balance between validity and utility of each indicator estimate, data from a three-year period was adopted where possible. This was achieved through aggregating the most recent complete full year in the relevant dataset, with the two years immediately preceding. The comparison period was then determined to be the aggregated three-year period preceding the initial established time period. This varied slightly between indicators, as different datasets were more recently updated than others. For example, APEDDR datasets were available to the end of 2021, while NCRES had data up to end of 2022. Note that these periods only apply to estimates that were calculated using NSW Health-managed datasets. Where only externally calculated estimates could be found, these were presented for the periods in which they were available.

Where there were greater than two subcategories available for an indicator – for example the incidence of different types of cancer – the majority of indicators were presented at the population level, rather than at the finer level of sex. A small number of indicators were unable to be reported by sex due to insufficient numbers precluding valid calculation at this level. There were instances where a decision was made to report only at the population level to maintain comparable space between indicators, even when finer level calculations were possible. This may be expanded in future SALHIs data visualisations.

4.4 Contexualising findings within NSW and SLHD overall

The same calculation methods were applied to each indicator at the SLHD and NSW level and at the same sex and time disaggregation in order to provide a comparison estimate. Any bias inherent in the method applied to the indicator at the sub-SLHD level would have likely carried through to the state-level estimate. The aim of the state-level comparator was to provide context for the indicator estimate *on the same scale* of that estimate, and thus it did not necessarily reflect the AIHW reported statewide estimates of that indicator. Sub-SLHD maps or line graphs of indicators were presented, along with NSW and SLHD overall estimates for context.

As a 'sense check' for calculated indicators, State and Local Health District estimates calculated by the AIHW (which were available for a subset of the indicators only) were consulted, with calculated estimates assessed for consistency against these published figures. This provided an indirect validation of the calculated estimates – where there was disparity between calculated estimates and AIHW estimates, calculation methods were rechecked. Where disparities could not be resolved entirely, the likely source of such disparity was described in the write-up for that indicator.

4.5 Impact of COVID-19

The calculation of many indicators was impacted by the COVID-19 pandemic and associated public health measures and social restrictions. For example, a reduced hospital admission rate for non-acute diagnoses impacted all calculated indicators reliant on hospital admission data. Where hospital admission may have been used as an approximation for the incidence of certain conditions, the COVID-19 pandemic severely affected the validity of such methods. This was noted for the relevant indicators where the differences were particularly pronounced. However, the impact of the COVID-19 pandemic on data should be considered when interpreting all indicators presented in this report as, in this context, it can be difficult to distinguish between genuine effects observed for an indicator and those effects caused by COVID-19. The section 'Caveat on comparisons and interpretations' is also relevant to this issue.

4.6 Visualisation

In general, indicators were assessed for validity before deciding on a specific visualisation approach. Where data could be validly estimated at the SA2 level or were available at a comparably sized area (such as postcode or Public Health Area), maps were used for graphical representation of data as they allowed for a simple visual comparison between areas and illustrated spatial clustering of indicator values. A cell count threshold of 30 was employed when visualising indicators using maps and, as such, an indicator was not visualised if the numerator was fewer than 30 in a given area. While this threshold is more conservative than the cell count threshold of 20 recommended by AIHW[10], it was adopted to ameliorate the inability of maps to capture estimates of uncertainty. In datasets where greater than 10% of the areas used for estimates had numerators with a cell count threshold of less than 30, data from these areas were aggregated to a SA3 level and represented visually in line plots, where confidence intervals could be shown. While all data tables are available in the supplementary documents, including estimates of uncertainty in the form of 95% confidence intervals, these may not be accessed by all readers of the report, and thus the more conservative threshold was necessary.

In instances where greater than 10% of SA3s were not able to be visualised, indicators were further aggregated or, in some cases, excluded altogether. Exclusion of indicators was only adopted as a last resort when numbers were very low and the indicator was particularly sensitive, such as infant and child mortality.

Scales on each map were informed by the data, with an emphasis on observed values within the SLHD. That is, colour scales were defined with upper and lower limits that aligned with the maximum and minimum values, respectively, within SLHD. Along with the minimum and maximum, eight colour breaks were used to represent 2.5% increments along the distribution. This allowed each defined category to contain a relatively equal number of observations and ensured that scales were not overly affected by extreme values. This also allowed each category to represent an equal proportion of observations. This, however, resulted in uneven increments between categories in some instances. Any extreme values observed outside of the SLHD boundary – those values falling below the 2.5^{th} percentile or above the 97.5^{th} percentile – were excluded to avoid distorting the scale of estimates within the SLHD boundary. For all line graphs, the range of values within the SLHD defined the scale, accounting for confidence intervals when applicable. Caution should be taken when interpreting some indicators if the observed range of values is small, as small differences may appear larger due to the scale.

NSW and SLHD-level comparators are presented on maps and line graphs using the same colour scale and/or graph scale for comparability.

[10] AIHW (2005) Age-standardised rate

4.6.1 Caveat on comparisons and interpretations

Any remarkable differences in estimates within SLHD or between the overall estimates drawn from NSW or SLHD data – including differences appearing temporally – have been described qualitatively and should be viewed as such. The report did not seek to formally test the statistical significance of differences for several reasons:

1. A statistically significant difference, if found, does not equate to clinical or health system relevance (and vice-versa), and is prone to misinterpretation.
2. The ability to detect a difference depends on many factors, not least of which is the number of groups being compared, and this itself varies between indicators. Testing an indicator with more groups (e.g. an indicator reported at SA2 level) may find a difference, while testing one with fewer groups (e.g. an indicator reported at SA3 or LGA level) may not find a difference. This is due to aggregate estimates often masking differences between the elements that have been aggregated. Where it was not appropriate to calculate estimates, (or where estimates were unavailable) at SA2-level, the power to detect differences between areas is reduced.
3. The number of individual tests required to confirm statistical significance would be large, giving rise to the potential for spurious results and a higher probability of type 1 errors (false positives). While there are methods that attempt to reduce this, these methods are not infallible and the risk of unsound data cannot be eliminated entirely. Effective statistical practice necessitates a judicious approach to testing.
4. The effects on indicators during COVID-19 time periods may yield significant differences that are neither unexpected nor representative of non-COVID-19 time periods.
5. This report aimed to calculate and describe indicators and, thus, analyses did not go beyond age-standardisation (with male/female stratification where necessary). Additional statistical analyses are required to draw valid inferences on indicator patterns, including a consideration of contributing factors and confounders for a given indicator.

If readers of this report have specific questions or hypotheses for an indicator that can be formally analysed, they are encouraged to contact, in the first instance, the report's authors to discuss their plans.

4.6.2 Note on the use of census data

The Australian Bureau of Statistics (ABS) conducts a census every five years to collect data on various aspects of Australian life, including population, employment, housing and education. In terms of data quality, the ABS has several measures in place to ensure the accuracy and reliability of the census data. For example, the ABS uses various methods to encourage participation in the census, including the provision of online and paper forms, and field staff who follow up with non-respondents. The ABS also conducts extensive testing and quality assurance procedures to ensure the accuracy and completeness of the data. Overall, the ABS census data is generally considered to be of high quality and is widely used by government, businesses, researchers and the public to inform policy and decision-making. Despite this, many population groups are known to be undercounted in the Australian census[11]. While there are some corrections available for these groups, in the counts presented in the current report (that is, at the Statistical Area 2 level), these were largely unavailable. As such, all data is presented with full awareness of this undercounting, and exact proportions should be interpreted with caution. Data should instead be taken as indicative of the population-level prevalence of these indicators.

For all ABS estimates, there is usually a portion of respondents whose response is either not applicable, invalid or not stated. In all instances, these numbers were removed from the denominator as binary proportions were to be presented so the indicator estimates are complementary. For example, if 10% of people within an area earned incomes that were 50% lower than the national median, the assumption is that 90% of people in that area had incomes *higher* than 50% of the

[11] ABS (2021) Census overcount and undercount

national median. While the ABS suggests including these in population denominators[12], it was thought that this could be misleading when only one proportion was presented visually in a map, where the proportion complement may be assumed to be complementary. As such, all percentages were calculated to reflect the proportion of *valid* responses.

4.6.3 Note on the use of PHIDU data

The Public Health Information Development Unit (PHIDU), located at Torrens University in South Australia, compile an annual health atlas of Australia. These are comprised of custom geographic units called ‘Public Health Areas’, which are modelled estimates and are generally consistent with SA2s.

The modelling methods employed by PHIDU, in collaboration with the ABS, are described in detail elsewhere[13]. In essence, national estimates based on the triennial ABS National Health Survey (NHS) were obtained and combined with predictor information from census and administrative data. The approach used modelling to predict the NHS outcomes using random effects logistic regression models, and applied the most appropriate set of predictor variables to predict the outcome. The Bayesian information criterion was employed to limit overfitting. To predict the proportion of each health behaviour in each Public Health Area (PHA), the models used measures of survey sampling error and model prediction error. This allowed modelling to optimise the balance between error types based on their contribution the relative root mean squared error (RRMSE). For example, PHAs with relatively large NHS samples (and relatively low sampling error) tend to weight the survey estimates more heavily than the model prediction, and vice versa. PHIDU only provide estimates for PHAs with an estimated resident population of >100 adults, and then only those deemed to be reliable based on their definition (RRMSE <25%). The PHIDU-sourced indicators used in this report had RRMSEs between 6.6% (obesity rates) and 15.7% (levels of risky alcohol consumption).

While more granular and/or SLHD-specific sources for health behaviour variables may be preferable, it was decided to present PHIDU data as reported, given they were the most granular spatial estimates available at the time of this project. This was further reinforced through the availability of supporting documentation on their derivation and validity, their reporting of different time periods, and their Australia-wide coverage.

[12] ABS (2022) Understanding supplementary codes in Census variables

[13] Australia Bureau of Statistics (2019) Modelled estimates for small areas based on the 2017-2018 National Health Survey

5

Overview of the Sydney Local Health District

5.1 Location and population

The SLHD is located directly west of the Sydney Central Business District and extends from the suburbs of Haymarket and Rosebery in the east to Homebush and Riverwood in the west – an area of approximately 126km^2 with a population density around 5,500 people per square kilometre according to 2021 Census counts. It is home to an incredibly diverse population, with substantial variability across socioeconomic status and cultural and linguistic diversity within a relatively small area.

5.2 Socioeconomic status

Socioeconomic status, as defined by the Australian Bureau of Statistics (ABS) Index of Relative Socioeconomic Disadvantage (IRSD)[14] and visualised in **Figure 2**, can be seen to vary substantially across the district, with areas of high disadvantage (deciles 1–3) concentrated in the south and west, and areas of relatively low disadvantage (deciles 8–10) concentrated in the north and eastern areas.

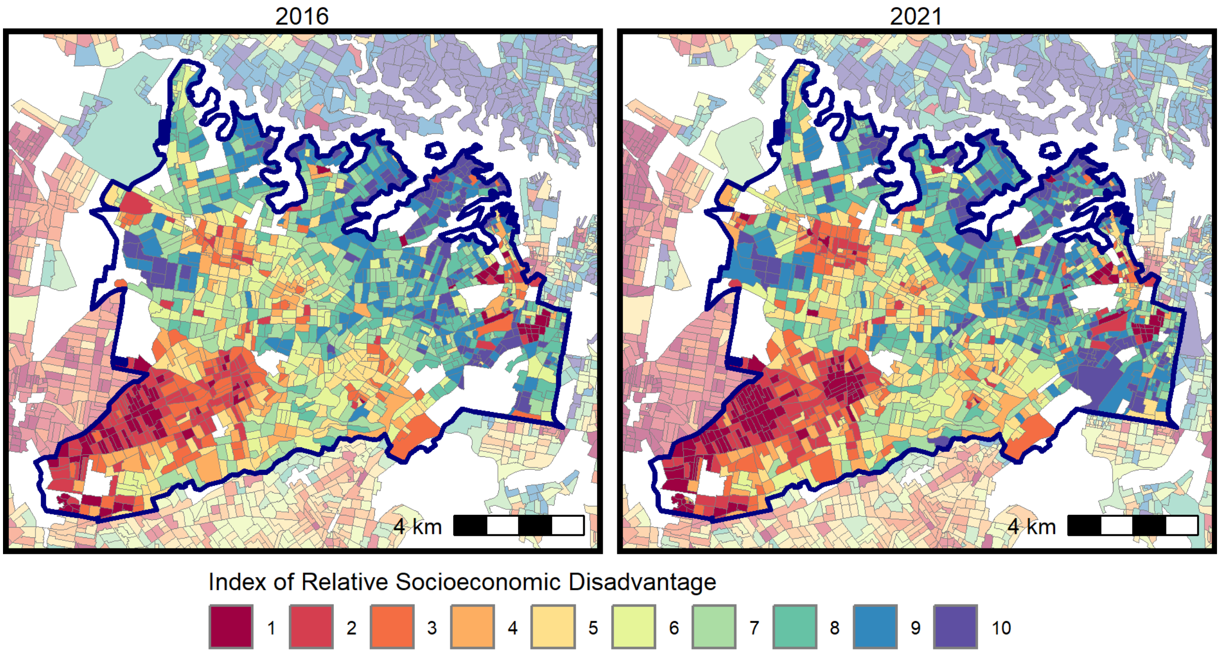

Figure 2 Index of Relative Socioeconomic Disadvantage Decile by Statistical Area 1, 2016 and 2021. Source: Socio-Economic Indexes for Areas (SEIFA), Australia

[14] Socio-Economic Indexes for Areas (SEIFA), Australia

5.3 Cultural diversity

One indicator of cultural and linguistic diversity, the primary language spoken at home, can be sourced directly from the ABS census counts for 2016 and 2021[15]. As shown in **Figure 3**, the proportion of people speaking a language other than English at home varies substantially across the district. Specifically, those living in the south-western and north-western areas have relatively high proportions of people speaking languages other than English at home, while areas in the east, and particularly north-east, have relatively lower proportions.

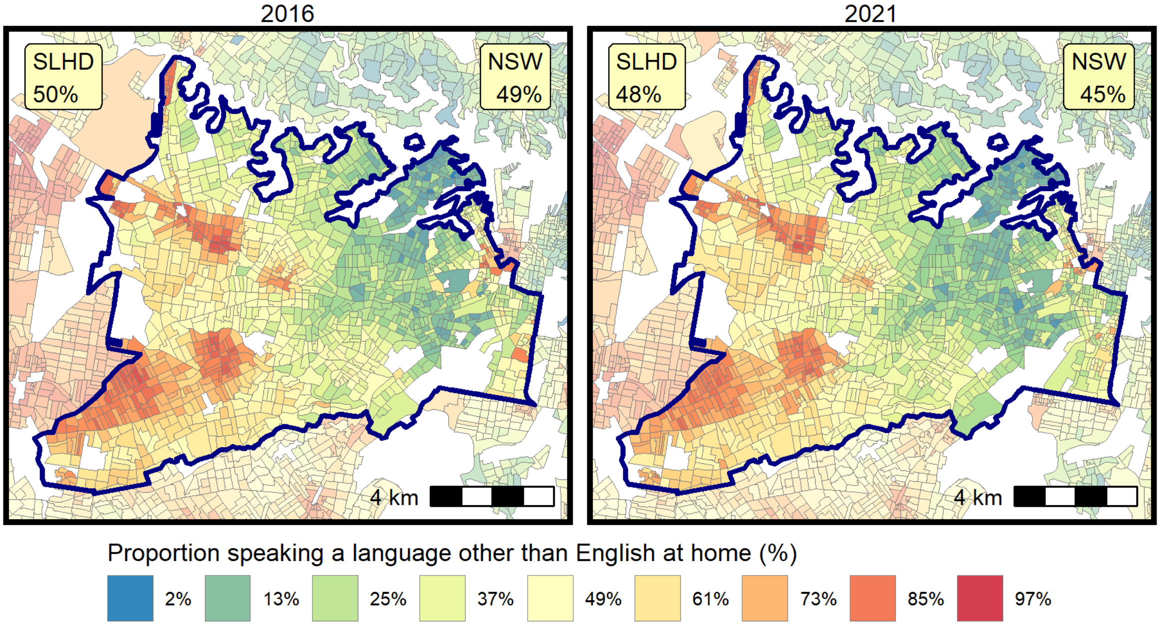

Figure 3 Socio-Economic Indexes for Areas (SEIFA), Australia. Source: ABS (2021) Language used at home (LANP).

5.3.1 Note on cultural and socioeconomic diversity

Considering the variability across the SLHD in these and other sociodemographic variables is necessary in understanding the potential context for differences among the assessed indicators; however, this does not suggest any direct causal relationship with indicators and their patterns. That is, differences identified in this report are almost certainly not attributable to any one factor but rather are influenced by a complex interplay of demographic, socioeconomic, environmental, lifestyle and genetic factors, with each factor's influence varying in different time windows within the life course[16]. Moreover, indicators in this report are best viewed as individual snapshots of health determinants, health systems and health statuses at distinct points in time. While there is a well-documented and logical process underpinning the AHPF and prioritisation of indicators, by definition, the selection itself of any set of indicators carries with it limitations and the requisite appreciation that they cannot measure everything related to health[17]. Indeed, indicators are likely to influence, and be influenced by, other indicators and this should be considered when interpreting this report. Finally, please also see the section 'Caveat on comparisons and interpretations', which describes how disentangling contributing factors is possible, but was neither within scope nor relevant to the aims of SALHIs.

[15] ABS (2021) Language used at home (LANP)

[16] Kuh D, Ben-Shlomo Y, Lynch J, et al. Life course epidemiology. *Journal of Epidemiology & Community Health* 2003; **57:778**-783

[17] AIHW (2018). Australia's Health Chapter 1.4 – Indicators of Australia's Health

6
Results

6.1 Layout of results

Results of all indicators have been organised in the following order:

1. A brief definition of the reported indicator, with a hyperlinked footnote directing to the associated METEOR entry.
2. Discussion of specific data sources for the indicator, expanding on the feasibility assessment outlined above and displayed in Table 1.
3. Identification of preferred data source and description of any deviation from the prescribed methods outlined in METEOR.
4. Visualisation of indicator at the determined spatial and temporal resolution.
5. State- and SLHD-level estimate comparisons added to visualisation, using the same methods to calculate the indicator.
6. Interpretation of broad, high-level findings of the estimation, both in the context of the SLHD and as compared with the NSW overall estimate. Note that the intent of this interpretation is to provide a 'capsule' summary of the indicator, with minimal interpretation of the estimates.
7. Brief discussion of limitations of the calculation, including any relevant warnings or cautions in interpreting estimates.

6.2 Determinants of health

A person's health is closely linked to the conditions in which they live and work. Factors such as socioeconomic position, educational attainment and lifestyle behaviours can affect the health of individuals and communities.

South-western SLHD had more pronounced clusters of areas with socioeconomic disadvantage above the NSW rate. Other SHLD areas were similar to, or below, the NSW rate. Between the 2016 and 2021 censuses, the patterns across SLHD have not changed markedly (i.e., areas that had relatively high or low rates of socioeconomic disadvantage remained so).

6.2.1 Socioeconomic factors

In general, every step up the socioeconomic ladder is accompanied by a benefit for health[18]. The relationship is two-way – poor health can be both a product of, and contribute to, lower socioeconomic position.

Socioeconomic position is often described through indicators such as educational attainment, income or level of occupation.

[18] AIHW (2022) Health across socioeconomic groups.

6.2.1.1 Proportion of people with low incomes

The proportion of households with low incomes was defined as the percentage of households with an income below 50% of the national median income[19]. Data were sourced via the ABS Census of Population and Housing for the census years 2016[20] and 2021[21], which detailed the proportion of the population in given income brackets[22].

National median household incomes were calculated for both census years[23], which was roughly $1,700 in 2016 and $1,800 in 2021. Households with a weekly income below $850 were classified as low income in 2016, and those with a weekly income below $900 classified as low income in 2021. Total personal income was accessed via the censuses, and the closest income range to each of these thresholds was designated 'low income'. For both 2016 and 2021, this included all income brackets less than $800 a week.

Note that this method deviated slightly from the AIHW methods, in which equivalised disposable income was the metric used and *persons* aged 15 years and older living in low-income households were enumerated. These variables could not be obtained from the ABS Census of Population and Housing, and thus total household income was used as the metric, with the proportion of *dwellings* enumerated. This was not expected to make a large difference to the estimation, and distributions displayed below are assumed indicative.

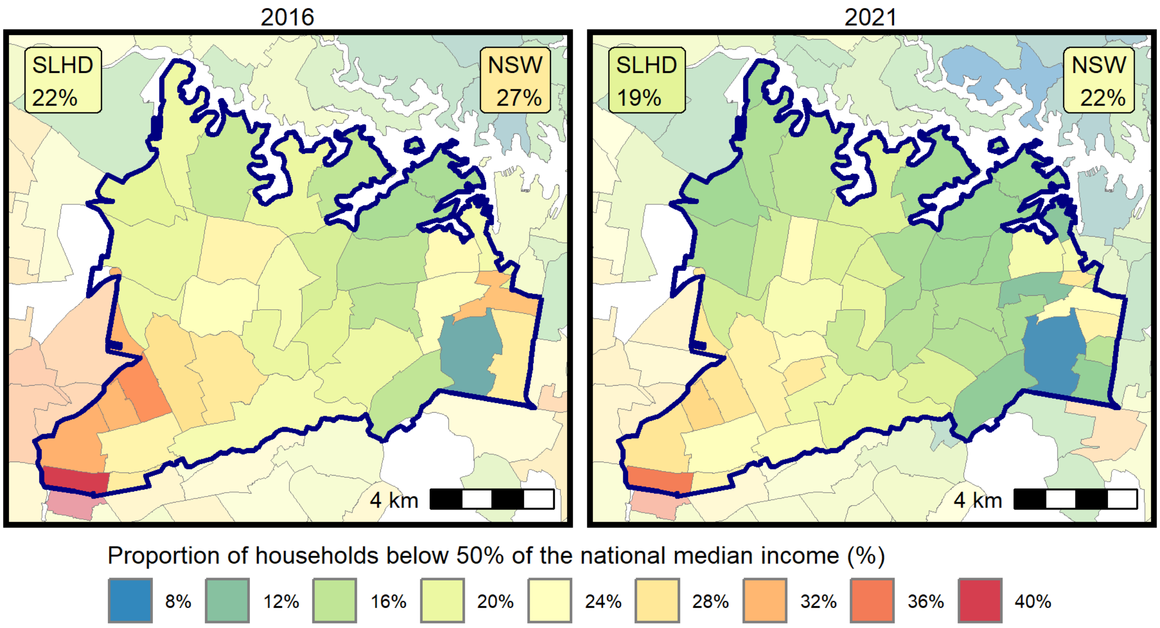

Figure 4 Proportion of households with low incomes by Statistical Area Level 2, 2016 and 2021. Source: ABS (2022) 2021 Census of Population and Housing.

Figure 4 shows the proportion of those households with low incomes in 2016 and 2021 for the Sydney Local Health District (SLHD). The proportion of the population with low incomes increased slightly from 2016 to 2021, with the south-western regions of the SLHD generally having a greater proportion of lower-income populations in both periods, with rates at or above the state level. Additionally, the south-western SA2s had the highest proportion of low incomes in both 2016 and 2021. Areas classified as low income were consistent across time periods, with slightly higher proportions in 2016 compared to 2021. However, this was likely to be a product of the methods, as income was reported in distinct income brackets in the census, and these did not always align with the reported medians.

[19] AIHW (2021) Proportion of people with low income, 2020.

[20] ABS (2017) 2016 Census of Population and Housing.

[21] ABS (2022) 2021 Census of Population and Housing.

[22] ABS (2022) Income.

[23] ABS (2023) Household Income and Wealth, Australia.

6.2.1.2 Educational attainment for selected school years and adults

The AIHW reported on broad educational attainment categories, spanning 'no education' to 'postgraduate degree'[24]. To obtain local estimates of this indicator, ABS census data on an individual's level of highest educational attainment (named 'HEAP') was used for the 2016 and 2021 censuses[25]. This variable was defined as the proportion of the population who had attained education or training following high school, including university and trade certificate qualifications, with results shown in **Figure 5**.

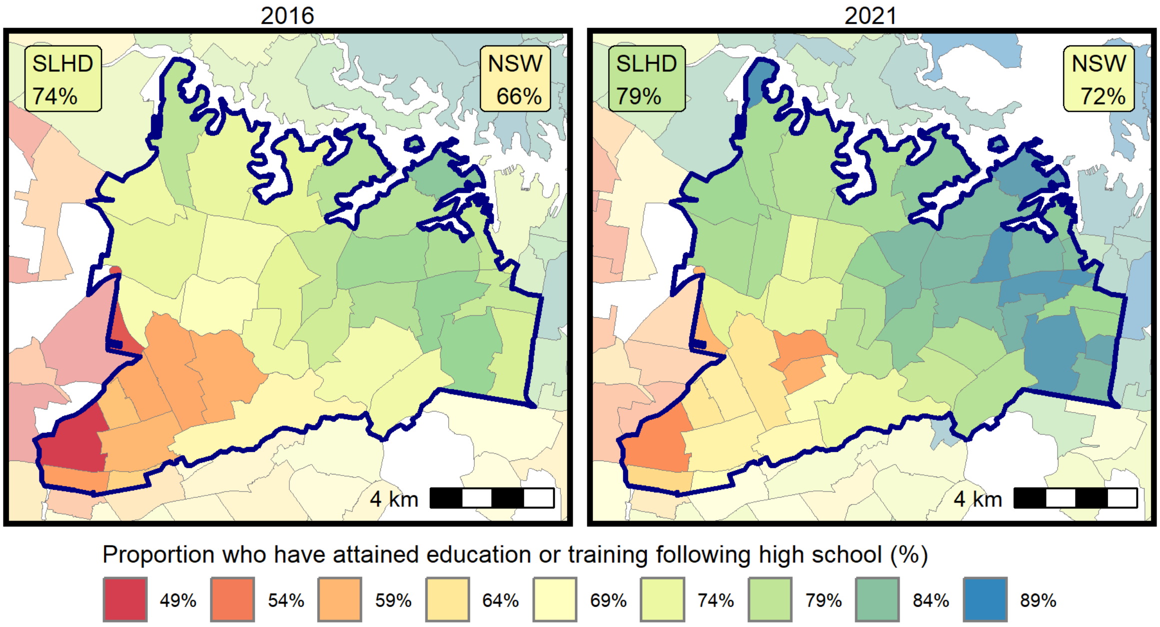

Figure 5 Educational attainment for selected school years and adults, by Statistical Area 2, 2016 and 2021. Source: ABS (2022) Level of highest educational attainment (HEAP).

Western SLHD SA2 populations had slightly lower post-high school educational attainment levels when compared to those SA2 populations in the eastern SLHD, with rates at or below the state level in both time periods. SA2s in the north-western areas of the SLHD saw proportions considerably higher than the state level. Proportions varied from around 50% to 90% by region, with values slightly higher across most areas in the second time period.

[24] AIHW (2006) Level of highest educational attainment

[25] ABS (2022) Level of highest educational attainment (HEAP)

6.3 Health behaviours

Health behaviours referred to actions individuals took that affected their health. They included actions that lead to improved health – such as a well-balanced diet or being physically active – and actions that increased one's risk of disease – such as smoking, excessive alcohol intake, or risky sexual behaviour.

6.3.1 Rates of current daily smokers

The AIHW defined a daily smoker as someone who smoked tobacco at the time of reporting – in the form of manufactured (packet) cigarettes, roll-your-own cigarettes, cigars or pipes – one or more times per day[26].

The PHIDU health atlas modelled smoking rates across Australia, and this was accessed to obtain information on smoking rates by small unit geographies[27]. These data are presented with no additional calculation or validation, beyond that mentioned in the section 'Note on the use of PHIDU data'.

6.3.1.1 Males

Modelled rates of smoking per 100 males in the population (numerically equivalent to a percentage), in 2018 and 2021, are outlined below by Public Health Area (**Figure 6**).

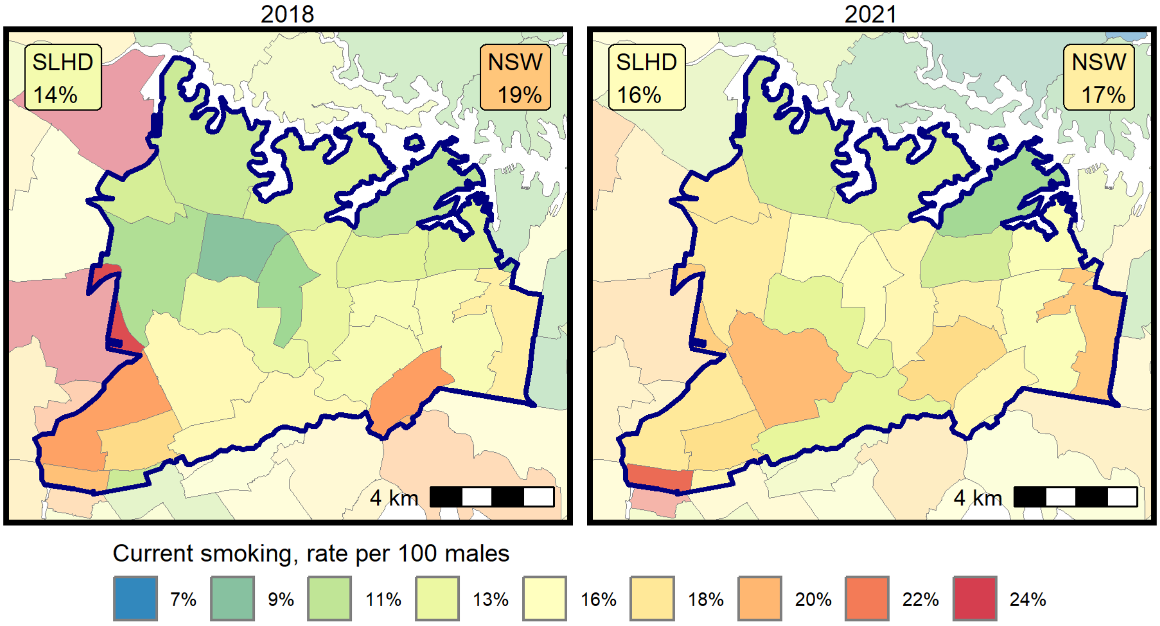

Figure 6 Modelled rates per 100 males of current daily smokers, by Public Health Area, for 2018 and 2021. Source: PHIDU (2021) Estimated male, female and total population, aged 18 years and over, who were current smokers, 2017–18.

Modelled rates of smoking appeared to be highest in the south-west areas of the Sydney Local Health District, and lowest in the north and east areas of SLHD. Overall, rates of current smokers varied from as high as 20% in the south-western areas of the SLHD, to 8% in the northern areas, in 2018. Rates were generally lower than the state level across most areas, although rates appeared to increase between sampling periods in some areas in the west. Conversely, slight reductions were observed in 2021 among those areas with the highest rates in 2018.

[26] AIHW (2022) Rates of current daily smokers.

[27] PHIDU (2021) Estimated male, female and total population, aged 18 years and over, who were current smokers, 2017–18.

6.3.1.1.1 Females

Modelled rates of smoking per 100 females in the population (numerically equivalent to a percentage), in 2018 and 2021, are outlined below by Public Health Area (**Figure 7**).

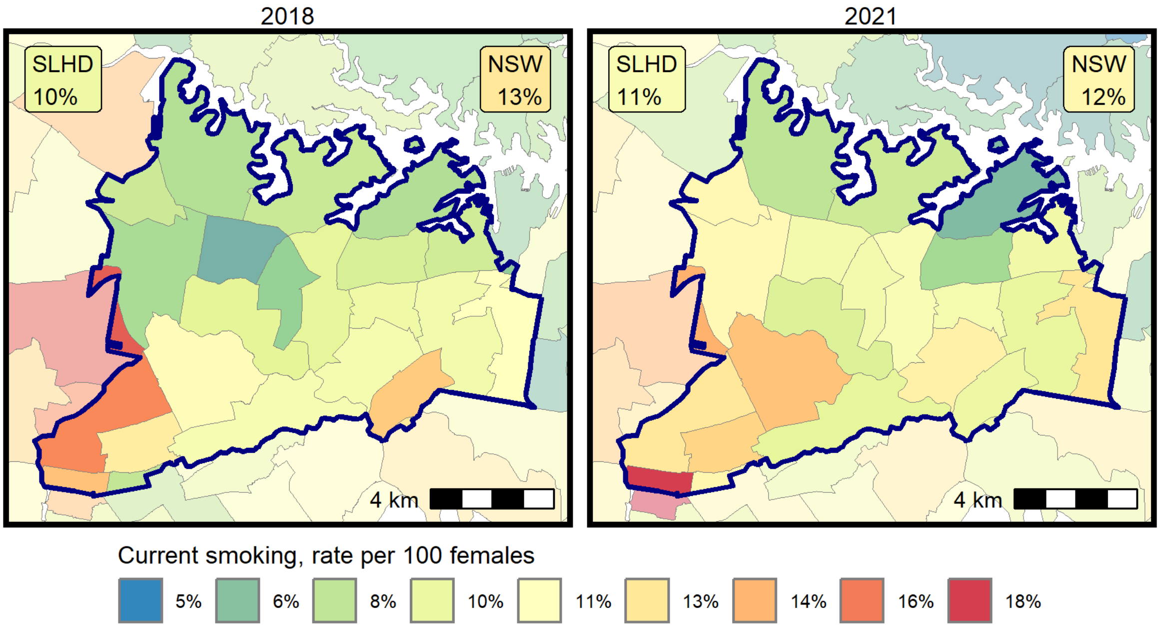

Figure 7 Modelled rates per 100 females of current daily smokers, by Public Health Area, 2018 and 2021. Source: PHIDU (2021) Estimated male, female and total population, aged 18 years and over, who were current smokers, 2017–18.

As with males, modelled rates of smoking appeared to be highest in the south-west areas of the Sydney Local Health District, and lowest in the north and east areas of the SLHD. Rates of smoking among females were slightly lower than for males, with rates varying from as high as 15% in the south-western areas of the SLHD, to 6% in the northern areas in 2018. Most areas had rates lower than the state level, with the exception of some areas in the south and west. As with males, 2021 rates of daily smoking among females appeared to increase slightly in some areas in the west, while noticeable reductions were observed in areas that had the highest rates in 2018.

6.3.2 Children exposed to tobacco smoke in the home

The AIHW sourced data on children exposed to second-hand tobacco smoke in the home from the Australian Drug Strategy Household Survey[28], completed every three years by approximately 22,000 Australians via paper, phone and online interviews[29]. As this data was considered highly sensitive, data was released with the state level as the lowest disaggregation. It may be possible to obtain data at smaller unit geographies if access to unit record data was obtained (subject to additional fees); however, this was not feasible at the time of this report. Therefore, only state-level data were presented.

Children exposed to tobacco smoke in the home was defined as households with current smokers and dependent children aged 0–14, as a proportion of all households with dependent children ages 0–14. Data at the New South Wales level for children exposed to tobacco smoke in the home is displayed in Figure 8.

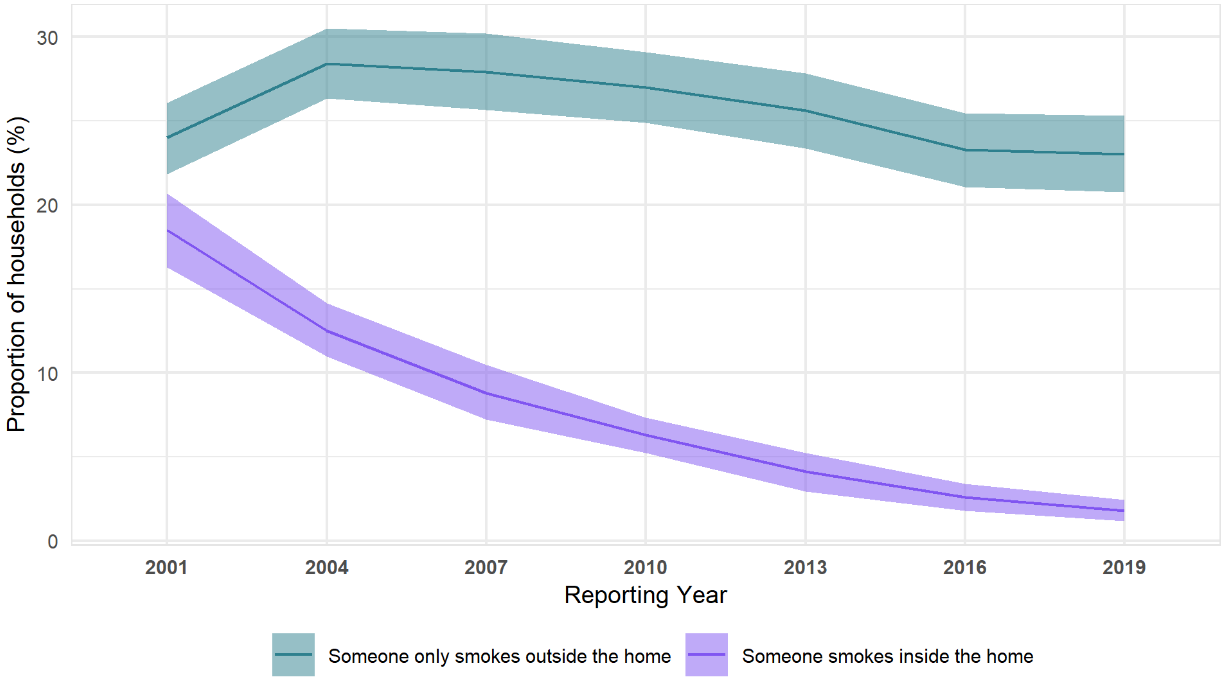

Figure 8 Proportion of children exposed to tobacco in the home by exposure category, NSW, 2001–2019. Source: AIHW (2022) National Drug Strategy Household Survey.

The proportion of households with dependent children aged 0–14 where someone smoked had declined substantially from 2001. This was especially pronounced in households where someone smoked inside the home, while decreases were also seen in households where someone only smoked outside the home. Specifically, the proportion of households with dependent children aged 0–14 with someone who smoked inside the home reduced from 19% in 2001 to less the 2% in 2019. The proportion of households with dependent children aged 0–14 with someone who only smoked outside the home peaked in 2004 at 28%, before gradually reducing to around 23% in 2019.

[28] AIHW (2021) Children exposed to tobacco smoke in the home.

[29] AIHW (2022) National Drug Strategy Household Survey.

6.3.3 Levels of risky alcohol consumption

Levels of risky alcohol consumption were sourced from PHIDU for 2018 and 2021[30]. Risky alcohol consumption was defined as the number of persons aged 18 years and over who consumed more than two standard alcoholic drinks per day on average. This was consistent with the AIHW definition of risky alcohol consumption, both in terms of frequency and quantity[31].

Modelled rates of risky alcohol consumption per 100 in the population, in 2021, are illustrated by Public Health Area below in (**Figure 9**). Additionally, these data, without additional calculation or validation beyond that mentioned in the section 'Note on the use of PHIDU data'.

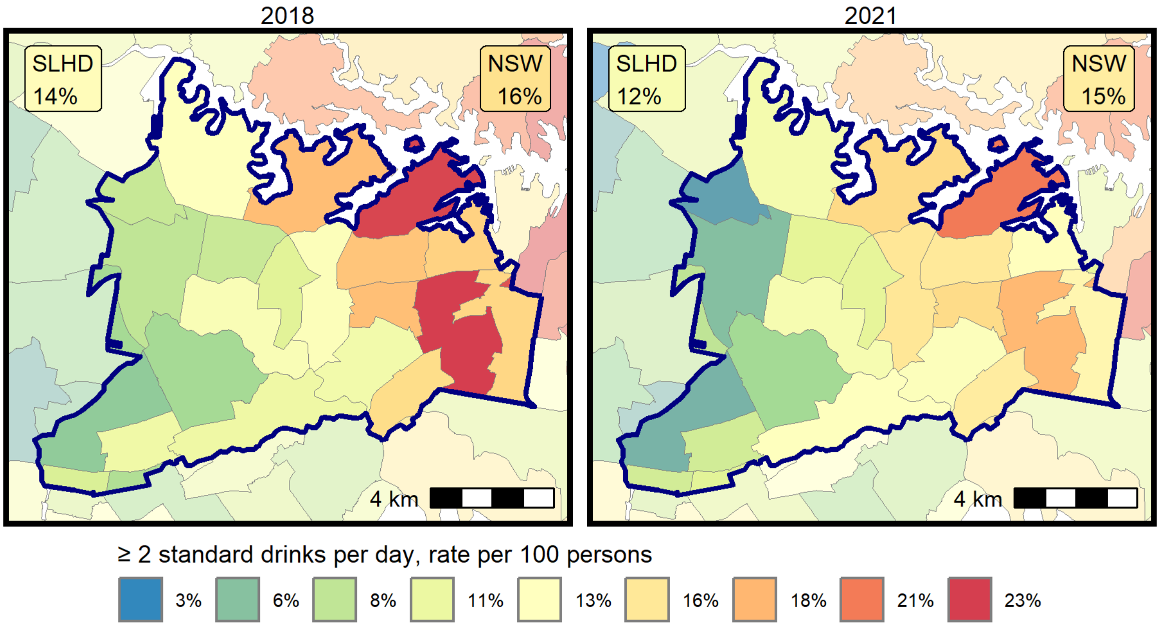

Figure 9 Modelled levels of risky alcohol consumption by Public Health Area, 2018 and 2021. Source: PHIDU (2021) Estimated male, female or total population, aged 18 years and over, consuming alcohol at levels considered to be a high risk to health over their lifetime, 2017–18.

Modelled rates were relatively higher in the east and north of the SLHD, with rates around 5–8% higher than the NSW rate. Rates were comparatively lower in the west and south of the SLHD, with rates considerably lower than the state level. Rates appeared to decrease across almost all areas in 2021 by around 1–3% per area, although some areas had more marked changes that potentially reflected COVID-19 impacts on population composition (e.g. fewer tertiary and other students over 18 residing in eastern areas in 2021 compared with 2018).

[30] PHIDU (2021) Estimated male, female or total population, aged 18 years and over, consuming alcohol at levels considered to be a high risk to health over their lifetime, 2017–18.

[31] AIHW (2022) Levels of risky alcohol consumption.

6.3.4 Inadequate fruit and vegetable intake

Levels of adequate fruit and vegetable intake were sourced from PHIDU-modelled data from 2018 and 2021[32]. In the interest of consistency with other reported indicators, the complement of the estimate was taken to reflect *inadequate* fruit and vegetable intake (i.e. 100 minus the modelled estimate). Metrics of adequate/inadequate fruit and vegetable intake was based on the 2013 National Health and Medical Research Council (NHMRC) dietary guidelines[33], as per the AIHW estimation[34].

Inadequate fruit and vegetable intake by Public Health Area (PHA) are shown below (**Figure 10**). Additionally, these data, with no additional calculation or validation beyond that mentioned in the above section 'Note on the use of PHIDU data'.

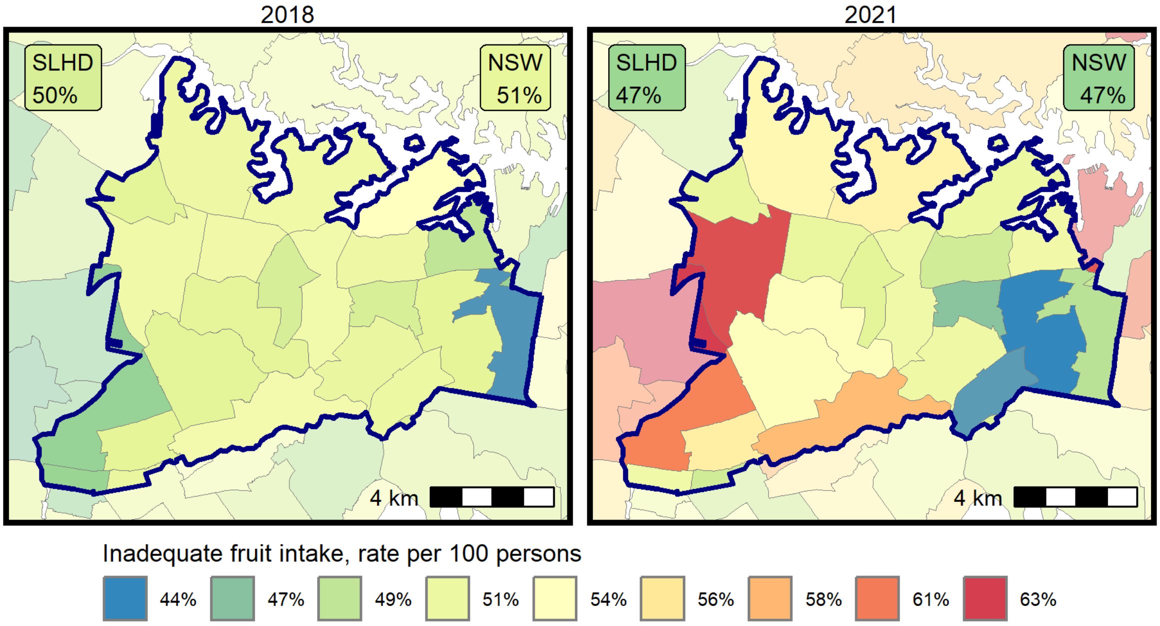

Figure 10 Modelled inadequate fruit and vegetable intake by Public Health Area, 2018 and 2021. Source: PHIDU (2017) Estimated population, aged 18 years and over, with adequate fruit intake, 2017-18.

Variability in the inadequate fruit and vegetable intake differed substantially across the estimation years. In 2018, rates were consistently around 47% and 50% across all areas. However, in 2021, inadequate fruit and vegetable intake was highly variable, reporting highest in the west and south-west of the SLHD, and lowest in the east of the SLHD. This may be a product of the modelling methods employed in each year, and thus results should be interpreted with caution.

[32] PHIDU (2017) Estimated population, aged 18 years and over, with adequate fruit intake, 2017–18

[33] AIHW (2013) Australian Dietary Guidelines

[34] AIHW (2020) Inadequate fruit and vegetable intake

6.3.5 Insufficient physical activity

Levels of insufficient physical activity were sourced from PHIDU-modelled data for 2018 and 2021[35]. Insufficient physical activity was based on the 2014 Australian Government Department of Health and Aged Care Physical Activity and Exercise Guidelines for all Australians[36], as per the AIHW estimation[37].

Rates of insufficient physical activity by Public Health Area are shown below (**Figure 11**). Additionally, these data, with no additional calculation or validation beyond that mentioned in the above section 'Note on the use of PHIDU data'.

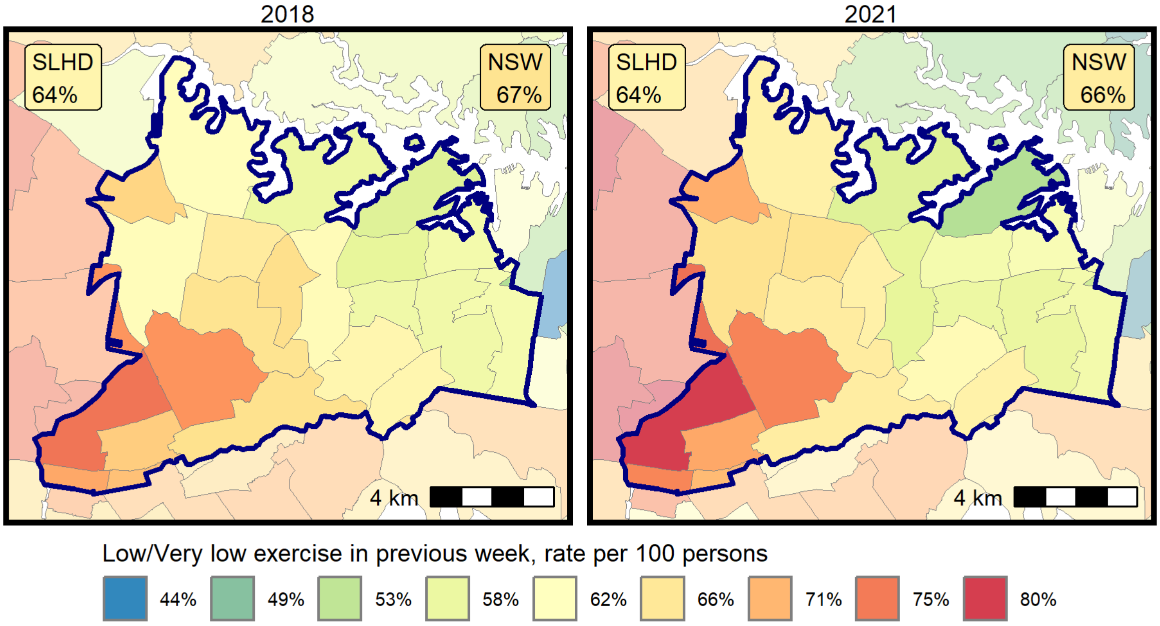

Figure 11 Modelled insufficient physical activity by Public Health Area (PHA), 2018 and 2021. Source: PHIDU (2021) Estimated population, aged 18 years and over, who did low, very low or no exercise in the week prior to being interviewed, 2017–18.

Rates of low to very low exercise were highest in the south-western areas of the SLHD, with rates slightly higher in 2021 compared with 2018. Conversely, rates appeared lowest in the north and east of the SLHD, with rates slightly lower in 2021 compared with 2018. Rates in the south-west of the SLHD were generally lower than the NSW rate, while areas in the north-east of the SLHD were at, or lower, than the NSW rate.

[35] PHIDU (2021) Estimated population, aged 18 years and over, who did low, very low or no exercise in the week prior to being interviewed, 2017–18

[36] AIHW (2021) Physical activity and exercise guidelines for all Australians

[37] AIHW (2021) Insufficient physical activity

6.3.6 Unsafe sharing of needles

The AIHW uses data from the Australian Needle Syringe Program Survey[38] to obtain statistics on the unsafe sharing of needles[39]. The Needle Syringe Program Survey asks a sentinel group of people who inject drugs (PWID) across NSW about their substance use and injecting behaviours. As an alternative, the Illicit Drug Reporting System (IDRS)[40], run by the National Drug and Alcohol Research Centre (NDARC), is a national illicit drug-monitoring system intended to identify emerging trends in illicit drug markets that are of local and national concern. The IDRS is designed to be sensitive to emerging trends, and to provide data in a timely manner, which means the reporting is of a broad, rather than detailed, analysis. Despite this, the interviews ask specific questions on the sharing and reuse of needles, which were considered relevant to the SALHIs' objectives. Importantly, with an annually recruited sentinel group of roughly 150 Sydney-based PWID, the data gathered is exclusively representative of the Sydney area, rather than representative of NSW more broadly. It was for these reasons, and for the increased duration of the data collection period (2001–2012), that data from the IDRS was preferred.

The data on the unsafe sharing of needles were sourced from the 2021 IDRS NSW interviews, which reported on participants' borrowing and lending of needles, and their sharing of injecting equipment, in the month prior to the interviews. These data were accessed from the December 2022 report released by the National Drug and Alcohol Research Centre (NDARC), UNSW Australia. These data are presented as reported **Figure 12**, without additional calculation or validation. Detailed background information and methods are available on the NDARC website[41].

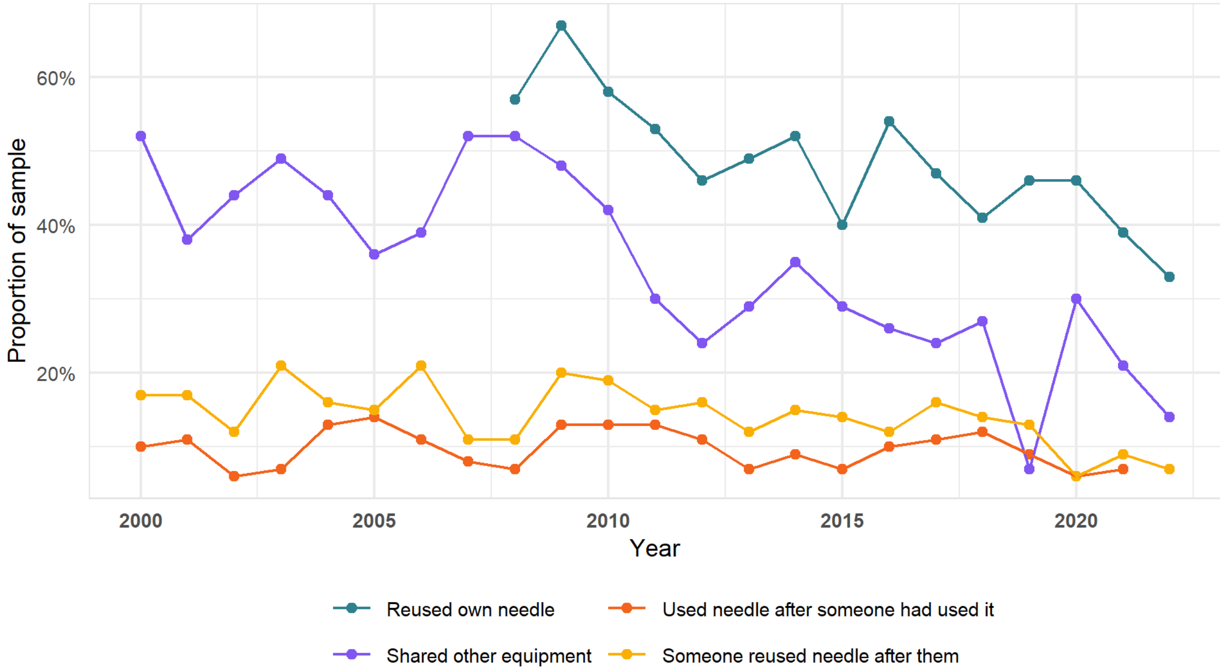

Figure 12 Unsafe injection practices in people who regularly inject drugs, Sydney, 2000–2022. Note: Data collection for 'reused own needle' started in 2008. For 2022, the 'used needle after someone had used it' value is suppressed due to very low numbers. Source: NDARC (2022) The Illicit Drug Reporting System (IDRS).

There was an overall decline, from 2000–2022, in the unsafe sharing of needles among those who reported: they reused their own needle; they used a needle after someone had used it; someone reused a needle after them; or they shared other equipment. The drop in proportion was highest among those who reported they shared other equipment, which more than halved between 2000 and 2012.

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[38] Kirby (2022) Australian NSP Survey National Data Report 2017–2021

[39] AIHW (2020) Sharing of used needles or syringes

[40] NDARC (2022) The Illicit Drug Reporting System (IDRS)

[41] NDARC (2022) The Illicit Drug Reporting System (IDRS)

6.4 Personal biomedical risk factors

Personal biomedical risk factors are bodily states that have an impact on a person's risk of disease. Specifically, being overweight or obese has been directly linked to particular health outcomes, such as cardiovascular disease, including coronary heart disease and stroke.

Representative estimates on biomedical factors are quite limited, and the AIHW emphasised the need for more surveys to monitor the levels of these risk factors in the Australian population over time. In 2021, the Australian Bureau of Statistics commenced a new Intergenerational Health and Mental Health Survey that will include measurement of biomedical risk factors, which will be explored for future iterations of SALHIs.

6.4.1 Prevalence of overweight and obesity

Rates of overweight or obesity were sourced from PHIDU-modelled data collected from 2018 and 2021[42]. Overweight and obesity were defined according to standard Body Mass Index (BMI) thresholds, with BMI ≥25 indicating overweight and BMI ≥30 indicating obesity[43].

6.4.1.1 Males

Modelled estimates of the male population who were classified as overweight or obese are shown below in **Figure 13**. These data, without additional calculation or validation beyond that mentioned in the above section 'Note on the use of PHIDU data'.

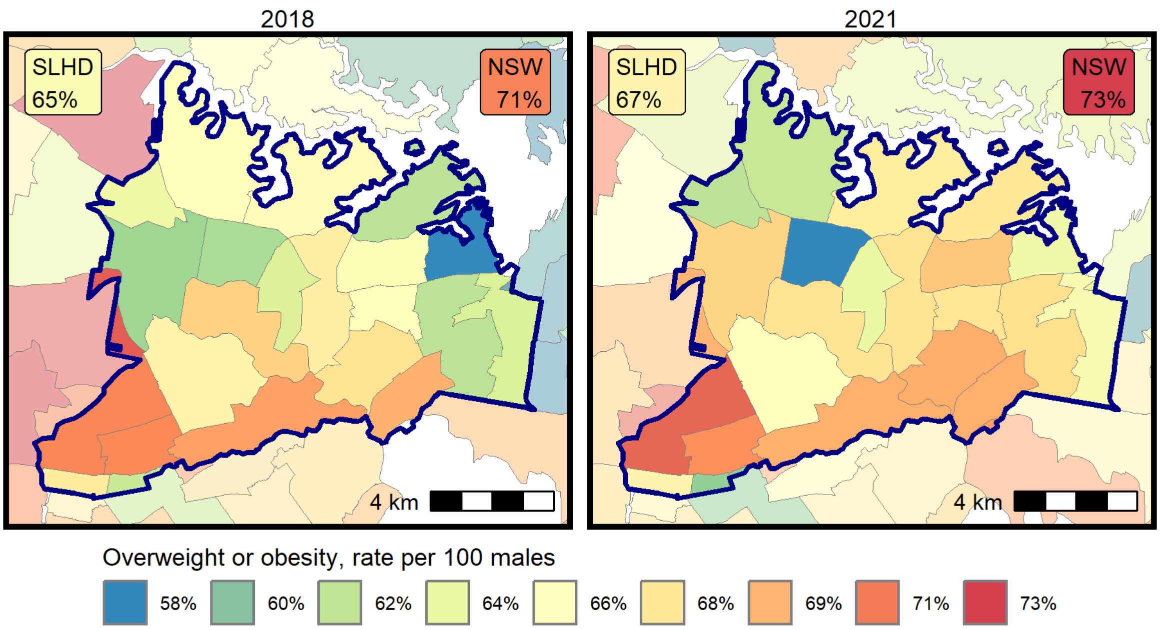

Figure 13 Modelled rates of overweight or obese males by Public Health Area, 2018 and 2021. Source: PHIDU (2021) Estimated male, female or total population, aged 18 years and over, who were obese or overweight, 2017–18.

Rates of overweight or obese males were highest in the south and west areas of the SLHD and lowest in the north and east of the SLHD. In general, rates of overweight or obesity appeared to increase across many areas from 2018 to 2021, with increases more pronounced in the south and east areas of the district. Most areas were slightly below the NSW rate in both time periods, although areas to the south-west of the district tended to be comparable with the overall NSW rate.

[42] PHIDU (2021) Estimated male, female or total population, aged 18 years and over, who were obese or overweight, 2017-18

[43] AIHW (2021) Insufficient Physical Activity

6.4.1.2 Females

Modelled estimates of the female population who were classified as overweight or obese are shown below in **Figure 14**. These data, without additional calculation or validation beyond that mentioned in the above section 'Note on the use of PHIDU data'.

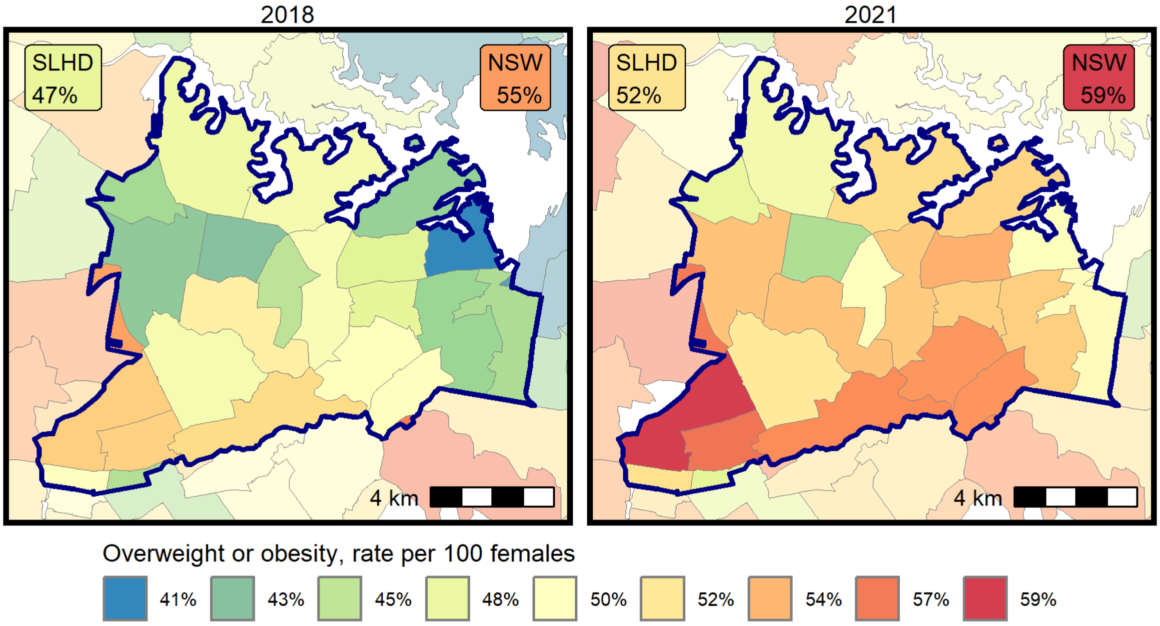

Figure 14 Modelled rates of obese or overweight females by Public Health Area, 2018 and 2021. Source: PHIDU (2021) Estimated male, female or total population, aged 18 years and over, who were obese or overweight, 2017-18.

While rates of overweight or obesity were slightly lower in females compared to males, similar spatial patterns were observed across the two years. As with males, increases were observed across most areas in the SLHD, although areas in the south and east of the district saw especially pronounced increases. As with males, most areas were slightly below the NSW rate in both time periods, although areas to the south-west of the SLHD tended to be comparable with the overall NSW rate.

6.5 Health systems

6.5.1 Effectiveness

Health systems play a crucial role in population health and can help to reduce the burden that ill health places on the community. Australia's health system is a complex mix of programs and services delivered by a range of health professionals, including vaccination programs, cancer screening programs, emergency and planned hospital care, and antenatal care.

In general, indicators at the hospital level, sourced from AIHW MyHospitals data, revealed performance comparable to, or exceeding, the NSW overall rate, with some fluctuations by year and indicator. Rates of antenatal care, sourced from NSW Health data assets, within the first trimester appeared to reduce considerably during the COVID-19 pandemic, possibly due to the public health measures implemented to reduce transmission of the virus. Interestingly, the opposite effect was observed for preventable hospitalisations. Rates of bulk-billed general practitioner attendances were notably lower in the east of the SLHD compared with other areas of SLHD.

6.5.2 Immunisation rates for vaccines in the national schedule

The AIHW reports on immunisation rates for children aged 1, 2 and 5 years old who have been assessed as fully immunised according to information recorded in the Australian Immunisation Register[44]. The current Australian Immunisation Register (AIR) schedule[45] for children following birth, between one and four years of age is summarised in Table 2.

Table 2 National vaccination schedule by age group and vaccination type. Source: AIHW (2020) Immunisation rates for vaccines in the national schedule, 2020.

Vaccination Type	Age Group		
	12 to <15 Months	24 to <27 Months	60 to <63 Months
Diphtheria + Tetanus + Pertussis	Dose 3	Dose 4	Dose 4 or 5
Hepatitis B	Dose 3	Dose 3	-
Haemophilus Influenzae Type B	Dose 3 (Pathway A) or Dose 2 (Pathway B)	Dose 4 (Pathway A) or Dose 3 or 4 (Pathway B)	-
Meningococcal C	-	Dose 1	-
Measles + Measles + Rubella	Dose 1	Dose 1 or 2	-
Pneumococcal	Dose 2 or 3	Dose 3 (From Q3 2018)	-
Polio	Dose 3	Dose 3	Dose 4
Varicella	-	Dose 1	-

Immunisation summaries, collated by age group and Local Government Area, were obtained from the AIR. These are prepared quarterly by the NSW Ministry of Health and are presented below, as originally reported, by age group for the proportion of non-Aboriginal children meeting the criteria for fully vaccinated at each age group. Immunisation in Aboriginal children is not summarised in this report due to low numbers in the AIR summaries leading to highly variable and likely unreliable estimates. Reporting of vaccination status among Aboriginal children is better sourced through reports specific to immunisation, where adequate discussion is given to the caveats and limitations in these estimates.

[44] AIHW (2020) Immunisation rates for vaccines in the national schedule, 2020

[45] AIR (2023) Immunisation rates for vaccines in the national schedule, 2023

6.5.2.1 By age: 12 months to less than 15 months

Proportion of children meeting the AIR definition of 'fully vaccinated' for non-Aboriginal children aged 12 months to less than 15 months is summarised by Local Government Area (LGA) below (**Figure 15**). A natural spline with three degrees of freedom was used to smooth estimates and provide a crude estimate of trends in these proportions over time.

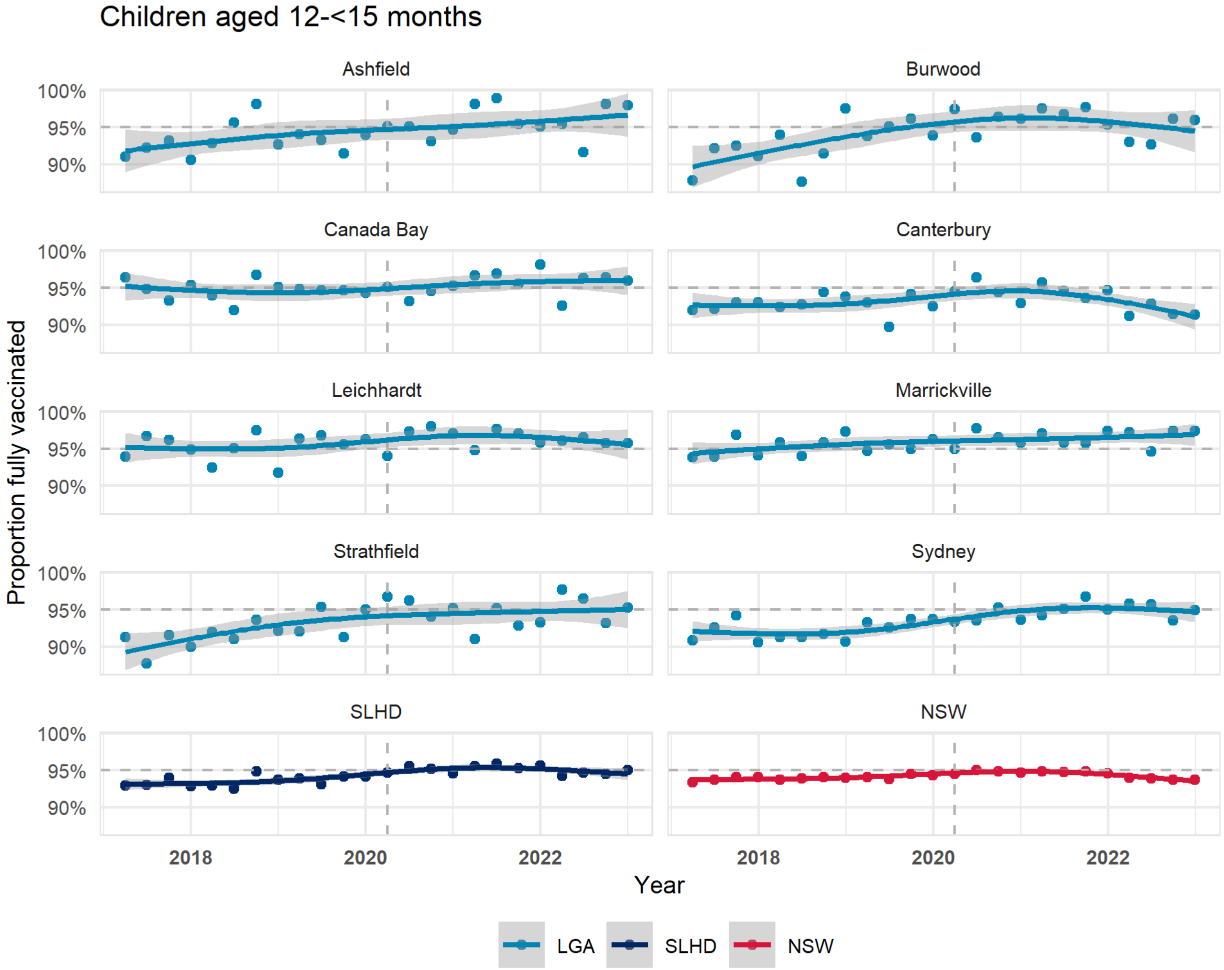

Figure 15 Proportion of children aged 12 months to less than 15 months meeting criteria for full vaccination by Local Government Area, with natural spline fitted (3 degrees of freedom) for smoothing, 2017–2022. Source: Australian Immunisation Register.

In general, rates of fully vaccinated children aged 12 months to less than 15 months increased across all LGAs up until the first quarter of 2020, which marked the start of the COVID-19 pandemic. Although most LGAs saw this trend continue, proportions in Leichhardt, Strathfield and Canada Bay LGAs appeared to flatten. Only the Canterbury LGA saw a noticeable downward trend; this was largely influenced by data from the most recent four quarters and results should be interpreted with caution.

Even accounting for any impact of the COVID-19 pandemic, most LGAs had at, or above, 95% of children aged 12 months to less than 15 months fully vaccinated by the end of the period, and the rates of most LGAs were slightly above, or comparable with, the NSW rate in most years.

6.5.2.2 By age: 4 months to less than 27 months

Proportion of children meeting the AIR definition of 'fully vaccinated' for non-Aboriginal children aged 24 months to less than 27 months is summarised by Local Government Area (LGA) below (**Figure 16**). A natural spline with three degrees of freedom was used to smooth estimates and provide a crude estimate of trends in these proportions over time.

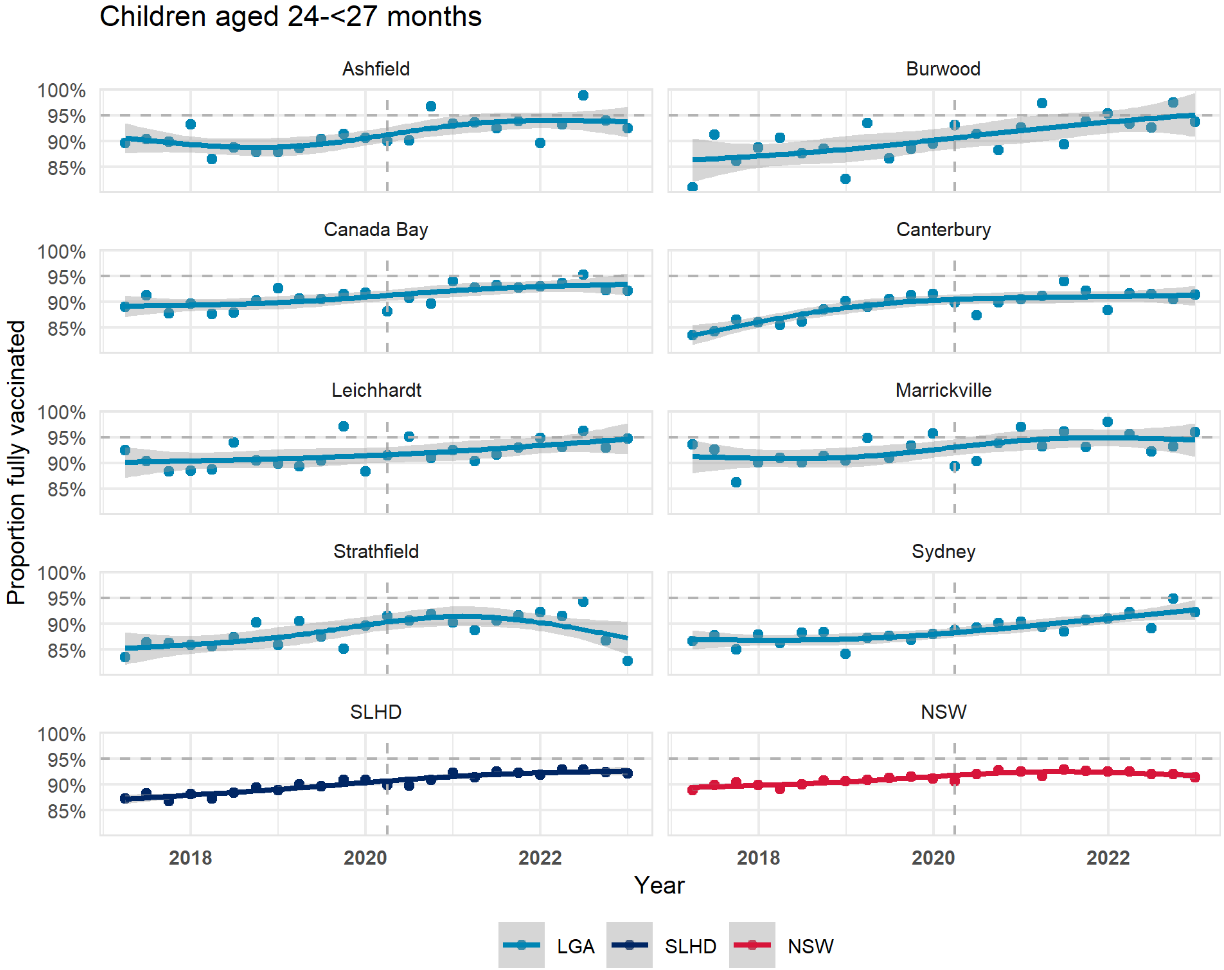

Figure 16 Proportion of children aged 24 months to less than 27 months meeting criteria for full vaccination by Local Government Area, with natural spline fitted (3 degrees of freedom) for smoothing, 2017–2022. Source: Australian Immunisation Register.

As with children aged 12 to less than 15 months, rates of fully vaccinated children aged 24 months to less than 27 months increased across all LGAs up until the first quarter of 2020, which marked the start of the COVID-19 pandemic. After the onset of the pandemic, proportions in Ashfield, Canterbury and Marrickville LGAs appeared to flatten. Only the Strathfield LGA saw a noticeable downward trend; this was largely influenced by the data collected in the final two quarters of the survey period and results should be interpreted with caution.

Even with the impact of the COVID-19 pandemic, most LGAs had at, or just below, 95% of children aged 24 months to less than 27 months fully vaccinated by the end of the period, and the rates of most LGAs were slightly above, or comparable with, the NSW rate in most years.

6.5.2.3 By age: 60 months to less than 63 months

Proportion of children meeting the AIR definition of 'fully vaccinated' for non-Aboriginal children aged 60 months to less than 63 months is summarised by Local Government Area (LGA) below (**Figure 17**). A natural spline with three degrees of freedom was used to smooth estimates and provide a crude estimate of trends in these proportions over time.

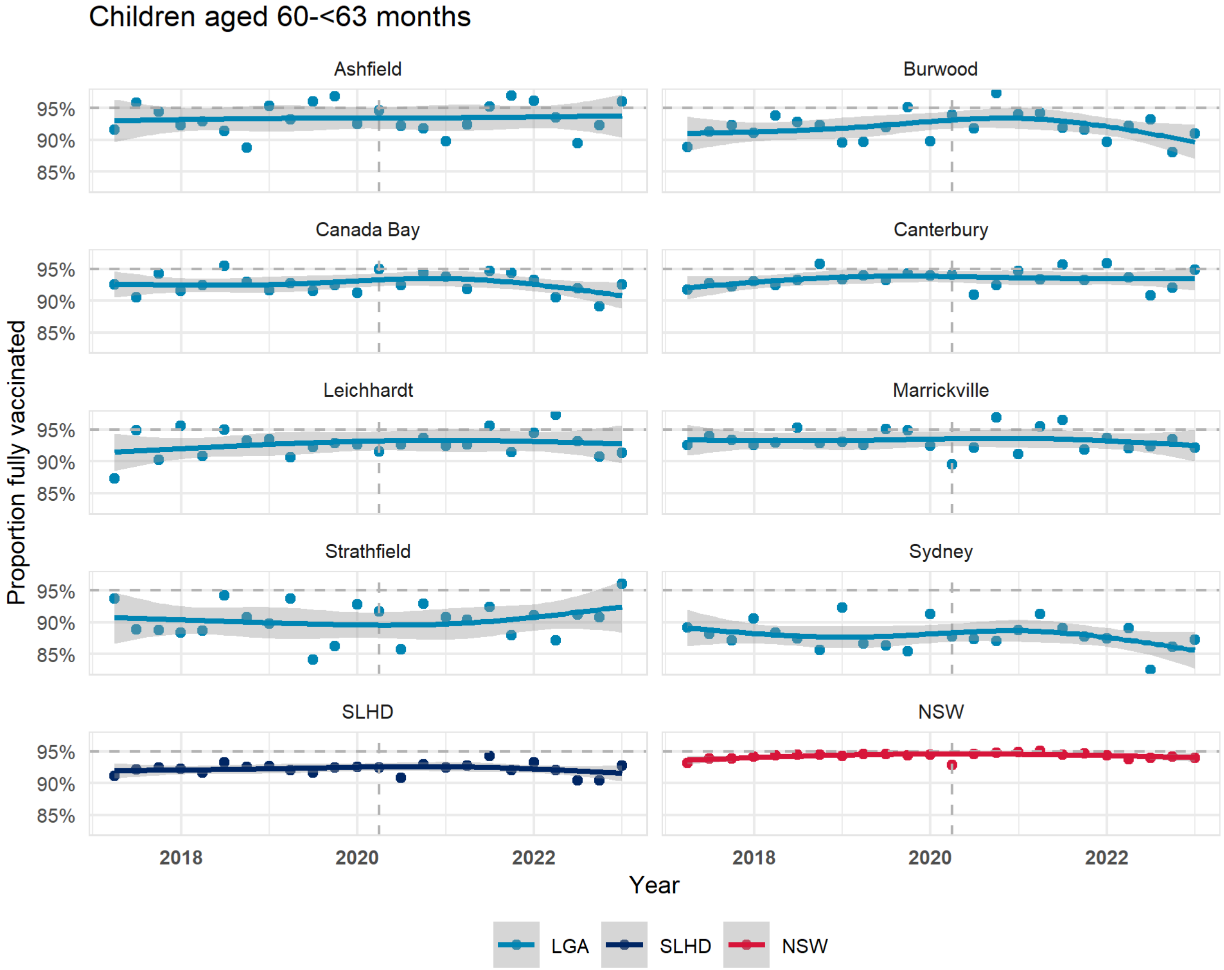

Figure 17 Proportion of children aged 60 months to less than 63 months meeting criteria for full vaccination by Local Government Area, with natural spline fitted (3 degrees of freedom) for smoothing 2017–2022. Source: Australian Immunisation Register.

Rates of fully vaccinated children aged 24 months to less than 27 months were fairly constant across all LGAs up until the first quarter of 2020, which marked the start of the COVID-19 pandemic. After the onset of the pandemic, proportions in the Burwood, Canada Bay and Sydney LGAs appeared to decrease. These decreases were largely influenced by the data observed during the most recent three to four data points, and future monitoring will reveal whether these observed reductions are only temporary or, instead, indicative of a slowly increasing proportion of the population opting not to fully vaccinate their children.

Even with the observed decreases following the COVID-19 pandemic, most LGAs had between 87% and 93% of children aged 60 months to less than 63 months fully vaccinated by the end of the collection period. Rates in most areas appeared slightly lower than the NSW overall rate.

6.5.3 Females with an antenatal visit in the first trimester of pregnancy

Females with an antenatal visit in the first trimester of pregnancy were defined as the proportion of women who gave birth and who had their first antenatal care visit before 14 weeks' gestational age, among all females who gave birth [46].

This data was sourced from the Perinatal Data Collection (PDC), a statewide surveillance system that monitors patterns of pregnancy care, pregnancy services and pregnancy outcomes. It included data on 'pregnancy duration at first antenatal care'; antenatal visits conducted any time during the first 13 weeks of gestation were included in this estimate.

Data are presented as is in **Figure 18**, with methods available on the AIHW website [47].

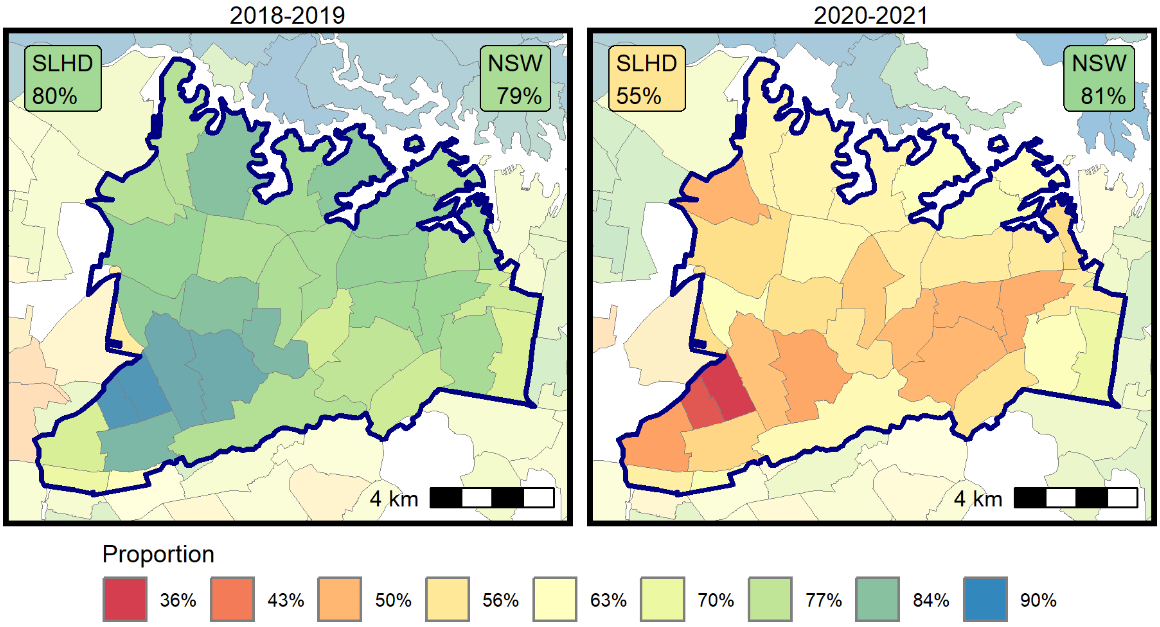

Figure 18 Proportion of females with an antenatal visit occurring in the first trimester of pregnancy by Statistical Area Level 2, 2016–2018 and 2019–2021. Source: Perinatal Data Collection, NSW Ministry of Health SAPHaRI.

The proportion of females who attended antenatal visits in the first trimester of pregnancy was much higher in the 2018–2019 period than in the 2020–2021 period. This was apparent across all SA2s and more pronounced in the western part of the SLHD. All SLHD SA2s reported lower rates in the second reporting period compared to the NSW overall rate, which appeared to slightly increase between time periods. The reduction in the proportion of antenatal visits seen from 2020–2021 was likely due to the impact of the COVID-19 pandemic and associated healthcare measures on access to antenatal care services. Future monitoring will reveal whether this variable will return to pre-pandemic levels in the coming years.

[46] AIHW (2022) Antenatal care visits in the first trimester for all females giving birth, 2022

[47] AIHW (2022) Antenatal care visits in the first trimester for all females giving birth, 2022

6.5.4 Cancer screening rates

Summarised screening data for national cancer screening programs (bowel cancer, breast cancer and cervical cancer) were sourced directly from the AIHW[48]. These data were aggregated from quarterly screening program participation and presented at varying geographies, depending on cancer type. As cancer registry data was unavailable at the time of this project, the aggregations provided by the AIHW were presented as reported, and no further disaggregation or analysis of the data was completed.

6.5.4.1 Bowel cancer

National bowel cancer screening program participation counts were obtained at the SA2 level, among residents aged 50–74; results are presented below (**Figure 19**). All year periods include full two-year periods between the 1st of January of the earlier year, and the 31st of December of the later years. This means that the two time periods overlap, with both datasets containing the year of 2020 in their estimation.

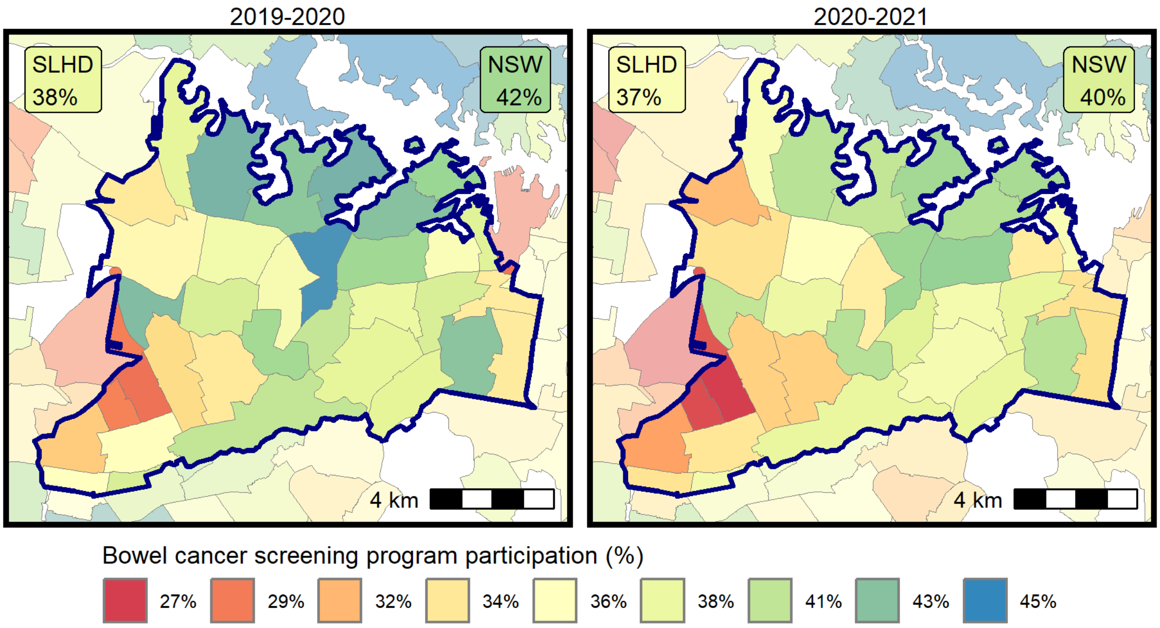

Figure 19 Participation rates for bowel cancer screening programs by Statistical Area 2, 2019–2020 and 2020–2021. Source: AIHW (2023) Cancer screening programs: quarterly data.

Bowel cancer screening participation was highest in the northern and eastern SA2s of the SLHD and appeared lowest in the south-western areas. While rates appeared to decline slightly in the 2020–2021 period compared with the 2019–2020 period, the distributions remained constant and participation rates declined evenly by around 3–6% across most jurisdictions. This mirrored the NSW overall rate, with most SA2s across the SLHD having rates at, or slightly above, the NSW rate in both time periods, with some exceptions to the south and west of the district.

[48] AIHW (2023) Cancer screening programs: quarterly data

6.5.4.2 Breast cancer

National breast cancer screening program participation counts were obtained at the SA3 level for the periods between 2018–2019 and 2019–2020, among women ages 50–74, with results presented in **Figure 20**. All year periods include full two-year periods between the 1st of January of the earlier year, and the 31st of December of the later years.

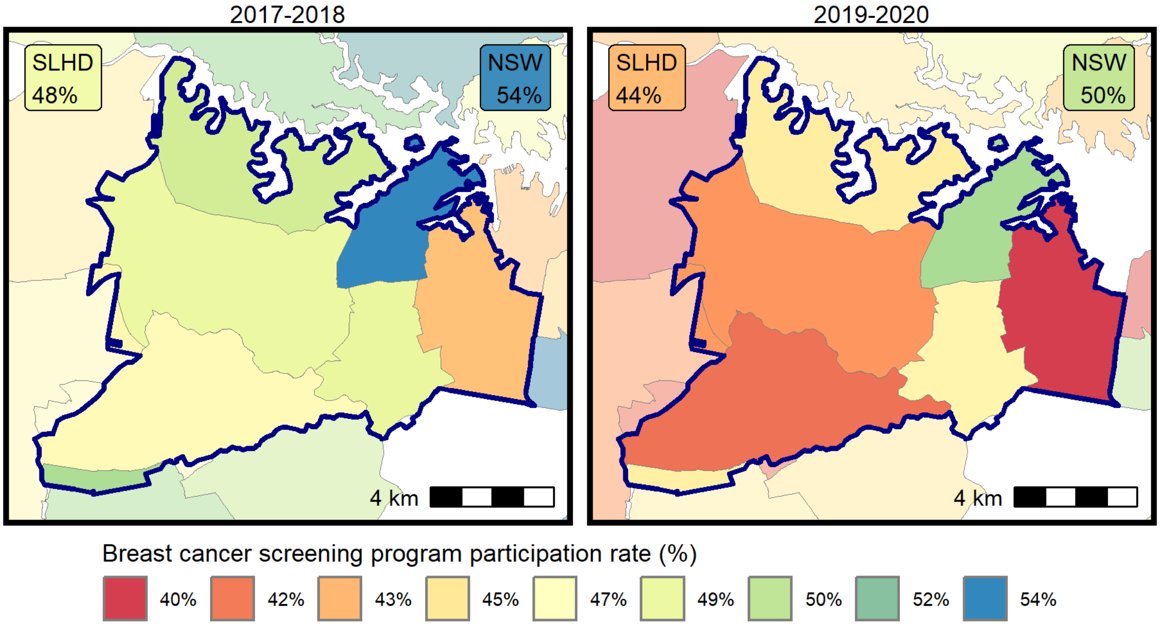

Figure 20 Participation rates for breast cancer screening programs by Statistical Area Level 3, 2017–2018 and 2019–2020. Source: AIHW (2023) Cancer screening programs: quarterly data.

Breast cancer screening participation was highest in the northern SA3s of the SLHD and appeared lowest in the south-western and eastern areas. As with bowel cancer, rates appeared to decline slightly in 2019–2020, while distributions remained constant. That is, participation rates declined roughly evenly by around 7–10% across most jurisdictions. While rates decreased at the state level, this was not as pronounced as the reductions at the SA3 level across the district.

6.5.4.3 Cervical cancer

National cervical cancer screening program participation counts were obtained at the SA3 level for the 2015–2016 and 2018–2021 periods, with results presented in **Figure 21**. Note that for 2015–2016 (a two-year period), overall rates refer to all women aged 20–69, while for 2018–2021 (a three-year period) overall rates refer to women aged 25–74. In addition, no data were available that covered 2017. In 2017, a revision of the National Cervical Screening program recommended women begin screening at age 25, with testing to occur every five years following a negative test[49]. As such, direct comparisons between the two periods should be interpreted cautiously.

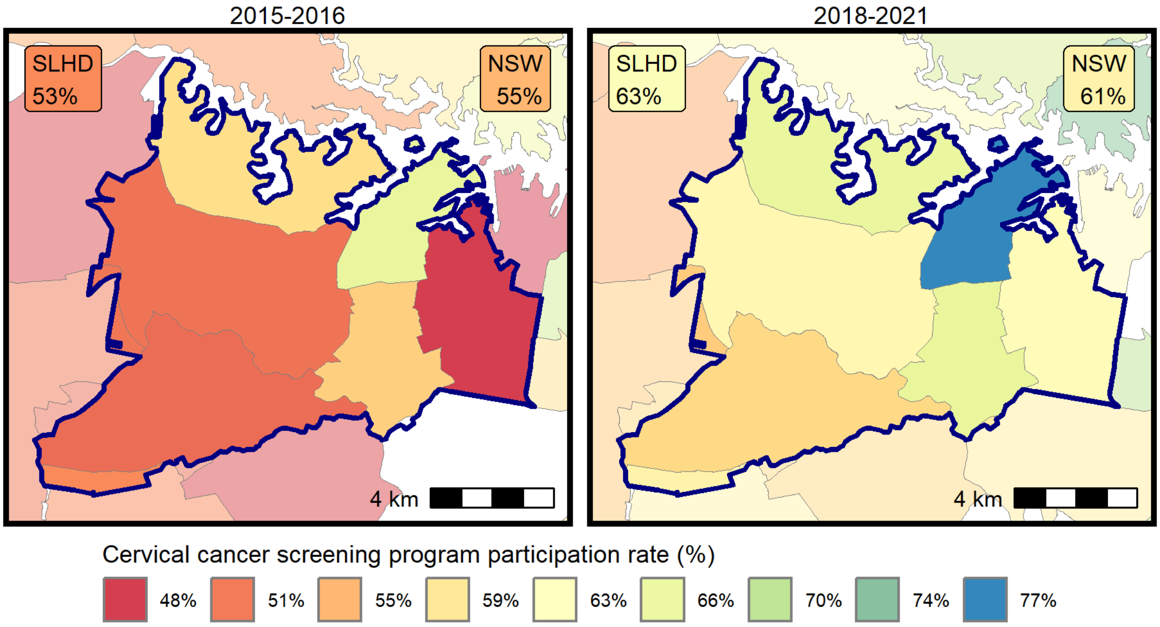

Figure 21 Participation rates for cervical cancer screening programs by Statistical Area 3, 2015–2016 and 2018–2021. Source: AIHW (2023) Cancer screening programs: quarterly data.

Unlike bowel cancer and breast cancer, cervical cancer program participation rates appear to have increased in all jurisdictions across the SLHD between 2015–2016 and 2018–2021; participation rates increased by around 13–19% between these two periods. Note that the differing age categories and inconsistent time periods may account for some, or all, of this change, and comparisons should be made cautiously. Rate increases were consistent with the NSW overall rate.

[49] The Cancer Institute NSW (2017). Changes to the National Cervical Screening Program

6.5.5 Selected potentially preventable hospitalisations

Potentially preventable hospitable admissions were defined as admissions to hospitals for conditions that might have been prevented via appropriate individualised preventative health interventions and early disease management[50]. Such intervention and management included those usually delivered in primary care and community-based care settings (including by general practitioners, medical specialists, dentists, nurses and allied health professionals).

For example, hospitalisations for conditions such as measles and tetanus can be prevented by primary health care through vaccination to prevent the conditions from occurring. Hospitalisations for diabetes complications can be prevented through appropriate, long-term management of diabetes by primary and community health practitioners.

Methods followed AIHW METEOR methods, with admissions coded according to ICD-10 codes from the NSW Health-managed linked Admitted Patient Data Collection. Data were summed by three-yearly period by age group and preventable condition category. Annual age-standardised rates per 100,000 were obtained using the 2001 Australian standard population.

6.5.5.1 Total

Total preventable hospital admissions include all conditions classified as preventable by the AIHW, which included vaccine-preventable conditions and chronic and acute conditions deemed avoidable through timely and appropriate care. Results are shown in **Figure 22**. Note that data for any area with fewer than 30 incident cases across each three-year period was suppressed.

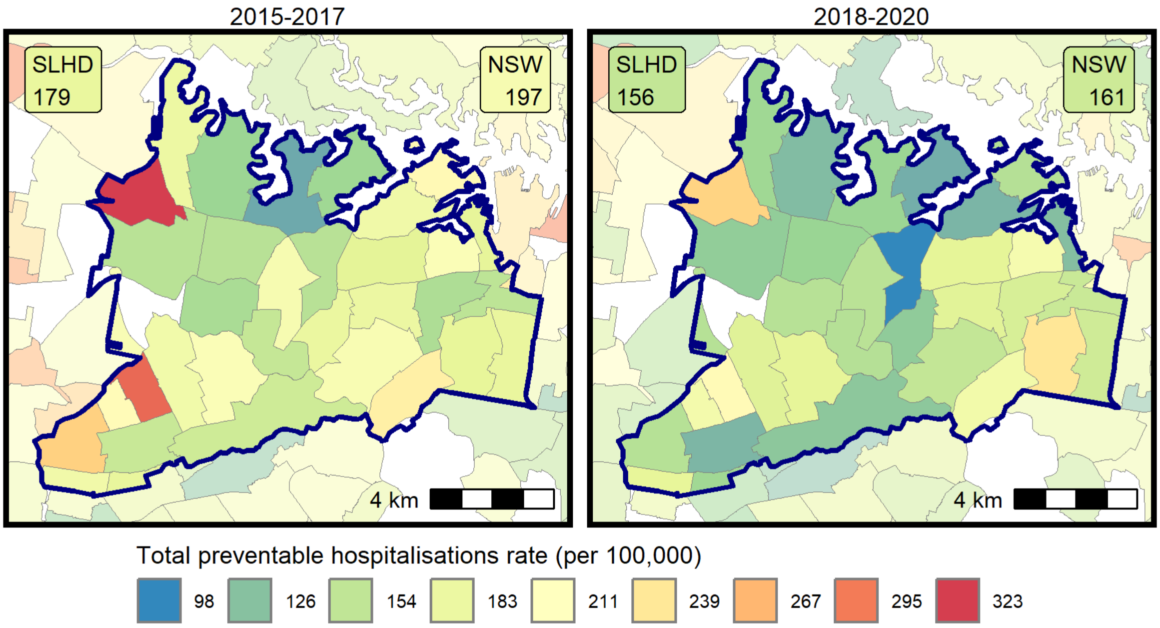

Figure 22 Age-standardised rates (per 100,000) of total potentially preventable hospitalisations by Statistical Area 2, 2015–2017 and 2018–2020. Note: missing areas are those with fewer than 30 admissions across the relevant period. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Total preventable hospitalisations generally ranged between 100 to 250 admissions per 100,000 persons in both periods, with somewhat higher rates in the south-western areas of the district. Strathfield had markedly higher rates (around 300 per 100,000) in 2015–2017 and, while this had decreased by the following period (200 per 100,000), it remained the area with the highest rates of potentially preventable hospitalisations within the SLHD. Note that the latter period (2019–2021) coincided with the COVID-19 pandemic, which greatly impacted hospitalisation rates overall, and this may partially or wholly, account for any differences. NSW rates were comparable with the SA2 level estimates across the district, with some small deviations above and below.

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[50] AIHW (2021) Selected potentially preventable hospitalisations

6.5.5.2 Acute conditions

Preventable hospital admissions associated with acute conditions included those conditions that might be prevented through appropriate, timely care. These included urinary tract infections, perforated or bleeding ulcers, cellulitis, ear, nose and throat infections and dental conditions. Results for the SLHD are shown in **Figure 23**.

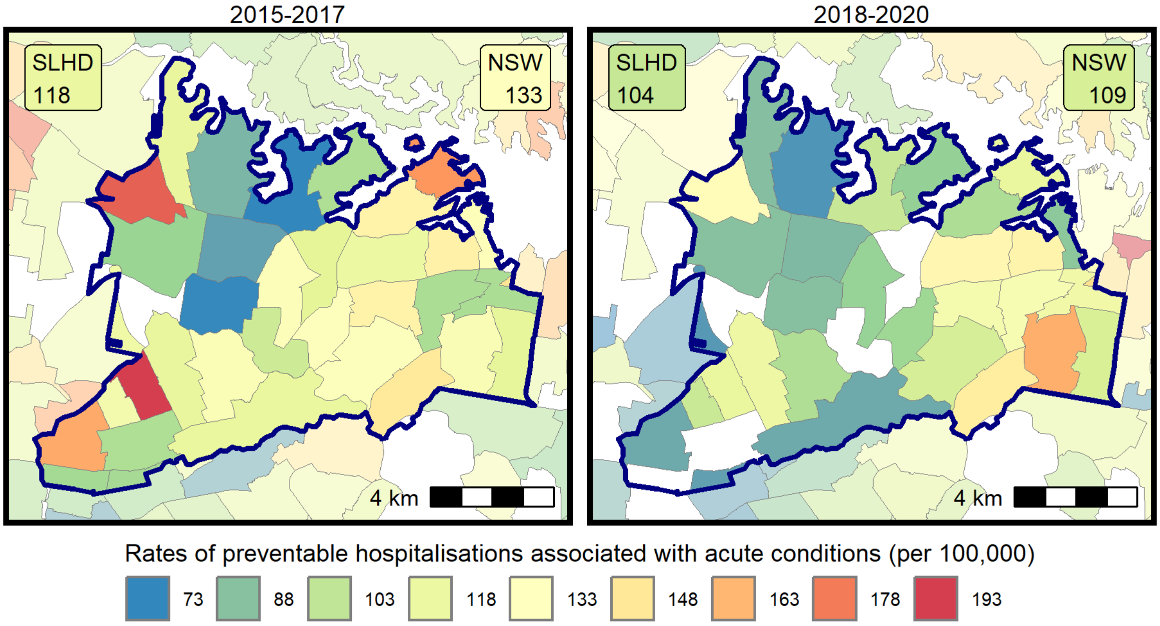

Figure 23 Rates of preventable hospitalisations associated with acute conditions by Statistical Area 2, 2016–2018 and 2019–2021. Note: missing areas are those with fewer than 30 admissions across the relevant period. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Rates of preventable hospitalisations associated with acute conditions generally ranged between 50 to 175 admissions per 100,000 persons in 2016–2018, with slightly higher rates in the south-western and eastern areas of the district. All areas saw substantial decreases in the 2019–2021 period, likely due to an overall decrease in hospital admission due to the COVID-19 pandemic. NSW rates were mostly comparable with the SA2 level estimates across the district, with some small deviations above and below.

6.5.5.3 Chronic conditions and vaccine-preventable hospitalisations

Vaccine-preventable hospital admissions included conditions preventable via the administering of an available vaccine, such as influenza, tetanus, measles, rubella and the mumps. Note that this did not include COVID-19, and admissions for COVID-19-related complications were not classified as vaccine-preventable at the time of this report. Preventable hospital admissions associated with chronic conditions include admissions that might have been prevented through appropriate, timely management and interventions of chronic conditions. These included admissions due to asthma, chronic obstructive pulmonary disorder, congestive cardiac failure, bronchiectasis, angina, diabetes, iron deficiency anaemia, hypertension, nutritional deficiencies or rheumatic heart diseases.

As most areas had fewer than 30 incident cases across the three-year periods, these were aggregated to the SA3 level and visualised in **Figure 24**.

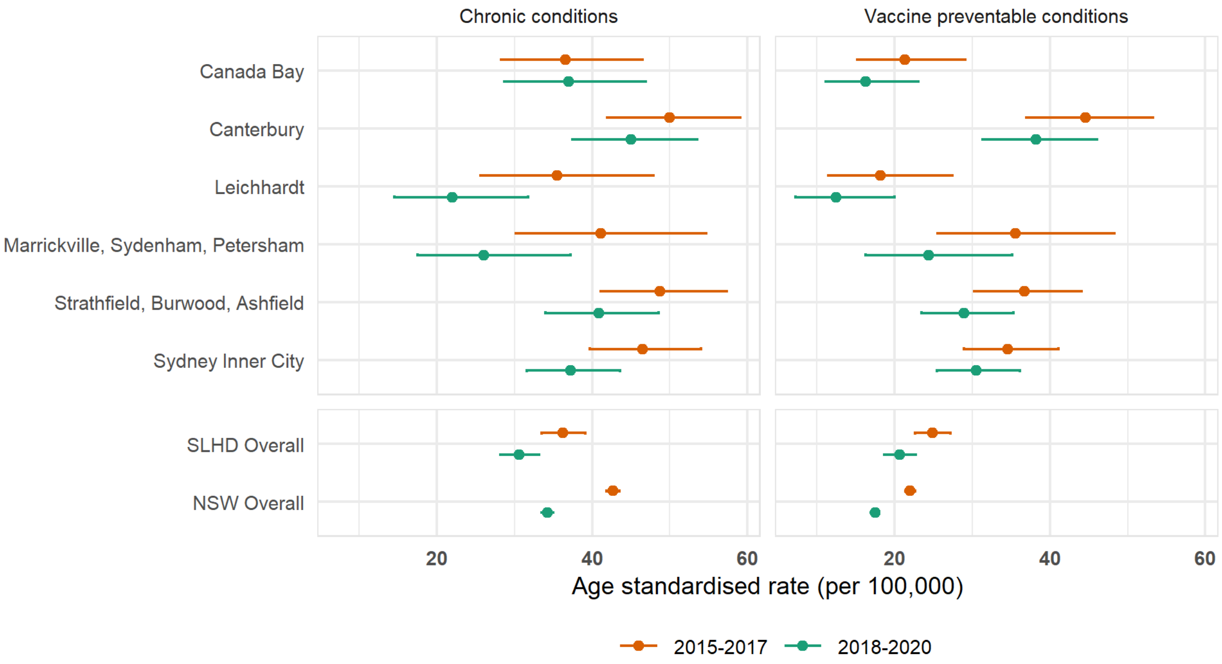

Figure 24 Rates of preventable hospitalisations associated with chronic conditions, and vaccine-preventable hospitalisations by Statistical Area Level 3, 2016–2018 and 2019–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Rates of preventable hospitalisations due to chronic conditions generally ranged between 30 to 43 admissions per 100,000 persons in 2016–2018, with rates highest in the Canterbury SA3. Rates decreased across all areas substantially in the 2019–2021 period, to between 13 and 26 admissions per 100,000 persons, likely due to an overall decrease in hospital admission due to the COVID-19 pandemic.

Rates of vaccine-preventable hospitalisations generally ranged between 18 to 35 admissions per 100,000 persons in 2016–2018, with higher rates in the Canterbury SA3. Rates across all areas decreased substantially in the 2019–2021 period, to between 6 and 17 admissions per 100,000 persons, likely due to an overall decrease in hospital admission due to the COVID-19 pandemic. Rates were generally comparable with, or slightly lower than, the NSW rate for chronic conditions but appeared slightly higher than the NSW rate across some areas for vaccine-preventable conditions.

6.5.6 Survival of people diagnosed with cancer

The method of obtaining the survival of people diagnosed with cancer employed by the AIHW[51] could not be replicated in the current report, as cancer registries were not accessible as an administrative data source. In the interest of completeness, an alternative method was adopted, with two key differences from the AIHW methodology. Firstly, cancer incidence was defined as index admission to hospital for cancer in a primary diagnosis code for that type of cancer, as coded in the NSW Health-managed linked Admitted Patient, Emergency Department and Deaths Registry (APEDDR), with ICD-10 codes informed by the METEOR[52]. Only index admission was included for each type of cancer, with all subsequent admissions for that type of cancer excluded for an individual.

Secondly, 365-day survival rates across a five-year period were used instead of five-year survival, as employed by the AIHW, in the interest of obtaining estimates for the most recent period. Deaths dates were obtained using linked Death Registry data, with any person with an index admission in 2022 excluded to ensure that all participants had at least 365 days of follow-up time.

This method almost certainly undercounts the incidence of cancer, with certain cancers less likely to require hospitalisation than others, and therefore more likely to be undercounted, and will bias survival rates in an unpredictable manner.

Unfortunately, findings using this method were deemed to be inadequate and overly sensitive to changes in hospital admission data for accurate, or even approximate, calculation. As such, these were suppressed and alternate data sources are currently being explored.

[51] AIHW (2020) Survival of people diagnosed with cancer

[52] AIHW (2020) Survival of people diagnosed with cancer

6.5.7 Potentially avoidable deaths

Potentially avoidable deaths were those categorised as avoidable in the context of the health system at the time of this report. These were broadly categorised into ten categories. In order of prevalence, these included diseases of the circulatory system, avoidable cancer, avoidable external causes, asthma, infections (such as viral pneumonia and HIV/AIDS), diabetes, diseases of the genitourinary system, complications of the perinatal period, diseases of the digestive system, and complications of pregnancy, labour or the puerperium[53].

The NSW Health-managed Cause of Death Unit Record File (CODURF) was accessed, and underlying cause of death codes were analysed to identify those deaths classified as potentially avoidable. Rates were age-standardised per 100,000 in the population using the 2001 Australian standard population.

Only the count of total potentially avoidable deaths was high enough to be enumerated at the SA2 level. The next three categories were visualised at the SA3 level, with the remaining categories having counts too low to be visualised even at the SA3 level. With incidences this low, all rates had considerable variability, and supplementary tables should be consulted for point estimates reported with 95% confidence intervals.

6.5.7.1 Total

Total avoidable deaths are visualised in **Figure 25** by Statistical Area 2 (SA2) for those areas with at least 20 reported avoidable deaths in the relevant three-year period.

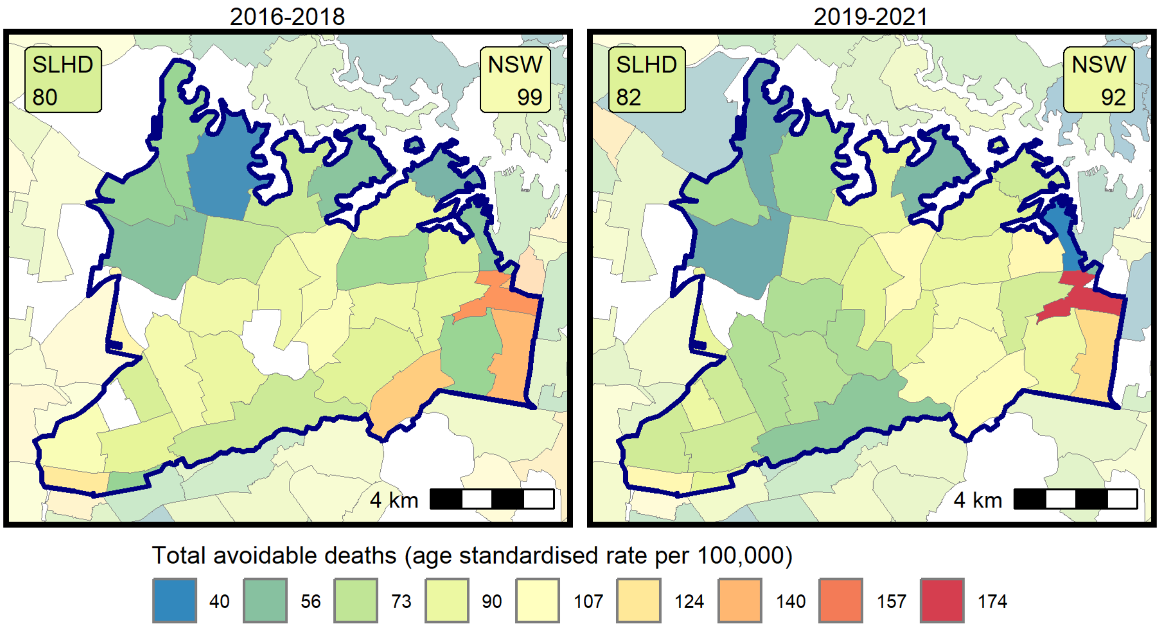

Figure 25 Age-standardised rates (per 100,000) of potentially avoidable deaths by Statistical Area 2, 2016–2018 and 2019–2021. Note: missing areas are those with fewer than 30 identified deaths across the relevant period. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Rates of avoidable deaths varied across the district from around 100 to 250 deaths per 100,000. Rates appeared highest in the south-western and central areas of the district, with a slight reduction observed across most areas in 2019–2021. In general, rates were slightly lower than the NSW overall rate, with the only exception being the SA2 of Ashfield in both time periods.

53 AIHW (2021) Potentially avoidable deaths

6.5.7.2 Avoidable mortality due to circulatory disease or cancer

Total avoidable deaths due to diseases of the circulatory system or cancer are visualised in **Figure 26** by sex and Statistical Area 3 (SA3) for those areas with at least 20 reported avoidable deaths in the relevant three-year period.

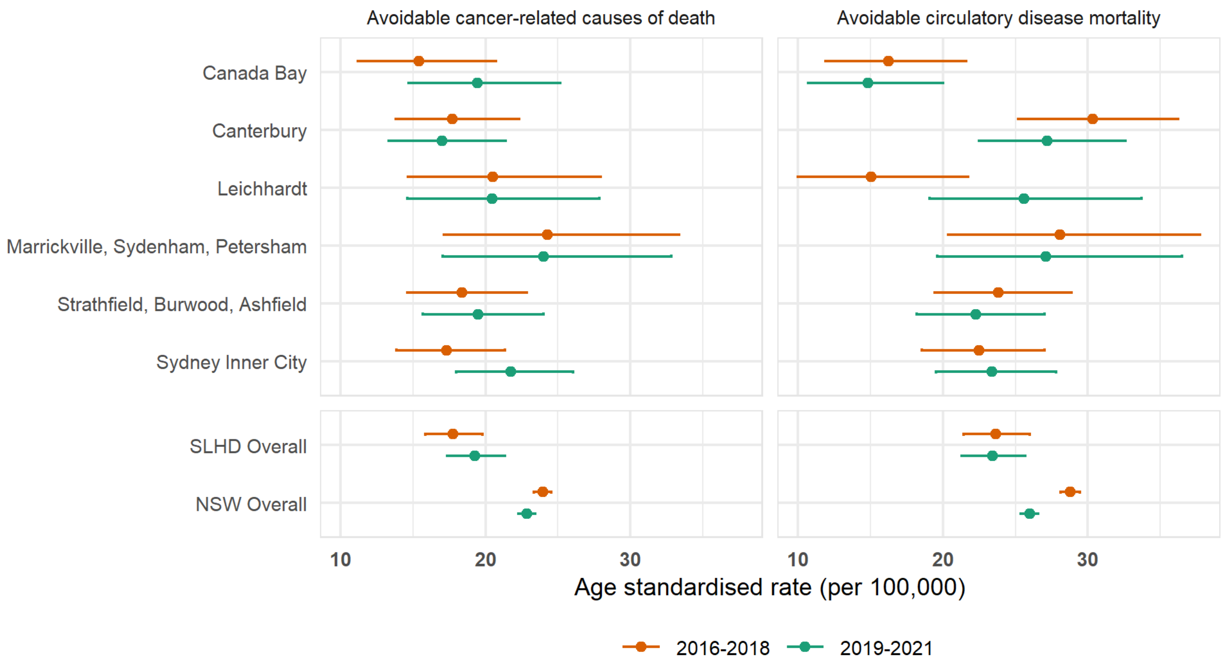

Figure 26 Age-standardised rates (per 100,000) of potentially avoidable deaths due to cancer or circulatory disease by Statistical Area 3, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Diseases of the circulatory system were responsible for the highest portion of avoidable deaths among all broad categories of avoidable deaths. Rates varied across the district from around 80 to 130 deaths per 100,000 in 2016–2018, with a slight decrease across most areas in 2019–2021 to between 70 and 90 deaths per 100,000. Rates across all areas were lower than the NSW overall rate in both time periods.

Rates of avoidable mortality due to cancer were much lower than avoidable circulatory diseases, although some variability was still observed across areas. Rates were generally similar or slightly lower in 2019–2021 compared with 2016–2018, with rates across all areas lower than the NSW estimate at both time points.

Rates were lower than the NSW overall rate for both conditions across all time periods.

6.5.7.3 Avoidable mortality from external causes or asthma

Total avoidable deaths due to external causes or asthma are visualised in **Figure 27** by Statistical Area 3 (SA3) for those areas with at least 20 reported avoidable deaths in the relevant three-year period.

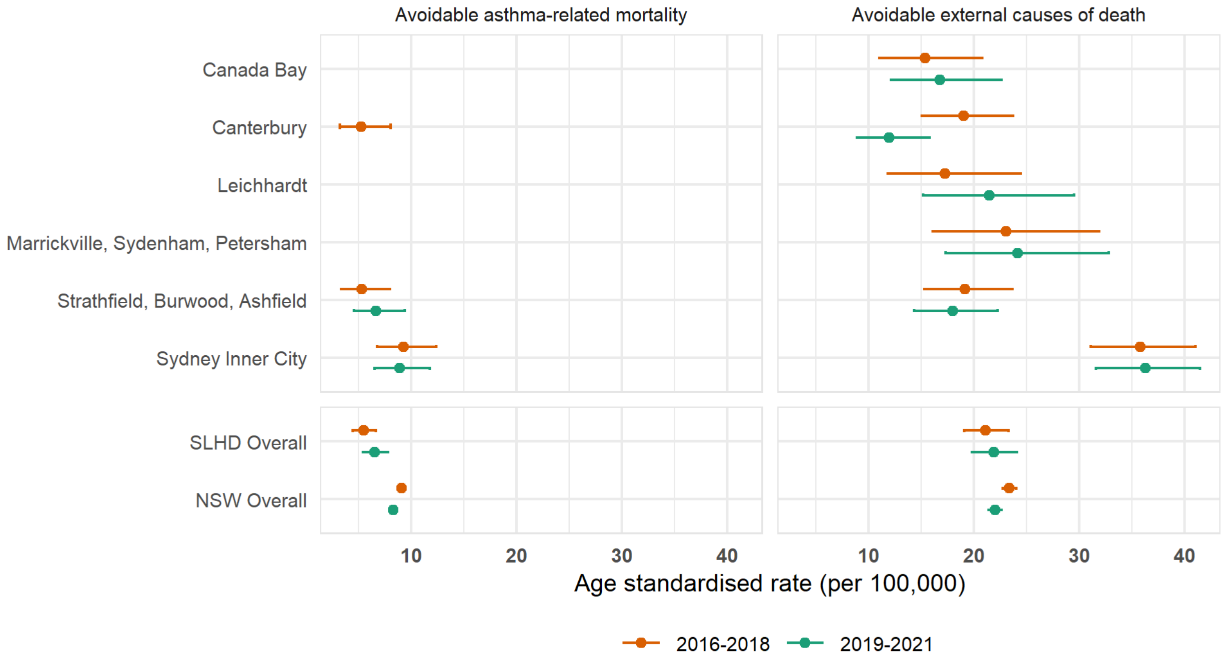

Figure 27 Age-standardised rates (per 100,000) of avoidable deaths from external causes or from asthma by Statistical Area 2, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Rates of avoidable deaths due to external causes were highest in the Sydney Inner City SA3, with rates as high as 45 deaths per 100,000 in 2016–2018. However, all other SA3s saw rates lower than NSW in both time periods, with especially low rates in Canterbury in the 2019–2021 period.

Rates of avoidable deaths due to asthma were generally low across SA3s in the SLHD, with slightly lower rates in 2019–2021 than in 2016–2018. In general, rates varied between 11 and 21 deaths per 100,000, with rates across all areas in the SLHD lower than the NSW overall rate in both time periods.

6.6 Safety

6.6.1 Adverse events treated in hospitals

Adverse events were defined as incidents that resulted in harm to a person receiving health care. They included infections, falls causing injuries and problems with medication and medical devices. Some adverse events may have been preventable.

The AIHW defined this measure as representing selected adverse events in health care that resulted in, or affected, hospital admissions, rather than all adverse events that occurred in hospitals during the collection period. Their methods are defined in their metadata[54].

Adverse events were broadly categorised into three groups:

1. External causes of injury or poisoning, where the adverse event was caused by unfavourable effects of medications prescribed or administered by a healthcare practitioner; abnormal reactions or complications to procedures performed by a healthcare practitioner, or misadventures during medical and surgical care
2. Place of occurrence of injury, where any injury or poisoning occurred within a health service area
3. Diagnoses, where the adverse event related to post-procedural disorders, complications during a procedure, infections following a procedure or complications of internal prosthetic devices

A hospital separation may be recorded against more than one adverse event category as some adverse events are reported as diagnoses and others as external causes or places of occurrence (of the injury or poisoning). Some of the adverse events may represent events that occurred before admission.

Rates of adverse events, calculated per 100 separations, by hospital and year, are displayed in Figure 28.

[54] AIHW (2020) Adverse events treated in hospitals

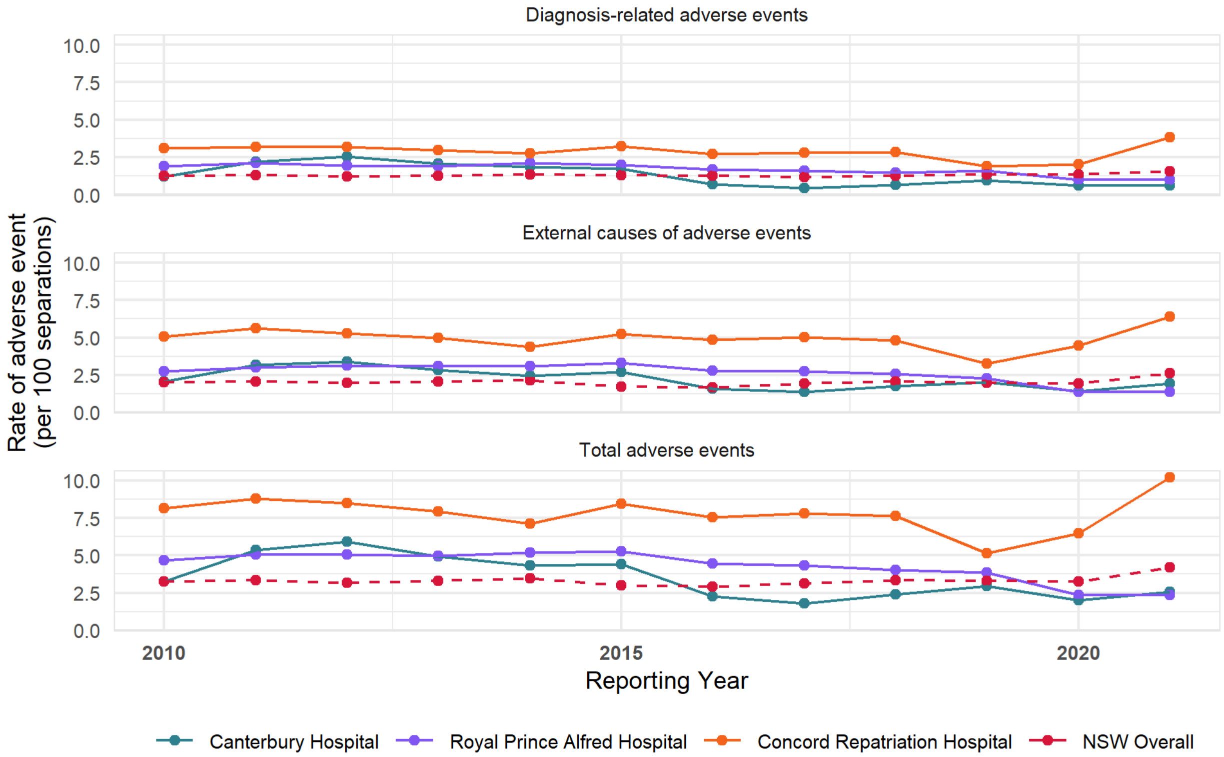

Figure 28 Adverse events treated in hospital per 100 admissions, by hospital within the Sydney Local Health District, 2010–2021. Source: AIHW MyHospitals API.

Rates of adverse events generally decreased across the period for all hospitals and adverse event types. However, Concord Hospital saw a sharp increase in the 2020 and 2021 time periods. However, this was accompanied by a dramatic drop in total separations in the same period, which has likely inflated the rate. As such, this increase may be an artefact of data collection and/or changes in overall service utilisation for Concord Hospital. For other hospitals in the district, rates continued to decrease in this period. In general, rates were slightly higher than the NSW overall rate in hospitals within the SLHD, with some exceptions during the latter half of the study period, particularly for Canterbury Hospital.

6.6.1.1 Healthcare-associated *Staphylococcus aureus* blood infections

The Australian Institute of Health and Welfare compiled broad safety and accessibility statistics at the hospital level and have made these data available via the MyHospitals Application Programming Interface (API)[55]. Data was accessed for hospitals within the SLHD for a variety of indicators, for the time period between 2010 and 2019. Note that data are presented as is, with no additional calculation or validation, with detailed metadata and methods available on the AIHW METEOR website [56].

Total number of hospital admissions, for Canterbury Hospital, Concord Repatriation Hospital, Royal Prince Alfred Hospital and Balmain Hospital are shown in **Figure 29**.

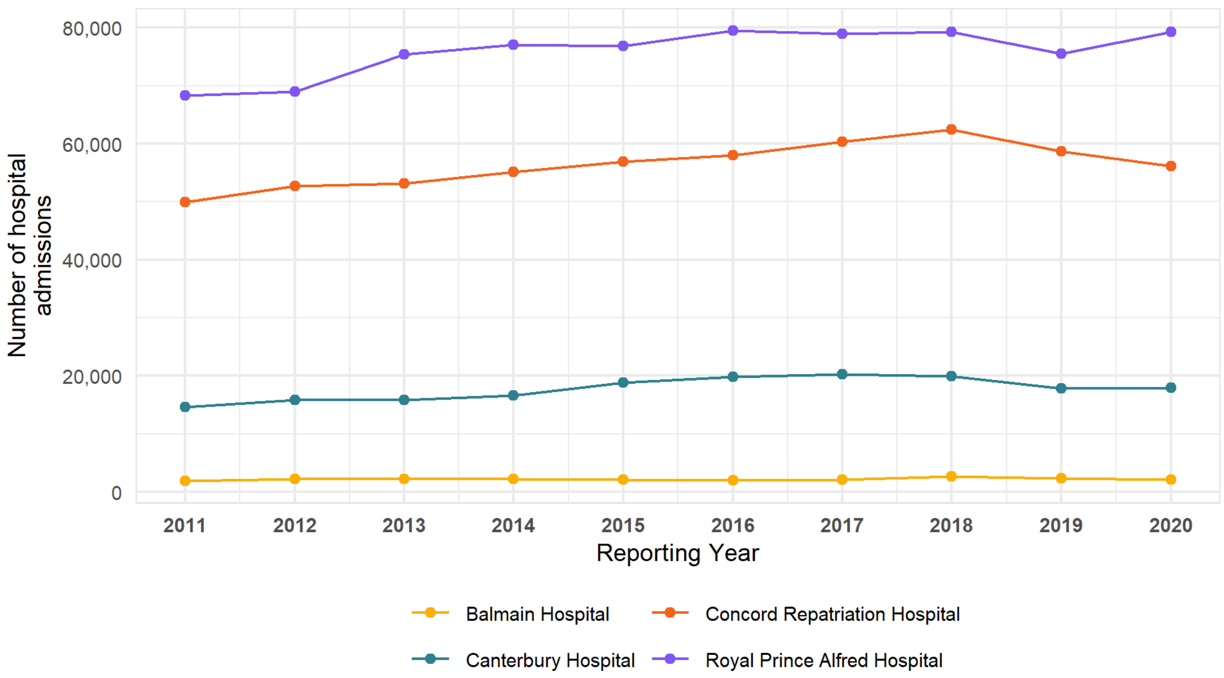

Figure 29 Total number of hospital admissions by hospital, for four hospitals within the Sydney Local Health District, 2011–2020. Source: AIHW MyHospitals API.

Rates of *Staphylococcus aureus* blood infections deemed to be healthcare-associated, per 10,000 patient days, were accessed for these four hospitals within the SLHD, with results shown in **Figure 30**.

[55] AIHW (2022) MyHospitals Data Portal

[56] AIHW (2022) Episode of healthcare-associated *Staphylococcus aureus bacteraemia*

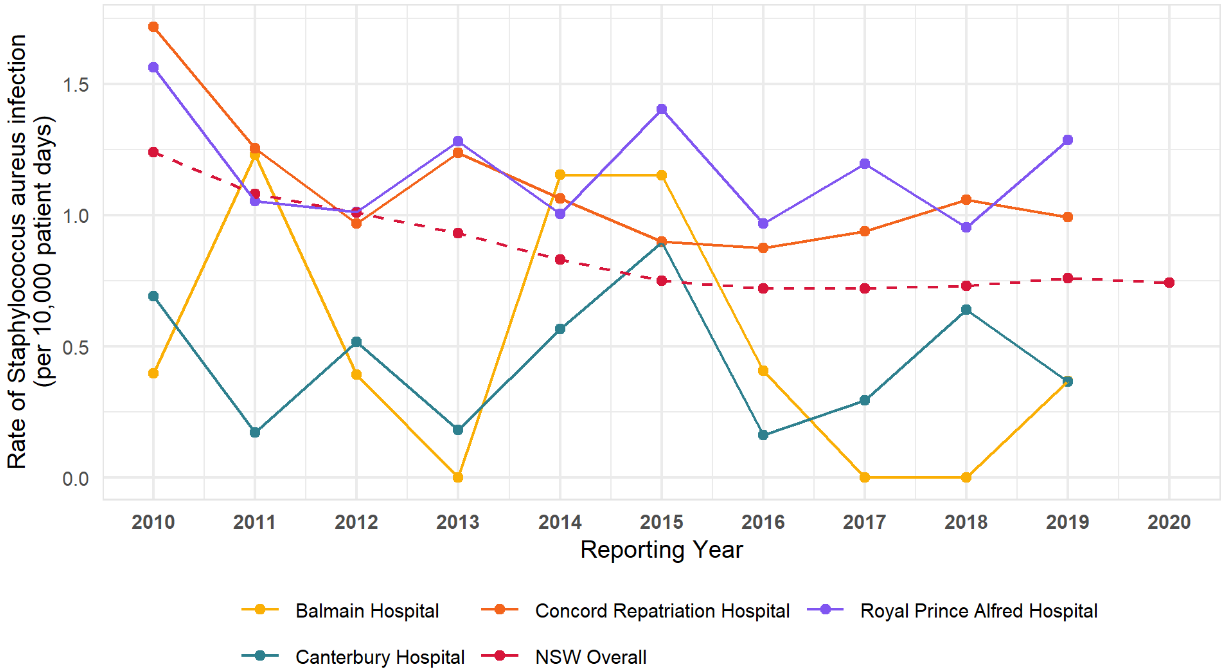

Figure 30 Rates of healthcare-associated *Staphylococcus aureus* blood infections (per 10,000 patient days) by hospital within the Sydney Local Health District, 2011–2019. Source: AIHW MyHospitals API.

Rates of *Staphylococcus aureus* infections were overall quite low over the period in all hospitals, with Royal Prince Alfred and Concord Hospital both seeing a gradual decrease over the study period. Canterbury Hospital saw consistently low infection rates, averaging around 0.5 infections per 10,000 patient days. Balmain Hospital had the greatest fluctuation, likely due to its much lower number of admissions. Overall, the NSW rate saw a similar trend to the individual hospital trends.

6.6.1.2 Sentinel events

A sentinel event is a particular type of serious incident that is wholly preventable and has caused serious harm to, or the death of, a patient.

The AIHW defined eight specific sentinel events that were monitored as part of the Health Performance framework[57]:

1. haemolytic blood transfusion reaction resulting from ABO (blood group) incompatibility
2. infant discharge to the wrong family
3. Intravascular gas embolism resulting in death or neurological damage
4. maternal death associated with pregnancy, birth or the puerperium
5. medication error leading to the death of a patient reasonably believed to be due to incorrect administration of drugs
6. procedures involving the wrong patient or body part resulting in death or major permanent loss of function
7. retained instruments or other material after surgery requiring re-operation or further surgical procedure
8. suicide of a patient in an inpatient unit.

Data could not be sourced at any disaggregation smaller than state for this indicator, and so data are presented as reported from the most recent AIHW Performance Framework data release[58]. However, sentinel events are exceedingly rare in NSW, and so this indicator could only be reported at the state level. Indeed, only three of the above sentinel events had counts high enough to be reported by the AIHW, namely medication error, retained instruments and suicide of a patient in an inpatient unit. Absolute number of sentinel events are visualised by type along with total sentinel events in **Figure 31**.

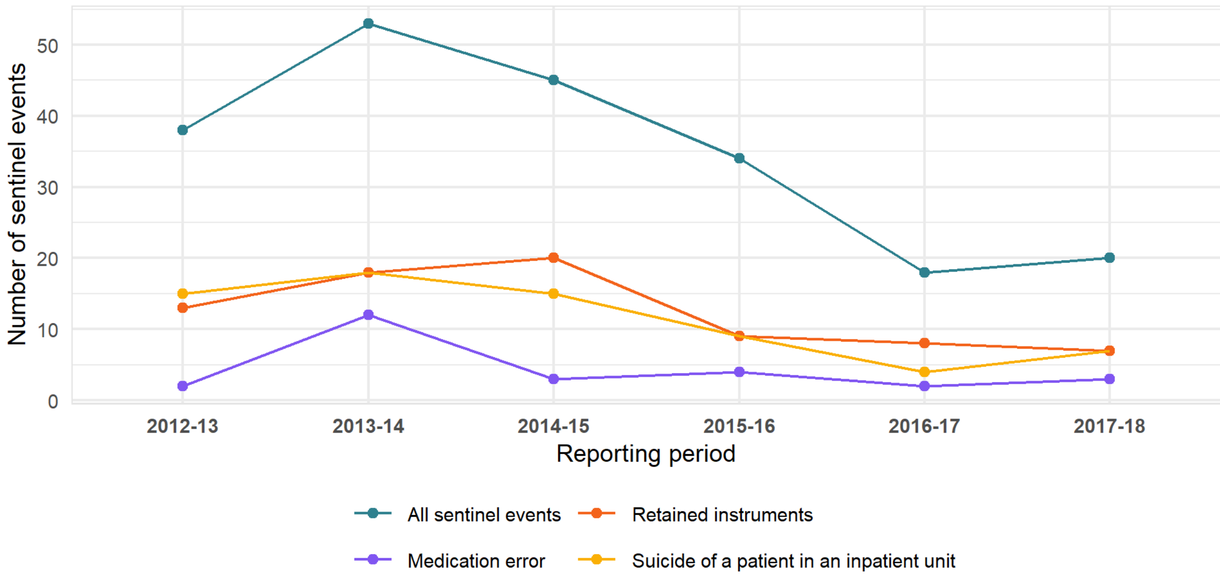

Figure 31 Number of sentinel events by broad category and in total, across hospitals in New South Wales, 2012–2018. Source: AIHW MyHospitals API.

The total number of sentinel events across NSW declined sharply between 2012 and 2018, with around 20 events total occurring in the 2017–2018 period, down from a maximum of 53 in 2013–2014. Numbers for this indicator, in general, are too low to be reported at any further disaggregation.

[57] AIHW (2022) Sentinel event

[58] AIHW (2022) Australia's health performance framework

6.6.2 Rate of seclusion

Rates of mental health seclusion and restraint were accessed by the AIHW MyHospitals API for hospitals within the Sydney Local Health District for the period between 2018 and 2021[59]. Note that this only included events where there was a designated specialised mental health acute service unit in a public hospital. Other wards, including emergency departments, as well as any wards or units in private hospitals, were not in-scope. Results are presented as is, with no further analysis or aggregation, in Figure 32. The rates are presented as number of events per 1,000 accrued mental health care days within the service organisation's inpatient unit(s) during the reference period.

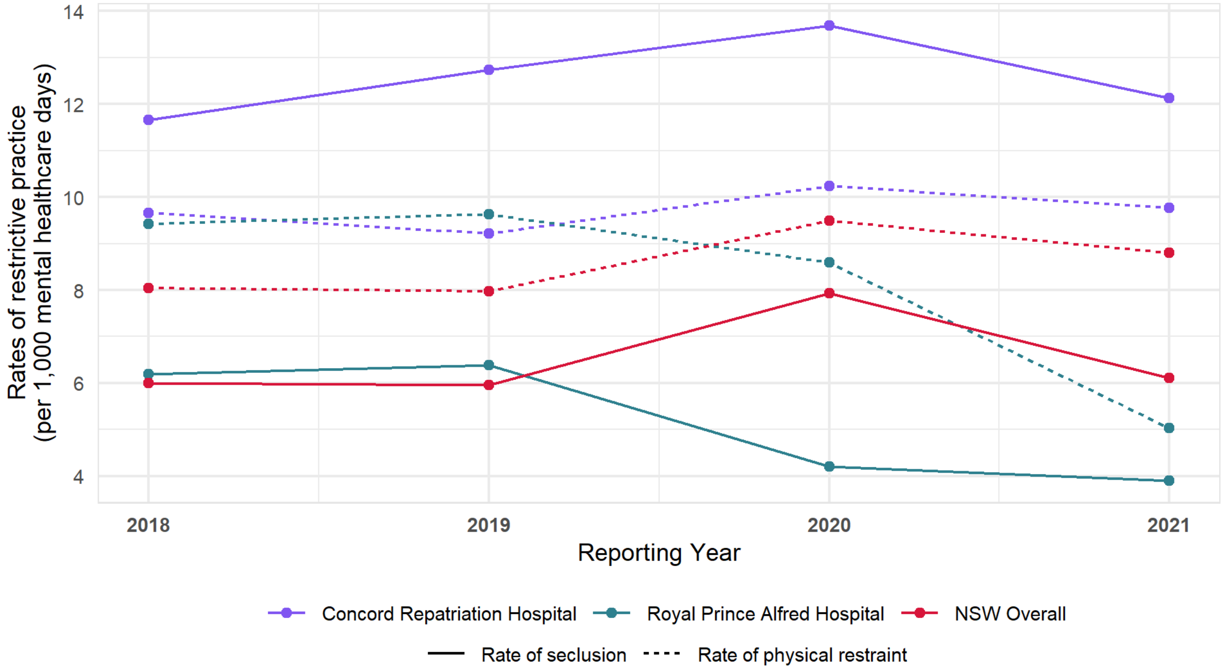

Figure 32 Rates of restrictive practices used (per 1,000 mental healthcare days) by hospital within the Sydney Local Health District, 2018-2019. Source: AIHW MyHospitals API.

The rate of mental health restraint and seclusion within the Royal Prince Alfred Hospital decreased during the study period, from around 6 events of mental health seclusion and 9 events of physical restraint per 1,000 mental health care days in 2018, to around 4 events of mental health seclusion and 5 events of physical restraint per 1,000 mental health care days in 2021. Concord Repatriation General Hospital had relatively stable sentinel event rates during the same period, around 12 and 10 events of seclusion and physical restraint per 1,000 mental health care days, respectively, in 2018 and 2021. Royal Prince Alfred Hospital had rates consistently at, or slightly lower, than the NSW rate, while rates in Concord Repatriation Hospital were consistently higher than the NSW rate.

[59] AIHW (2022) Public Mental Health Services: Seclusion rate

6.6.3 Continuity of care

6.6.3.1 Unplanned hospital readmission rates

The AIHW defined unplanned hospital readmission as a readmission within 28 days of separation following certain procedures, for a specific set of diagnoses relating to complications of that procedure[60]. The procedures for which unplanned readmission was assessed included knee replacement, hip replacement, tonsillectomy and adenoidectomy, hysterectomy, prostatectomy, cataract surgery and appendicectomy. Readmission included general, unspecified complications following procedures or complications specific to that procedure.

An unplanned readmission was thus any readmission meeting these three criteria:

1. The readmission was to the same hospital following a separation in which one of the following procedures was performed: knee replacement, hip replacement, tonsillectomy and adenoidectomy, hysterectomy, prostatectomy, cataract surgery or appendicectomy.
2. The readmission occurred within 28 days of the previous date of separation.
3. A principal diagnosis for the readmission had one of relevant ICD-10-AM codes, detailed via METEOR.[61]

The denominator in this instance was all separations during which any of the above procedures were performed. Time to readmission was taken as the time from the final separation date for the procedure (accounting for any transfers associated with the admission), to the next admission for which one of the specified ICD-10-AM codes was the principal diagnosis code. Rates of unplanned readmission to hospital are visualised in **Figure 33**.

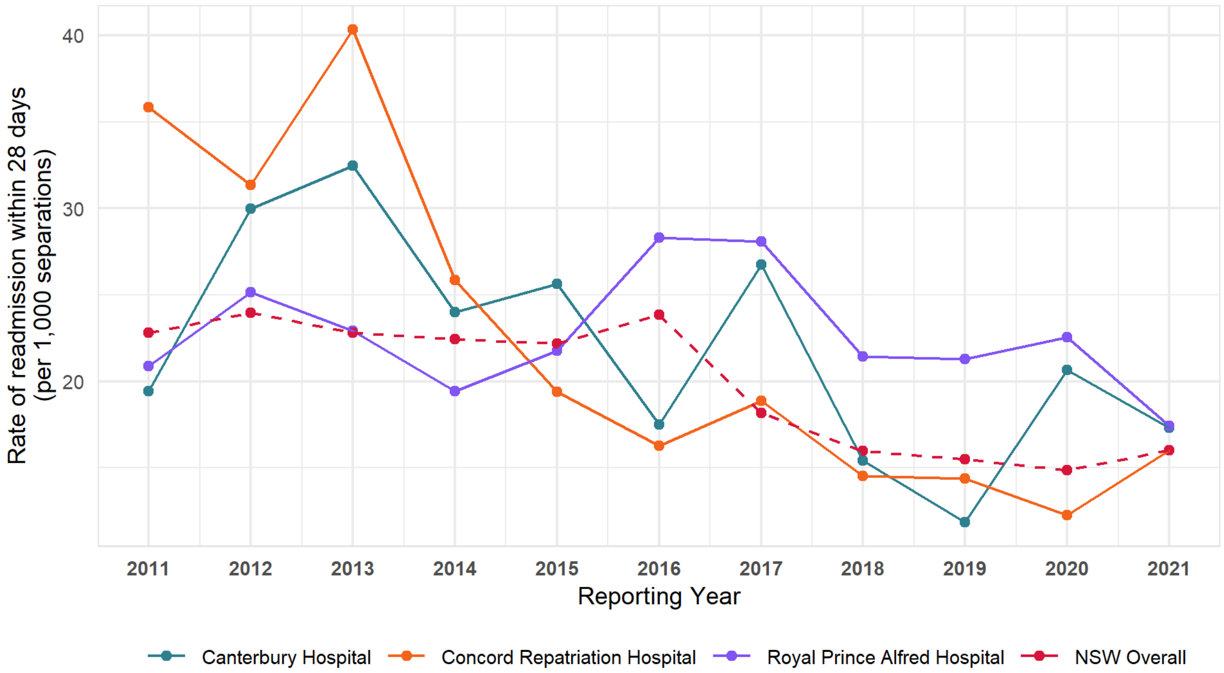

Figure 33 Unplanned 28-day readmission following certain procedures, by hospital within Sydney Local Health District, and by year 2011–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Rates of unplanned readmission to hospital within 28 days of separation following certain procedures generally declined over the ten-year period for all hospitals within the SLHD. In 2021, the three surveyed hospitals were comparable in their readmission rates, at around 16–17 readmissions within 28 days of separation per 1,000 separations. Concord Repatriation Hospital saw the most pronounced decrease over the period, indicating a maximum of around 40 readmissions within 28

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[60] AIHW (2022) Unplanned hospital readmission rates

[61] AIHW (2022) Unplanned hospital readmission rates

days per 1,000 separations in 2013, before decreasing sharply around 2014 and mostly maintaining this decrease. All rates observed were higher than the NSW overall rate for all time periods and hospitals, with similar trends observed at the state level as at the hospital level.

6.6.4 Accessibility

6.6.4.1 Bulk billing for non-referred (GP) attendances

Bulk billing is where a general practitioner (GP) bills Medicare directly for eligible medical or allied health services, imposing no other gap payment on the patient. That is, there is no direct cost to the patient as the provider accepts the Medicare benefit as full payment for the service.

GP attendances are Medicare benefit-funded patient/doctor encounters, such as visits and consultations, for which the patient has not been referred by another doctor.

Data were accessed from the AIHW directly at the Statistical Area 3 level, though the provided statistic deviates slightly from the indicator definition. Specifically, rates refer to the percentage of the population who accessed a bulk-billed GP service within the given time frame, *not* the proportion of services that were bulk-billed[62]. The data is presented by sex as provided by the AIHW, with no further analysis or disaggregation.

6.6.4.1.1 Males

The proportion of males in the population who accessed a bulk-billed non-referred (GP) attendance by SA3 for the periods 2019–2020 and 2020–2021 are presented in **Figure 34**.

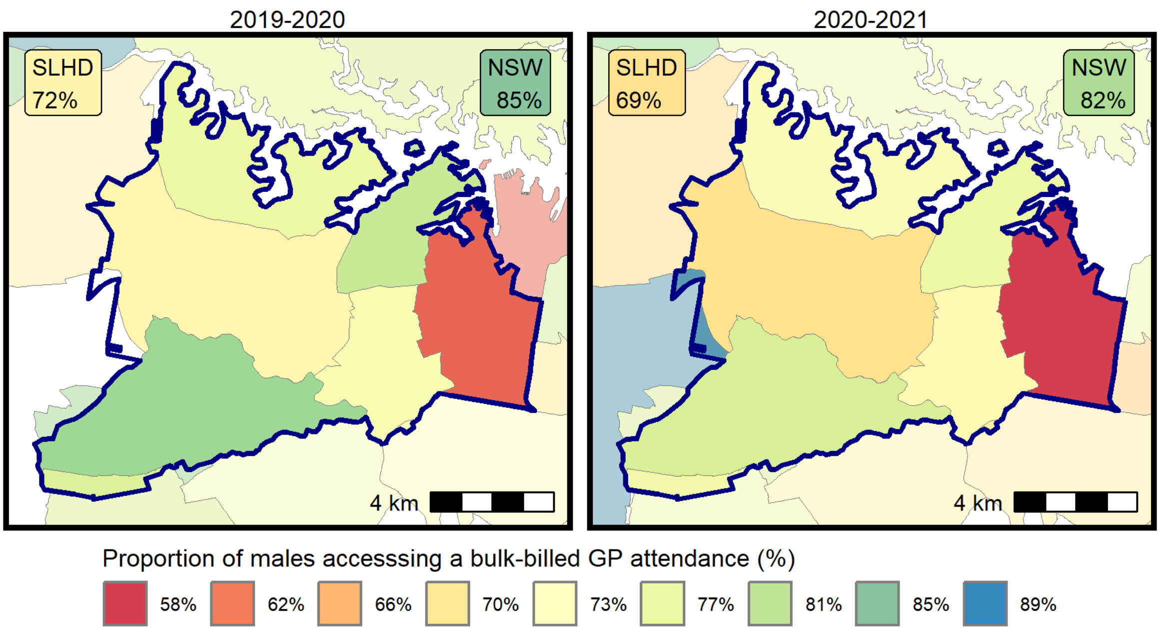

Figure 34 Proportion of male population accessing bulk-billed non-referred (GP) attendances by Statistical Area Level 3, 2019–2020 and 2020–2021. Source: AIHW Medicare-subsidised GP, allied health and specialist health care across local areas.

The proportion of males accessing bulk-billed GP services varied across the district, from around 80% in the north and south-west of the district, to as low as 60% in the easternmost SA3 (Sydney Inner City). Rates decreased across all areas by approximately 3% in the 2020–2021 period, with rates generally lower across all SA3s than the NSW overall estimate for both time periods.

[62] AIHW (2020) Bulk billing for non-referred (GP) attendances

6.6.4.1.2 Females

The proportion of females in the population who accessed a bulk-billed non-referred (GP) attendance by SA3 for the periods 2019–2020 and 2020–2021 are presented in **Figure 35**.

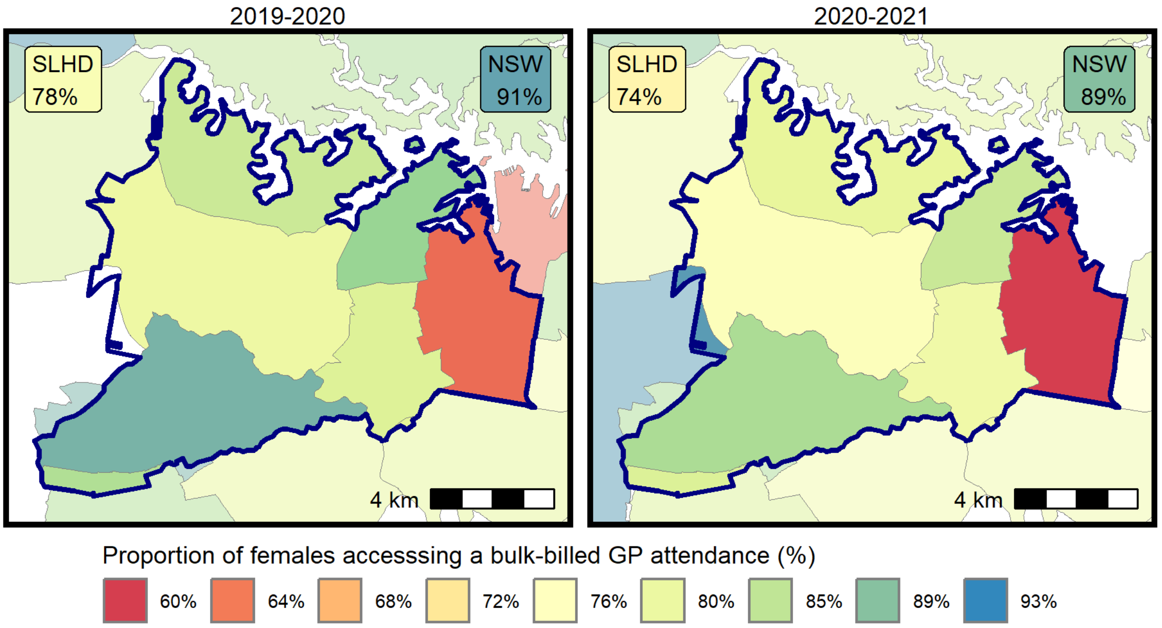

Figure 35 Proportion of female population accessing bulk-billed non-referred (GP) attendances by Statistical Area Level 3, 2019–2020 and 2020–2021. Source: AIHW Medicare-subsidised GP, allied health and specialist health care across local areas.

The proportion of bulk-billed GP services by SA3 for females was slightly higher than for males, but similarly varied across the district from around 85-90% in the north and south-west, to 60% in the easternmost SA3 (Sydney Inner City). As with males, rates have decreased across all areas in the 2020–2021 period, by approximately 3%, with rates across all SA3s generally lower than the NSW overall estimate across both time periods.

6.6.4.2 Waiting times for elective surgery: waiting times in days

Elective surgery is defined as surgery planned via specialist clinical assessment and resulting in placement on an elective surgery waiting list. Surgery is defined as procedures listed in the surgical operations section of the Commonwealth Medicare Benefits Schedule[63].

The MyHospitals API was accessed for hospitals within the SLHD to obtain data on median waiting times for elective surgery, for the time period between 2011 and 2021. Note that data are presented as reported, with no additional calculation or validation and with detailed metadata and methods available on the AIHW METEOR website [64]

The median wait times for elective surgery – for Canterbury, Concord and Royal Prince Alfred hospitals – across urgent, semi-urgent and non-urgent categories are detailed in **Figure 36**. Note the different scales for the *y* axes across panels.

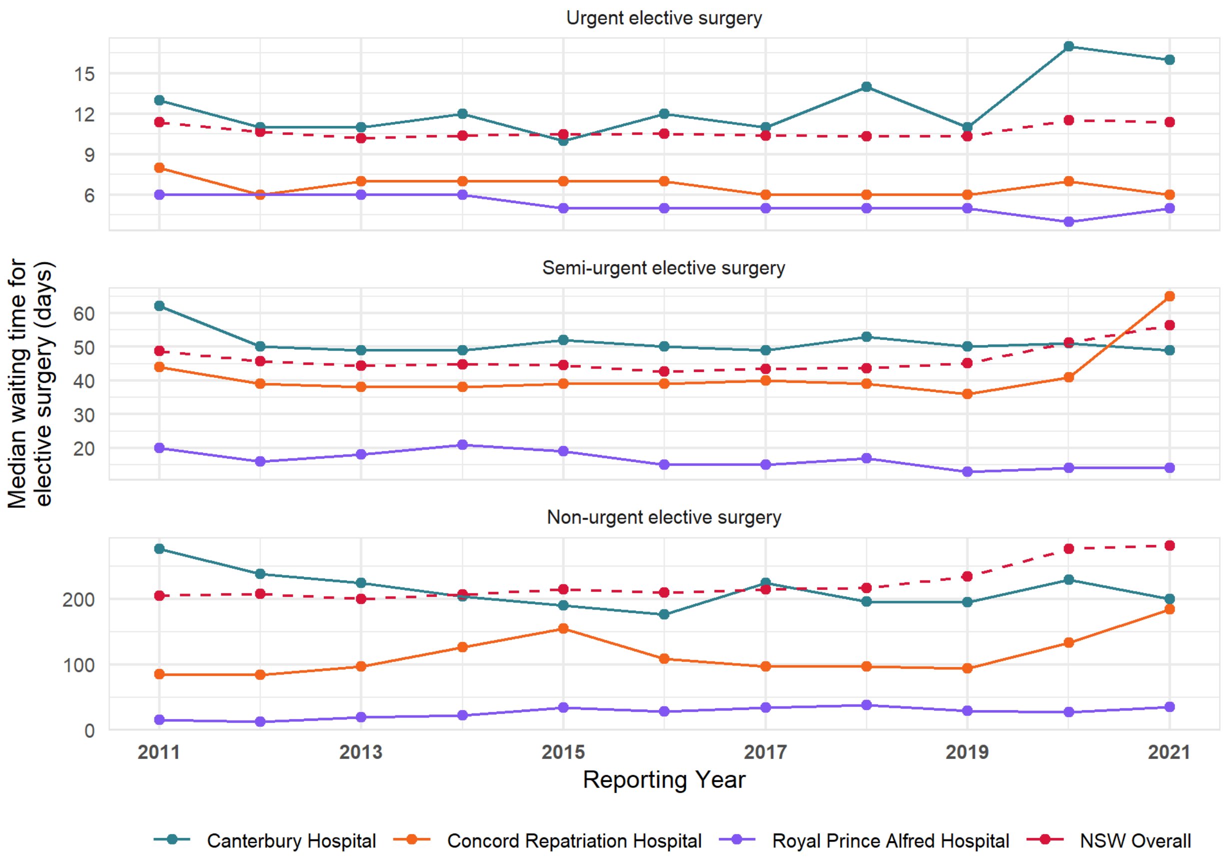

Figure 36 Median waiting time for commencement of elective surgery (in days), by urgency category and hospital, within the Sydney Local Health District, 2011–2019. Note the different scales of *y* axes across plots. Source: AIHW MyHospitals API.

Royal Prince Alfred Hospital had consistently lower wait times for elective surgeries across all three categories and time points. Canterbury, on the other hand, had mostly higher wait times. In 2020–2021 an increase in wait times for Concord Repatriation Hospital in both the semi-urgent and non-urgent elective surgery categories was observed. While non-urgent and semi-urgent elective surgery wait times appeared to decrease over the study period for Canterbury Hospital, wait times for urgent elective surgeries increased over the same period. Only Canterbury saw wait times at or above the NSW overall rate, while all other hospitals were consistently lower in almost all time points and categories.

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[63] AIHW (2015) Elective surgery

[64] AIHW (2022) Waiting times for elective surgery: waiting times in days

6.6.4.3 Waiting times for elective surgery: proportion of population admitted within clinically recommended time

The MyHospitals API was accessed for hospitals within the SLHD to obtain data on proportion of patients admitted for elective surgery within the clinically recommended time, for the time period between 2011 and 2021. Note that data are presented as is, with no additional calculation or validation and with detailed metadata and methods available on the AIHW METEOR website [65]

The proportion of patients admitted within clinically recommended times for elective surgery, for Canterbury, Concord, Royal Prince Alfred hospitals, across urgent, semi-urgent and non-urgent categories are detailed in **Figure 37**.

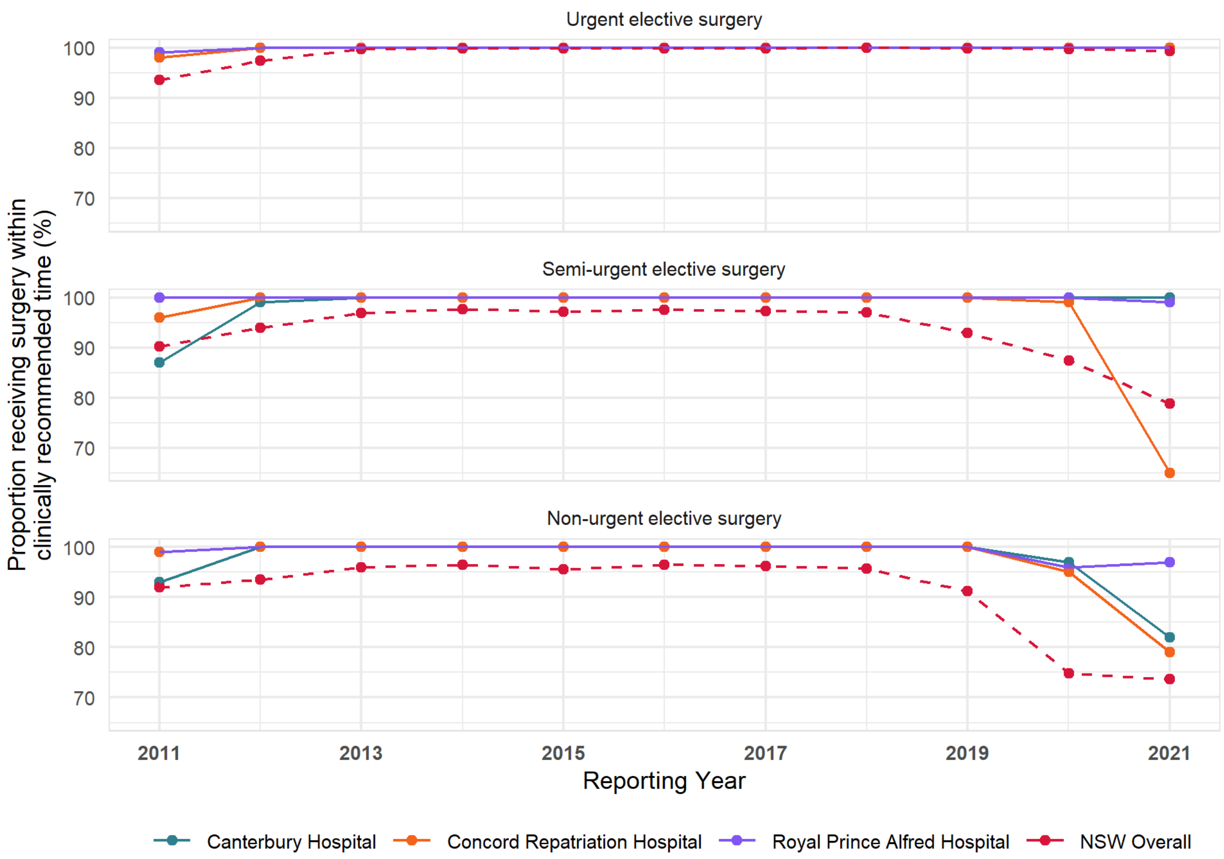

Figure 37 Proportion of patients admitted for elective surgery within the clinically recommended time by urgency category and hospital within the Sydney Local Health District, 2011–2019. Source: AIHW MyHospitals API.

Almost all patients were seen within the clinically recommended waiting time for urgent elective surgeries across all three hospitals at all time points. The proportion of patients seen within clinically recommended waiting times dropped noticeably for both semi-urgent and non-urgent elective surgeries the for the 2019–2020 and 2020–2021 periods, particularly for Concord Repatriation Hospital for the semi-urgent elective surgery category. These delays are very likely a result of the COVID-19 pandemic, and future data points are needed to track the patterns during 2022 and 2023. Despite this, all hospitals within the SLHD performed at, or consistently above, the NSW overall rate across all time points and categories.

[65] AIHW (2019) Waiting times for elective surgery: proportion admitted within clinically recommended time

6.6.4.4 Waiting times for elective surgery: percentage of population who waited more than 365 days

The MyHospitals API was accessed for hospitals within the SLHD to obtain data on the proportion of patients who waited more than 365 days for elective surgery, by hospital. However, this variable was not available at the hospital level via this data source and there was no alternative data source available. As such, this variable is not visualised along with related metrics related to waiting time for elective surgery. Rates reported by this indicator are likely to be very low considering the high proportion of people admitted for elective surgery within clinically recommended times, as visualised in Figure 37. Nonetheless, future reports will aim to find alternative data sources for this indicator.

6.6.4.5 Waiting times for emergency hospital care: proportion of population seen on time

The MyHospitals API was accessed for hospitals within the SLHD to obtain data on the proportion of patients whose clinical care commenced within national benchmarks for waiting times for each triage category in public hospital emergency departments (ED). Data were retrieved for the time period between 2011 and 2021. Note that data are presented as is, with no additional calculation or validation and with detailed metadata and methods are available on the AIHW METEOR website [66].

The proportion of patients whose clinical care commenced within the national benchmarks for ED waiting times, for Canterbury, Concord, Royal Prince Alfred hospitals, are detailed in **Figure 38**, categorised by urgency category.

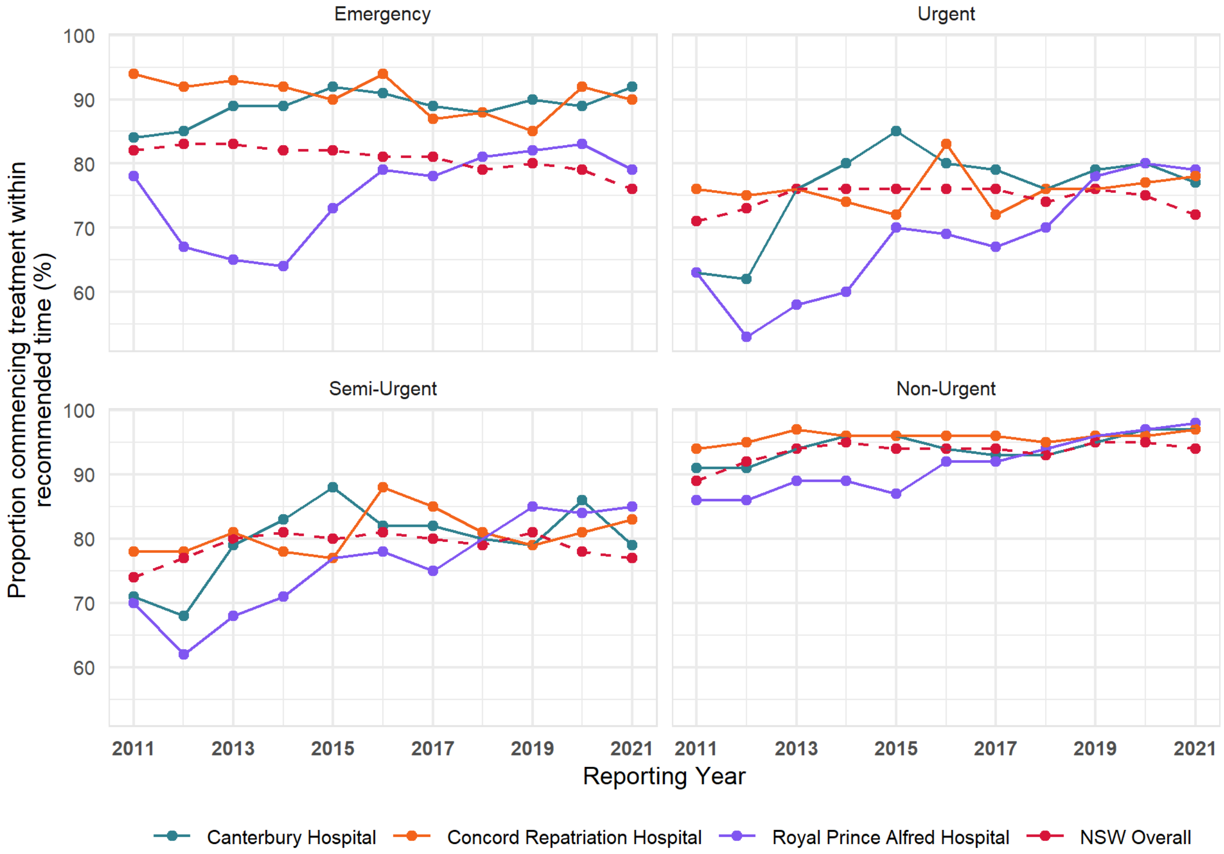

Figure 38 Proportion of patients admitted to the emergency department within the clinically recommended timeframe, by urgency category and hospital, within the Sydney Local Health District, 2011–2021. Source: AIHW MyHospitals API.

Across all urgency categories and hospitals there was a general trend upwards in proportion of patients seen within the clinically recommended waiting time. Both Concord and Canterbury hospitals had rates at around 90% for presentations classified as an emergency, while Royal Prince Alfred (RPA) was a little lower, at around 80% of presentations seen on time. In 2021, all three hospitals were comparable in terms of patients seen on time from the 'urgent' category, with around 80% of all patients seen on time. In terms of consistency, Concord Repatriation Hospital saw the least amount of change across the period, with high proportions of patients seen on time across the whole period. Results from RPA had greatest variability, beginning with the lowest proportions of patients seen on time across all urgency categories in 2011 and increasing substantially across all categories through the reporting period to be mostly consistent with Concord and Canterbury hospitals at the end of the period. Concord Repatriation Hospital and Canterbury Hospital tended to see rates at or above the NSW rate, while RPA saw rates lower than the state rate until the final three or four time points, when rates increased above the state level.

[66] AIHW (2021) Waiting times for emergency hospital care: proportion seen on time

6.6.4.6 Waiting times for emergency department care: waiting times to commencement of clinical care

The MyHospitals API was accessed for hospitals within SLHD to obtain data on median time elapsed, in minutes, for each patient from presentation in the emergency department to the commencement of the emergency department non-admitted clinical care, for the time period between 2011 and 2021. Note that data are presented as is, with the only additional calculation being a conversion of minutes to hours to ease interpretation. Detailed metadata and methods are available on the AIHW METEOR website [67].

The median time elapsed in hours for each patient from presentation in the emergency department to the commencement of the emergency department, for Canterbury, Concord, Royal Prince Alfred hospitals, by subsequent admission status, are detailed below in **Figure 39**.

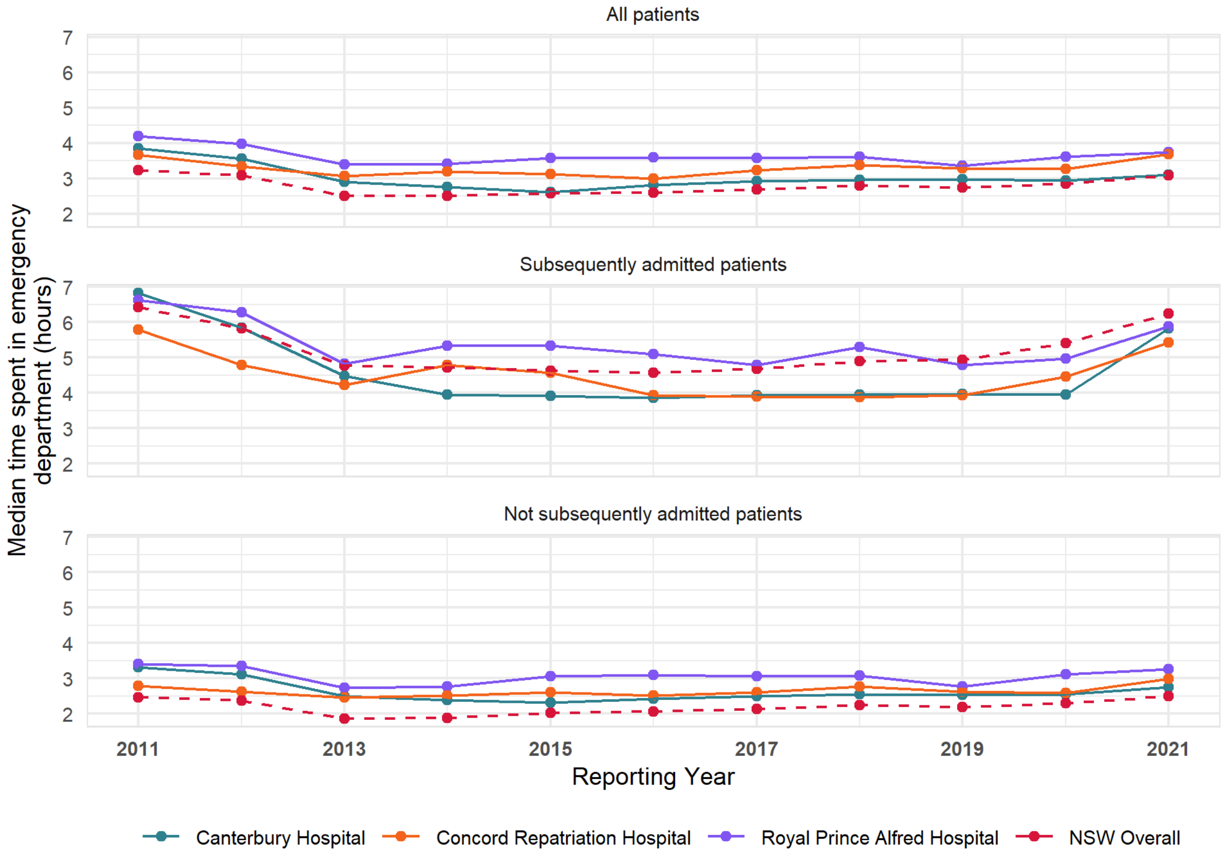

Figure 39 Median waiting times until commencement of clinical care (in hours), by subsequent admission status and hospital, within Sydney Local Health District, 2011–2021. Source: AIHW MyHospitals API.

Across all subsequent admission statuses and hospitals there was a general decrease in median waiting times to commencement of clinical care, with all hospitals seeing a relative increase in 2020 and 2021. Royal Prince Alfred (RPA) had overall higher median clinical care commencement wait times in subsequently admitted patients by around an hour, when compared to Concord and Canterbury hospitals. In 2021, however, all three hospitals had similar median waiting times of around 5.5 to 6 hours until the commencement of clinical care for subsequently admitted patients. RPAH had waiting times slightly higher than the NSW rate for subsequently admitted patients, although this dropped to below the NSW overall rate in 2019. All other hospitals in the SLHD had waiting times below the NSW overall rate, across all other categories and time points.

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[67] AIHW (2021) Waiting times to commencement of clinical care

6.6.4.7 Waiting times for emergency department care: percentage of patients whose length of emergency department stay is 4 hours or less

The MyHospitals API was accessed to obtain data on the proportion of patients whose length of emergency department stay is 4 hours or less, for the time period between 2011 and 2021, at hospitals within the SLHD. Note that data are presented as is, with no additional calculation. Detailed metadata and methods are available on the AIHW METEOR website [68].

The proportion of patients whose length of emergency department stay was four hours or less at Canterbury, Concord and Royal Prince Alfred hospitals, for the time period between 2011 and 2021 and categorised by urgency are detailed in **Figure 40**.

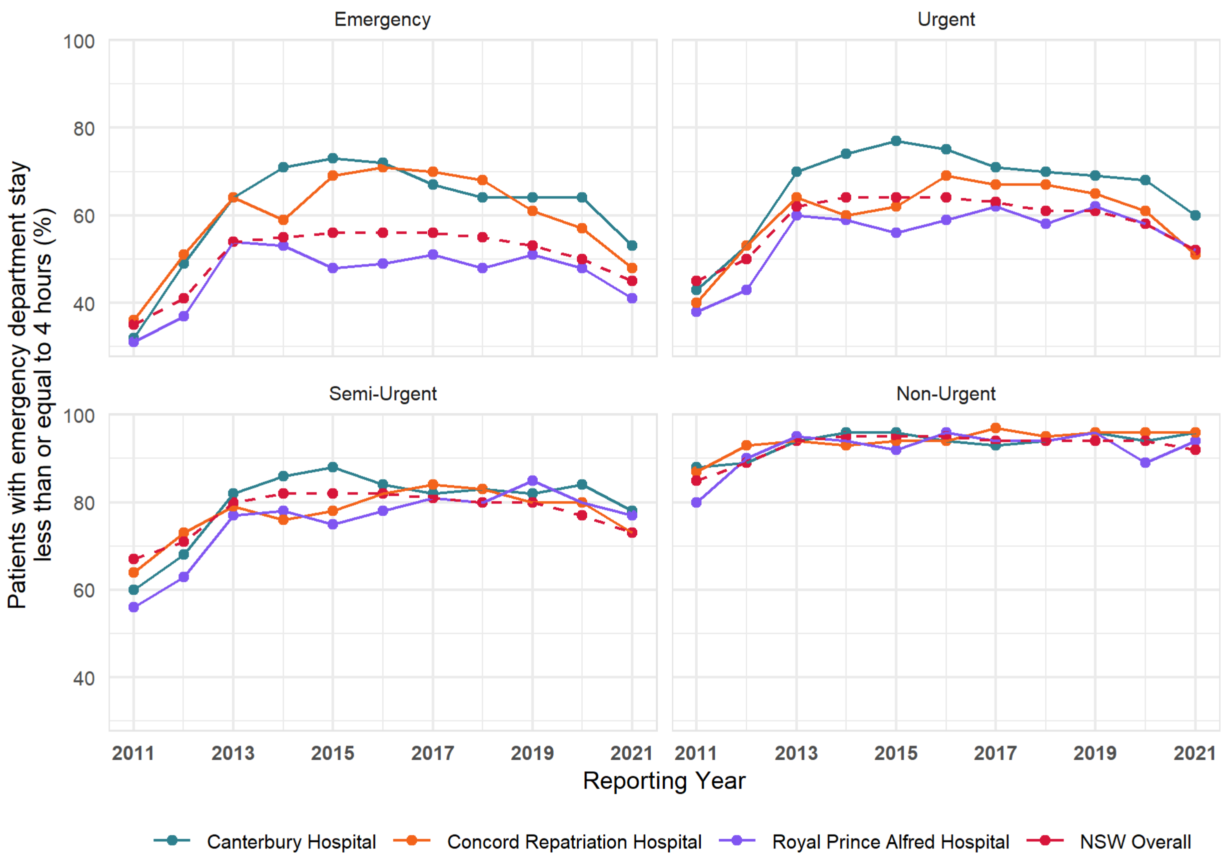

Figure 40 Proportion of patients whose length of emergency department stay was four hours or less, by subsequent admission status and hospital within the Sydney Local Health District, 2011–2021. Source: AIHW MyHospitals API.

Across all urgency categories and hospitals with the SLHD, there was a general trend upwards in the proportion of patients whose length of emergency department stay was four hours or less before being subsequently admitted to hospital. However, there were slight decreases seen across all hospitals and categories in 2020 and 2021, which may be accounted for by increased COVID-19-related health measures affecting triage and processing times. Between 60 and 70% of patients classified as emergent and urgent presenting at at Concord and Canterbury hospitals were seen within four hours. Comparatively, around 50 and 60% of patients classified as emergent and urgent presenting at RPAH, respectively, were seen within four hours. In 2020 and 2021, all three hospitals were comparable in terms of patients seen within four hours or less across all categories, with only non-urgent admissions seeing a decrease in the proportion of patients with stays four hour or less. Concord Repatriation and Canterbury Hospitals tended to have a higher proportion of patients with emergency departments stays less than, or equal to, four hours across most time points and categories, while RPAH tended to have rates at, or slightly below, the NSW overall rate.

[68] AIHW (2021) Waiting times for emergency department care: percentage of patients whose length of emergency department stay is 4 hours or less.

6.6.4.8 Waiting times for emergency department care: time spent in the emergency department

The MyHospitals API was accessed to obtain data on the time until most patients (90%) left the emergency department – categorised by subsequent admission status – in the time period between 2011 and 2021, for hospitals within the SLHD. Note that data are presented as is, with the only additional calculation being a conversion of minutes to hours to ease interpretation. Detailed metadata and methods are available on the AIHW METEOR website [69].

The time until 90% of patients left the emergency departments at Canterbury, Concord and Royal Prince Alfred hospitals, by subsequent admission status are detailed in **Figure 41**.

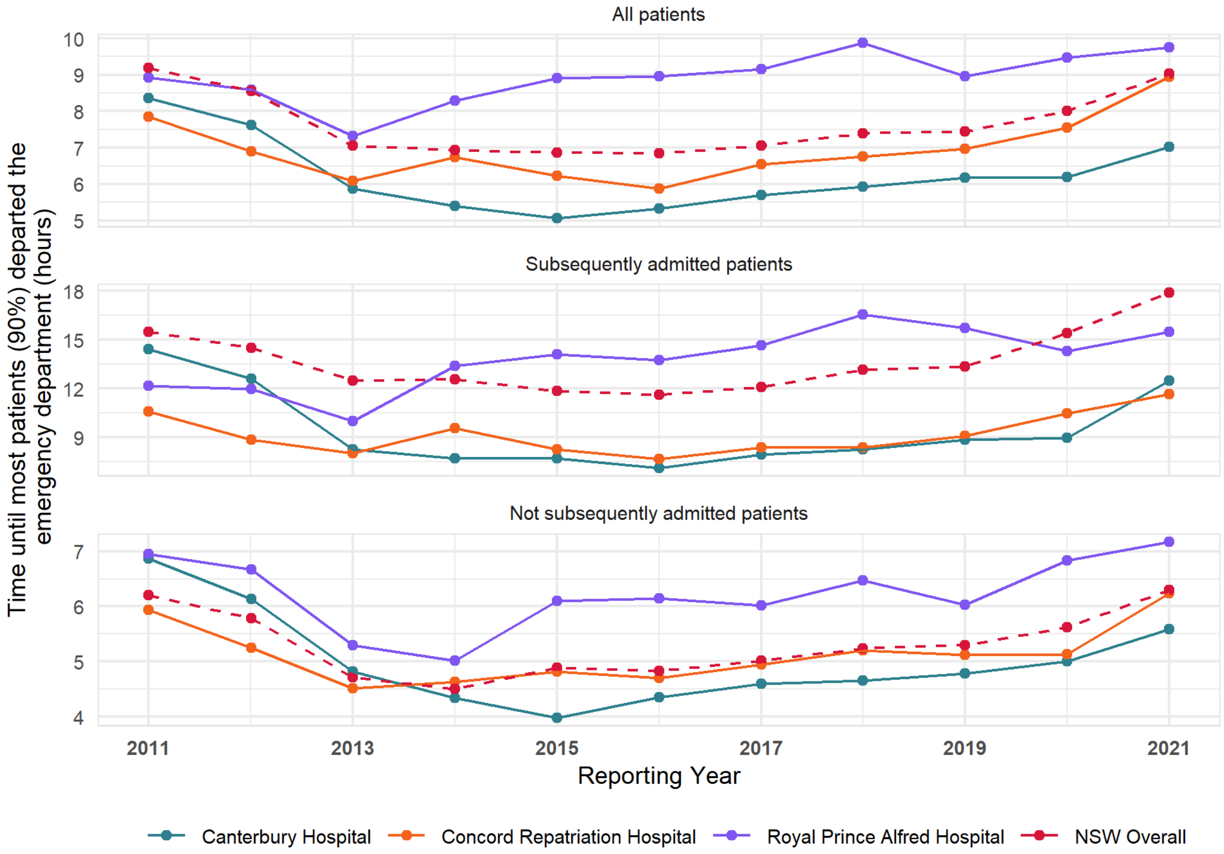

Figure 41 Time until most (90%) patients departed the emergency department, by subsequent admission status and hospital within the Sydney Local Health District, 2011–2021. Note different *y* axes across panels. Source: AIHW MyHospitals API.

Across both subsequent admission statuses and all hospitals there was a general increase in the time taken for most (90%) of patients to depart the emergency department. Times were substantially higher for RPA across both subsequent admission statuses, with the difference most notable in those patients subsequently admitted to hospital. All hospitals saw a sharp increase in 2020 and 2021, with differences especially pronounced in those patients subsequently admitted to hospital, likely due to the increased strain on hospital resources during the COVID-19 pandemic. As with the proportion of patients whose stay in the emergency department was four hours or less, Concord Repatriation and Canterbury Hospitals generally had a lower time until 90% of patients had departed emergency departments than the NSW overall time, while RPAH had times at, or slightly above, the NSW overall rate.

[69] AIHW (2021) Waiting times for emergency hospital care: proportion seen on time

6.7 Efficiency and sustainability

6.7.1 Cost per weighted separation and total case weighted separations

The average cost per weighted separation was calculated as an adjusted average cost, where the relative complexity of the activity was taken into account. This calculation used the national cost weights to weight separations at the Diagnosis Related Group (DRG) level. This was measured against the cost per national weighted average unit (NWAU), which was defined as the cost associated with providing one 'average' unit (1 NWAU) of public hospital service, based on public hospital services provided to acute admitted patients [70].

To ensure the national comparability of public hospitals, the cost per NWAU:

- included a subset of comparable running costs, which were accounted for similarly across states and territories. For example, property, plant and equipment costs were excluded from the calculations; and
- counted similar services for similar acute patients by using the NWAU.

Weighted cost per hospital admission was accessed via the NSW Health-managed Admitted Patient Data Collection and summarised at the SA2 level per period to assess the average cost, in NWAU, associated with the population residing in each SA2. The denominator used was the number of in-scope acute admitted hospital admissions from that area.

6.7.1.1 Males

The average cost per weighted separation for males, by SA2 across the SLHD, is shown in **Figure 42**.

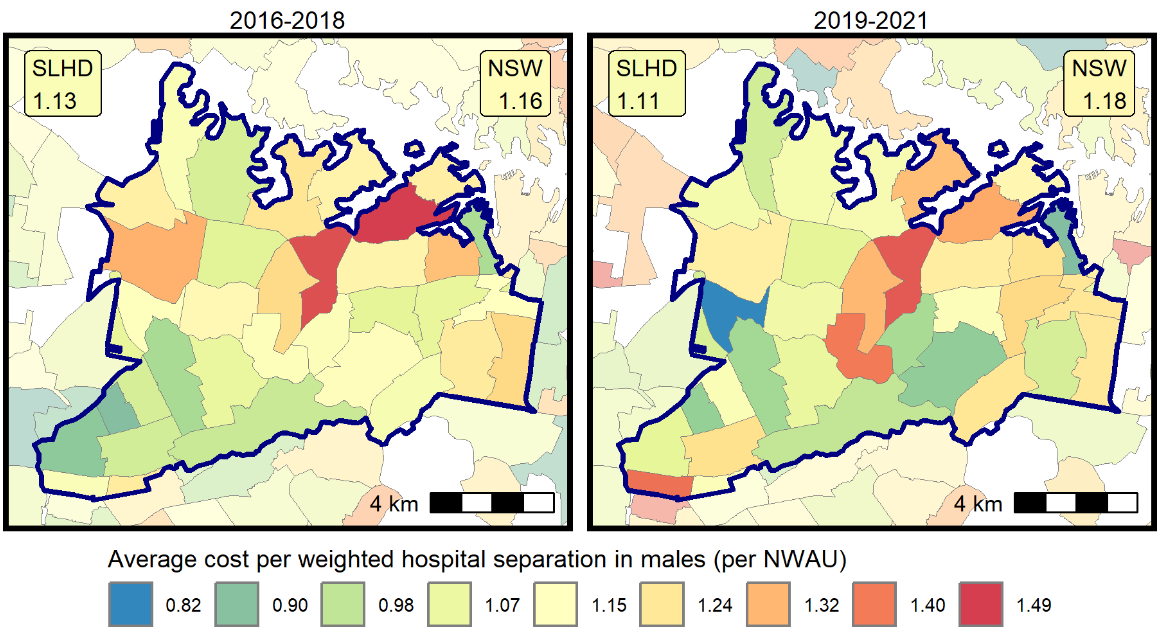

Figure 42 Average cost per weighted hospital separation in national weighted average units (NWAU) among males by Statistical Area 2, 2016–2018 and 2019–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Males, in general, had costs per weighted separation close to 1 NWAU. While there was some fluctuation across the district, the median cost stayed close to one in both years (1.12 and 1.13, respectively). Costs were consistently slightly higher in Haberfield and Summer Hill across both periods, with hospital separations averaging around 1.4 NWAU per in-scope acute hospital admission. Most areas across the SLHD had costs at, or below, the NSW overall rate.

[70] AIHW (2020) Cost per weighted separation and total case weighted separations.

6.7.1.2 Females

The average cost per weighted separation for females, by SA2 across the SLHD, is shown in **Figure 43**.

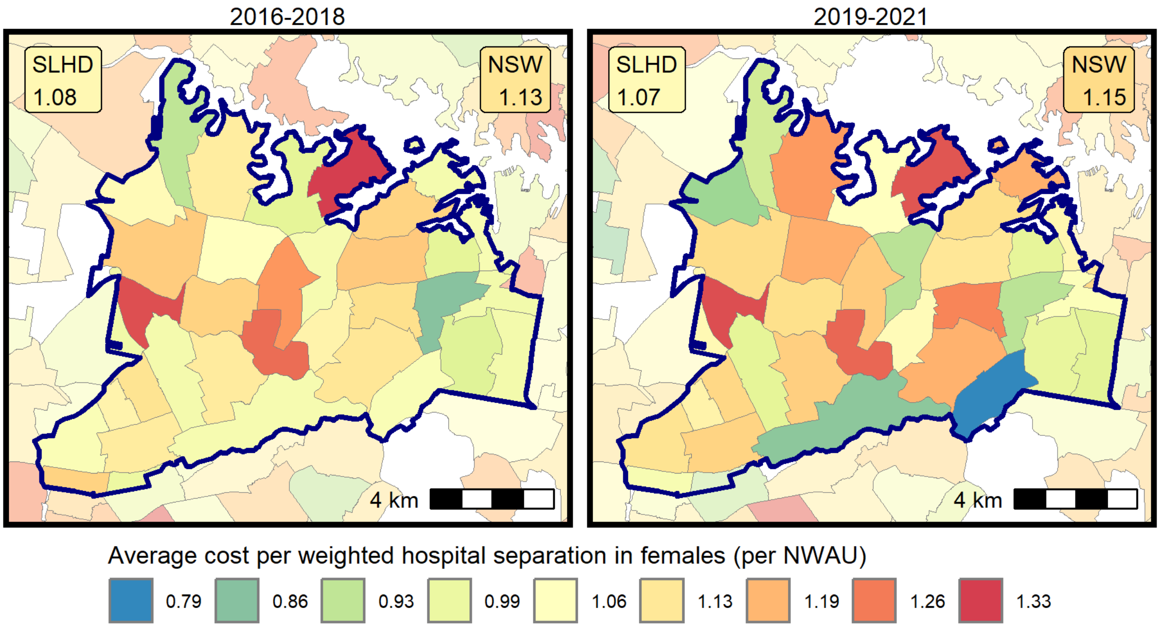

Figure 43 Average cost per weighted hospital separation in national weighted average units (NWAU) among females by Statistical Area 2, 2016–2018 and 2019–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Like males, females had costs per weighted separation close to 1 NWAU. While there was some fluctuation across the district, the median cost stayed close to one in both years (1.09 and 1.11, respectively). Costs were consistently slightly higher in Drummoyne and Rodd Point across both periods, with hospital separations averaging around 1.3 NWAU per in-scope acute hospital admission. Around half of the areas across the SLHD had costs at, or below, the NSW overall rate.

6.7.2 Net growth in health workforce

The AIHW define the net growth in health workforce[71]. The workforce for each health profession is defined as those employed in Australia as medical practitioners, nurses/midwives, dental practitioners and allied health practitioners. This definition excludes those who are registered in the profession but are retired from regular work; those working outside the profession; those working in the profession but on extended leave of 3 months or more; and those working outside Australia.

The AIHW sourced their data on the health workforce directly from the Australian Government Department of Health and Aged Care Health Workforce dataset [72]. This supplied the number of people employed in each of the healthcare workforce categories, by Statistical Area 3 (SA3) level. Note that, in contrast to other indicators, SA3 in this instance referred to the place of work, rather than the place of residence, of the individual. Thus, this indicator referred to the number of people in the health workforce operating within any given SA3. Estimated resident populations sourced from the ABS were used to calculate rates of health workforce employees per 100,000 resident population in each SA3.

6.7.2.1 Medical practitioners, nurses and midwives

Figure 44 shows the rates of medical practitioners, and of nurses and midwives, per 100,000 people, categorised by SA3 and year between 2013 and 2021. Note that different scales on each *y* axis were used to better illustrate ranges. As rates were substantially affected by the number of facilities, especially large hospitals, operating in individual SA3s, comparisons should ideally be made between the growth or reduction in rates over time for each SA3, rather than between the SA3s themselves.

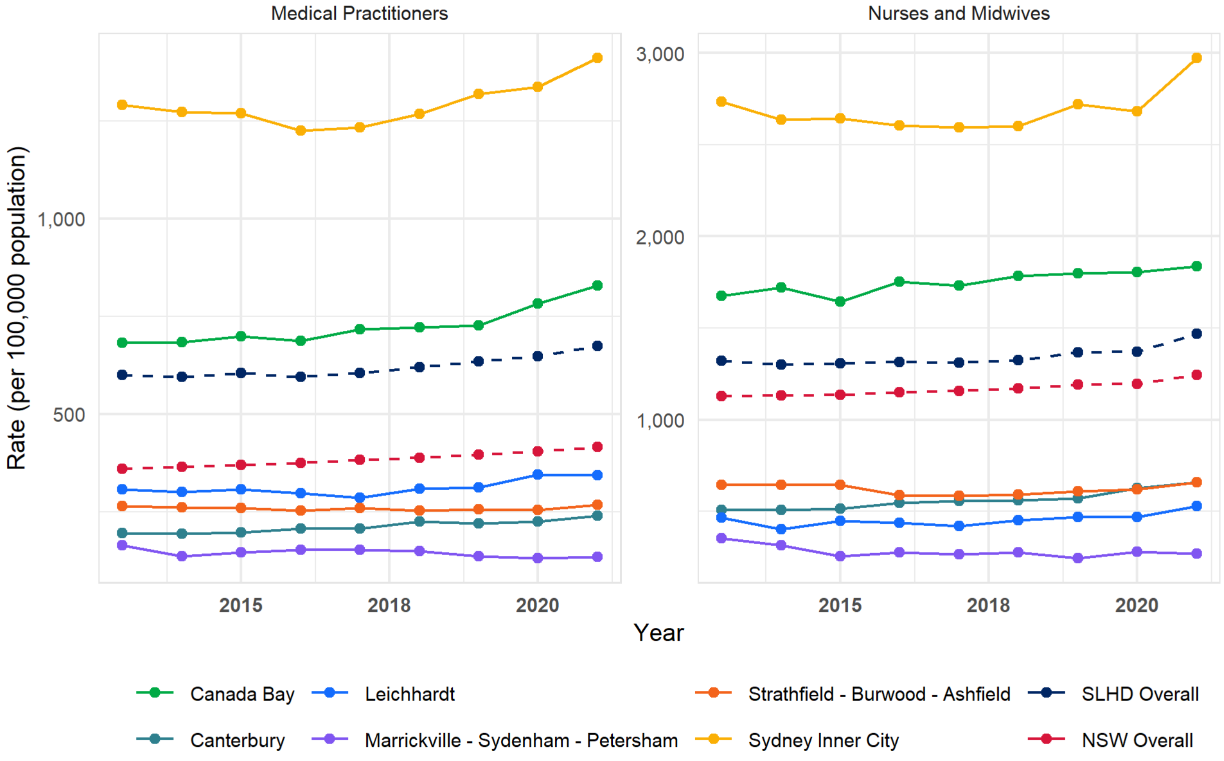

Figure 44 Rate of medical practitioners, and nurses and midwives, employed in the health workforce per 100,000 resident population, by year and Statistical Area 3, 2011–2016 and 2016–2021. Source: Australian Government (2022) Health Workforce Data.

Rates of medical practitioners, and nurses and midwives, employed in SLHD SA3s per 100,000 resident population, increased in the Sydney Inner City, Canada Bay and Leichhardt SA3s, while Canterbury and Strathfield, Burwood and Ashfield remained relatively consistent. Only the

[71] AIHW (2020) Net growth in health workforce

[72] Australian Government (2022) Health Workforce Data

Marrickville, Sydenham and Petersham SA3 saw a steady decline across both categories. In general, SLHD rates were higher than NSW overall, largely due to the high rates within Sydney Inner City and Canada Bay, with rates increasing overall across the time period.

6.7.2.2 Allied health and dental practitioners

Figure 45 shows the proportional net change across allied health and dental professionals employed in SLHD SA3s between census years: 2011–2016 and 2016–2021. Note that different scales on each y axis were used to better highlight ranges. As rates were substantially affected by the number of facilities, especially large hospitals, operating in individual SA3s, comparisons should ideally be made between the growth or reduction in rates over time for each SA3, rather than between the SA3s themselves.

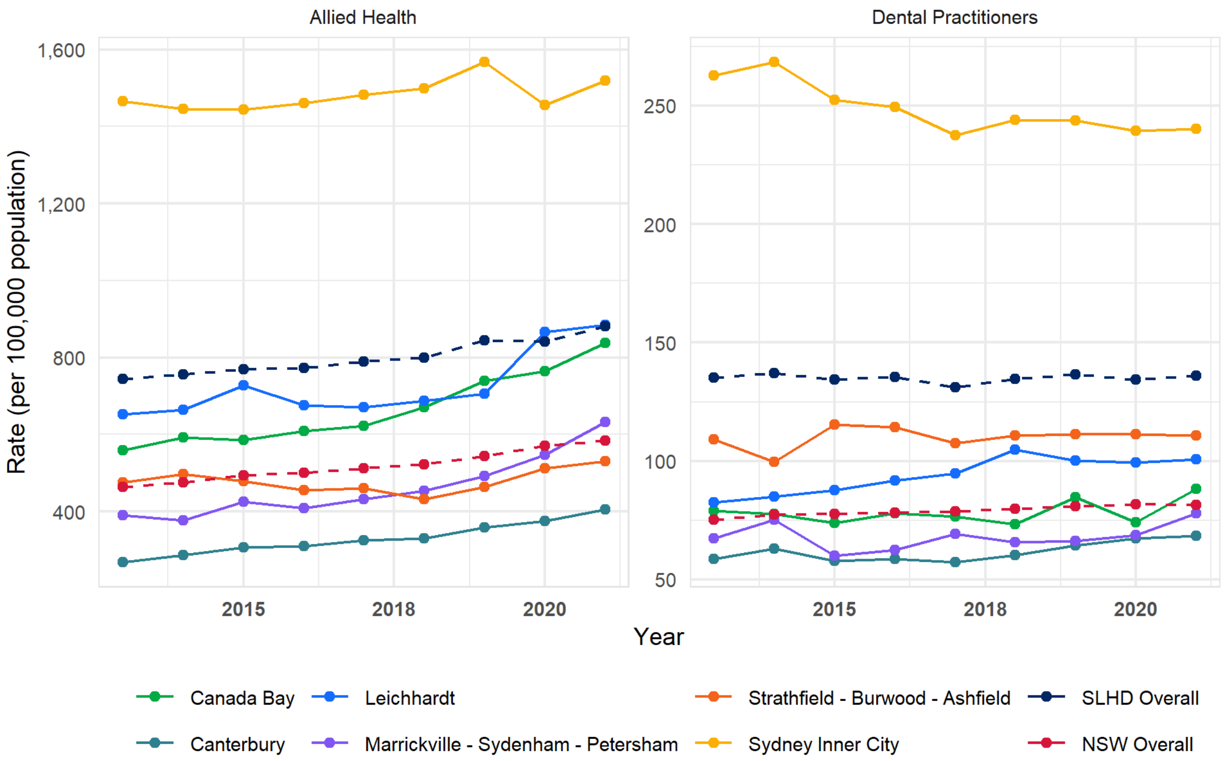

Figure 45 Rate of employment of allied health and dental practitioners per 100,000 residential population by year and Statistical Area 3, 2011–2016 and 2016–2021. Source: Australian Government (2022) Health Workforce Data.

As with the categories of medical practitioners, and nurses and midwives, rates were highest in the Sydney Inner City SA3 by a large margin. In general, rates of people employed in allied health roles increased across all SA3s, as well as in NSW overall. While rates of employed dental practitioners appeared to decrease slightly in the Sydney Inner City SA3, rates either increased or stayed consistent across all other SA3s and were roughly consistent both at the SLHD and NSW level.

6.8 Health Status

6.8.1 Health conditions

6.8.1.1 Incidence of heart attacks (acute coronary events)

Incidence of acute coronary events was assessed using AIHW methodology on the NSW Health-managed Admitted Patient Data Collection (APDC) and the Cause of Death Unit Record File (CODURF). Specifically, the number of non-fatal admissions for acute myocardial infarctions or unstable angina were added to the number of deaths where acute coronary heart disease was identified as the underlying cause of death[73]. To account for double counting of distinct events, a maximum of one acute coronary event per person per year was counted.

Numbers were summed across three-yearly periods by sex and age group (in five-year divisions) and standardised to the 2001 Australian standard population to adjust for differences in incidence and populations by age groups and to allow for direct comparison between statistical areas. Finally, age-standardised rates were divided by the time period (i.e. three years) to reflect average annual rates per 100,000 population.

The incidence of acute coronary events across males and females was calculated for the periods 2016 to 2018 and 2019 to 2021, with results shown in Figure 46.

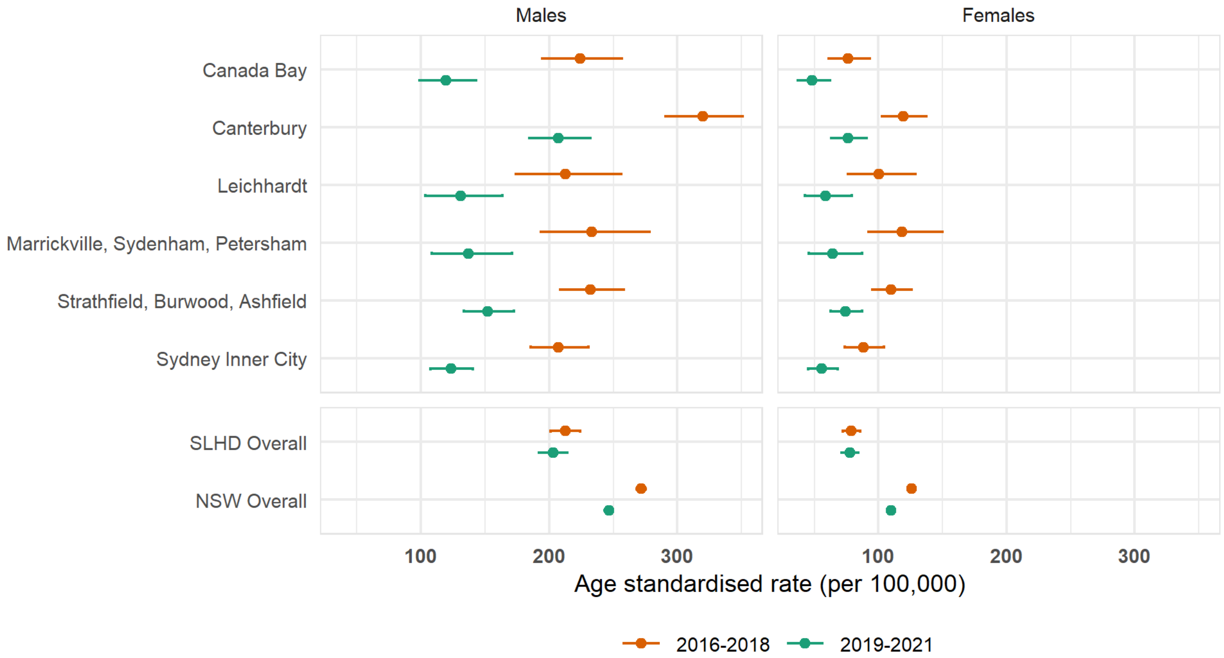

Figure 46 Incidence of acute coronary events by index hospital admission per 100,000 population, by sex and Statistical Area 3, 2016–2018 and 2019–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Rates of acute coronary events were highest in the south-western areas of the SLHD, with rates varying between around 210 and 320 events per 100,000 males and between 80 and 120 events per 100,000 females in 2016–2018. In general, these rates declined substantially across all areas and both sexes in the 2019–2021 period. This is likely due to the overall drop in non-acute hospital admissions during the COVID-19 pandemic. Nonetheless, ongoing monitoring will determine if numbers reflect a true relative decrease in the rate of hospitalisation associated with acute coronary events. Almost all SA3s at all time points were below the respective NSW rate, with only exception being males in Canterbury, which were slightly *above* the NSW overall rate at both time points.

[73] AIHW (2022) Incidence of heart attacks (acute coronary events)

6.8.1.2 Incidence of selected cancers

Incidence of selected cancers, by cancer group, was reported by the AIHW[74]. While unit record cancer registry data was not easily accessible, summaries provided by the Cancer Institute were accessed at the Local Government Area (LGA), with the four cancer groups of highest incidence reported below. Specifically, these included prostate cancer (in men), breast cancer (in women), melanoma of the skin, and lung cancer (in all persons)[75].

Numbers were reported as is across two-yearly periods, with provided estimates age-standardised by respective population denominator. That is, males for prostate cancer, females for breast cancer and all persons for melanoma of the skin and lung cancer.

6.8.1.2.1 Breast cancer and prostate cancer

Age-standardised rates of breast cancer in women and prostate cancer in men are visualised in **Figure 47**.

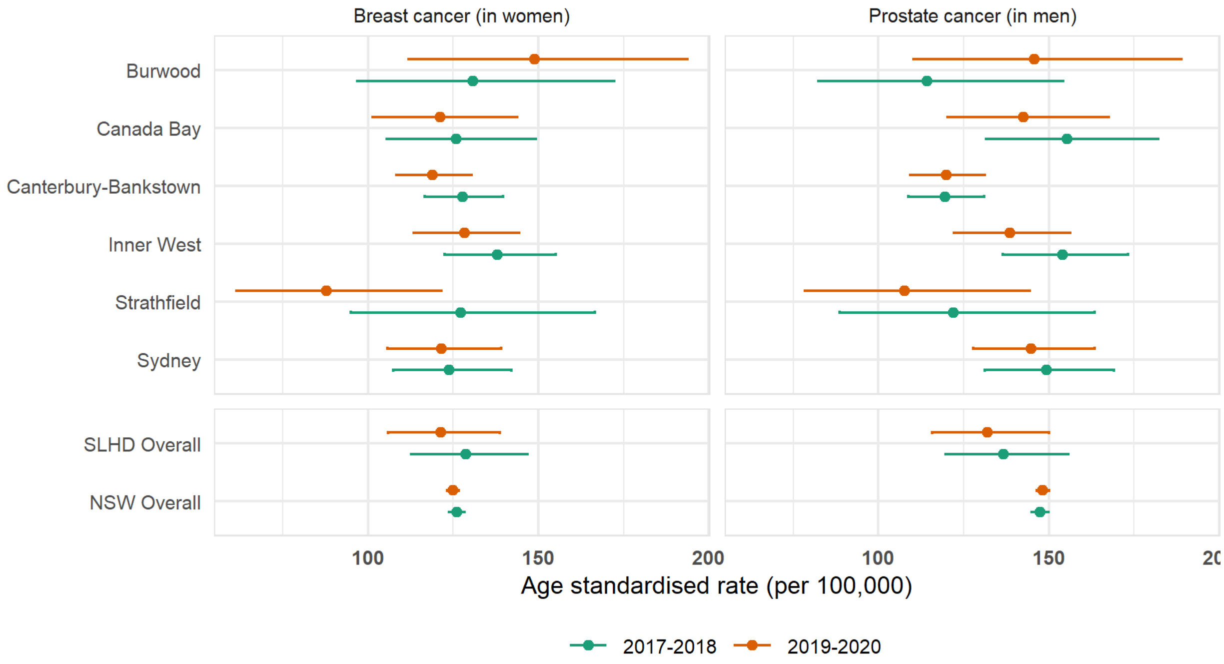

Figure 47 Age-standardised incidence of breast cancer in women and prostate cancer in men by Local Government Area, 2017–2018 and 2019–2020. Source: AIHW (2020) Incidence of selected cancers.

Rates of breast cancer in women were variable across the LGAs within the district, with rates slightly higher than the NSW overall rate in the Inner West and lower than the NSW overall rate in Strathfield. However, uncertainty around these estimates was high, and these may not reflect true differences in overall rates. In general, rates varied between 90 and 150 incident cases per 100,000 females.

Prostate cancer in men was similarly variable across the district, with rates appearing to be lowest in Strathfield, and highest in the Inner West and Canada Bay. In general, rates varied between around 110 and 150 incident cases per 100,000 men.

[74] AIHW (2020) Incidence of selected cancers

[75] The Cancer Institute (2022) Cancer type summaries

6.8.1.2.2 Lung cancer and melanoma of the skin

Incidence of lung cancer and melanoma of the skin is shown by Local Government Area in **Figure 48**.

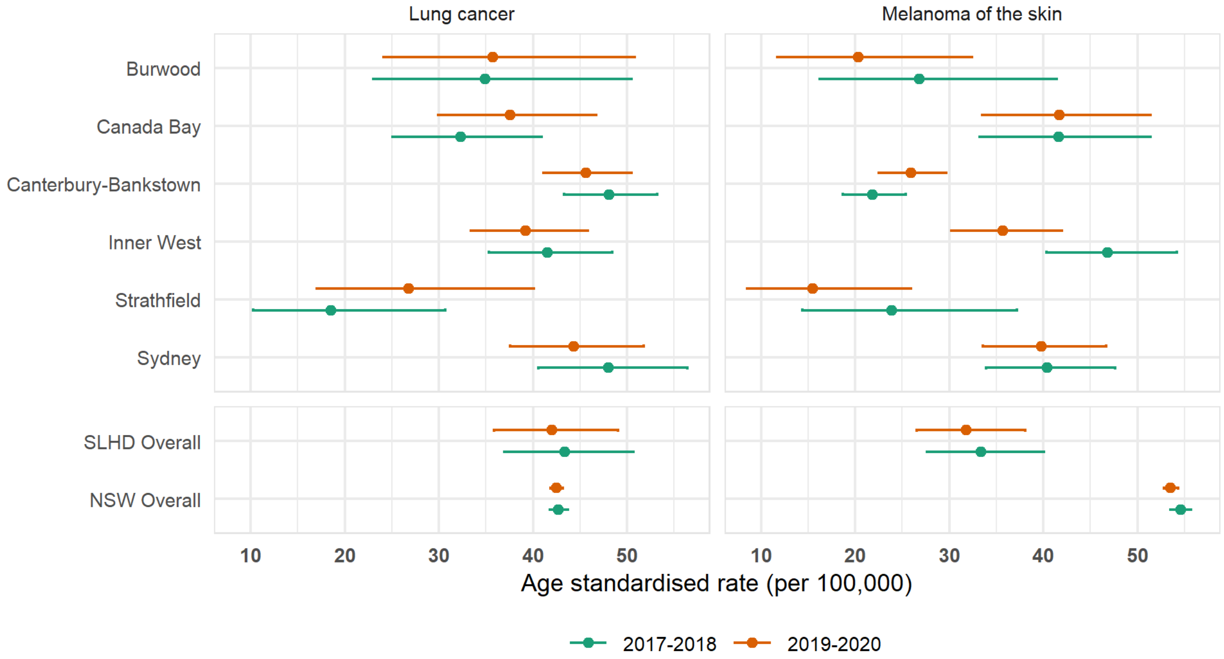

Figure 48 Age-standardised incidence of lung cancer and melanoma of the skin per 100,000 population by Local Government Area, 2017–2018 and 2019–2020. Source: AIHW (2020) Incidence of selected cancers.

Rates of lung cancer were variable across the LGAs within the district, with rates slightly higher than the NSW overall rate in the Sydney and Canterbury–Bankstown LGAs and lower than the NSW overall rate in Strathfield. However, uncertainty around these estimates was high, and these may not reflect true differences in overall rates. In general, rates varied between 20 and 50 incident cases per 100,000 in the population.

Rates of melanoma were similarly variable across the LGAs within the district, with rates lower than the NSW overall rate in all LGAs across all time points. Rates were especially low to the west of the district, in the Canterbury–Bankstown and Strathfield LGAs, with incident cases across the time period lower than 30 per 100,000 population. While this was lower than the threshold employed when calculating age-standardised rates from unit record data, as these rates were supplied from the Cancer Institute, they are presented as is.

6.8.1.3 Incidence of sexually transmissible infections & blood-borne viruses

In the AIHW calculation, sexually transmissible infections (STIs) and blood-borne viruses (BBVs) included the number of notifications of syphilis, human immunodeficiency virus (HIV), hepatitis B, hepatitis C, chlamydia, and gonorrhoea[76].

The Notifiable Conditions Records for Epidemiology and Surveillance (NCRES) data collection included all of these except for HIV, which required special access due to the sensitivity of the information. As such, it was not possible to include HIV notifications in the total incident cases of STIs and BBVs, although the number of new notifications across this period was likely to be quite small[77]. Hepatitis B and hepatitis C data contained notifications of newly diagnosed infections, including cases known to have been newly acquired or classified as 'unspecified'. Chlamydia and gonorrhoea notifications included cases that were not sexually acquired, especially in the 0–4 year age group. These notifications may only represent a fraction of the actual number of persons with the disease in the community. The number of notifications reflected health care seeking behaviour and testing practices, which may have varied across NSW. Consequently, these data are likely an underestimation of the true incidence of infections in NSW.

Rates were directly age-standardised to the 2001 Australian standard population.

Note that many hepatitis B infections likely represent historical infections that have only been detected for the first time in Australia.

6.8.1.3.1 Males

The rates of new STI and BBV notifications for males are shown in **Figure 49**.

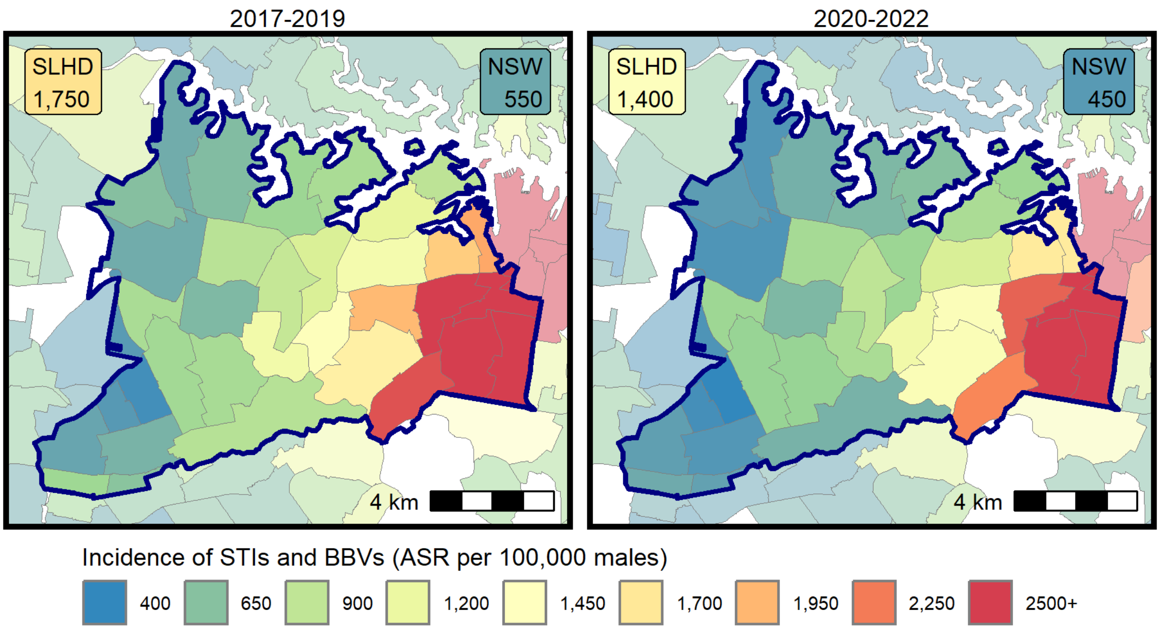

Figure 49 Age-standardised incidence rate (ASR) of sexually transmissible infections (STI) and blood-borne viruses (BBVs) per 100,000 population among males by Statistical Area 2, 2017–2019 and 2020–2022. Note the scale of this figure has been capped at 2,500 notifications per 100,000, when observed rates may have been much higher than this. Source: Notifiable Conditions Records for Epidemiology and Surveillance, NSW Ministry of Health.

Rates of STI and BBV notifications were substantially higher for males than for females, as has been demonstrated in previous reporting[78], with high rates thought to be attributable to rates of notifications in men who have sex with men (MSM). There was considerable variability across the district, with rates over five times higher in the east of the district than in the west, likely due to the distribution of MSM across the district.

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[76] AIHW (2021) Incidence of sexually transmissible infections and blood-borne viruses

[77] NSW Health (2020) NSW Sexually Transmissible Infections Strategy 2016 – 2020

[78] NSW Health (2020) NSW Sexually Transmissible Infections Strategy 2016 – 2020

While the median rate across the district was around 700–800 new notifications per 100,000 males, as has been previously reported, this was not evenly distributed across the district, with the areas to the east disproportionately accounting for these higher rates.

Finally, it must be noted that **Figure 49** includes *all* notifications for STIs and BBVs stated above, while the vast majority of these notifications are associated with either chlamydia or gonorrhoea, with rates of syphilis, hepatitis B and hepatitis C making up only a small proportion of the overall rates.

Rates in the eastern areas of the SLHD were comparable with the NSW overall rate. However, rates in eastern SA2s were several times higher than the NSW overall rate.

6.8.1.3.2 Females

The rates of new STI and BBV notifications for females are shown in **Figure 50**.

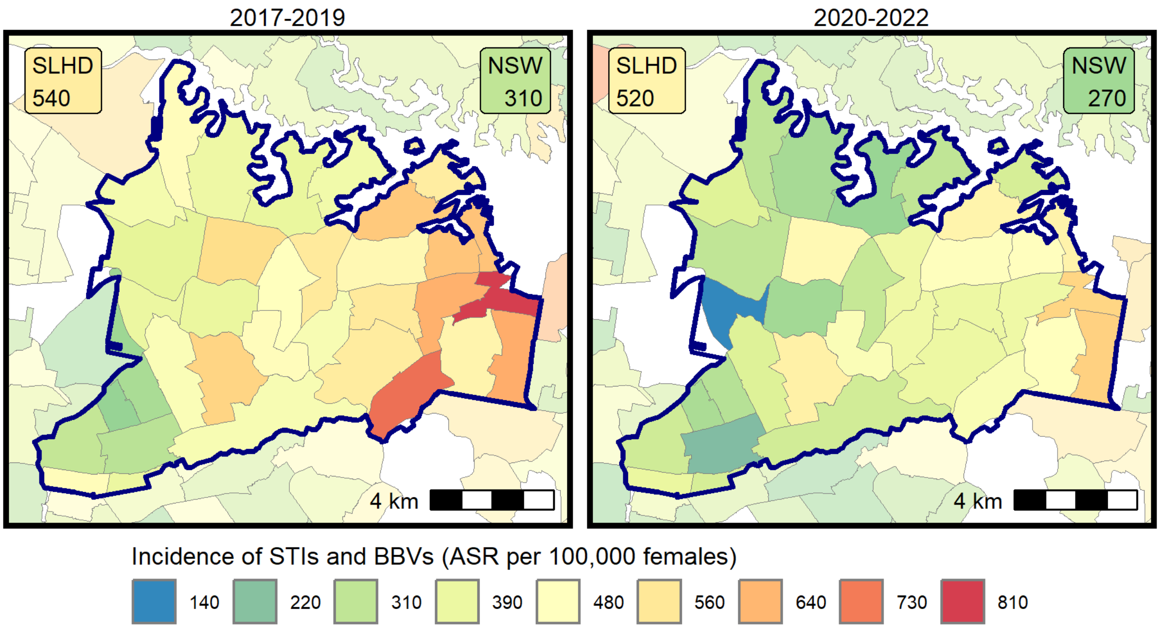

Figure 50 Age-standardised rate (ASR) of incidence of sexually transmissible infections and blood-borne viruses per 100,000 population among females by Statistical Area 2, 2017–2019 and 2020–2022. Source: Notifiable Conditions Records for Epidemiology and Surveillance, NSW Ministry of Health.

Rates of STI and BBV notifications were considerably lower in females than in males, as has been demonstrated in previous reporting[79]. As with males, however, there was considerable variability across the district, with rates around twice as high in the east of the district than in the west. While the median rate across the district was around 400–500 new notifications per 100,000 females, as has been previously reported, this was not evenly distributed across the district, with some areas to the east seeing rates as high as 700–800 new notifications per 100,000 females in the population.

As with males, **Figure 50** includes *all* notifications for STIs and BBVs stated above, while the vast majority of these notifications were associated with either chlamydia or gonorrhoea. By comparison, rates of syphilis, hepatitis B and hepatitis C made up only a small proportion of the overall rates.

As with males, rates in the eastern areas of the SLHD were mostly comparable with the NSW overall rate, with rates in eastern SA2s being several times higher than the NSW overall rate.

[79] NSW Health (2020) NSW Sexually Transmissible Infections Strategy 2016 – 2020

6.8.1.4 Incidence of end-stage kidney disease

Methods for identifying incidence of end-stage kidney disease were explored, with reference to the AIHW METEOR metadata website [80].

However, as we did not have linked cause of death data, it was not possible to include those who died of chronic renal failure, hypertensive renal failure or unspecified renal failure in the numerator, as was suggested by the AIHW metadata. Including records from the Cause of Death Unit Record File without first linking these deaths back to the APDC to confirm their status as novel entries would likely result in double counting of records. Furthermore, registry data on kidney transplants and dialysis were not able to be accessed and there was no clear method for approximation using hospital admission data. AIHW reported this indicator at the national level only, with minimal disaggregation by region of state and age group that could not be used to describe rates in NSW specifically. As such, this indicator was excluded from estimation.

[80] AIHW (2020) Incidence of end-stage kidney disease

6.8.2 Hospitalisation for injury and poisoning

The number of hospitalised injury or poisoning cases was calculated as the number of hospital separations with a principal diagnosis code in the ICD-10-AM (10th edition) range S00–T75 or T79 (excluding any with Z50 Care involving use of rehabilitation procedures appearing in any additional diagnosis field). This provided control for any transfers to another facility. Methods are detailed on the AIHW METEOR metadata website[81].

Methods were recreated as described using hospital admissions from the NSW Health-linked Admitted Patient, Emergency Department Attendance and Deaths Register (APEDDR) and rates were directly age-standardised to the 2001 Australian population.

6.8.2.1 Males

Rates of hospitalisation for injury and poisoning were generally higher for males than they were for females, and generally lower in metropolitan areas than in remote and regional areas[82].

Average rates per 100,000 in the population for males across the most recent available three-year periods are shown in **Figure 51**.

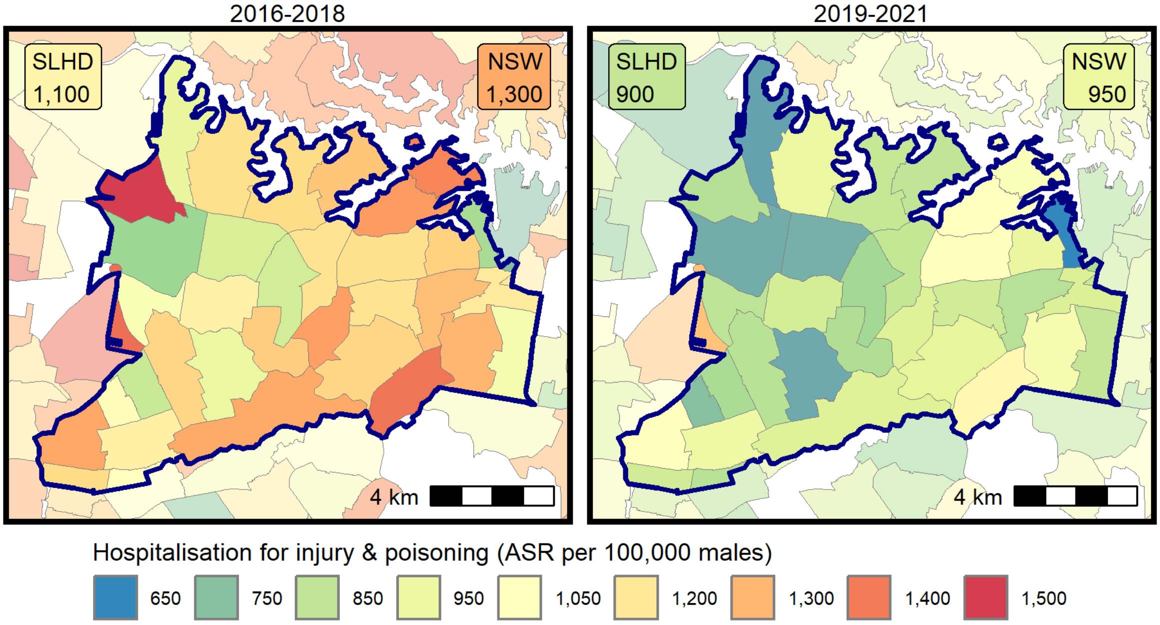

Figure 51 Age-standardised rates (ASR) for hospitalisation for injury and poisoning (per 100,000) among males by Statistical Area 2, 2016–2018 and 2019–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Rates for hospitalisation for injury and poisoning among males within the Sydney Local Health District were relatively lower than the New South Wales rate, ranging between 600–1000 admissions per 100,000 in the population in 2016–2018 and dropping substantially in 2019–2021 to between 400–800 admissions per 100,000. This fall was most likely due to the effects of the COVID-19 pandemic and associated public health orders; continued monitoring will reveal whether this effect will persist into future monitoring periods. There was little apparent pattern to the geographic distribution in either period, with hospitalisations due to poisoning and injury distributed evenly across the district.

Rates across the SLHD were mostly comparable with the NSW overall rate, with the drop in rates across time periods also observed.

[81] AIHW (2021) Hospitalisation for injury and poisoning

[82] AIHW (2018) Australia's Health; Chapter 3.15 – Injury

6.8.2.2 Females

Average rates per 100,000 in the population for females across the most recent available three-year periods are shown in **Figure 52**.

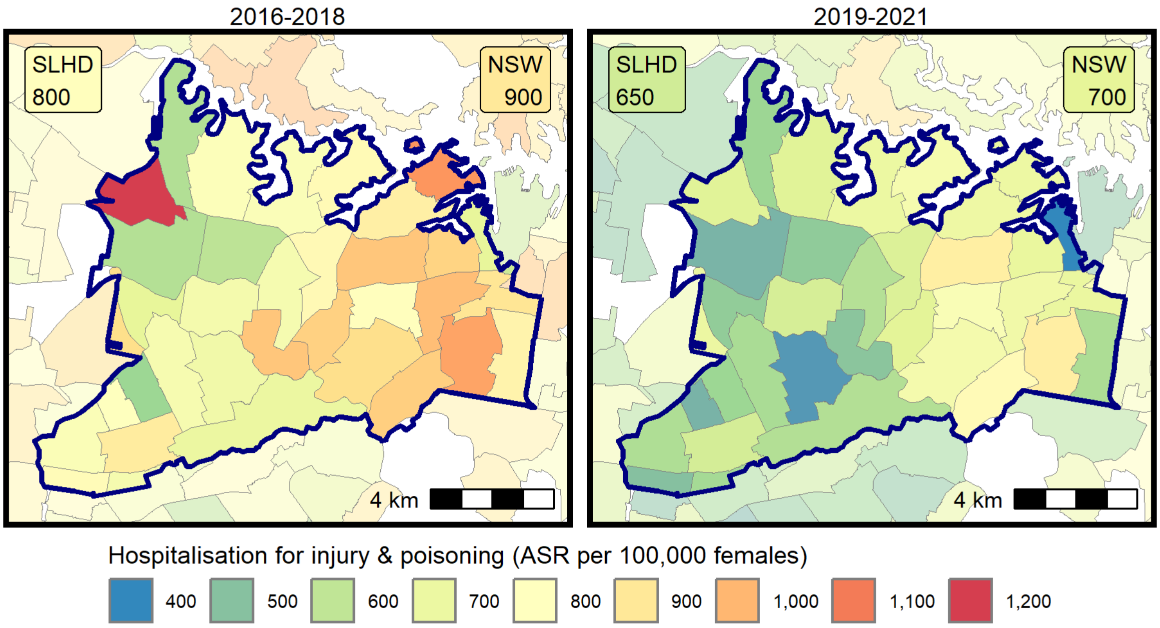

Figure 52 Age-standardised rates (ASR) for hospitalisation for injury and poisoning (per 100,000) among females by Statistical Area 2, 2016–2018 and 2019–2021. Source: Admitted Patient, Emergency Department Attendance and Deaths Register, NSW Ministry of Health SAPHaRI.

Rates for hospitalisation for injury and poisoning among females within the Sydney Local Health District were relatively low, ranging between 700–1,000 admissions per 100,000 in the population in 2016–2018 and dropping substantially in 2019–2021 to between 400–800 admissions per 100,000. As with males, this fall was most likely due to the effects of the COVID-19 pandemic and associated public health orders; continued monitoring will reveal whether this effect will persist into future monitoring periods. Unlike males, there appeared to be a clustering of higher rates of injury and poisoning admissions to the east and north-west of the district, where rates were relatively highest in both periods.

Most areas in the SLHD were comparable with the NSW overall rate, with some fluctuations discussed above.

6.8.3 Proportion of babies born with low birthweight

Incidence of low birthweight among live-born singleton babies was estimated with reference to the AIHW Meteor's metadata for this indicator[83]. Specifically, the NSW Health-managed Perinatal Data Collection (PDC) was accessed, with any live singleton birth with a recorded birthweight lower than 2500g identified and represented as a proportion of all live-born singleton babies by SA2 in **Figure 53**.

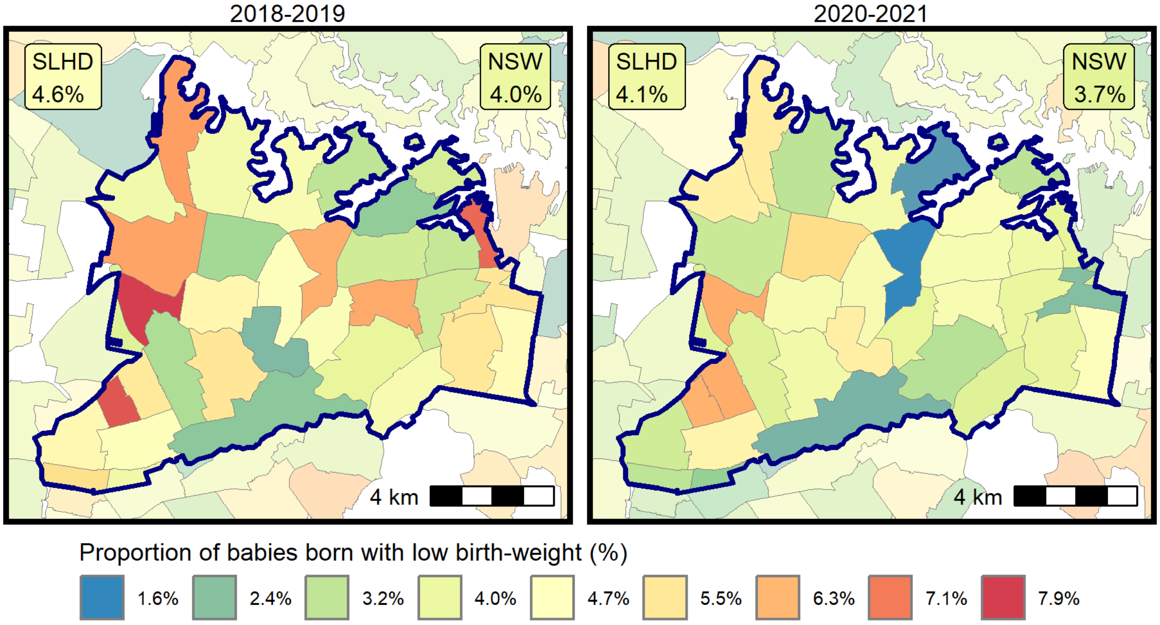

Figure 53 Proportion of babies born with low birthweight by Statistical Area 2, 2018–2019 and 2020–2021. Source: Perinatal Data Collection, NSW Ministry of Health SAPHaRI.

Rates of low birthweight appeared slightly higher in the western areas of the district, with relatively lower rates in the central-east and northern areas of the district. Rates appeared relatively stable across time, with rates varying between 3% and 6% across areas, with a slightly higher number of areas with relatively high proportions in 2018–2019 compared with 2020–2021.

Most areas had rates of babies born with low birthweight comparable to the NSW overall rate. In contrast, some areas to the west had rates around 50% higher than the NSW overall rate in 2018–2019, although this had decreased somewhat in 2020–2021.

[83] AIHW (2022) Proportion of babies born of low birthweight

6.8.4 Prevalence of Type 2 diabetes

The AIHW used the 2011–12 National Health Measures Survey to quantify the proportion of people with type 2 diabetes across Australia [84]. There appears to be no newer data source on this indicator from the AIHW, with existing estimates reported only at the state level. Alternative data sources for the district were thus explored.

The National Diabetes Services Scheme (NDSS) is an Australian Government Initiative, administered by Diabetes Australia. The NDSS provides services and support to people living with diabetes, to enhance their capacity to understand and self-manage their condition, as well as to help them gain access to services, support and subsidised diabetes products.

The NDSS provides freely available postcode level[85] data on current registrants. While this is not a complete data collection of people living with diabetes in Australia, people are incentivised to register with the scheme, which is likely to ensure the data pool has a broad coverage. Data were accessed by postcode and disaggregated by diabetes type, with a particular focus on type 2 diabetes across the SLHD. Results are visualised in Figure 53. To protect the privacy of registrants, the NDSS rounded data to the nearest ten-count. As such, proportions represented visually may be slightly different from the true registrant rate; however, as this smoothing affects all areas equally, it maintains an indicative picture of NDSS registrants across the SLHD.

Note that rates shown in **Figure 54** are proportions of the population within each postcode. That is, these estimates are not age-standardised and, as such, may be subject to bias from different age group distributions within each postcode.

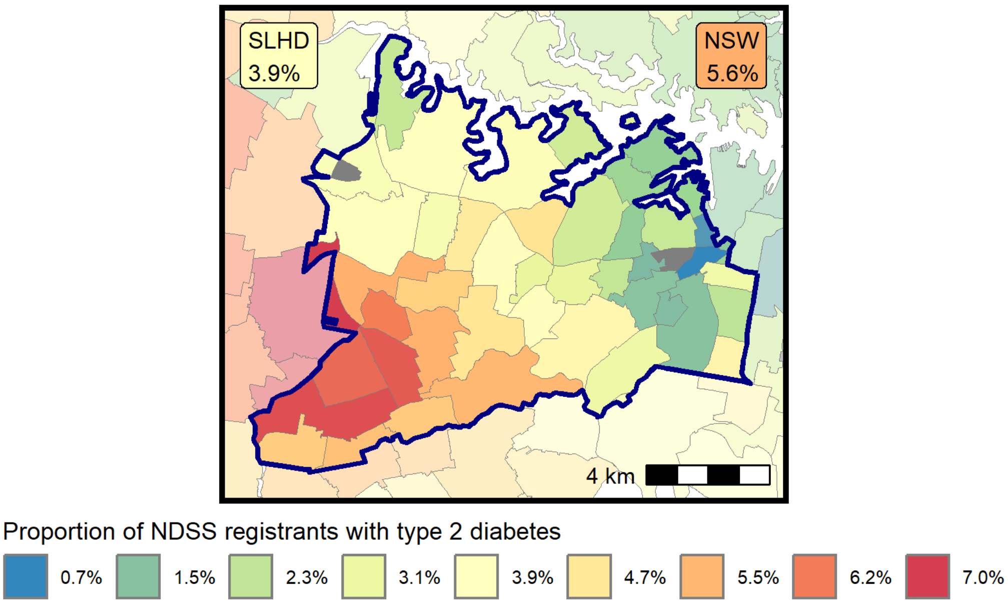

Figure 54 Proportion of population with type 2 diabetes, registered the National Diabetes Services Scheme, by postcode, 2022. Source: NDSS (2022) Map of NDSS registrants.

There was a higher proportion of type 2 diabetes registrants in the south-western areas of the SLHD, with rates between 6% and 7% in these areas. Rates were relatively lower in the eastern areas of the district, with rates varying between 1 and 2% in these areas. Note that not all people living with type 2 diabetes were captured in Figure 54, as this was dependent on registration with the NDSS. The representativeness of NDSS registrants of the total number of people living with type 2 diabetes is unknown, and so these estimates should be interpreted with caution in absence of additional data sources to validate these estimates. Most areas in the east and north of the district had lower proportions of type 2 diabetes registrants in the population, though the south-west saw rates slightly higher.

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[84] AIHW (2022) Prevalence of type 2 diabetes

[85] NDSS (2022) Map of NDSS registrants

6.8.5 Notifications of selected childhood diseases

AIHW methods for quantifying notifications of selected childhood diseases were explored[86]. Specifically, notifications for the vaccine-preventable conditions measles, pertussis and *Haemophilus influenzae* type b were extracted from the NSW Health-managed Notification Conditions Records for Epidemiology and Surveillance (NCRES) database. As numbers were very low across both the SLHD and neighbouring LHDs in the most recent time period, numbers were aggregated to yearly notifications by LHDs neighbouring the SLHD and visualised in **Figure 55**. Note that the vast majority of these notifications relate to pertussis events, with this disease accounting for just over 99% of all notifications across the entire period. These notifications may only represent a fraction of the actual number of children with the disease in the community. The number of notifications reflects healthcare-seeking behaviour and testing practices, which may vary across NSW. Consequently, these data were likely an underestimation of the true incidence of infections in NSW.

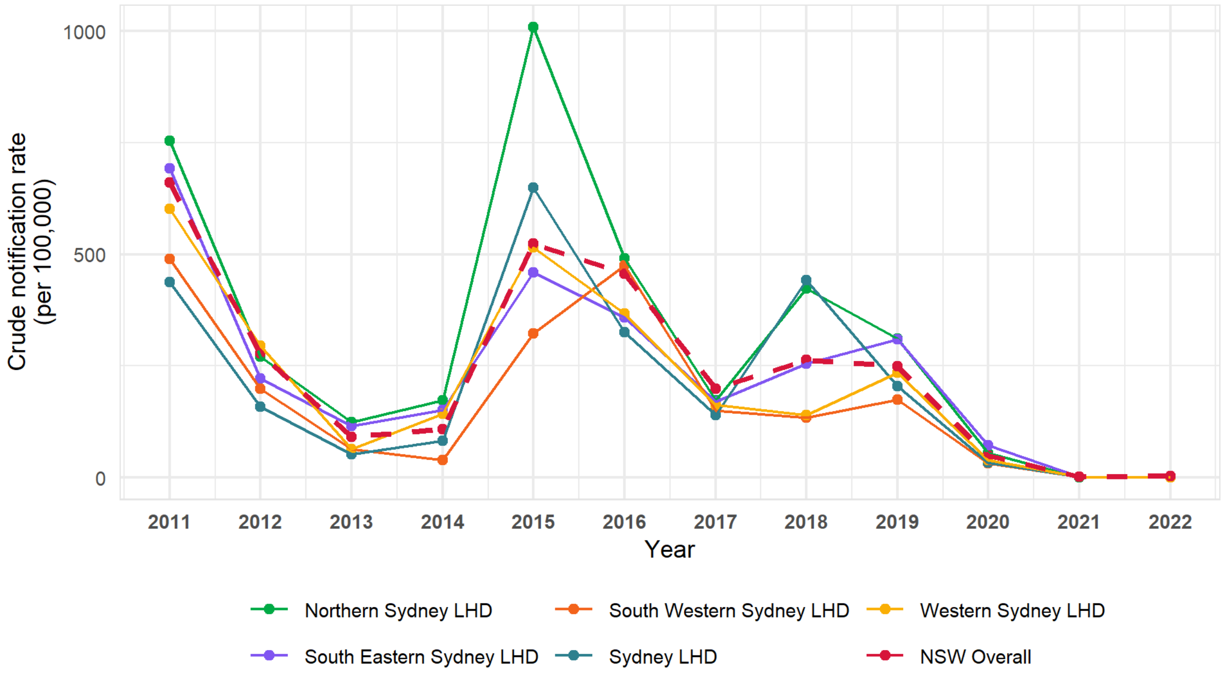

Figure 55 Crude notification rate (per 100,000 children aged 14 and under) of selected vaccine-preventable childhood diseases (measles, pertussis, and *Haemophilus influenzae* type b), by Local Health District and year. Source: Notifiable Conditions Records for Epidemiology and Surveillance, NSW Ministry of Health.

Notifications of vaccine-preventable childhood diseases are known to come in waves, with periods of relatively low volume followed by periods of high volume. During the most recent two reported years, notification rates have sharply dropped, coinciding with the COVID-19 pandemic. Rates during the period of 2020 to 2022 were the lowest seen across the entire reporting extent, with all Sydney LHDs having fewer than ten notifications per year in 2021 and 2022. Prior to this, SLHD saw rates comparable to neighbouring LHDs. Specifically, SLHD ranked lowest in terms of notification rate from 2011 to 2014, before seeing a slight increase in 2014 and peaking in 2015 with the second highest crude rate observed during this high-volume year (around 700 cases per 100,000 children ages 14 and under). Numbers were second highest in 2018, where SLHD recorded the highest rate of notifications across all neighbouring LHDs (around 450 notifications per 100,000 children aged 14 and under).

SLHD tended to have rates of vaccine-preventable childhood diseases lower than the NSW overall rate, although there were some peaks in 2015 and 2018 where the SLHD rates slightly exceeded the NSW overall rate.

[86] AIHW (2020) Notification of selected childhood diseases

6.9 Human function

6.9.1 Severe or profound core activity limitation

The severe or profound core activity limitation data variable recorded the proportion of people who require assistance in their day-to-day lives due to a long-term health condition, disability or old age, across one or more of the three core activity areas of self-care, mobility, and communication[87]. The ABS census comprises questions specifically on the need for assistance with core activities[88], and this variable was consulted across the 2016 and 2021 Census years and is visualised in **Figure 56**.

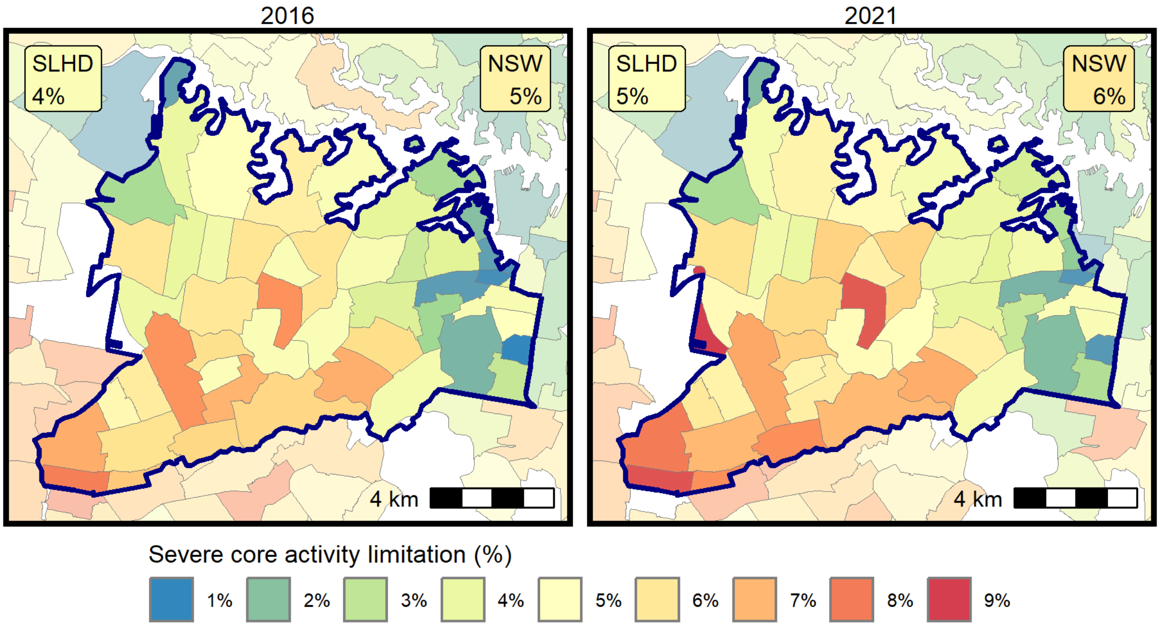

Figure 56 Proportion of population with self-reported core activity limitation by Statistical Area 2, 2016 and 2021. Source: ABS (2021) Core activity need for assistance (ASSNP).

There was a slight increase in the proportion of people with severe or profound core activity limitation across the SLHD from 2016 to 2021. This increase was particularly evident in areas that already had high levels of severe or profound core activity limitation in 2016. Areas to the south-west of SLHD tended to have a higher percentage of people with severe or profound core activity limitation than those in the north or the east of the district.

Areas to the east and north of the SLHD had rates considerably lower than the NSW overall rate, while areas to the south and west had areas that were slightly higher than the NSW overall rate.

[87] AIHW (2015) Extent of core activity limitation, disability flag code.

[88] ABS (2021) Core activity need for assistance (ASSNP).

6.10 Wellbeing

6.10.1 Proportion of adults with psychological distress

Modelled rates of ‘high’ or ‘very high’ psychological distress, as measured by the Kessler Psychology Distress Scale (K10)[89], were sourced from PHIDU for 2021[90]. While this indicator was typically a self-reported measure, these estimates were the results of modelled data from the ABS National Health Survey 2017–2018. While the specific modelling methods were unclear, it appeared that estimates were disaggregated from larger geographies using current demographic estimates from the 2021 Census of Population and Housing. Output was visualised as is in **Figure 57**, with no additional calculation or validation beyond that mentioned in the section ‘Note on the use of PHIDU data’.

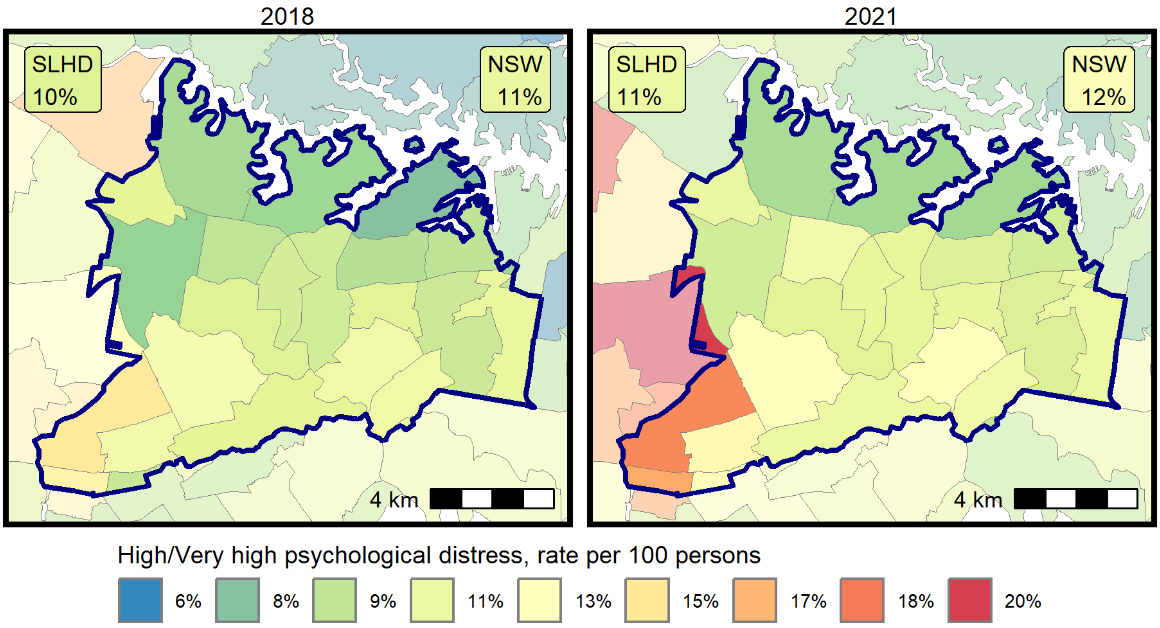

Figure 57 Modelled proportion of adults aged 15 and over with self-reported high or very high psychological distress, by Public Health Area for 2018 and 2022. Source: PHIDU (2022) Estimated male, female or total population, aged 18 years and over, with high or very high psychological distress based on the Kessler 10 Scale (K10), 2017–18.

Rates of high to very high psychological distress appeared highest in the south-western areas of the SLHD. Distributions were mostly similar across the two years, although some areas in the south-west saw noticeable increases in rates of psychological distress. Rates in in Lakemba, Punchbowl and Wiley Park were as high as 18% in 2021, up from 14% in the same area in 2018.

Generally, areas across the SLHD were comparable with the NSW overall rate, if not slightly lower. However, two areas to the west, as discussed above, were around 50% higher than the NSW overall rate in the latter time period of 2021.

[89] AIHW (2022) Proportion of adults with very high levels of psychological distress.

[90] PHIDU (2022) Estimated male, female or total population, aged 18 years and over, with high or very high psychological distress based on the Kessler 10 Scale (K10), 2017–18.

6.10.1.1 Self-assessed health status

AIHW measured self-assessed health status as the proportion of adults aged 15 or over with 'fair' or 'poor' self-assessed health[91]. As PHIDU-modelled estimates employed the same definition, these estimates were used as is[92]. While this indicator was typically a self-reported measure, these estimates were the results of modelled data from the ABS National Health Survey 2017–2018. These data are presented in **Figure 58**, with no additional calculation or validation beyond that mentioned in the section 'Note on the use of PHIDU data'.

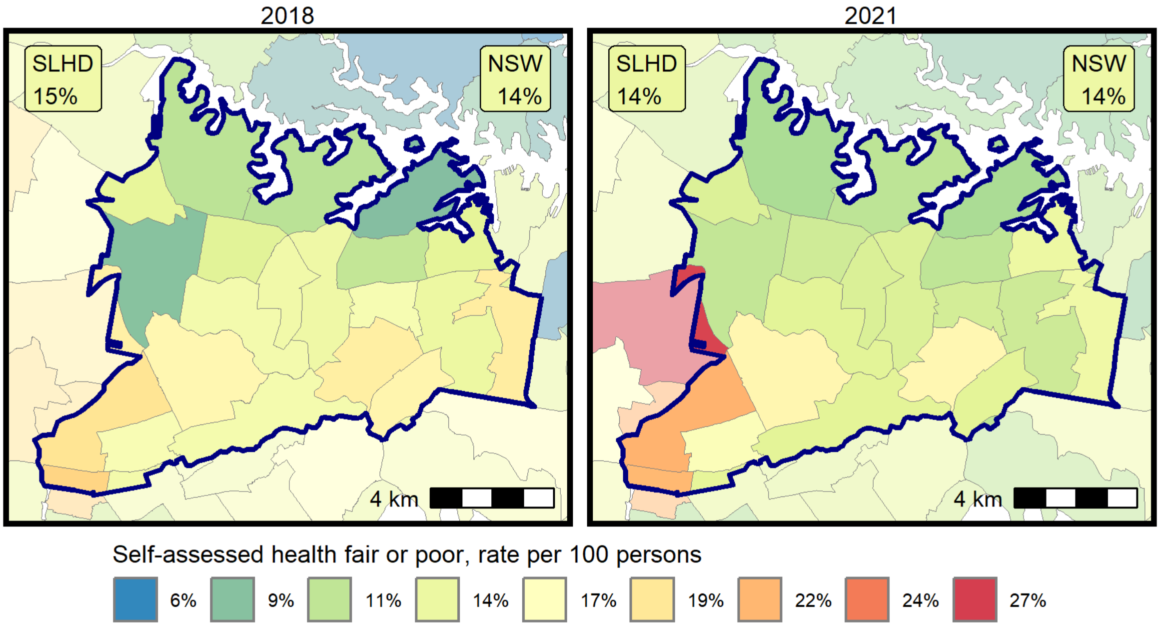

Figure 58 Modelled proportion of adults aged 15 and over with 'fair' or 'poor' self-assessed health, by Public Health Area, 2018 and 2022. Source: PHIDU (2022) Estimated population, aged 15 years and over, with fair or poor self-assessed health, 2017–18.

Rates of self-assessed 'fair' or 'poor' health status appeared to be highest in the south-western population health areas of the Sydney Local Health District, and lowest to the northern areas of the district. Overall, rates of self-assessed 'fair' or 'poor' health were constant across the two time periods, as some areas in the south and west increased slightly, while areas in the east and north appeared to decrease slightly.

Generally, areas across the SLHD were comparable with the NSW overall rate and were often slightly lower than this overall rate in the north. However, two areas to the west, as discussed above, were around 50% higher than the NSW overall rate in the latter time period of 2021.

[91] AIHW (2020) Self-assessed health status

[92] PHIDU (2022) Estimated population, aged 15 years and over, with fair or poor self-assessed health, 2017–18

6.11 Deaths

6.11.1 Infant and young child mortality rate

Mortality data was sourced from the Cause of Death Unit Record File (CODURF). The CODURF contained all death records registered in Australia from each of the State and Territory Registries of Births, Deaths and Marriages (RBDMs), compiled and coded using ICD-10 codes. The NSW Cause of Death Unit Record File was held by the NSW Ministry of Health Secure Analytics for Population Health Research and Intelligence.

Infant and young child mortality was defined as mortality rates for infants under 1 year old and children aged less than 5 years. Rates for infants and young children were calculated individually for the two age groups; infant mortality rates used single-year infant deaths for the numerator, and the number of single-year live births for the denominator while child mortality rates use deaths in children aged 0–4 as the numerator, and single-year population data for the denominator.

Methods are available on the AIHW website[93]

While this variable was calculated using available data sources, the rates were deemed too low and too variable to be considered reliable or useful. The vast majority of areas (either at the SA2 or SA3 level) had fewer than ten deaths over the period and, in the interest of sensitivity, it was decided not to present this indicator.

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[93] AIHW (2022) Infant and young child mortality rate.

6.11.2 Life expectancy

Life expectancy was defined as the number of additional years a person of a specific age is expected to live. Life expectancy at birth is often used as a marker of premature mortality within a population and is calculated using age-specific mortality rates within a region[94].

Life expectancy calculations have been shown to be unstable with populations fewer than around 25,000[95], and *all* SA2s in the SLHD had populations lower than this, especially when disaggregated by sex. In fact, most areas had populations disaggregated by sex of around 5,000, almost a fifth of the recommended pool size. In order to allow for valid calculation, data would need to be aggregated by five-year periods. In future, additional methods could be taken to achieve stable estimates of life expectancy at small geographies, however, these were beyond the scope of this report.

Life expectancy was initially calculated by sex at the Statistical Area 2 level, with data aggregated to five-year groups. It was found that these estimates were highly sensitive to the specification of the Chiang II method of life expectancy estimation. This method carries with it considerable unquantifiable error. Alternative methods are being explored for more reliable estimation at small unit geographies; in the meantime, pre-calculated ABS[96] estimates of life expectancy at the SA4 level were sourced and visualised for three SA4s, namely Sydney: Inner West, Sydney: City and Inner South, and Sydney: Inner South-West. The Inner West SA4 has 100% of its area within the SLHD; the City and Inner South SA4 has 46% of its area within the SLHD, and the Inner South-West SA4 has 19% of its area within the SLHD. All other SA4s has fewer than 1% of their areas within the SLHD.

Life expectancy over time, by sex and SA4, is visualised in **Figure 59**. Note that males and females are visualised on different scales, to account for the known differences between male and female life expectancy[97].

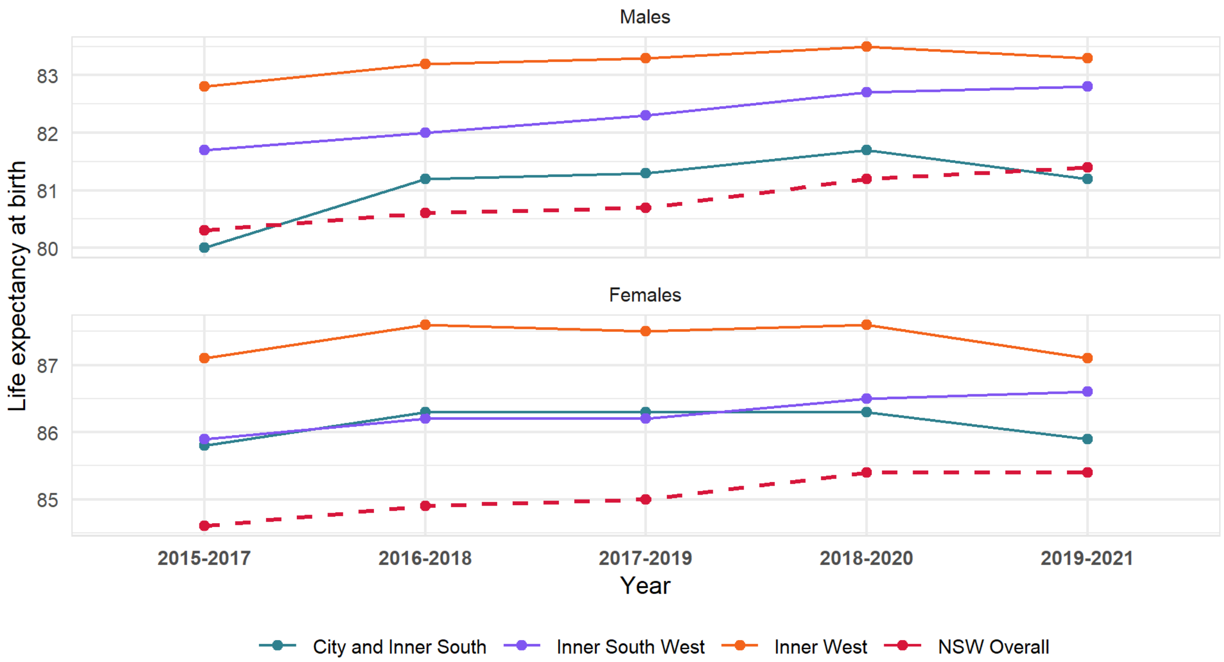

Figure 59 Life expectancy estimates at birth, by sex and Statistical Area 4, 2015–2021. Note differing scales on the *y* axis. Source: ABS (2022) Life Tables.

[94] ABS (2022) Life tables methodology.

[95] Stephens, Purdie, Yang & Moore (2013) Life expectancy estimation in small administrative areas with non-uniform population sizes. BMJ Open.

[96] ABS (2022) Life Tables.

[97] ABS (2022) Life Tables.

Life expectancy, for both males and females, was highest in the Inner West SA4, with life expectancy ranging between 82.8 and 83.5 years of age for males, and 87.1 and 87.6 years of age for females. The Inner South-West saw an upwards trend for both males and females, with expected ages increasing from 82 to 83 years in males and from 86 to 87 years in females, across the period. While the Inner South-West, City and Inner City SA4s had comparable life expectancy for females at the start of the period, the Inner South-West was notably higher for both males and females by the end of the period. Interestingly, both the City and Inner West SA4s saw a slight decrease in life expectancy for both sexes in the most recent period – this was not observed in the Inner South-West.

Across almost every SA4 and time point, SA4s within the SLHD had higher life expectancy than the NSW overall life expectancy. The only exception to this was the City and Inner South, where life expectancy was slightly lower than NSW in 2015–2017 and 2018–2021.

6.11.3 Major causes of death

Major cause of death records reported how many people had died in a population and what caused their death. In addition to measuring deaths rates, major causes of death data provided an understanding of what the main causes of death were, a variable that changed over time and differed by sex and age group. In Australia, deaths from infectious diseases had decreased, while deaths from chronic conditions, such as cancers and dementia, had increased.

Major causes of death were sourced from CODURF using selected International Classification of Diseases (ICD-10) codes for underlying causes of death, as supplied by AIHW using the General Record of Incidence of Mortality (GRIM) disease list. Age-standardised mortality rate per 100,000 in the population was presented for cancers, circulatory diseases, respiratory conditions, external causes, and nervous systems conditions in Sydney Local Health District across the two most recent three-year periods of 2016–2018 and 2019–2021.

CODURF data was accessed and summarised, with methods available on the AIHW website[98].

For all cause of death categories, results were aggregated to the SA3 level to ensure stable estimates could be calculated. While some categories could be stably estimated at the SA2 level, this was considerably variable, with many areas not allowing for stable estimation. For consistency, all cause of death categories were aggregated to the SA3 level prior to visualisation.

6.11.3.1 Cancer

Underlying causes of deaths associated with cancer – including colorectal, pancreatic, lung, skin, melanoma of the skin, breast, and prostate cancer – were visualised a the SA3 level in **Figure 60**.

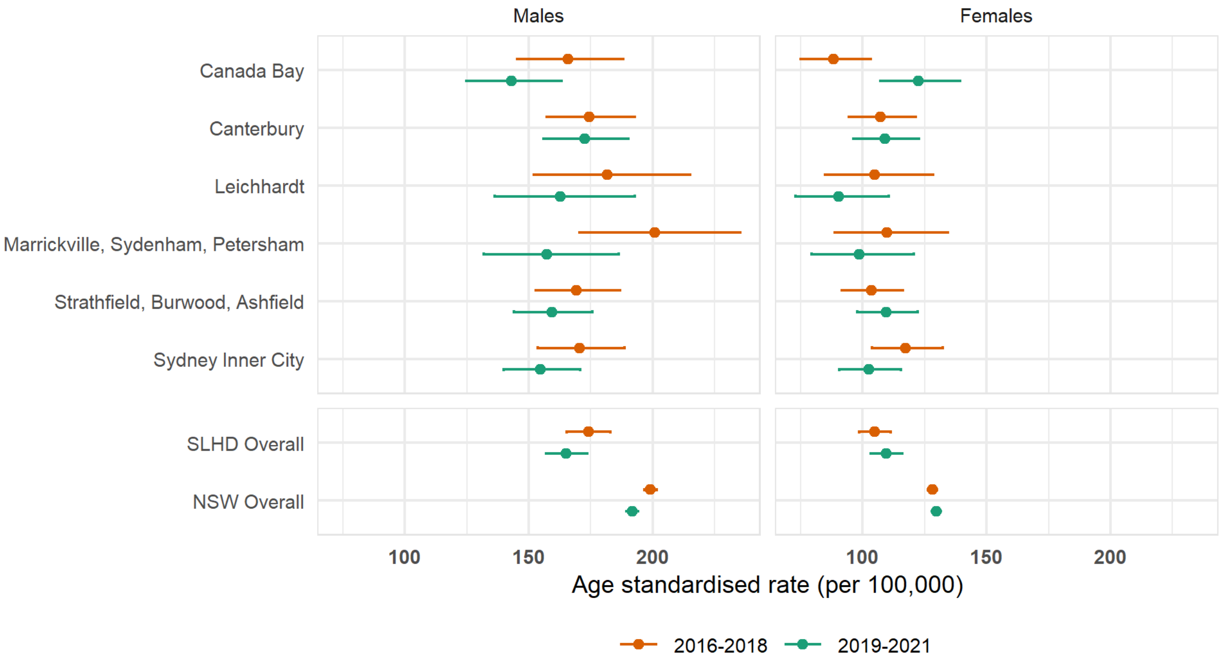

Figure 60 Rates of death attributable to colorectal, pancreatic, lung, skin, melanoma of the skin, breast and prostate cancer (per 100,000) by Statistical Area 3, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Rates of mortality associated with cancer were relatively low across the district and were higher in males than in females. Specifically, rates ranged from around 150 to 200 deaths per 100,000 in the population in males, and between 90 and 120 deaths per 100,000 in the population in females. Rates were comparable across the two time periods, with some areas seeing a slight decrease in the most recent period.

[98] AIHW (2021) Major causes of death.

Generally, rates for males and females were lower than the NSW overall rate across all SA3s and time points, with the only exception being the SA3 of Marrickville, Sydenham and Petersham in 2016–2018, where the rate was comparable to the NSW overall rate. However, the uncertainty around this estimate was considerable, as with as all other estimates produced at the SA3 level, and so this result should be viewed with some caution.

6.11.3.2 Circulatory

Underlying causes of deaths associated with circulatory diseases –including hypertensive disease, coronary heart disease, heart failure, cerebrovascular disease and stroke – were summarised at the SA3 level in **Figure 61**.

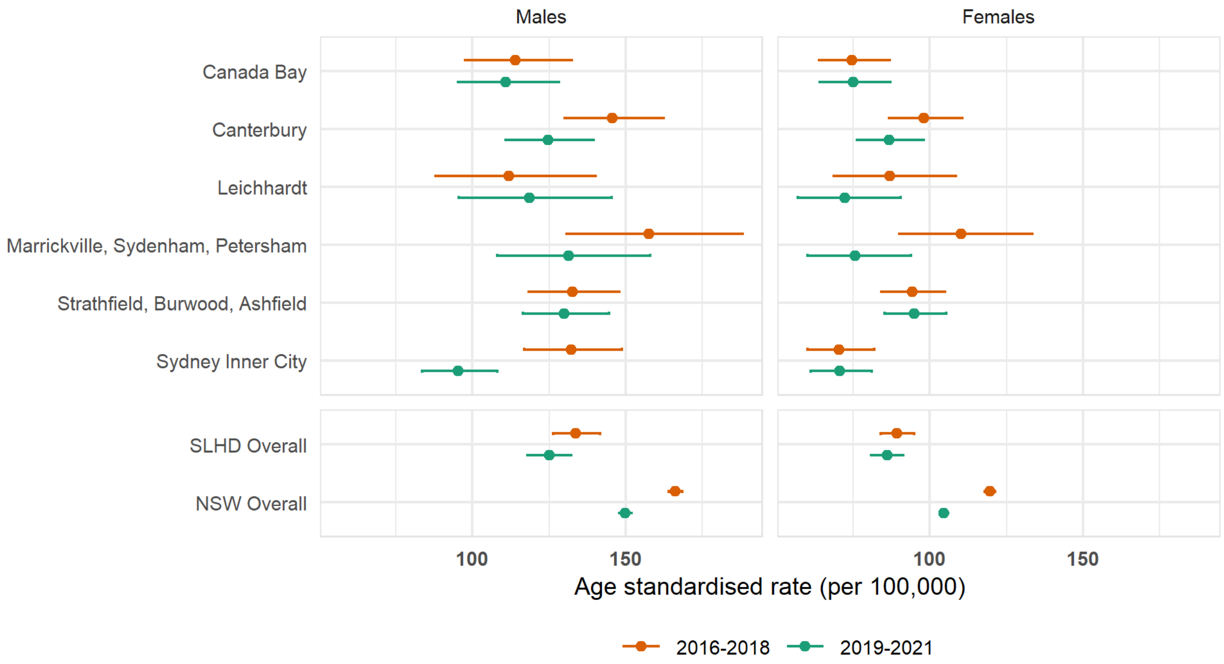

Figure 61 Rates of death attributable to circulatory disease (per 100,000) by Statistical Area 3, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Causes of death associated with circulatory diseases were relatively low across the district, and higher in males than for females. Specifically, rates ranged from between 95 and 150 deaths per 100,000 in the population for males, and between 50 and 110 deaths per 100,000 in the population for females. Rates appeared slightly lower overall in 2019–2021 compared with 2016–2018 for many areas, with substantial drops for males observed in Sydney Inner City and for females in Marrickville, Sydenham and Petersham.

Despite uncertainty in the estimates, it appears that all rates were either comparable with, or slightly below, the NSW overall rate across all SA3s and time points.

6.11.3.3 Respiratory conditions

Underlying causes of deaths associated with respiratory conditions – including influenza, pneumonia, chronic obstructive pulmonary disease (COPD), asthma, acute severe asthma, and 'other' – were summarised in **Figure 62**. Consistent with AIHW definitions, the ICD-10 codes for this indicator excluded mortality due to COVID-19[99].

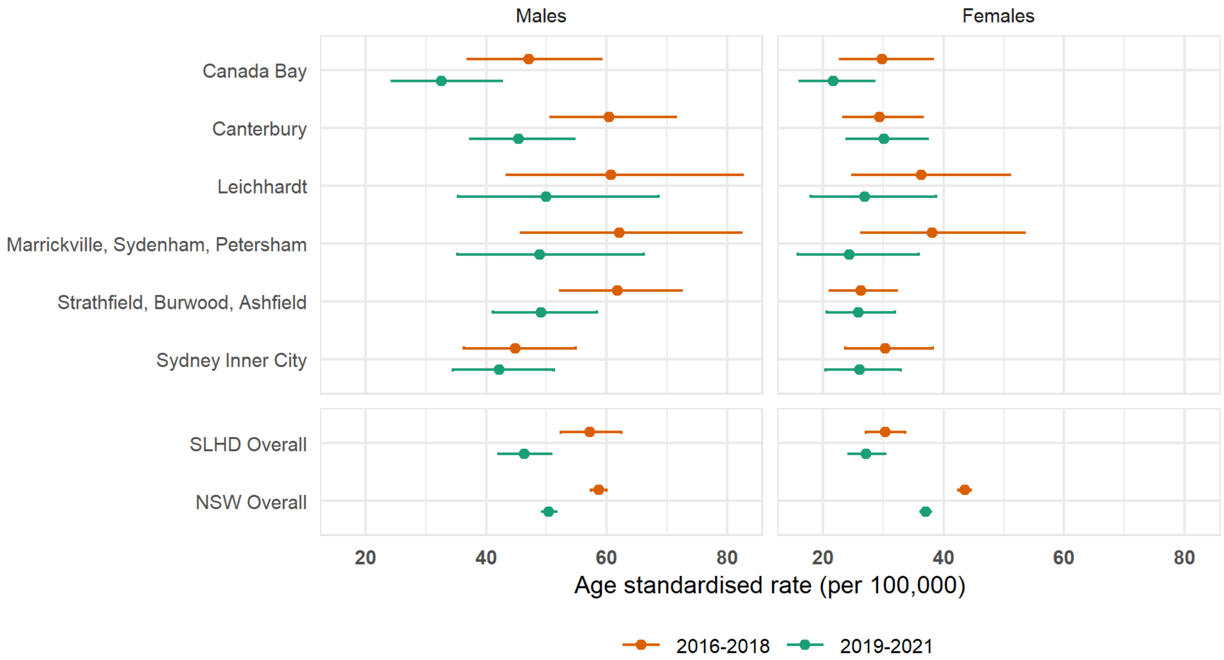

Figure 62 Rates of death attributable to respiratory conditions (per 100,000) by Statistical Area 3, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Causes of death associated with respiratory conditions were relatively low across the district and ranged from between 25 to 60 deaths per 100,000 in the population for males, and 20 and 35 deaths per 100,000 in the population for females. Rates appeared overall lower in 2019–2021 than in 2016–2018, although all estimates were quite variable and based on low-observed numbers and, as such, these should be interpreted with caution.

Generally, rates for males and females across all SA3s and time points were lower than the NSW overall rate, with some exceptions in Marrickville, Sydenham and Petersham, as well as Leichhardt, Strathfield, Ashfield, Burwood and Canterbury, for both time points – these rates were comparable to the NSW overall rate. As mentioned above, the uncertainty around all estimates was considerable, and this result should be viewed with some caution.

[99] AIHW (2021) Major causes of death.

6.11.3.4 External causes

External causes of death encompassed any environmental event or circumstances that caused of injury, poisoning or other adverse effect. These included transport accidents, drownings, falls, fires, accidental poisonings, contacts with venomous animals or plants, exposures to electric currents or extreme temperatures, intentional self-harm events (including suicide), assaults, operations of war, complications of medical or surgical care, or sequelae of external causes. These were visualised in **Figure 63**.

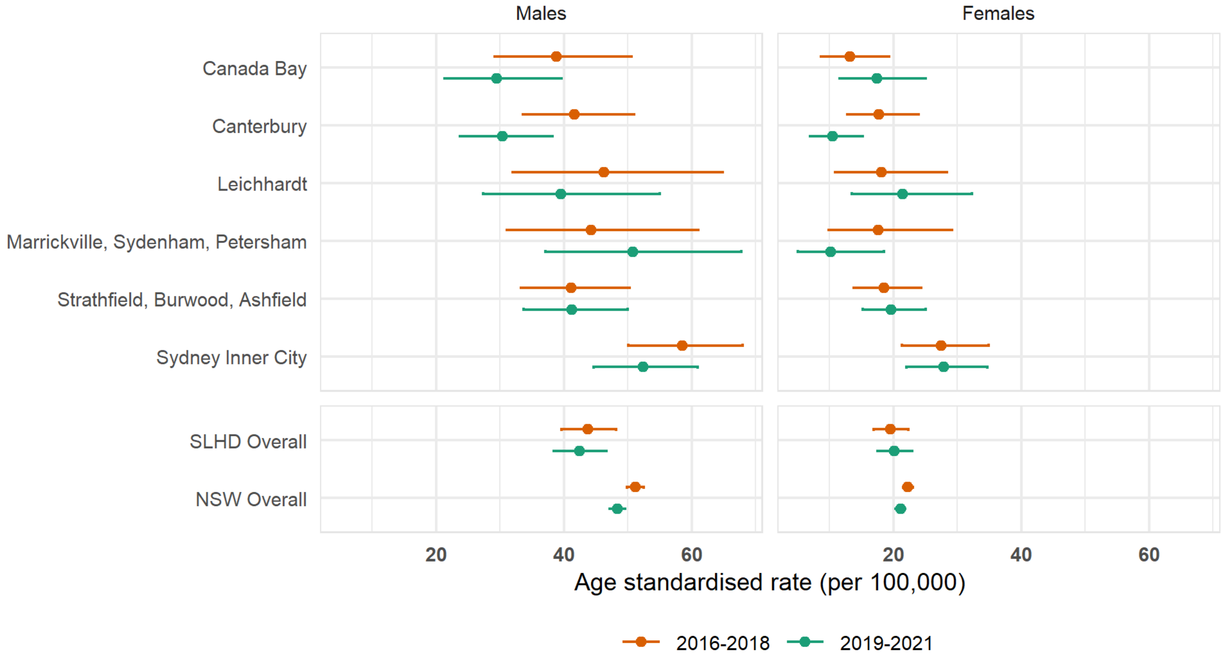

Figure 63 Rates of death attributable to external causes (per 100,000) by Statistical Area 3, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Causes of death associated with external causes were relatively low across the district, and higher in males than in females. Specifically, rates ranged from between 25 to almost 60 deaths per 100,000 in the population for males, and between 10 to almost 30 deaths per 100,000 in the population in females. Rates appeared generally lower in 2019–2021 than in 2016–2018, although all estimates were quite variable and based on low-observed numbers. As such, these should be interpreted with caution.

Generally, rates for males and females across all SA3s and time points were lower than the NSW overall rate, with the main exception being in Sydney Inner City, where the rates for males and females were comparable, or slightly higher, than the NSW overall rate. As mentioned above, the uncertainty around all estimates was considerable, and this result should be viewed with some caution.

6.11.3.5 Diseases of the nervous system

Underlying causes of death due to diseases of the nervous system included inflammatory diseases of the central nervous system (CNS), systemic atrophies affecting the CNS, extrapyramidal and movement disorders, demyelinating diseases of the CNS, episodic and paroxysmal disorder, nerve disorders, disorders of the peripheral nervous system, diseases of myoneural junction and muscle, and cerebral palsy and other paralytic syndromes. These were visualised in **Figure 64**.

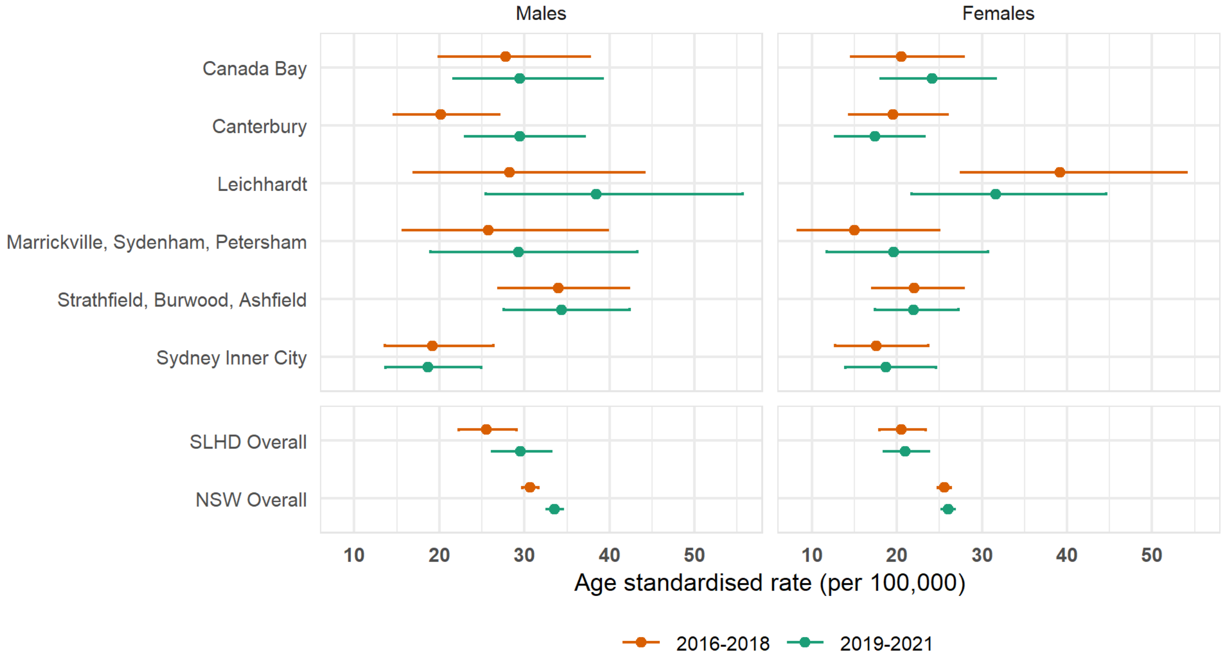

Figure 64 Rates of death attributable to nervous system conditions (per 100,000) by Statistical Area 3, 2016–2018 and 2019–2021. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Causes of death associated with nervous system conditions were similarly low across the district, with comparable rates across both sexes. Specifically, rates ranged from between 19 to almost 40 deaths per 100,000 in the population for males, and between 15 to almost 40 deaths per 100,000 in the population for females. Rates were comparable across the two time periods, though in all estimates were quite variable due to these low numbers and should be interpreted with caution.

Generally, rates for males and females across all SA3s and time points were comparable with the NSW overall rate, with the main exception being for females in Leichhardt where the rates for both time points were slightly higher than the NSW overall rate. As mentioned above, the uncertainty around all estimates was considerable, and this result should be viewed with some caution.

6.11.3.6 Mortality due to suicide

Suicide and intentional self-harm are complex and can have multiple contributing factors. Suicide rates are a commonly used indicator of community mental health. Suicide was identified using the underlying cause of death unit record data and ICD-10 codes supplied by AIHW[100]. Deaths by suicide were accessed by year of occurrence of death rather than year of death registration. Reporting of deaths by suicide by year of death can provide more reliable information on trends in occurrence compared with reporting by year of registration; however, the latest data available may have underestimated the number of deaths, especially those in the later months of the year, due to a lag in registration.

Rates of suicide were very low across the district, and so data were aggregated to the SA3 level to protect confidentiality and allow for stable estimation of rates. However, this aggregate still resulted in many areas having fewer than 30 reported deaths due to suicide across the period. In the interest of completeness, it was decided to instead present *crude* rates, per 100,000 in the population, by SA3 and sex for all areas with at least five reported deaths across the relevant period. These are shown in **Figure 65**. Note that, owing to these small numbers, estimates should be treated with caution due to substantial variability in the estimation.

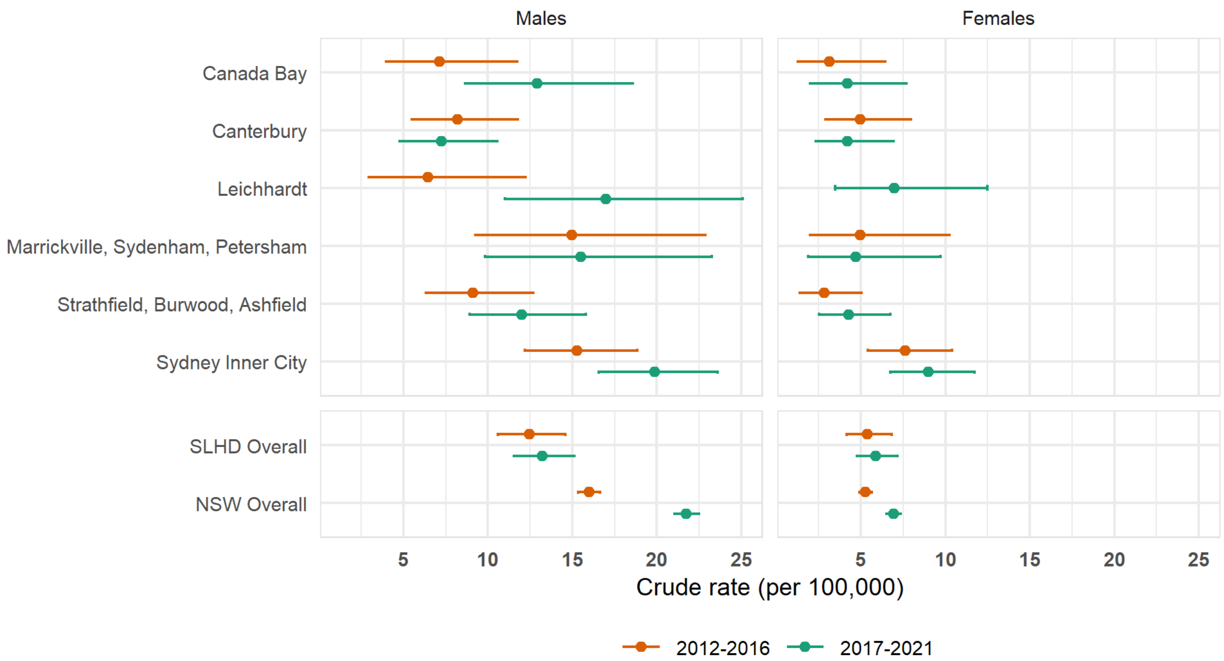

Figure 65 Crude rates of death attributable to suicide (age-standardised rates per 100,000) by sex and Statistical Area 3, 2016–2018 and 2016–2020. Source: Cause of Death Unit Record File held by the NSW Ministry of Health SAPHaRI.

Rates of mortality due to suicide were generally low across the district, with rates highest in the Sydney Inner City SA3. In fact, only the Sydney Inner City SA3 had numbers high enough to allow for valid calculation of age-standardised rates (i.e. 30 or greater deaths), with all other SA3s having lower than this rate across the individual time periods. Due to the small number of recorded deaths due to suicide, specific estimates should be interpreted cautiously.

Generally, rates of death attributable to suicide for males and females across all SA3s and time points were comparable to, or slightly lower than, the NSW overall rate. The main exception to this was the Sydney Inner City rates for females at both time points, which were slightly higher than the NSW overall rates. As mentioned above, the uncertainty around all estimates was considerable, and so this result should be viewed with some caution.

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100 AIHW (2021) Mortality due to suicide.

7

Next Steps

7.1 Next stages

Broadly, the actions following this report will be:

1. Develop a complementary visualisation that allows for the selective visualisation of indicators and tables, with the potential to visualise areas beyond the Sydney Local Health District (where data is available)
2. Implement an ongoing reporting plan that aligns with AIHW reporting cycles, as resources allow
3. Conduct a review of all indicator sources and methods to externally assess validity. Explore alternative sources and approaches, and prioritise indicators according to interest via the aggregation of scores to allow for more focused reporting
4. Assess the feasibility of complementary indicators and more sophisticated analytic approaches, to allow for more precise estimates of uncertainty. Investigate the potential for these to forecast future estimates. (It is acknowledged, however, that this is beyond the scope of current AIHW reporting practice and represents a considerable advancement on current approaches.)
5. Accept both general feedback and specific suggestions from users of this report via the Public Health Research Analytics and Methods for Evidence team (see Contacts)

Small Area Local Health Indicators

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