TOWARDS A COMPREHENSIVE NCD REPORTING FRAMEWORK FOR AUSTRALIA

Supported by The Australia-Indonesia Centre

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Executive Summary

This is a commissioned piece of research by the Australia Indonesia Centre, a bilateral partnership to address common health challenges. Non-communicable diseases such as cardiovascular disease, diabetes and cancer are now the leading causes of death and disability in both settings. As such, the Australia-Indonesia Centre has identified non-communicable disease (NCD) as the health priority across both countries (http://australiaindonesiacentre.org/clusters/health/).

NCDs represent a complex group of conditions which share the common characteristics of chronicity and non-transmissibility; many are associated with significant stigma and are determined, to varying degrees, by living conditions and behaviours. Australia's health policy has included a focus on NCDs, however this has been predominantly focused on conditions arising during adulthood; we are increasingly understanding that NCDs impact substantially on the health and wellbeing of children and adolescents. We now understand that NCDs extend beyond cardiovascular disease, diabetes and cancer (the typical focus of policy) to include other important conditions such as mental health and chronic pain. As such, there is a need to re-consider what NCDs are important to consider for Australia, and at what stages of the life-course. This represents the overarching aim of this project.

In the first section of this report we mapped existing policy frameworks for the key NCD outcomes, risks and determinants for all Australians to understand the current policy context. We also mapped modelled burden of disease data to consider what may be important NCDs across the life course. Further, we consulted a broad range of stakeholders to identify additional aspects of NCD that should be measured. The purpose of this exercise is to define **what** should be measured and for **whom.** The key output of this first section is a draft reporting framework for NCDs in Australia.

In the second section, we mapped data available against the draft reporting framework. We interrogated Australia's National Health survey (given this is primarily designed to monitor health and wellbeing) and key administrative datasets (such as hospital separations and cancer registry data). Key indicators harmonised with available data were defined. We also identified key data gaps which included mental disorder, sense organ disorders, skin and oral health conditions. Data were also very limited for children and adolescents overall.

In the third section, we populate key aspects of the draft reporting framework to illustrate the burden of these NCDs, their risks and determinants. Based on these findings, we then refined the **reporting framework**, defining what NCDs should be measured in Australia and for whom. We anticipate that this framework will be useful to those responsible for collecting and reporting data around NCDs, and those working in public health policy.

The fourth section maps a specific reporting framework for Aboriginal and Torres Strait Islander Australians, given the distinct epidemiology and policy context. Within this section, we redefine the framework using policy and data sources with an Indigenous Australian focus. We have reported on key NCD outcomes and risk from the Australian Aboriginal and Torres Strait Islander Health Survey data, and used this data to refine the reporting framework. The key output from this section is an NCD reporting framework for Indigenous Australians.

Key learnings

1. NCDs extend beyond cardiovascular disease, diabetes, cancer and chronic respiratory disease, the focus of recent policy. Any reporting of NCDs in Australia should include a focus on musculoskeletal

disorders, mental disorder, neurological disease, chronic skin conditions, vision and hearing defects and gynaecological conditions as these all contribute to the burden of disease in Australia and are, in part, preventable. Key to prevention is a measure of risk factors and determinants.

2. NCDs occur across the life-course and not just in adulthood. NCDs that emerge in childhood and adolescence provide a particularly important target for intervention as this can improve the health of young people now, their health as adults, and the health of the next generation.

3. Aboriginal and Torres Strait Islander (Indigenous) Australians have a distinct profile of NCD- in general NCDs occur earlier in life and to a greater severity. There is a distinct policy context, and unique opportunities for response. As such, require distinct NCD reporting framework.

4. Current data systems in Australia measure some, but not all relevant NCDs. Particular gaps exist around some key NCDs (such as mental disorder), with data for children and adolescents particularly lacking. There is a need to continue to invest in objective measures, and extend this across the life-course. Commitment to regular repetition of the Australian Health Survey is the first step.

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Introduction

The need to focus on NCDs

Non-communicable diseases (NCDs) are now the leading cause of mortality globally, up to 60-70% of deaths are caused by largely preventable diseases [2, 3]. For over a decade the World Health Organization (WHO), the World Bank and the United Nations Development Programme (UNDP) have been actively working to increase action on NCDs, in response to the increasing worldwide prevalence [4]. Governments have begun to enact policies relating to NCD; and public health & medical experts continue to publish research and evidence on NCD, the risk factors and associated social determinants.

Defining Non-communicable Disease

Defining NCDs is not easy. The UN High Level Meeting defined NCDs as primarily four conditions (cardiovascular disease, cancer, diabetes and chronic respiratory disorders) caused by four behavioural risk factors (diet, physical activity, smoking and alcohol)[4]. This definition is commonly adopted, however as recognised by the UNHLM itself, it fails to include other important NCDs such as mental and substance use disorders, musculoskeletal conditions and neurological diseases.

It remains unclear how best to define NCDs [5]. For the purpose of this project we considered NCD to be a medical condition or disease that is non-infectious or transmissible. We included those conditions defined as 'NCD' in the Global burden of disease (GBD) study and in NCD policy frameworks. We included those which may have transmissible underlying cause (such as Cirrhosis, having an underlying cause of Hepatitis C, among other causes). Injuries were excluded (despite many common risks and determinants) except for suicide and self-harm due to their alignment with mental health conditions.

NCD is the leading cause of death and disability in Australia

While the life expectancy for Australians is high, we also have the most years spent in ill-health when compared to other OECD countries [6]. Much like the rest of the world, NCDs have emerged as the leading causes of death and ill-health in Australia. The Australian Burden of Disease Study (2011) found that the top 4 disease groups, accounting for more than half of the burden of disease in Australia, were cancer, cardiovascular disease, mental and substance use disorders, and musculoskeletal conditions. The study also found differences across the life course, with mental & substance use disorders and injury (including suicide) contributing the most burden for Australia's young people; cancer was established as the main burden for 50-79 year olds; and cardiovascular disease the main cause of disability and death in older Australians [7].

NCDs are largely preventable through modification of risk behaviours and exposures in early life (for example, poor diet, tobacco smoking), and early detection and treatment of health risks (such as hypertension, overweight and obesity). Many of these risk factors have their origins in childhood and adolescence, and it is well recognized that these life stages are crucial to prevention efforts- for the benefit of the individual now, into adult life, and into the next generation [8].

In terms of prevention, a large proportion of cancers, diabetes and heart diseases worldwide are currently preventable via cost-effective, evidence-based prevention measures [4, 9]. 32% of all cancers diagnosed in Australia in 2010 were potentially preventable by avoiding 13 known risk factors [10]. Analysis shows that taxation packages on unhealthy food and alcohol, screening for chronic kidney disease, a polypill of blood pressure and cholesterol-lowering medication offered as a

preventive measure to at-risk groups, and interventions in physical activity and obesity all proved to be cost-effective prevention strategies when modelled for the Australian population [11].

The disability and death associated with NCD places a huge cost and financial burden on individuals, their families and the broader health system. The loss of the main income earner to premature death or disability and sickness, and hospital bills and medications can have catastrophic impacts on low income earners, even those residing in high income countries [12, 13]. In addition to the cost to individuals, and their families, NCDs are amongst the most expensive diseases in terms of health-care expenditure. In Australia, the top four most expensive disease groups are NCDs; cardiovascular diseases, oral health, mental disorders, and musculoskeletal. In 2008-09 the direct health-care costs for these four disease groups accounted for 36% of all health expenditure, or roughly $27 billion [14]. The increase of NCDs impacts significantly on the economic development and growth of a nation also, with a 10% rise in NCD mortality said to reduce the economic growth for that year by 0.5% [15].

Socioeconomic disadvantage is associated with an excess burden of NCD risk and outcome. In Australia the burden of cardiovascular disease, mental & substance use disorders and cancer is where the greatest inequality is evident [7]. However, the determinants of NCD extend well beyond socioeconomic disadvantage. For example, Aboriginal and Torres Strait Islander (Indigenous) Australians experience an excess risk of NCD risk and outcome, Indigenous Australians of high socioeconomic status report a greater burden of type 2 diabetes compared to non-Indigenous Australians of low SES [16].

A life-course approach to NCD

There is growing emphasis globally on the importance of a life-course approach to NCD prevention [2]. Many of the primary prevention strategies, for NCD reduction later in life, target behaviours that have their beginnings in childhood and adolescence [17]. It is also important to acknowledge that NCDs are a mounting crisis in all age groups, throughout the world, not only in adults [18]. So, while childhood and adolescence present a crucial point of intervention for primary prevention, the burden of NCD experienced by these age groups should not be overlooked. Many of the leading causes of death for children are treatable NCDs (e.g. leukaemia, rheumatic heart disease, and asthma), and in adolescence a significant share of the burden of disease is substance use, mental disorder and self-harm [19]. A life-course approach to prevention and control of NCDs will improve infant, child and adolescent health, but also improve future health outcomes as adults and into the next generation [8, 20].

The need for well-defined reporting frameworks and indicators.

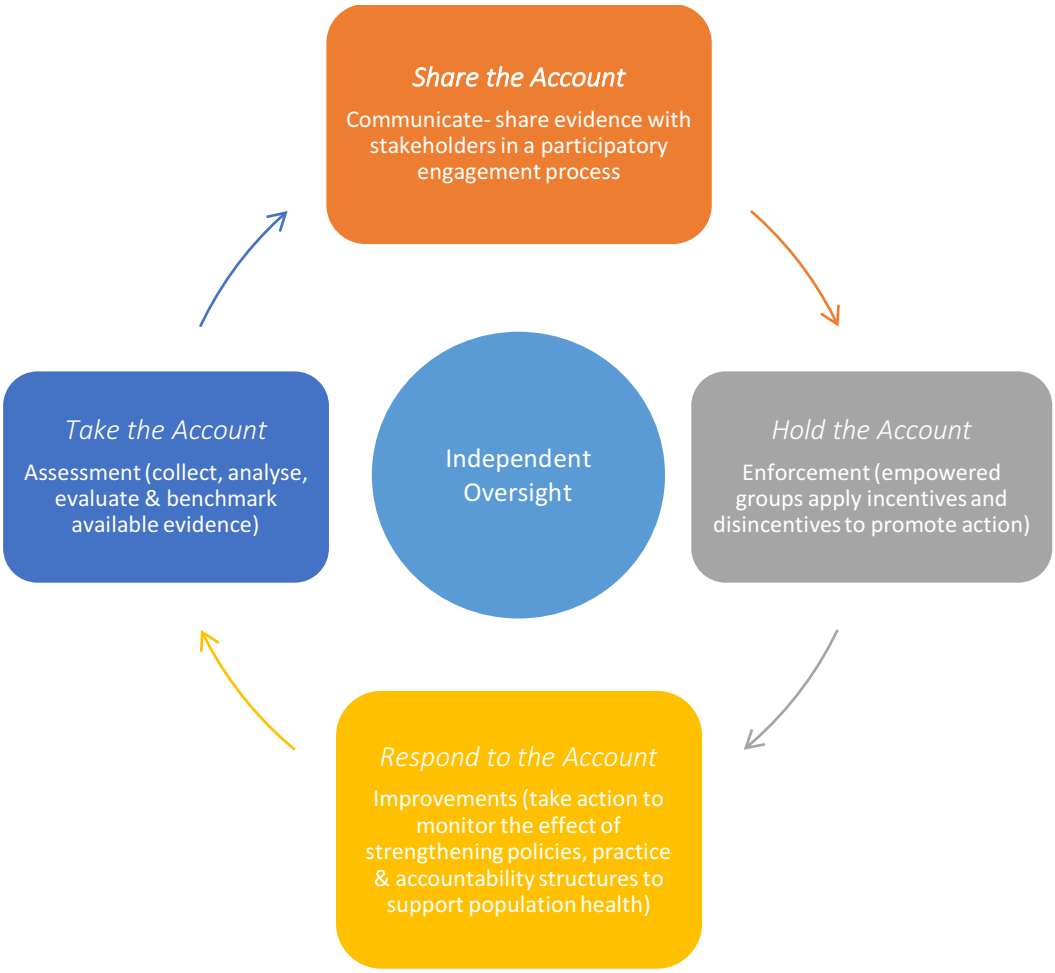
In Australia that there is a need for high quality data to identify priorities and ensure accountability. One of the barriers to accurate prevention measures is the availability of good quality data, which allows us to identify priorities, inform intervention and to track progress.

A reporting framework is generally defined as a group of indicators brought together to describe the status of a given population. Reporting frameworks typically align with policies and conceptual models of social development and well-being. Indicators are a measure which summarises a facet of health, wellbeing, their determinants or services response. Indicators help to identify and quantify a problem, but to contribute to accountability around NCDs they must also be measured, reported on, and used to monitor and track progress for goals [21]. Australia has several reporting frameworks which have helped to galvanise action around NCD and bring NCD to the fore, Australia's Health Tracker (AHT) and the National Health Priority Areas (NHPA). Given the breadth and complexity of NCD as a disease group, a comprehensive reporting framework which covers NCD outcomes, risks

and determinants will provide a clear structure with which to set priorities (formally define indicators; assess data availability, quality and gaps), inform intervention and track progress.

A strong reporting framework accompanied by well-defined indicators provides the basis of *accountability* for NCDs globally [4], and in Australia. Kraak & colleagues (2014) 'accountability framework' describes a four-stage process for achieving accountability within a strategy for health promotion, see figure A [22]. Kraak's accountability framework was developed to promote healthy food environments with independent body oversight, the framework has also been modified and recommended in public health context for effective accountability and oversight in the area of Adolescent health and wellbeing [8]. Tolhurst and colleagues have also already recognized the potential for application of a modified version of this accountability framework to chronic disease and health conditions [23].

Figure A. Accountability framework [22]



Strengths and limitations of current frameworks in Australia

There are currently three key frameworks in Australia which focus on chronic conditions and the major NCDs, Australia's Health Tracker (AHT), the National Strategic Framework for Chronic Conditions (NSFCC) and the National Health Priority Areas (NHPA) initiative. Table A below describes the core purpose, strengths and weaknesses of each framework.

AHT is a reporting framework for preventable chronic diseases, conditions and their risk factors. The AHT is the first reporting framework of this kind in Australia and builds on the goals set by the World Health Organization (WHO) in the Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020 and the Mental Health Action Plan 2013-2020. One of the key strengths of the AHT lies in the interactive sub-national maps by indicator, available online for use by policy makers, health care professionals, researchers or the general public.
NSFCC was released by the Australian Health Ministers' Advisory Council in 2017. The framework sets out three specific objectives, and strategic priority areas within each objective, for preventing chronic illness in Australia. For each objective, indicators are selected to 'measure success' from currently available data. Like AHT, NSFCC has a prevention focus rather than disease- specific focus: reduce modifiable risk factors to promote health, heavily influenced by the WHO global action plan for the prevention and control of NCDs.

The NHPA were established in response to the WHO's global strategy 'Health for all by the year 2000'. A collaborative approach was taken, with coordination from Commonwealth and State and Territory departments, and input from non-government organisations, health experts, clinicians and consumers. The disease groups targeted were chosen because it was believed that significant gains could be made in those areas which were also contributing considerably to the burden of disease in Australia.

Table A. Strengths and limitations of existing frameworks in Australia.

	Australian Health Tracker	National Strategic Framework for Chronic Conditions	National Health Priority Areas Initiative
Core Focus	Focus: Building accountability. The Australian Health Policy Collaboration developed targets and indicators for accountability in chronic diseases and their risk factors in Australia. The Australian Health Tracker report cards are for monitoring and reporting publically on key targets and indicators.	Focus: Policy direction. The focus of the document is to provide the main policy direction for Chronic conditions, with specific reference to achieving the vision that "all Australians live healthier lives through effective prevention and management of chronic conditions".	Focus: Policy direction and national data priorities.
Strengths	Interactive, sub-national maps by indicator, available online for use by policy makers, health care professionals, researchers or the public. The 'report cards' – Australia's health tracker publications give a snapshot of key NCD health outcomes and risk factors – can be tracked over time.	NSFCC strength is that the three objectives do begin to cover 3 key aspects to tackling NCD; prevention, access to evidence based and appropriate health care, and recognising the priority populations and their specific needs.	Collaboration between Commonwealth, State and Territory governments to have coordinated targets. NHPA acknowledge the need to populate key indicators and focus on building national benchmark data. Included disease groups causing the most burden in Australia including Mental Health and Musculoskeletal disorders.
Limitations	No focus on the burden of disease experienced by children and adolescents, Child and adolescent health examined purely in terms of risk factors. Important	Very little focus on the life-course within the indicators. 'By age group' disaggregation recommended for some indicators. A few other indicators mention 'children'	The main limitation to the NHPA now is that it is outdated and largely replaced by the NSFCC. The other limitations to the initiative were similar to the

	chronic diseases which have lasting impact across the life-course, such as asthma, anxiety, and drug use disorders have their origin in these neglected periods of life. For example 50% of adult mental illness commences before the age of fourteen [24]. While AHT does expand on WHO priorities, there are significant omissions, like the NSFCC. The main difference is that the AHT is constantly developing and new report cards are being added – such as the recent SES and oral health report cards – to broaden priorities; however, the NSFCC is defined for use from 2017-2025.	or 'older adults' but no age cuts are defined. As with AHT there is very little priority given to the burden of disease experienced by children and adolescents. Disease groups causing significant burden to the Australian population (as identified in both the ABoD 2011 and GBD 2015 studies) are omitted, such as musculoskeletal disorders/ back pain, neurological disorders (including dementia, now the leading cause of death for Australian females [25], and sense organ disorders.	AHT and NSFCC. Little focus across the life-course, little on determinants of health, and largely adult disease focus/ narrow focus.
Are indicators well defined?	Yes; AHT has well defined indicators which are measureable. Specificity could be improved around targeted age groups, and sex where necessary [26].	No; indicators vary between being well-defined WHO indicators, such as "Unconditional probability of dying between ages 30–70 years from cardiovascular disease", to very loosely-defined indicators such as "Exclusive breastfeeding".	Somewhat; indicators are reasonably well-defined.
Any focus on burden across the life-course?	No; focus on children and adolescents is focused on risk factors for adult disease.	No; again, children and adolescents considered in terms of preventable risk factors.	No; again, children and adolescents considered in terms of risk factors.
Any focus on risk factors?	Yes; the AHT has indicators for relevant risk factors in children, adolescents and adults.	Yes; risk factors are articulated, although the definitions are weak.	Yes, disease specific risk factors are discussed.
Any focus on determinants?	Somewhat; AHT has a report card specifically focused on Socio-economic differences in NCD in Australia, which is a reasonable measure of social inequity in the context of NCD. AHT make recommendations to policy changes that could impact on the social determinants of health, however they do not specifically report on any other structural determinants such as Education or Economic participation.	Somewhat; Low income, educational attainment and unemployment are listed as indicators, but again, not fully defined, and it appears they are conceptually thought of as risk factors within this framework rather than social determinants of health.	No. Determinants are acknowledged in various documents for the NHPA but they are not fully defined, or reported on in reporting documents.
Are Aboriginal and Torres Strait Islanders differing	Somewhat; where there are data available AHT does report some statistics by	Somewhat; target priority populations are identified & Indigenous people are	Somewhat sporadically, dependant on disease outcomes. Similar to NSFCC,

needs acknowledged?	Indigenous and non-indigenous Australians. There is no focus on NCDs specifically relevant to Indigenous populations, or how the Indigenous populations needs may differ.	included within that definition. It appears that the intention is to report specific indicators within these priority populations. However, it is unclear exactly how that will be expressed, given there are many 'target populations' noted.	target priority populations are identified & Indigenous people are included within that definition.

The Current Project

The overarching aim of this project is to define a comprehensive reporting framework for NCDs in Australia that builds on those currently in use.

The specific objectives are to:

- Define a reporting framework for NCD outcomes, risks and determinants that is of specific public health and policy relevance to Australia;
- Map data, assess the quality of currently collected data, and define clear indicators to apply to the reporting framework;
- Analyse the available data to describe a profile of NCD and its risks for Australia; and
- Consider what a NCD reporting framework for Aboriginal and Torres Strait Islander Australians might include.

This report is presented as four sections, each addressing a specific objective outlined above.

Section 1

A revised NCD reporting framework for Australia

This section of the report defines a comprehensive reporting framework for NCDs in Australia. Specifically, it defines what NCDs should be reported, and at what stages of the life-course, in Australia.

Section 1 Contents

- Method: Describes the priority setting approach used to develop the reporting framework for NCD in Australia.
- Key Findings: The preliminary reporting framework for NCD in Australia is presented in this section. The reporting framework has 3 main parts: Outcomes, Risk Factors and Determinants.
- Discussion: This section discusses the key implications arising from the developed framework.

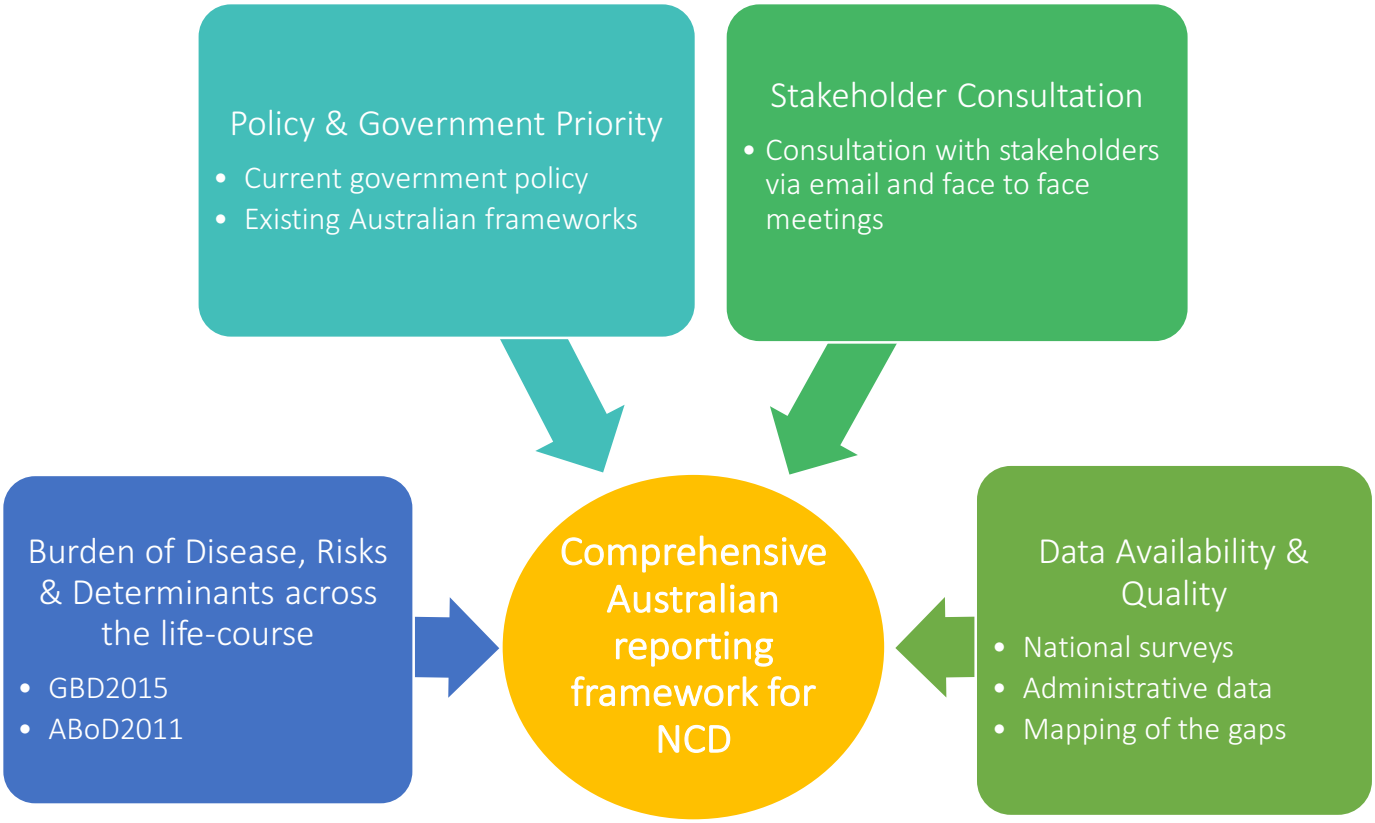
Method: Prioritising NCD outcomes, risks and determinants

The reporting framework was defined using a modified priority setting approach [3]. For key age-groups across the life course (defined below), we defined the key **NCD outcomes** by considering public health relevance (contribution to modelled burden of disease) and policy relevance (review of national and international policy frameworks). We additionally consulted a broad range of stakeholders and reviewed current data collection systems (on the assumption that data are collected for conditions previously defined as important). This approach is summarised in Figure 1.0. We undertook a similar approach for **NCD risks,** defined initially by the top risk factors attributed to the burden of NCDs (again using modelled burden of disease data), policy relevance (again, by reviewing national and international policy frameworks) and stakeholder recommendations. For **NCD determinants** we used the Commission on Social Determinants of Health (Closing the Gap in a generation) as a starting point for considering key determinants [27]. While reviewing policy frameworks we aimed to incorporate any further key determinants as they were identified, however the social determinant framework outlined in the commission on social determinants was exhaustive.

This approach is detailed further below.

Approach to defining key NCDs across the life-course

Figure 1.0: Conceptual framework for the project:



Burden of disease

We used the 2015 Global Burden of Disease study (GBD2015) data to identify key NCD causes in Australia. We examined the leading causes of death and disability across the life-course attributable to NCD.

GBD2015 research gathers and analyses data on premature death and disability from 249 diseases (including 164 NCDs) and injuries in 195 countries, by sex and age. The outcomes included in GBD2015 are grouped into four levels. For example, Major Depressive Disorder: Level 1- Non-communicable diseases, Level 2- Mental and substance use disorders, Level 3- Depressive disorders, Level 4- Major Depressive disorder. For this project, we examined Level 3 data with some exceptions. The GBD2015 study measures the burden of disease in Disability-adjusted Life Years (DALYs). DALYs are described as the sum of years lost due to premature death (YLLs) and years lived with disability (YLDs). DALYs are also defined as 'years of healthy life lost'.

GBD2015 has age-specific data available in several age groupings; to elicit the most detail from the data we examined the following groups: 0-6 days; 7-27 days; 28-364 days; 1-4 years; 5-9 years; 10-14 years; 15-19 years; 20-24 years; 25-29 years; 30-34 years; 35-39 years; 40-44 years; 45-49 years; 50-54 years; 55-59 years; 60-64 years; 65-69 years; 70-74 years; 75-79 years; 80+ years.

Ranking the data

For each sex and age grouping we ranked the NCD causes by DALY rate. We initially examined the DALY rate for those outcomes classified in GBD2015 as Non-communicable disease. The exception to this rule is Intentional self-harm. In the GBD2015 study intentional self-harm is grouped under the level 1 category of 'Injury'. For this reporting framework, we grouped intentional self-harm under mental disorders. Globally, self-harm and suicide comprises a significant proportion of the burden of disease, specifically for 15-39 year-olds [28]. In Australia, for both genders, self-harm and road injuries are the only two causes not classified as NCD which fall into the top ten for 15-49 year olds. Given the strong link between self-harm, suicide, mental ill-health and poor psycho-social outcomes we have chosen to include it in our framework under mental disorders [29, 30].

Those causes with the highest rate within the group were ranked 1. For example, in Australian males aged 5-9years the NCD cause with the highest observed DALY rate is asthma with 747.85 DALYs per 100,000. At this point we also calculated, for each sex and age grouping, the proportion of total DALYs attributed to each cause from the total number of DALYs attributable to non-communicable diseases. We then examined the proportion of NCD burden (by age and sex) that the top ten causes accounted for. Table 1.0 shows that those causes that we have included in our framework account for over 50% of the NCD burden across age and sex.

Table 1.0: Proportion of NCD burden accounted for in the top ten causes by age and sex.

GBD age groupings	Australia	
	Female	Male
0-6 days (early neonatal)	99.9%	99.9%
7-27 days (late neonatal)	99.4%	99.4%
28-364 days (post neonatal)	95.1%	95.2%
1-4 years	88.7%	90.2%
5-9 years	80.6%	82.4%
10-14 years	82.6%	79.6%

15-19 years	76.1%	73.9%
20-24 years	76.1%	72.4%
25-29 years	75.0%	70.9%
30-34 years	70.5%	68.2%
35-39 years	66.3%	63.8%
40-44 years	63.2%	58.8%
45-49 years	59.5%	53.2%
50-54 years	56.6%	50.3%
55-59 years	53.8%	50.6%
60-64 years	52.7%	52.6%
65-69 years	53.1%	55.2%
70-74 years	53.7%	56.4%
75-79 years	55.9%	58.6%
80+ years	67.5%	66.0%

Defining the age bands for the framework

While the burden and specific types of NCDs change remarkably across the life-course (particularly in early to mid-life), there are also periods such as later life where the main NCDs change little. We sought to define age-bands that reflected this pattern. When we examined the Global Burden of Diseases Study (2015) data by age, similarities emerged in the profile of burden of disease between age groupings. Where there was significant overlap in the important causes of disease burden we combined the age groups together to ensure the framework was not overly repetitive. For example, when we report against age 25-39 years this includes the GBD2015 age groupings 25-29 years, 30-34 years, and 35-39 years. Across the three age groups there are 14 individual causes included on the framework for age 25-39 years (2 female only, 3 male only and 9 shared causes).

We have purposefully given space within the framework for detail to emerge on the rapid transition of life from infancy through to the end of adolescence. The variability in the top ten NCD outcomes over this period was striking. This made retaining the early years of the life-course in smaller, more refined age groups, a logical choice.

Table 1.1. Selected age groupings.

GBD age groupings	Current framework age groupings
Early Neonatal (<=7 days)	<1yr
Late Neonatal (8-28 days)	
Post Neonatal (29-365 days)	
01 to 04	01 to 04
05 to 09	05 to 09
10 to 14	10 to 14
15 to 19	15 to 19
20 to 24	20 to 24
25 to 29	25 to 39

30 to 34	
35 to 39	
40 to 44	40 to 59
45 to 49	
50 to 54	
55 to 59	
60 to 64	60+
65 to 69	
70 to 74	
75 to 79	
80+	

Australian Burden of Disease

We examined the top ten leading causes of total burden for each age group as reported in the Australian burden of disease (ABD) study (2011). These causes were also mapped onto the current framework, to the relevant age and gender. Many leading causes overlapped with those selected from the GBD2015 data, in some cases the ABD data extended the age group or sex included. However, four causes were added to the list that weren't originally included: atrial fibrillation was added for females; and non-rheumatic vascular disease, chronic liver disease, and attention-deficit/ hyperactivity disorder were added for males.

Government policy and strategic priorities

Policies and frameworks were examined to establish which NCD outcomes and risk factors are of priority to the Australian government. Australia has many national frameworks focussed on specific disease groups or outcomes, such as chronic conditions, mental health, or oral health. For this project, we were really searching for clear priorities with concrete targets or indicators, to map them against our own detailed framework. For example, we know that musculoskeletal disorders are a National Health Priority Area, but how is priority defined? Which disorders, and at which life stage, are being prioritised? Is there a gender difference worth noting? The documents reviewed varied in the detail afforded to measureable outcomes.

National Strategic Framework for Chronic Conditions

National Strategic Framework for Chronic Conditions (NSFCC) was released by the Australian Health Ministers' Advisory Council in 2017[31]. The framework sets out three specific objectives, and strategic priority areas within each objective, for preventing chronic illness in Australia. For each objective, indicators are selected to 'measure success' from currently available data. Where the indicators link to a disease grouping, specific disease or risk factor we have mapped them on the current framework as a government priority.

The National Health Priority Areas

"In 2007, deaths due to the eight National Health Priority Areas accounted for 77% of all underlying causes of death and were either associated with or the underlying cause of 90% of deaths"[32].

The National Health Priority Areas agreed by the Australian Health Ministers' Advisory Council were:

- Cancer control
- Cardiovascular health
- Injury prevention and control
- Mental health

- Diabetes mellitus
- Asthma
- Arthritis and musculoskeletal conditions
- Obesity
- Dementia

The government identified eight priority cancers for specific focus: lung cancer; colorectal cancer, melanoma, non-melanocytic skin cancer, prostate cancer, breast cancer, cervical cancer and non-Hodgkin's lymphoma. For musculoskeletal conditions, arthritis (including osteoarthritis, rheumatoid arthritis and juvenile arthritis), osteoporosis, and back problems were identified as the most common musculoskeletal conditions in Australia. We have added all NCD specific NHPA's into the framework (only injury prevention was excluded). Some government priorities were not disease specific, where a disease grouping is recognised as a priority but specific diseases are not named we have noted this in the framework, and undertaken to include all relevant causes for the disease grouping based on the information available from the NHPA. In the same way, most of the NHPA's were not clear on which age groups were prioritized, so where applicable we have included across the life-course.

Non-government frameworks

Australian health tracker

Australia's health tracker (AHT) is a reporting framework for preventable chronic diseases, conditions and their risk factors. The AHT is the first reporting framework of this kind in Australia and builds on the goals set by the World Health Organization (WHO) in the Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020 and the Mental Health Action Plan 2013-2020. The clear indicators outlined in the AHT were easily integrated into our framework.

WHO Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020

In 2013 the WHO launched the Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020 [2]. The action plan sets out six objectives, nine voluntary global targets and 25 indicators to measure progress against the targets. The overall vision and goal of the action plan is to reduce the preventable and avoidable burden of morbidity, mortality and disability due to non-communicable diseases. The WHO targets and indicators relating to NCD risks, outcomes, and determinants were mapped onto our framework.

Stakeholder Consultation

Our stakeholder group is comprised of researchers, policy makers, health care providers and community members, all aged 18 years and over. The stakeholders provided input into the completeness of the reporting framework, advice on data availability and quality, interpretation of data and policy recommendations.

Key findings: The preliminary reporting framework for NCD

Below we have plotted the preliminary reporting framework for NCDs. As described in the method above, the reporting framework has 3 main parts: Outcomes, Risk Factors and Determinants.

NCD Outcomes:

In the NCD outcomes section we have plotted disease/ health condition outcomes across relevant age groups. The source is noted (please see legend below). Colour coding is used to identify if an outcome is relevant to both sexes (green), males only (yellow) and females only (orange). Sometimes different data sources/ frameworks identified different sexes as priorities within an age group. In these cases, we have marked with a small 'f' or 'm' next to the relevant acronym. E.g. ABD_f would refer to the Australian Burden of Disease study identifying females as a priority in this age group. The 'Brief Rationale' column gives a short overview of which ages and sexes have been prioritised, and (where necessary) sometimes identifies a specific outcome where a disease group has been listed. E.g. for gynaecological diseases, where ABD specified polycystic ovarian syndrome, while GBD referred to a group of gynaecological diseases, not one specifically.

NCD Risk Factors:

In the NCD Risk Factors (RF) section we have plotted the identified RF across relevant age groups. The source is noted (please see legend below). Initial analysis of the most relevant RF for males and females identified that the top ten risk factors were the same across males and females. The 'Brief Rationale' for this section therefore relates to the type of NCD outcome that the RF is attributable to. The rationale for inclusion is based on the attributable risk to the top NCD outcomes rather than the age groupings or gender affected.

NCD Determinants:

In the NCD Determinants section we have proposed the use of the framework described in the Commission on Social Determinants of Health (CSDH) as a part of a surveillance system for health equity [27]. Overall social determinants of health were very poorly defined or used in the policies and frameworks we analysed for building this framework. Sometimes determinants were identified but were defined as risk factors or outcomes, or not included at all. Hence, we have integrated the existing CSDH framework which covers the key categories relevant for measuring the determinants of health, into our NCD Determinants section.

Box A: Reporting Framework Legend

Key Acronyms:
GBD = Global Burden of Disease Study
ABD = Australian Burden of Disease Study
NSFCC = National Strategic Framework for Chronic Conditions
NHPA = National Health Priority Areas
AHT = Australian Health Tracker
WHO = World Health Organisation
AG = Advisory Group

Sex Differences:
Colour coding: when sex varies between age groups: orange for females, yellow for males, green for both. In some cases, sex varies within age groups, and between priority areas/ data sources: (m) denotes priority for males and (f) for females.

The 'Brief Rationale' column gives a short overview of which ages and sexes have been prioritised, and (where necessary) sometimes identifies a specific outcome where a disease group has been listed.

Table 1.2. *NCD Outcomes*

NCD Outcomes in Males & Females Across the Life-course											
L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neoplasms		NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC AHT, WHO	NSFCC AHT, WHO	NSFCC AHT, WHO	All cancers- AHT: age 30-70yrs, NSFCC: age not specified
	Brain and nervous system cancer		GBD								GBD top 10: age 1-4
	Breast cancer							GBD, ABD	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD top 10: age 35-79, ABD top 10: age 45-74, NHPA: age 50+, AHT: age 50-74, WHO: age 50-70.
	Cervical cancer					AHT	NHPA, AHT	NHPA, AHT, WHO	NHPA, AHT, WHO	NHPA, AHT	NHPA: adults, age not specified, AHT: age 18-70, WHO: age 30-49.
	Colorectal cancer								GBD, ABD, NHPA, AHT	GBD, ABD, NHPA, AHT	GBD top 10: age 50+, ABD top 10: age 45+, NHPA: age 50-74, AHT: age 50-74
	Leukaemia	GBD	GBD	GBD							GBD top 10: post neonatal - age 9
	Malignant skin melanoma	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified
	Non-melanoma skin cancer	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified
	Non-Hodgkin lymphoma	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified
	Prostate cancer								GBD, NHPA	GBD, ABD, NHPA	GBD top 10: age 55-80+, ABD top 10: 65+, NHPA cancer

	Tracheal, bronchus and lung cancer								GBD, ABD, NHPA	GBD, ABD, NHPA	GBD top 10: age 50-80+, ABD top 10: age 45+, NHPA cancer

NCD Outcomes in Males & Females Across the Life-course											
L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cardiovascular diseases							NSFCC, NHPA, AHT	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	NHPA: priority for adults, AHT: age 30-70yrs, NSFCC*: age not specified
	Atrial Fibrillation									ABD	ABD top 10: age 85-95+
	Cardiomyopathy and myocarditis	GBD									GBD top 10: age <1
	Cerebrovascular disease								GBD	GBD, ABD	GBD top 10: age 55-80+, ABD top 10: age 65+,
	Ischemic heart disease							GBD_m, ABD_m	GBD, ABD	GBD, ABD	GBD top 10: age 35-80+, ABD top 10: age 45-95+
	Non-rheumatic vascular disease									ABD	ABD top 10: age 95+

** These disease groupings (Cancer and Cardiovascular disease) are recognised as a priority but specific diseases are not prioritised.*

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Chronic respiratory diseases		NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC, AHT, WHO	NSFCC, AHT, WHO	NSFCC, AHT, WHO	AHT/WHO*: age 30-70yrs, NSFCC*: age not specified
	Asthma	NHPA	GBD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	ABD, NHPA	NHPA	GBD top 10: age 1-39, ABD top 10: age 5-44, NHPA: age not specified
	Chronic obstructive pulmonary disease								ABD	GBD, ABD	GBD top 10: age 60-80+, ABD top 10: age 45-95+

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cirrhosis											
	Chronic liver disease								ABD_m	ABD_m	ABD top 10: age 45-64

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neurological disorders											
	Alzheimer disease and other dementias									GBD, ABD, NHPA, NFD	GBD top 10: age 75-80+, ABD top 10: age 65+, NHPA priority for 65+, NFD noted.
	Epilepsy	GBD	GBD	ABD	ABD						GBD top 10: age <1-4, ABD top 10: age 5-14
	Migraine			GBD	GBD	GBD	GBD	GBD	GBD		GBD top 10: age 5-59
	Motor neuron	GBD									GBD top 10: age <1

NCD Outcomes in Males & Females Across the Life-course										
	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Mental disorders	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NHPA/ NSFCC* age not specified
Anxiety disorders			GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	ABD	GBD top 10: age 5-59, ABD top 10: age 5-64
Attention-deficit/ hyperactivity disorder			ABD	ABD						ABD top ten: age 5-14 (m only)
Autistic spectrum disorders	GBD	GBD	GBD, ABD_m	GBD, ABD_m						GBD top 10: age <1(m only) 1-14 (m&f), ABD top 10: age 5-14 (m only)
Bipolar disorders					GBD, ABD	GBD, ABD_f	GBD, ABD_f	ABD		GBD top 10: age 15-29, ABD top 10: age 15-44 (f only)
Conduct disorder			GBD, ABD	GBD, ABD	GBD					GBD top 10: age 5-19, ABD top 10: age 5-14
Depressive disorders			ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD_f	GBD top 10: age 10-69, ABD top 10: age 5-64
Schizophrenia							GBD	GBD		GBD top 10: age 30-49
Self-harm (inc. Suicide)					GBD, ABD, NHPA, AHT	GBD, ABD, NHPA, AHT	GBD, ABD, AHT	GBD, ABD, AHT	ABD_m	GBD: (Injury, not NCD) top 11 all-cause DALY rank age 15-59, ABD top10: age 15-64, AHT: age 15-44

** These disease groupings (Chronic respiratory disease and mental disorders) are recognised as a priority but specific diseases are not prioritised.*

L2 L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Substance use disorders										
Alcohol use disorders					ABD	ABD	GBD_m, ABD_m	ABD_m,		GBD top 10: age 25-34 (m only), ABD top 10: age 15-44
Drug use disorders					GBD	GBD	GBD, ABD_m	GBD, ABDm		GBD top 10: age 15-54, ABD top 10: age 25-44 m only

NCD Outcomes in Males & Females Across the Life-course										
	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Diabetes, urogenital, blood, and endocrine diseases										
Diabetes mellitus	GBD, NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	GBD, ABD_m, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD top 10: <1 and 45-80+, ABD top 10: age 45-95+, AHT/WHO: 18+, NHPA/ NSFCC: no age
Gynaecological diseases~					ABD	GBD, ABD	GBD	GBD		GBD top 10: age 20-49, ABD top 10: age 15-24 (PCOS only).
Chronic kidney disease									GBD, ABD,	GBD top 10: age 80+, ABD top 10: age 85+,
Hemoglobinopathies and haemolytic anaemias	GBD	GBD	GBD							GBD top 10: age <1-9

	Urinary diseases	GBD		GBD top 10: age <1

~Note: Gynaecological disease includes uterine fibroids, polycystic ovarian syndrome, Female infertility due to other causes, Endometriosis, Genital prolapse, Premenstrual syndrome, other gynaecological diseases.

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Musculoskeletal disorders											
	Gout	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified
	Juvenile Arthritis	NHPA	NHPA	NHPA	NHPA	NHPA					NHPA: age <16
	Low back & neck pain	NHPA	NHPA	NHPA	GBD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD top 10: age 10-80+, ABD top 10: age 15-74, NHPA: age not specified
	Osteoarthritis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	ABD, NHPA	ABD, NHPA	ABD top 10: age 45-94, NHPA: age not specified
	Osteoporosis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified
	Rheumatoid arthritis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	ABD, NHPA	ABD, NHPA	ABD, NHPA	ABD top 10: age 25-74, NHPA: age not specified

NCD Outcomes in Males & Females Across the Life-course											
L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Other non-communicable diseases											
	Congenital birth defects	GBD, ABD	GBD, ABD	GBD	GBD	GBD					GBD top 10: age <1-19, ABD top 10: age <5
	Oral disorders			ABD, AHT	ABD, AHT	AHT	AHT	AHT	AHT	GBD_f, AHT	GBD top 10: age 60-64 (f only), ABD top 10: age 5-14 (dental caries specified for ABD), AHT: age 5+
	Sense organ diseases (see note below)	GBD	GBD	GBD	GBD			GBD	GBD	GBD, ABD	GBD top 10: age <1-14 & age 35-80+, ABD top 10: age 75-95+ (hearing: 75-95+, vision: 95+ only)
	Skin diseases~ >>Acne vulgaris			ABD	GBD, ABD	GBD, ABD	GBD_f, ABD				GBD L4- top 11: age 10-24, ABD top 10: age 5-24
	Skin diseases >>Dermatitis		GBD	GBD, ABD_f	GBD, ABD_f	GBD					GBD L4- top 11: age 1-19, ABD top 10: age 5-14
	Skin diseases >>Psoriasis			GBD	GBD						GBD L4- top 11: age 5-14
	Skin diseases >>Urticaria	GBD	GBD								GBD L4- top 11: age <1- 4
	Sudden infant death syndrome	GBD, ABD,	ABD,								GBD top 10: age <1, ABD top 10: age <5

~Note: *Sense organ disease (SOD): In GBD mostly all attributed to level 4 age-related and other hearing loss, however SOD does include cataract, glaucoma, macular degeneration, refraction and accommodation disorders, other vision loss, and other sense organ diseases. In ABD, this only represents hearing loss.*
Skin diseases: some skin diseases measured in GBD and classified within non-communicable disease are not NCDs. Therefore, we examined the skin diseases list at L4 and refined it to examine the DALY estimates for only those which are NCDs. e.g. Acne, Alopecia areata, Decubitus ulcer, Dermatitis, Other skin & subcutaneous diseases, Pruritus, Psoriasis, and Urticaria.

Table 1.3. *Risk Factors for NCD*

Top Risk Factors for NCDs in Males & Females										
	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Brief Rationale
Metabolic										
Dietary Risks (inadequate fruit & veg, salt intake,		GBD, ABD, NSFCC, WHO	GBD, ABD, NSFCC, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	Attributable RF for Neoplasms; CVD; and Diabetes, urogenital, blood, & endocrine diseases.
Low physical activity			GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	Attributable RF for Neoplasms; CVD; and Diabetes, urogenital, blood, & endocrine diseases.
High blood pressure					GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	Attributable RF for CVD and Diabetes, urogenital, blood, & endocrine diseases.
High fasting plasma glucose					GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	Attributable RF for CVD; and Diabetes, urogenital, blood, & endocrine diseases.
High body-mass index			GBD, ABD, NSFCC, NHPA, AHT	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	Attributable RF for Neoplasms; CVD; Diabetes, urogenital, blood, & endocrine diseases; and Musculoskeletal disorders.
High total cholesterol					GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	GBD, ABD, NSFCC, AHT	Attributable RF for CVD.
Impaired kidney function						GBD	GBD	GBD	GBD	Attributable RF for CVD and Diabetes, urogenital, blood, & endocrine diseases.
Environmental										
Occupational risks (ergonomic, particulates, noise, asthmagens, carcinogens & injury)					GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	Attributable RF for Neoplasms; Chronic respiratory diseases; Musculoskeletal disorders; and Other NCDs.

Top Risk Factors for NCDs in Males & Females										
	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Brief Rationale
Behavioural										
Tobacco (smoking, smoking while pregnant & second-hand smoke)	GBD, ABD, NSFCC	GBD, ABD, NSFCC	GBD, ABD, NSFCC	GBD, ABD, NSFCC	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	Attributable RF for Neoplasms; CVD; Chronic respiratory diseases; Diabetes, urogenital, blood, & endocrine diseases; and Other NCDs.
Alcohol (total per capita, heavy episodic drinking)				GBD, ABD, NSFCC	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	GBD, ABD, NSFCC, AHT, WHO	Attributable RF for Neoplasms; Mental & substance use disorders; and Self-harm.
Drug use				GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	Attributable RF for Neoplasms; Mental & substance use disorders; and Self-harm.
Unsafe sex				GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	Attributable RF for Neoplasms (cervical cancer)
Other										
Sexual abuse & violence (childhood sexual abuse & intimate partner violence)		GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	Attributable RF for Mental & substance use disorders and Self-harm.

Table 1.4. *Social determinants of health*

Data collection, collation and analysis of the social determinants of health is a crucial part of any national health surveillance system. The framework below was proposed in the Commission on Social Determinants of Health (CSDH) as a part of a surveillance system for health equity [27]. The determinants were identified in the CSDH report and cover the key categories relevant for adequately measuring the determinants of health; including several aimed at monitoring beyond the health-sector. This framework provides a strong basis from which to define indicators for social determinants for NCD.

The Social Determinants for NCDs in Males & Females			
Daily living conditions.	**Health behaviours:**	Smoking	Already covered by the risk factors outlined above.
		Alcohol	
		Physical activity	
		Diet and nutrition	
	Physical and social environment:	Water and sanitation	
		Housing conditions	
		Infrastructure, transport, and urban design	
		Air quality	
		Social capital	
	Working Conditions:	Material working hazards	
		Stress	
	Health Care:	Coverage	
		Health-care system infrastructure	
	Social protection:	Coverage	
		Generosity	
Structural drivers of health inequity.	**Gender:**	Norms & values	
		Economic participation	
		Sexual & reproductive health	
	Social inequities:	Social exclusion	
		Income and wealth distribution	
		Education	
	Socio-political context:	Civil rights	
		Employment conditions	
		Governance & public spending priorities	
		Macroeconomic conditions	

Section 1 Discussion: A revised reporting framework for Australia

- Examining NCD across the life-course creates a complex and multidimensional picture. However, it also highlights opportunities for early intervention.
- The disease burden in Childhood and Adolescence has not been expressed as a priority, in a clear and measureable way, by government or non-government frameworks or policy documents.
- Frameworks/clear priorities are lacking for children and adolescents: Childhood cancers, asthma, epilepsy, migraine, diabetes, sense organ disorders, and sudden infant death syndrome.
- Frameworks/clear priorities are lacking for adults and older people: chronic liver disease, dementia, gynaecological diseases, musculoskeletal disorders, and sense organ disorders.

Adult onset cancers such as breast, colorectal and prostate cancer are clearly represented within existing frameworks, however childhood cancers such as Leukaemia are not mentioned. Cardiovascular disease is prioritised for adults and has clear indicators within existing frameworks. Chronic Respiratory diseases, like cancer, generally have clear targets and indicators for adults while children and adolescents are not prioritised, despite the burden of asthma being significant across the life-course. Likewise, Diabetes has indicators defined for adults, but not for children and adolescents. Given the increasing prevalence of type 2 diabetes and associated risk factors, clear indicators need to be defined and measured across the life-course.

Neurological disorders (including dementia) show a lack of clear targets and indicators, given dementia is now the leading cause of death for females in Australia, accountability is vital. The burden of migraine is also significant, impacting across the life-course from age 5 to 59. Musculoskeletal disorders are completely lacking in clear priority focus or well-defined indicators, despite being recognised as being in the top 4 disease groups, accounting for more than half of the burden of disease in Australia [7]. While recognised as a NHPA, there is no priority around ages or targets, and no indicators defined in the NSFCC. There is a burden of chronic liver disease (CLD) in adults 45-64 which does not appear to be prioritised, however, many of the underlying causes of CLD have specific government strategies and targets, such as Hepatitis C, with the Fourth National Hepatitis C Strategy 2014-2017. Clear indicators for CLD would provide a further insight into the progress made over time against the underlying causes.

Gynaecological diseases and chronic kidney disease, also lack strategic policy. Gynaecological disease, which includes uterine fibroids, polycystic ovarian syndrome, female infertility due to other causes, Endometriosis, Genital prolapse, Premenstrual syndrome, and other gynaecological diseases, has a significant burden in women aged 15-59. The National Women's Health Policy (2010) has no specific mention of the gynaecological diseases identified here, apart from a note on funding for polycystic ovarian syndrome education and to develop evidence based guidelines for health professionals. Chronic disease is covered but only in the context of Diabetes, Cancer and Cardiovascular disease (CVD), not chronic gynaecological diseases.

Chronic kidney disease (CKD) is often undiagnosed and asymptomatic, up to 90% of kidney function can be lost before symptoms are evident [33]. Kidney Health Australia is calling on the government for a National Action Plan to tackle kidney disease in Australia. 51% of people with CKD have diabetes or CVD and over two-thirds of people with diabetes have CVD or CKD [33]. The strong link between diabetes, CVD and CKD, presents a clear opportunity for a coordinated, strategic approach to tackle these three prevalent diseases.

The burden related to hemoglobinopathies and haemolytic anaemias, and urinary diseases is all experienced in age 9 or younger, and again there are no clear strategies or indicators for these disease groups. Other non-communicable diseases such as congenital birth defects, oral disorders, skin disorders and sudden infant death syndrome all disproportionately affect infants, children and adolescents. They also lack any priority setting or strategic focus from existing health frameworks. The only strategic frameworks identified in this group of disorders was for oral health. Australia's National Oral Health Plan 2015-2024 has some sound indicators recommended across the life-course focused on prevention and accessible oral health care in the general population and across priority populations. AHT has released a new national report card focused on Oral Health which outlines key targets and indicators for oral health in children, adolescents and adults. The AHT report card also highlights the lack of sound data or government funding for oral health despite the link to NCDs and their risk factors.

Our framework highlights the importance of mental disorder, in particular, that the there is a significant burden experienced by children and young people and the most prevalent disorders (anxiety and depression) firmly have their geneses in late childhood and early adolescence [24]. The Fifth National Mental Health and Suicide Prevention Plan describes 24 key national performance indicators and a process to be established around reporting against these indicators. This plan will provide a strong foundation to strengthen reporting on Mental Health outcomes for Australians. The plan also recognizes the experience of mental health differs across the life course and it appears that indicators to be reported on will be disaggregated by age, however this is dependent on availability of data. Interestingly the plan highlights that while mental health and substance disorders are the leading cause of non-fatal burden, most early deaths of psychiatric patients are due to physical illnesses [34]. This highlights that comorbidities are a significant factor in both the prevention and treatment of all NCDs, and a coordinated, rather than piecemeal, approach to NCDs is required.

Substance use disorders have a significant burden across late adolescence into adulthood, although primarily for males from age 25. The National Drug Strategy (2017-2026) outlines 5 indicators designed to measure success of the strategy and monitor priorities. They mostly draw on the National Drug Strategy Household Survey to populate the indicators. The indicators reported in the strategy are not disaggregated by age or sex, but most are reported from age 14 and up.

Section 2

Data and indicators to measure NCDs in Australia

In this section, we have explored how well our NCD framework can be populated by sound, nationally representative, data. We also consider here the completeness of the data, the quality of the measures and the suitability to the population measured. We then defined indicators to apply to the reporting framework.

Section 2 Contents

- Method: Data sources identified and evaluated to define indicators with which to populate the reporting framework with quality Australian data.
- Key Findings: Map of data availability, quality and proposed indicators. Like the reporting framework, the data map has 3 main parts: Outcomes, Risk Factors and Determinants.
- Discussion: This section discusses the data sources prioritised in the data map and the proposed indicators.

Method

The three primary data sources selected for inclusion in this project were: The National Health Survey (2014-2015) (NHS), The National Hospital Morbidity Database (2013-2015) (NHMD), and the AIHW Australian Cancer Database (2013) (ACD).

Assessing how well the leading causes of death and disability are measured in Australia is a key aspect of this project. The Australian National Health Survey administered by the ABS is designed to measure the health of the Australian population triennially, allowing the comparison over time of key health outcomes and risk factors. In this section we will map the NHS against our framework of Key NCD outcomes, risks and determinants, to evaluate how well NCD is measured by this survey. Not all conditions are best measured by population survey, therefore we have also mapped available administrative data from the NHMD and ACD. We have attempted to map both survey and administrative data for all NCD outcomes. For some outcomes there was more than one data source available, in which case a single data source was selected by considering several factors (population, measures, quality of method). Using the preferred data source (where available) we defined a clear indicator for measuring the outcome.

There are other sound data sources available in Australia, however the purpose of this work was not to piece together the minimum health data to populate every indicator. Rather, we have focussed on how well Australia's key health survey and administrative morbidity data describe NCD in Australia.

Description of the data sources

National Health Survey 2014-15

The 2014-2015 National Health Survey [1] was conducted with around 19,000 individuals, in all states an territories of Australia, including urban, rural and remote areas across nearly 15,000 private dwellings. The survey is the latest in a series of nationally representative health surveys carried out by the ABS. The survey was intended to measure a broad range of health information, including prevalence of chronic health conditions and their risk factors, such as smoking, overweight and obesity, alcohol consumption and exercise. The survey also covers use of health services and actions people have taken for their health, and demographic and socioeconomic characteristics. The survey includes self-reported interview items (see Box B for further information) and objectively measured items (anthropometric measures, biomedical samples). The NHS summary data are publically available via the ABS website as publication reports and Data Cubes. University students and reseaarchers may also access more detailed data throug the Universities Australia Agreement. Further ABS products available under the agreement, for the extraction of NHS survey data, are TableBuilder, Microdata and DataLab.

Box B. The use of personal and proxy interviews in the NHS

National Health Survey: 2014-2015, the use of personal and proxy interviews. Summarised from the National Health Survey Users Guide [1]

Age Group	Interview Type
0-14	Child Proxy (parent/ guardian interviewed)
15-17	Self-report (child interviewed- parent may or may not be present) or Child Proxy (parent interviewed- child may or may not be present)
18+	Self-report*

*Adults with a significant illness or disability sometimes had a proxy interviewed on their behalf, provided the ABS interviewer was certain this was acceptable to the individual. The respondent was still present during the interview and physical measurements were taken, where possible/ appropriate.

Sections that required personal reflection or the selected person to be physically present were not part of the interview in cases where a proxy was used and the selected person was not present. These included: Physical measures (blood pressure, height, weight and waist measurements), mental wellbeing, Self-perceived body mass, financial stress, and Housing Tenure.

National Hospital Morbidity data;

The AIHW compiles hospital data provided by the states and territories under the National Health Information Agreement [35]. Episode-level records from admitted patient morbidity is collected in Australian hospital data collection systems, and compiled into the National Hospital Morbidity Database (NHMD). Data items include administrative and length of stay data, diagnoses, procedures, external causes of injury and poisoning, and demographic details. Selected data is then made publically available online in the AIHW Data Cubes [36]. Further data or disaggregation can be requested via a custom data request made directly to AIHW.

AIHW Australian Cancer Database;

Cancer is a notifiable disease in Australia. Legislation requires certain organisations and individuals to notify the Jurisdictions central cancer registry about all newly diagnosed cases of cancer. The AIHW collates this data annually, cleans and standarises the data, and notifies the registries of any duplicates. The data are then added to the Australian Cancer database [37]. The database contains all new cases of cancer diagnosed in Australia since 1 January 1982. There are some exclusions that apply:

- Benign, borderline malignancy or in situ tumors.
- Recurrences and metastases are not included.
- Basal cell carcinomas (BCC) and squamous cell carcinomas (SCC) of the skin are not included because they are not notifiable diseases.
- National data on non-melanoma skin cancers (other than BCC and SCC) are complete from 2001 only.

- Data on myelodysplastic syndromes and some myeloproliferative cancers are complete from 2003 only.

Selected cancer incidence data is publically available online in the AIHW Data Cubes, or via the NCCI website.

Data Quality

The quality of the data source was also evaluated by population, measures and method. The method employed was modified from Azzopardi and colleagues and described in Box C below [3]. Once a sound data source and indicator was identified, the search was concluded.

Box C. Method for evaluation of data quality *(Azzopardi and colleagues, 2017).* All data were assessed by population, measure, and method. Within data sources there could be variability within these domains, depending on the outcome of interest; assigned a letter, number and colour code.
Population A = National sample from all jurisdictions in Australia B = Multiple (but not all) states or territories of Australia C = Single state or territory D = Multiple communities of sites (either within or across states and territories) E = Single community or site
Measures 1 = Direct assessment of health condition 2 = Self-report measure of health condition 3 = Parent/ proxy report of health condition
Quality of method Shaded Green- Methodologically sound (Both sample and measure are appropriate) Shaded Amber- Some Methodological flaws (limited sample OR issues with measure) Shaded Red- Methodological flaws and limitations (potential limitations with sample AND issues with measure).

Key Findings: Data map and proposed indicators

Below we have mapped the key data sources and defined indicators to populate the reporting framework for NCD. As described in the method above, the data availability and quality map has 3 main parts: Outcomes, Risk Factors and Determinants.

NCD Outcomes:
For NCD outcomes we have mapped both key Survey and Administrative datasets where available. The data source is graded across the life-course following the method noted in Box C above, and detailed in the data map. The proposed indicator is listed next to the data source which has been selected, based on the data quality assessment. Where two indicators are listed, both data sources were assessed as equally important to report.

NCD Risk Factors:
For NCD Risk Factors (RF) we have mapped available survey data. Like the Outcomes section, the data source is identified, graded and the proposed indicator is listed. Only Survey data was assessed for the population of the RF indicators.

NCD Determinants:
For NCD Determinants data we have begun to map some key data that could potentially populate the proposed indicators. Many of the determinants identified relate to structures beyond the health system and investigating these is beyond the scope of this project. However, selected data sources and indicators have been proposed for a selection of Determinants.

Table 2.0. *NCD Outcomes: Data map and proposed indicators*

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators											
Neoplasms	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Available indicator based on data
Brain/ nervous system cancer *Administrative data*		A1								AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in 1-4yr olds)
Survey data		A3								National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Breast cancer *Administrative data*							A1	A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in 25+yr old females)
Survey data							A2	A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped. Breast cancer specifically named.*
Cervical cancer *Administrative data*						A1	A1	A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in 20+yr old females)
Survey data						A2	A2	A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Colorectal cancer *Administrative data*								A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in 40+yr olds)
Survey data								A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Leukaemia *Administrative data*	A1	A1	A1							AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in <=9yr olds)
Survey data	A3	A3	A3							National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Malignant skin melanoma *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in Australia)
Survey data	A3	A3	A3	A3	A2	A2	A2	A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Non-melanoma skin cancer *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in Australia) excluding BCC and SCC
Survey data	A3	A3	A3	A3	A2	A2	A2	A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Non-Hodgkin lymphoma *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in Australia)
Survey data	A3	A3	A3	A3	A2	A2	A2	A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Prostate cancer *Administrative data*								A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in 40+yr old males)
Survey data								A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*
Tracheal, bronchus and lung cancer *Administrative data*								A1	A1	AIHW Cancer Database 2014	Incidence of registered cases (per 100,000 per year, in 40+yr olds)
Survey data								A2	A2	National Health Survey 2014-15	*Ever diagnosed with cancer, cancers then grouped.*

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators, continued.												
Cardiovascular diseases		**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-39**	**40-59**	**60+**	**Available Data Source**	**Proposed Indicator**
Atrial Fibrillation *Administrative data*										A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 60+yr olds)
Survey data										A2	National Health Survey 2014-15	*Ever diagnosed with heart or circulatory condition, with an open-ended space to name condition, some suggestions in survey, this outcome is not noted.*
Cardiomyopathy/ myocarditis *Administrative data*		A1									AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in <1yr olds)
Survey data		A3									National Health Survey 2014-15	*Ever diagnosed with heart or circulatory condition, with an open-ended space to name condition, some suggestions in survey, this outcome is not noted.*
Cerebrovascular disease *Administrative data*									A1	A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 40+yr olds)
Survey data									A2	A2	National Health Survey 2014-15	*Ever diagnosed with heart or circulatory condition, with an open-ended space to name condition, some suggestions in survey, Stroke is noted.*
Ischemic heart disease *Administrative data*								A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 25+yr olds)
Survey data								A2	A2	A2	National Health Survey 2014-15	*Ever diagnosed with heart or circulatory condition, with an open-ended space to name condition, some suggestions in survey, Heart attack is noted.*
Non-rheumatic vascular disease *Administrative data*										A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 60+yr olds)
Survey data										A2	National Health Survey 2014-15	*Ever diagnosed with heart or circulatory condition, with an open-ended space to name condition, some suggestions in survey, this outcome is not noted.*
Chronic respiratory diseases		**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-39**	**40-59**	**60+**	**Data Source**	**Proposed Indicator**
Asthma *Administrative data*		A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital Separations available*
Survey data		A3	A3	A3	A3	A2/ 3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term asthma (population prevalence, in <1-60+) (prompted in survey)
COPD* Chronic Bronchitis/ Emphysema *Administrative data*									A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital Separations available*
Survey data									A2	A2	National Health Survey 2014-15	Chronic bronchitis and chronic emphysema combined (>6mth duration) (population prevalence, in 40+) (prompted in survey)

*COPD = Chronic Obstructive Pulmonary Disease

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators, continued.											
Cirrhosis	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Chronic liver disease *Administrative data*								A1	A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 40+yr olds)
Survey data											

Neurological disorders	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Alzheimer disease and other dementias *Administrative data*									A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 60+yr olds)
Survey data									A2	National Health Survey 2014-15	Current or long term dementia (including Alzheimer's) (population prevalence, in 60+) (prompted in survey)
Epilepsy *Administrative Data*	A1	A1	A1	A1						AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, 0-14yr olds)
Survey data	A3	A3	A3	A3						National Health Survey 2014-15	Current or long term Epilepsy (population prevalence, in <1-14) (National Health Survey, 2014-15) (prompted in survey)
Migraine *Administrative Data*			A1	A1	A1	A1	A1	A1		AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data			A3	A3	A2/3	A2	A2	A2		National Health Survey 2014-15	Current or long term migraine (population prevalence, in 5-59yrs) (prompted in survey)
Motor neuron *Administrative data*	A1									AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in <1yr olds) (ICD10 G12.2 Motor neuron disease)
Survey data											

Substance use disorders	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Alcohol use disorders *Administrative data*					A1	A1	A1	A1		AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data					A2/3	A2	A2	A2		National Health Survey 2014-15	Current or long term harmful use or dependence on alcohol (population prevalence, in 15-59) (prompted in survey)
Drug use disorders *Administrative data*					A1	A1	A1	A1		AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available for mental and behavioural disorders due to substance use.*
Survey data					A2/3	A2	A2	A2		National Health Survey 2014-15	Current or long term harmful use or dependence on drugs (population prevalence, in 15-59) (prompted in survey)

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators, continued.											
	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Mental disorders					A2	A2	A2	A2	A2	National Health Survey 2014-15	K5 & K10 High/ Very High Psychological distress (population prevalence, in 18+)
Anxiety disorders *Administrative data*			A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data			A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Anxiety (population prevalence, in 5-60+) (prompted in survey)
ADHD* *Administrative data*			A1	A1						AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data			A3	A3						National Health Survey 2014-15	Current or long term ADHD (population prevalence, in 5-14yrs) (prompted in survey)
Autistic spectrum disorders *Administrative data*	A1	A1	A1	A1						AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data	A3	A3	A3	A3						National Health Survey 2014-15	Current or long term ASD (population prevalence, in <1-14) (prompted in survey)
Bipolar disorders *Administrative data*					A1	A1	A1	A1		AIHW National Hospital Morbidity Database 2015-16	Hospital Separation due to Bipolar affective disorder (per 100,000 per year in 15-59yr olds)
Survey data					A2	A2	A2	A2		National Health Survey 2014-15	Current or long term Bipolar (population prevalence, in 15-59) (prompted in survey)
Conduct disorder *Administrative data*			A1	A1	A1					AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data			A3	A3	A2/3					National Health Survey 2014-15	Current or long term conduct disorder (population prevalence, in 5-19) (prompted in survey)
Depressive disorders *Administrative data*			A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data			A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Depression (population prevalence, in 5-60+) (prompted in survey)
Schizophrenia *Administrative data*							A1	A1		AIHW National Hospital Morbidity Database 2015-16	Hospital Separation due to schizophrenia (per 100,000 per year in 25-59yr olds)
Survey data							A2	A2		National Health Survey 2014-15	Current or long term Schizophrenia (population prevalence, in 25-59) (prompted in survey)
Self-harm (inc. Suicide) *Administrative data*											Data Gap
Survey data											Data Gap

* Attention-deficit/ hyperactivity disorder

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators, continued.											
Diabetes, urogenital, blood, and endocrine diseases	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Diabetes mellitus *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in <1-60+) (ICD10 E10, E11, E13, E14)
Survey data	A3	A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Diabetes (population prevalence, in <1-60+) (prompted in survey)
Gynaecological diseases~ *Administrative data*										Data Gap: Certain diseases may have reasonable data from hospital separations but it wouldn't necessarily give an accurate account of Gynaecological diseases overall.	
Survey data											
Chronic kidney disease *Administrative data*									A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data									A2	National Health Survey 2014-15	Current or long term Kidney disease (population prevalence, in 60+) (prompted in survey)
Hemoglobinopathies and haemolytic anaemias *Administrative data*	A1	A1	A1							AIHW National Hospital Morbidity Database 2015-16	Hospital separation (per 100,00 per year, in 0-9yrs) available for Haemolytic Anaemias (ICD10 D55-D59 includes: thalassemia, sickle-cell disease, hereditary anaemias, acquired haemolytic anaemia)
Survey data											Data Gap
Urinary diseases *Administrative data*											Data Gap
Survey data											Data Gap

~Note: Gynaecological disease includes uterine fibroids, polycystic ovarian syndrome, Female infertility due to other causes, Endometriosis, Genital prolapse, Premenstrual syndrome, other gynaecological diseases.

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators, continued.											
Musculoskeletal disorders	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Gout *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data	A3	A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Gout (population prevalence, in <1-60+) (prompted in survey)
Juvenile arthritis *Administrative data*	A1	A1	A1	A1	A1					AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in <1-60+) (ICD10 M08-M09 Juvenile arthritis and Juvenile arthritis in psoriasis)
Survey data											Data Gap
Back pain *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data	A3	A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Back pain (>6mth duration) (population prevalence, in <1-60+) (prompted in survey)
Neck pain *Administrative data*											Data Gap
Survey data											Data Gap
Osteoarthritis *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data	A3	A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Osteoarthritis (population prevalence, in <1-60+) (prompted in survey)
Osteoporosis *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available (M80/ M81with or without fracture)*
Survey data	A3	A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Osteoporosis (population prevalence, in <1-60+) (prompted in survey)
Rheumatoid arthritis *Administrative data*	A1	A1	A1	A1	A1	A1	A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data	A3	A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Current or long term Rheumatoid arthritis (population prevalence, in <1-60+) (prompted in survey)

NCD OUTCOMES: Data Availability, Quality & Proposed Indicators, continued.											
Other NCDs	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Data Source	Proposed Indicator
Congenital birth defects *Administrative data*	A1	A1	A1	A1	A1					AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available for Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)*
Survey data	A3	A3	A3	A3	A2/3					National Health Survey 2014-15 *(some birth defects are prompted but not all)*	Congenital malformations, deformations & chromosomal abnormalities (population prevalence, in 0-19yrs)
Oral disorders (dental caries) *Administrative data*			A1	A1					A1	AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 1-19) Dental caries (ICD10 K02)
Survey data											Data Gap
Sense organ disease (vision) *Administrative data*	A1	A1	A1	A1			A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data	A3	A3	A3	A3			A2	A2	A2	National Health Survey 2014-15	Current or long term visual defect (population prevalence, in CHECK AGES) prevalence) (prompted in survey)
Sense organ disease (hearing) *Administrative data*	A1	A1	A1	A1			A1	A1	A1	AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available for hearing loss*
Survey data	A3	A3	A3	A3			A2	A2	A2	National Health Survey 2014-15	Current or long term hearing or ear problem (population prevalence, in CHECK AGES) (prompted in survey)
>>Acne vulgaris											Data Gap
>>Dermatitis *Administrative data*		A3	A3	A3	A2/3					AIHW National Hospital Morbidity Database 2015-16	Hospital Separation (per 100,000 per year, in 1-19) Dermatitis and eczema (ICD10 L20–L30)
Survey data		A3	A3	A3	A2/3					National Health Survey 2014-15	Current or long term Dermatitis (population prevalence, in 1-19yrs) (NOT prompted in survey)
Skin diseases >>Psoriasis *Administrative data*			A1	A1						AIHW National Hospital Morbidity Database 2015-16	*Hospital separations available*
Survey data			A3	A3						National Health Survey 2014-15	Current or long term Psoriasis (population prevalence, in 5-14yrs) (prompted in survey)
Skin diseases >>Urticaria *Administrative data*	A1	A1								AIHW National Hospital Morbidity Database 2015-16	Indicator to be defined: Use Hospital Separations for Urticaria? (ICD10 L50)
Survey data											Data Gap
SIDS *Administrative data*	A1	A1									Data Gap
Survey data											Data Gap

Table 2.1. *Risk Factors for NCD: Data map and proposed indicators*

NCD RISK FACTORS: Data Availability, Quality & Proposed Indicators.											
	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60y+	Data Source	Proposed Indicator
Behavioural											
Dietary Risks > Inadequate fruit intake		A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report inadequate fruit intake (NHMRC 2013), (population prevalence in ages 1-60+)
Dietary Risks > Inadequate vegetable intake		A3	A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report inadequate veg intake (based on NHMRC 2013), (population prevalence in ages 1-60+)
Low physical activity			A3	A3	A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report 2014 physical activity guideline for age group not met (population prevalence) Age groups: 15-17yrs; 18-64 yrs; 65+yrs.
Tobacco >>Age at smoking commencement					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report age at smoking commencement, population prevalence in 15yrs +
Tobacco >>Daily smoke status					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report daily smoker status, population prevalence in 15yrs +
Tobacco >>Smoking compared to 12mths ago					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report smoking level compared to 12mths ago, population prevalence in 15yrs +
Tobacco >>Second-hand smoke					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report indoor smoking occurring in the home, prevalence in Australian households
Alcohol >> Binge drinking in the past 12 mths *Exceeds the NHMRC 2009 guideline for single occasion risk*					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report binge drinking (>5 or more drinks on a single occasion in the past 12 mths), population prevalence in age 15+
Alcohol >> Lifetime risky drinking *Exceeds NHMRC 2009 guideline for lifetime risk*					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report lifetime risky drinking (consuming on average >2 standard drinks per day), population prevalence in age 15+
Drug use											Data Gap
Unsafe sex											Data Gap

NCD RISK FACTORS: Data Availability, Quality & Proposed Indicators											
	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Data Source	Proposed Indicator
Metabolic											
High blood pressure					A1	A1	A1	A1	A1	National Health Survey 2014-15	Measured systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90mmHg.
High blood sugar					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report high sugars in blood or urine (as told by a doctor or nurse), only asked if reported NOT to be diabetic, population prevalence in 15yrs+
High body-mass index			A1	A1	A1	A1	A1	A1	A1	National Health Survey 2014-15	Measured BMI using age and sex specific cut off points for overweight and obese, population prevalence in 2+ years.
High total cholesterol					A2/3	A2	A2	A2	A2	National Health Survey 2014-15	Self-report high cholesterol, population prevalence in 15yrs+
Impaired kidney function											Data Gap
Environmental											
Occupational risks e.g. ergonomic, particulates, noise, asthmagens, carcinogens											Data Gap
Other											
Sexual abuse & violence >>childhood sexual abuse											Data Gap
Sexual abuse & violence >>intimate partner violence											Data Gap

Table 2.2. *Social determinants of Health: Data map and proposed indicators*

Mapping data and indicators for social determinants.

The Social Determinants for NCDs in Males & Females			Data Source	Potential Indicators
Daily living conditions	Health behaviours:	Smoking	Already covered by the risk factors outlined above.	
		Alcohol		
		Physical activity		
		Diet and nutrition		
	Physical & social environment:	Water and sanitation		- Measure of access to clean water and sanitation
		Housing conditions	ABS Census 2016	- Overcrowding - Housing Suitability Measure (i.e. the measure on whether they have enough bedrooms for the household mix- derived scale)
		Infrastructure, transport, and urban design	AATSIHS	- Ease of accessing transport when needed
		Air quality	State EPA's	- Air Quality monitoring by the EPA
		Social capital		- Report having a friend/ relative who can confide in (AATSIHS) - Report feeling safe in their community at night
	Working Conditions:	Material working hazards	ABS (Work-related injuries 2013-2014)	- Persons aged 15+ who experienced a work-related injury or illness in past 12mths
		Stress		- Self-reported stressful work conditions - Strength of legislation around OH&S for MH
	Health Care:	Coverage	AIHW	- Common cancer screening rates - Vaccination rates
		Health-care system infrastructure		- Elective surgery patient waiting times by urgency category
	Social protection:	Coverage		- Social housing waiting time/ Percentage of lower income households in housing stress.
		Generosity		- Percentage of GDP spent on social welfare.
Structural drivers of health inequity	Gender:	Norms & values		Beliefs around: - Gender ratio of time spent in unpaid work - Gender pay gap
		Economic participation	ABS Gender indicators 2017	- Labour force participation rate by gender

		Sexual & reproductive health		- Met need for contraception
	Social inequities:	Social exclusion		- Disconnection with community
		Income and wealth distribution	ABS (Key Economic Indicators & NHS)	- Average weekly ordinary time earnings, full-time adults - Ability to raise $2000 in an emergency
		Education	ABS (NHS)	- Education attainment
	Socio-political context:	Civil rights		- Strength of legislation protecting civil rights
		Employment conditions		- Strength of legislation for employee protections.
		Governance & public spending priorities		- Percentage of GDP spent on health care
		Macroeconomic conditions		-Unemployment rate

Section 2 Discussion: Data and indicators to measure NCDs in Australia

The first step in accountability for NCDs is collecting, analysing and evaluating available evidence. The work presented in section 1 and 2, building the reporting framework and mapping (and critically appraising) the available data, will form a part of the first step in increasing accountability on NCD outcomes and risk factors. There are several considerations of note regarding the data sources selected here and the indicators proposed. These strengths and limitations are discussed below.

National health survey prioritised.

In defining indicators for this project, we prioritised data available from national surveys over administrative datasets for many health outcomes and risk factors. This is primarily because these national surveys are designed to measure the health of the population. There are also sound measures of inequity such as the SEIFA indexes, ASGS remoteness index and full disaggregation by gender and age. For the slow onset, chronic diseases and risk factors managed across multiple health sectors (such as type 2 diabetes, obesity or hypertension), the national health surveys provide a better indication of burden. Especially when biomedical samples are taken to confirm diagnosis and identify previously undiagnosed cases. For example, in the Australian Health Survey, 1 in 5 people with biomedical results indicating diabetes mellitus were previously undiagnosed [38].

There were some exceptions, for example cardiovascular disease, which will often result in a serious cardiac event, subsequent hospital visit which resolves in either mortality or ongoing chronic illness. In this case hospital separation data could prove to be a better indication of the burden of severe illness, while the national survey could miss those acute cases. In some cases, hospital separation data proved to be the only nationally representative data available with age and gender disaggregation.

Cancer is another exception. The National Cancer Control Indicators website provides excellent accountability and transparency around cancer incidence, screening rates and other vital statistics. The NCCI synthesises the available data from multiple sources and successfully communicates the data in a way that is both accessible (user friendly) and transparent (disaggregation available by important measures of inequity, data tables available to download). The data source for cancer incidence reported in this project is the AIHW Cancer Database 2014. The significant gap in cancer data is around basal cell carcinoma (BCC) or squamous cell carcinoma (SCC) because these cancer types are not reportable to cancer registries.

Variation in the quality of indicators.

Given the variability of data sources and the even the variability of measures within data sources, there is significant variation of the quality of the indicators across outcomes and risk factors. Hospital separation data report each episode of care, rather than individuals. Ten episodes of care could be 10 individuals attending hospital 10 times or 1 individual attending 10 times for the same condition. Therefore, chronic conditions such as diabetes, hypertension, or asthma, could be inaccurately counted. Other factors such as remoteness and stigma associated with certain illness or injury (such as self-harm) also impact on hospital data.

Within the National Health Survey measures can vary a great deal. There are specific outcomes (mostly related to the NHPA's cardiovascular disease, diabetes, cancer, chronic respiratory disease, mental health, and arthritis) that have a series of questions (around diagnosis, chronicity, and symptoms) dedicated to eliciting a fuller picture of the burden experienced by an individual. Other outcomes and risk factors are mentioned in a list, questioning if the individual has ever been diagnosed with anything from a group of diseases, the individual then lists any relevant illnesses. Those outcomes and risk factors listed are therefore much more likely to be reported. However, the list itself can vary in quality, symptoms such as 'fluid problems' are listed alongside specific conditions

such as Epilepsy. Finally, the individual is asked about any 'other' illnesses and they have space to note anything else of relevance to them. These illnesses (and the previous listed illnesses) are then mapped against the ICD-10 and reported in the survey findings. This method would be particularly dependent on people having a good understanding of their illness, and a willingness to report those with stigma attached. Both limitations are particularly relevant considerations to the suitability of this method for use with adolescents.

Suitability of measure for children and adolescents.

The National Health Survey (NHS) is self-report for age 18+, with a few exceptions as noted in Box B earlier. Young people aged 15 and above can self-report (with parental permission) but a parent may (or may not) also be present in the room while the interview is conducted. For young people 15-17 whom permission is not granted by parents and children under 15, a parent proxy interview is used. This method is problematic and calls into question the sensitivity of the survey for capturing health risk behaviours such as smoking and alcohol use, but even for less-sensitive daily recall questions such as those relating to physical activity and dietary intake. By contrast, this method does not pose any immediate concern for other chronic illnesses which usually have a clear diagnosis and treatment, such as type 1 diabetes or asthma. The NHS does have data items which identify parent presence or proxy use at various stages of the interview, important tools in establishing the validity of these measures. There is also a lack of data for mental wellbeing, for any respondent under 18.

Given the important risk factors and outcomes pertinent to children and adolescents (such as tobacco uptake, risky alcohol use, overweight, anxiety and depression) are impacted by perceived stigma and potential parental repercussions, it is vital that respondents can answer questions confidentially. Perhaps this highlights the need to extend current data collection systems to include a confidential self-report survey which is administered directly to children and young people, expanding the scope of the current National Health Survey to include better items for children and young people.

Data gaps.

Some NCD outcomes and risk factors do not have nationally representative data available, hence no indicator has been defined. Other data gaps identified are not a complete lack of data but of questionable quality, such as missing data for certain age groups or the measure used suspected to be less reliable in certain age groups.

One of the key aims of this study was to recognise key data gaps, to identify priorities for future research. Obvious data gaps we identified in the National Health Survey included disease outcomes such as- self-harm, gynaecological diseases, urinary diseases, neck pain, chronic liver disease; and risk factors such as- impaired kidney function, drug use, unsafe sex, sexual abuse and violence and occupational risks. Further data gaps exist around better item quality for Mental health in children and adolescents and Substance use/ abuse. The validated mental health questions in the NHS were only asked from age 18 onward.

Australia absolutely has the technical capacity to extend our data collection and processing to cover the finer detail needed for improved accountability on NCD outcomes, risks and determinants.

Summary.

Australia has a robust foundation of public health surveys, administrative data and disease registries. Currently there are strengths worth recognising and highlighting as a way of identifying benchmarks to strive for, such as the NCCI website. However, the available data has certain limitations, outlined above, which mean indicators need to be interpreted with care. There are also data gaps across outcomes and age groups which identify future research priorities, such as the lack of data available for gynaecological diseases. For the purposes of this study there is sufficient data to begin to describe

the profile of NCD for Australia, with respect to the common risks and outcomes experienced across the life-course.

Section 3

An Updated NCD Profile for Australia

In this section, we have analysed the data sources identified in Section 2. Where possible we have reported on the indicator proposed in the data map.

Section 3 Contents

- Method: Data sources identified in Section 2 were analysed and presented in tables and bar graphs. A detailed overview of how we accessed available data for analysis is available in appendix 2.
- Key Findings: Data visualisations, disaggregated by sex are presented here. The profile has 2 main parts: Outcomes and Risk Factors. Data tables can be found in appendix 3.
- Discussion: This section discusses the profile of NCD in Australia and key limitations to the data analysis.

Method

NHS survey data was accessed online using TableBuilder, an online portal run by the ABS. It is designed to facilitate the use of complex survey data such as NHS, Census, and AATSIHS. Once built, tables can be exported to Microsoft Excel. Hospital separation statistics by principal diagnosis data cubes were accessed via the AIHW's online portal. Users can disaggregate by age and sex easily using a pre-defined 'drag and drop' menu. Tables can also be exported or copied. The AIHW National Cancer Registry data is available using the Australian Cancer Incidence and Mortality (ACIM) books available from the AIHW website, by downloading a pivot table or individual cancer tables.
Once the raw data was extracted, we analysed it with Stata/MP 14.2 for Mac. We then visualized the data using Tableau Desktop Professional Edition 10.5.5. Further detail on the extraction and data tables are available in appendix 2 and 3.

Key Findings, Part A: A Profile of NCD for Australia

The figures and a brief analysis is provided below, grouped by disease grouping and risk factor type.

Neoplasms

The incidence rate for selected cancers is shown below in Figure 3.0 and 3.1 We see that most of the top 9 cancers in Australia do have an impact across the full life-course, with a gradual increase in incidence rate as age also increases. Cervical and breast cancer have a different pattern, emerging in adolescence and early adulthood. While breast cancer rate keeps increasing into older adulthood, cervical cancer stays constant. Prostate cancer and trachea, bronchus and lung cancer, both have an increase in burden at age 40, followed by a more than six-fold increase in incidence by age 60 and over.

Figure 3.0.

Registered cases for selected Cancers: Rate per 100,000 p.a. (ACD, 2014)

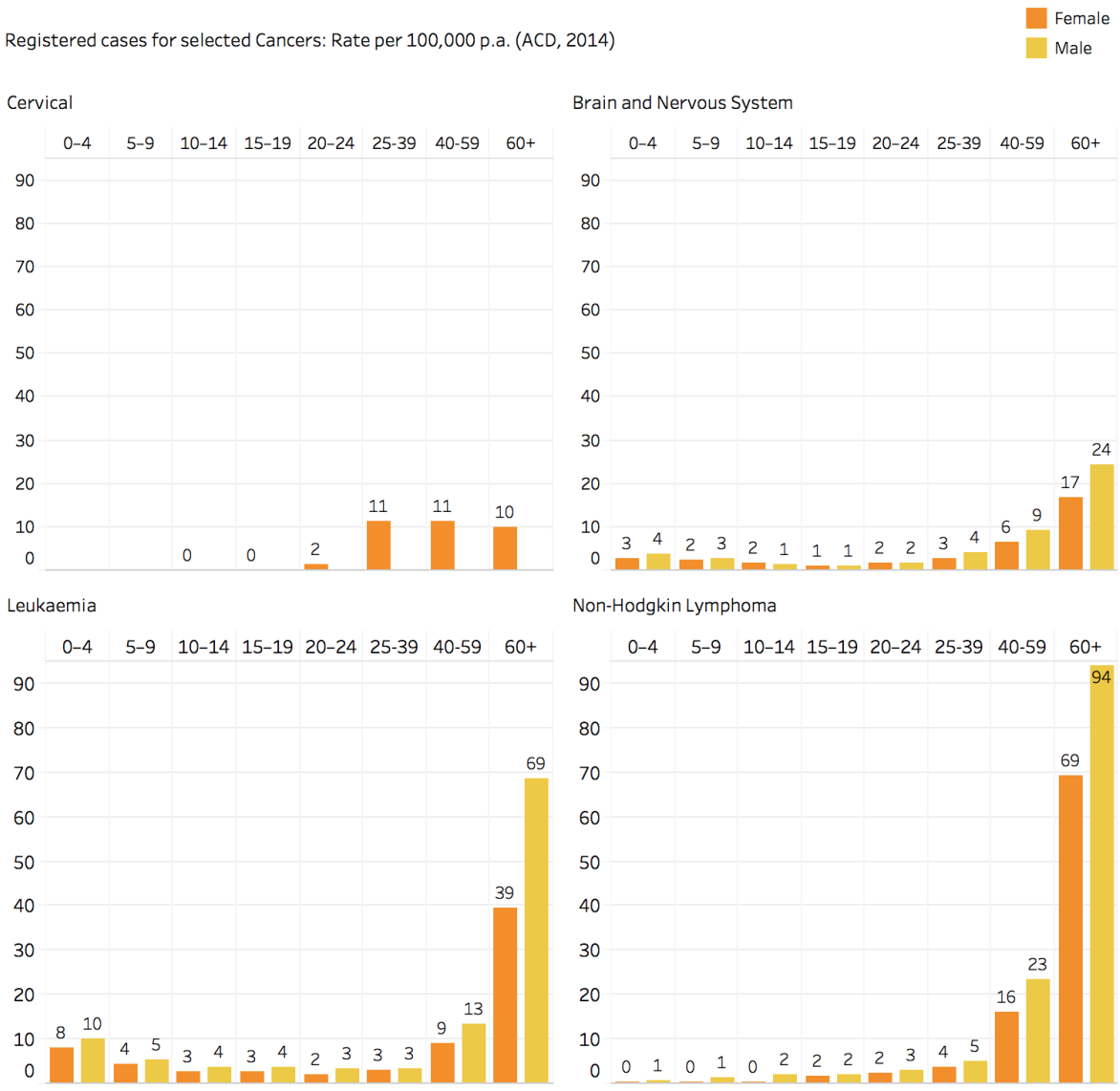
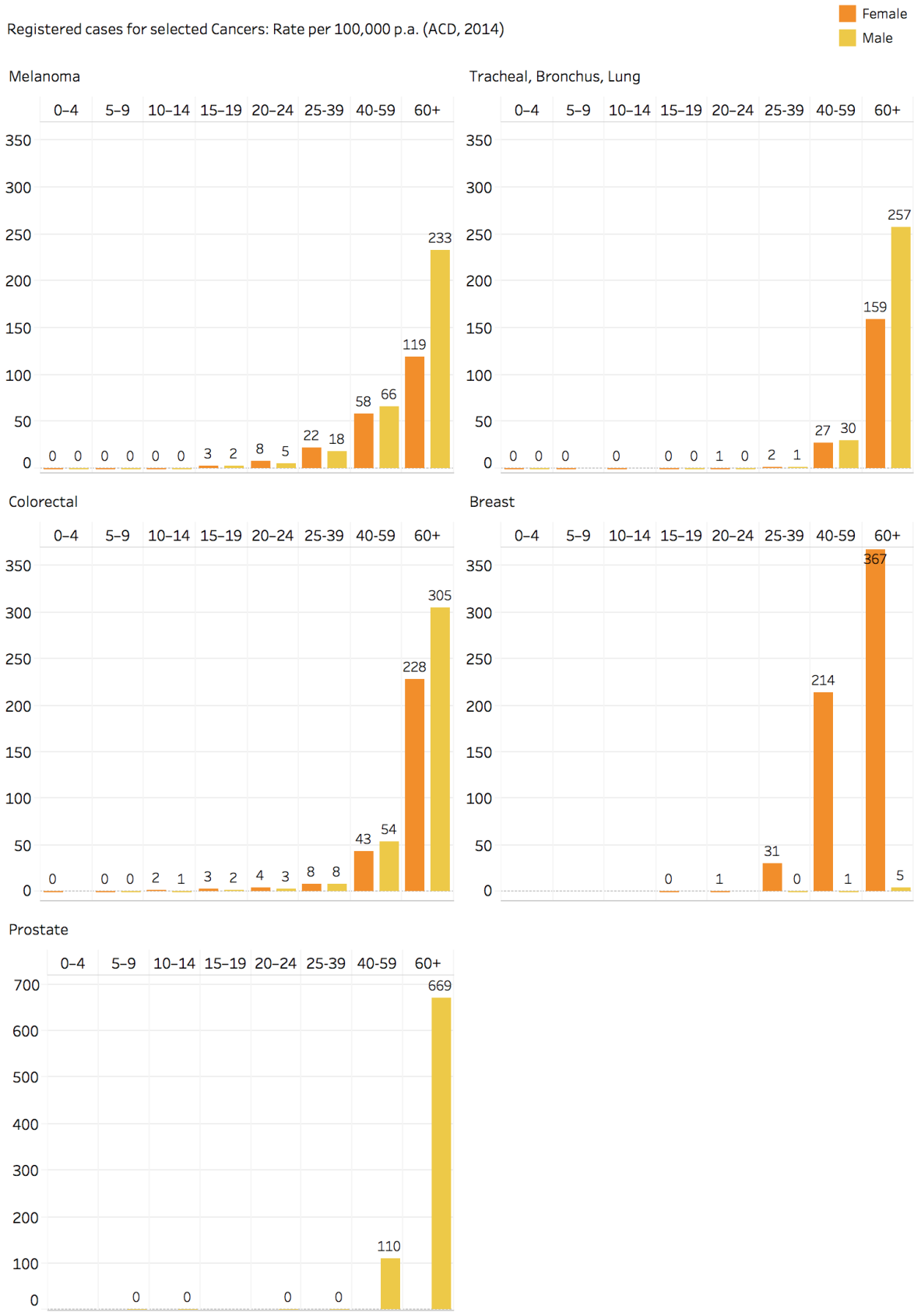


Figure 3.1.


Registered cases for selected Cancers: Rate per 100,000 p.a. (ACD, 2014)
Female
Male
Melanoma
0–4 5–9 10–14 15–19 20–24 25-39 40-59 60+
0 0 0 0 0 0 3 2 8 5 22 18 58 66 119 233
Tracheal, Bronchus, Lung
0–4 5–9 10–14 15–19 20–24 25-39 40-59 60+
0 0 0 0 0 0 1 0 2 1 27 30 159 257
Colorectal
0–4 5–9 10–14 15–19 20–24 25-39 40-59 60+
0 0 0 2 1 3 2 4 3 8 8 43 54 228 305
Breast
0–4 5–9 10–14 15–19 20–24 25-39 40-59 60+
0 1 31 0 214 1 367 5
Prostate
0–4 5–9 10–14 15–19 20–24 25-39 40-59 60+
0 0 0 0 110 669
0 50 100 150 200 250 300 350
0 100 200 300 400 500 600 700

Cardiovascular diseases

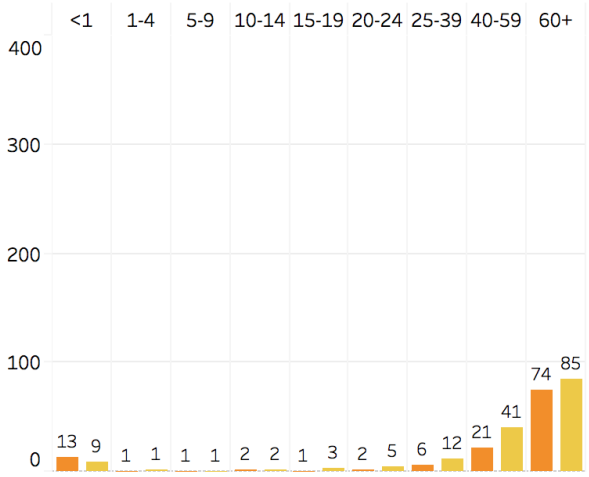
The rates displayed below in figure 3.2 are for hospital separations, which count occasions of care in Australian hospitals. For non-rheumatic heart disease, atrial fibrillation, and ischaemic heart disease we see there are very high rates in the 60 and over age group, and quite high in the 40-59 age group as well. These three outcomes also appear to have consistently higher rates for males than females. However, cardiomyopathy and cerebrovascular disease (stroke), have elevated rates in infancy, reduce slightly after infancy then steadily increase throughout adolescence, young adulthood and into the older age groups. While it is clear there is increased burden around age 40+, especially for males, there is a recognisable burden of cardiovascular disease across the life-course.

Figure 3.2.

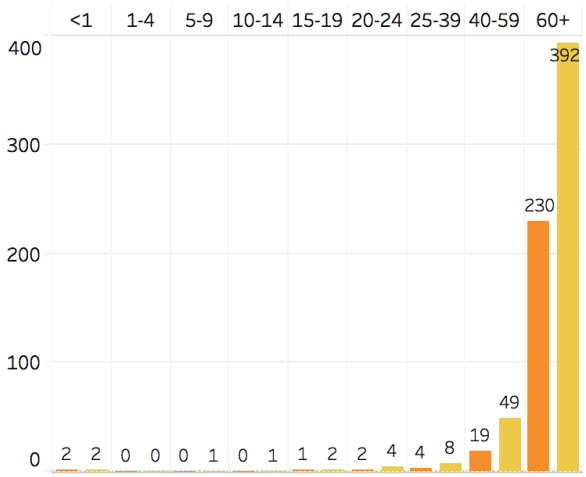
Hospital Separations for selected Cardiovascular Diseases:
Rate per 100,000 p.a. (NHMD, 2015-16)

Female
Male

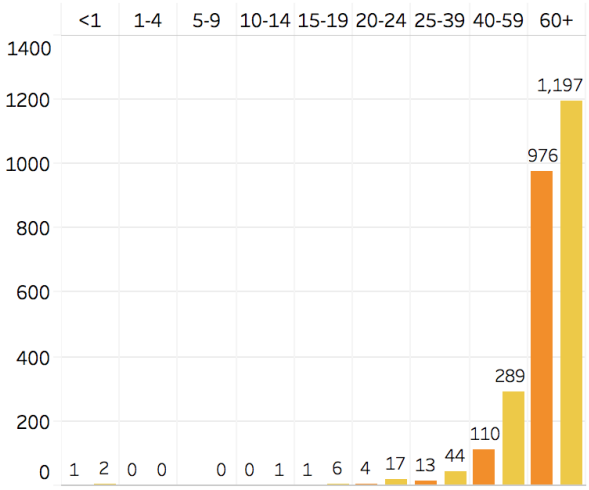
Cardiomyopathy



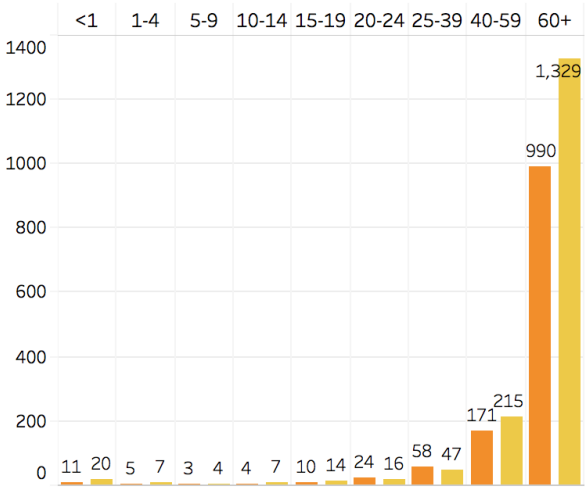
Non-Rheumatic Heart Disease



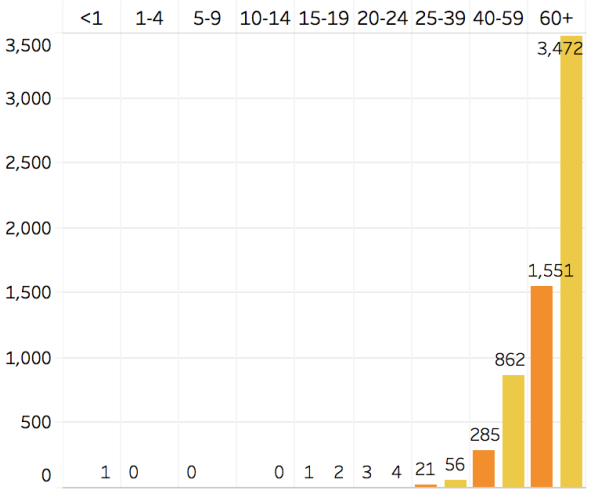
Atrial Fibrillation



Cerebrovascular Disease



Ischaemic Heart Disease

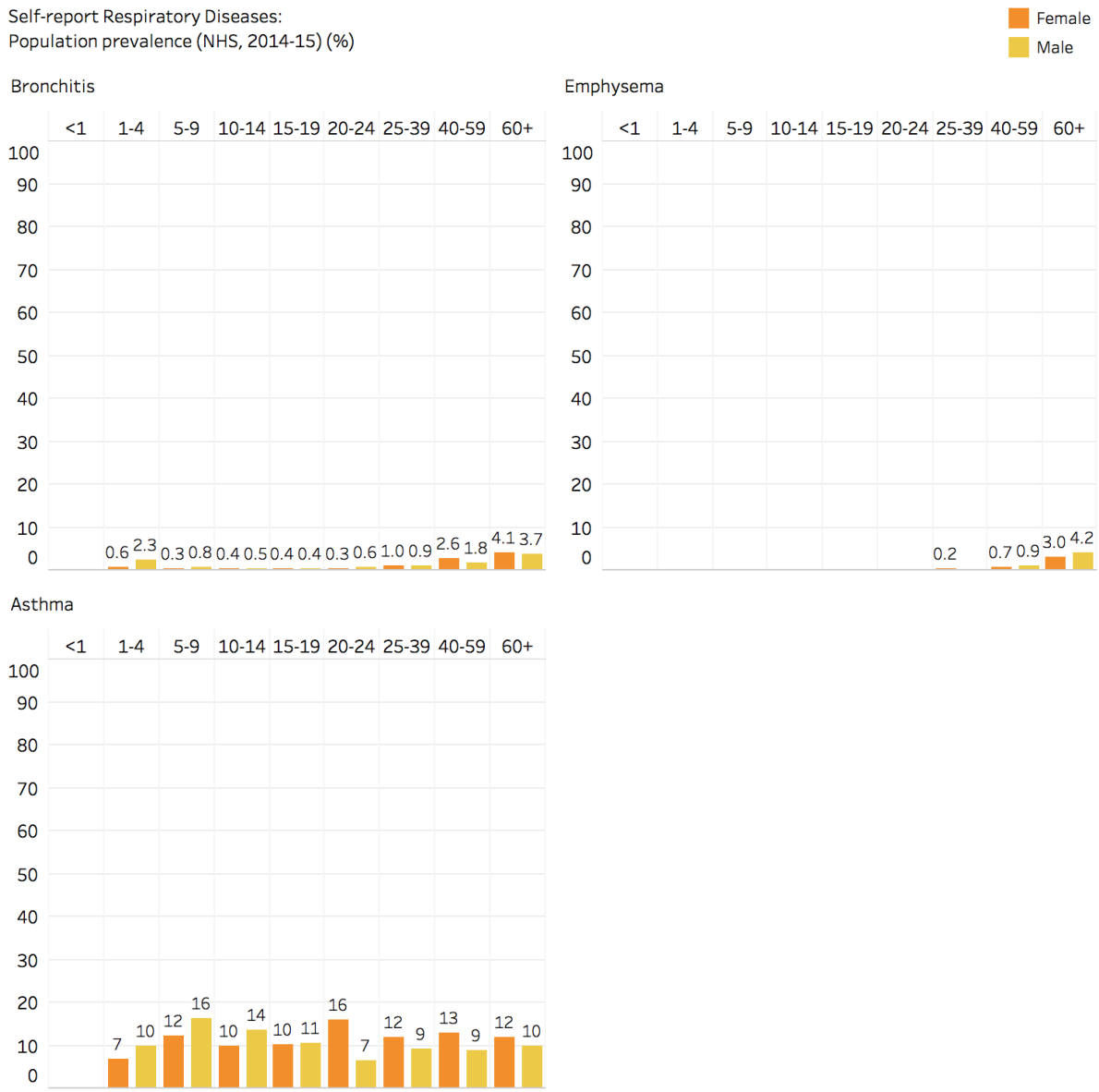


Chronic respiratory diseases

For chronic obstructive pulmonary disease (COPD) we have presented the population prevalence for chronic bronchitis and emphysema in figure 3.3. The estimates below age 40 for both bronchitis and emphysema should be interpreted with care as the relative standard of error (RSE) indicates potential sampling error. The combined prevalence is quite low considering COPD is a significant cause of death in Australia, however this could reflect the quality of the measure used in the NHS, or that a population survey is not the best measure for these outcomes. Despite the lower prevalence, the data follows the trend we would expect for COPD, increasing around age 40.

Asthma has a consistent burden across the life-course, with an overall lifetime prevalence of 10%. Asthma is more common in young males, from age 1 to 14 the prevalence for males is about 1.4 times that for females. However later in life this trend flips and we see the prevalence in males is about 0.8 times that of females.

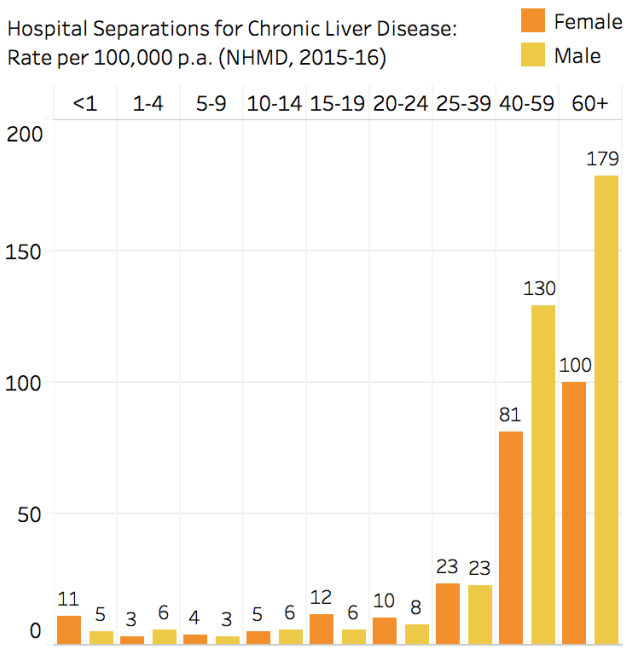
Figure 3.3.



Cirrhosis

Hospital separations for chronic liver disease indicate burden across the life-course, with a rapid increase from age 25 and older.

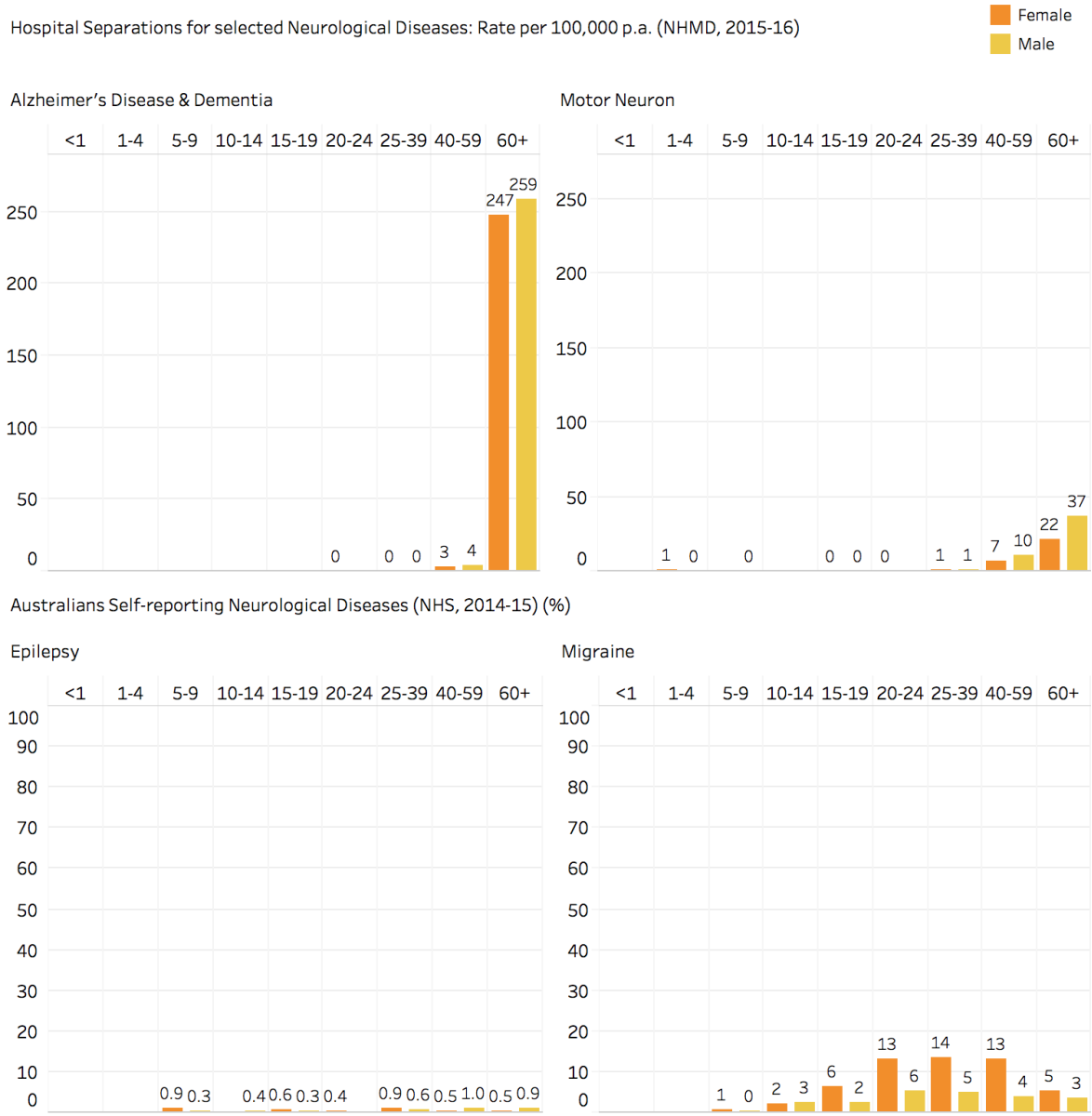
Figure 3.4.



Neurological disorders

Hospital separations for motor neuron has the opposite pattern to the modelled data from burden of disease (as noted in the framework), however, Alzheimer's is as expected, impacting the 60+ age group the most. In women aged 15-59 the prevalence of migraine is 2 times that of males across the same age groups. It appears epilepsy has a consistent prevalence across the life-course, however the RSE is very high for estimates in the age groups under 20 years, yet we would expect these age groups to have a burden of epilepsy.

Figure 3.5.



Mental disorders

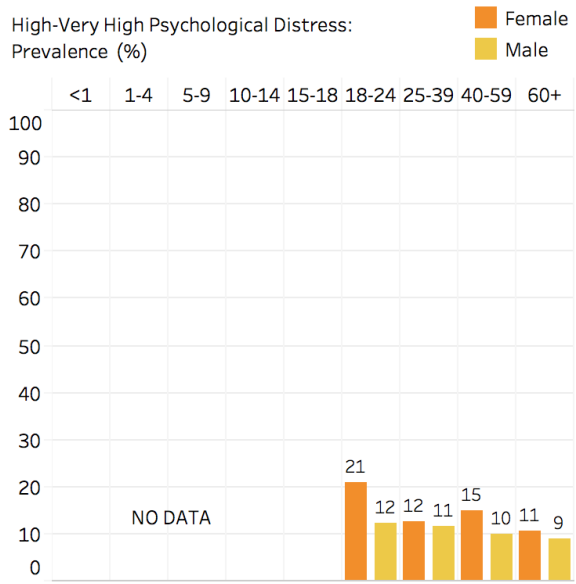
Figure 3.6 below shows a gradual increase in the prevalence of anxiety and depression from a young age, and continuing across the life-course. However, estimates under the age of 15 should be interpreted with care. Anxiety is more prevalent in women in the 15-59 age groups, depression also appears to be slightly higher in women. Attention deficit hyperactivity disorder and autism spectrum disorder both appear to be more prevalent in males aged 5-19years.

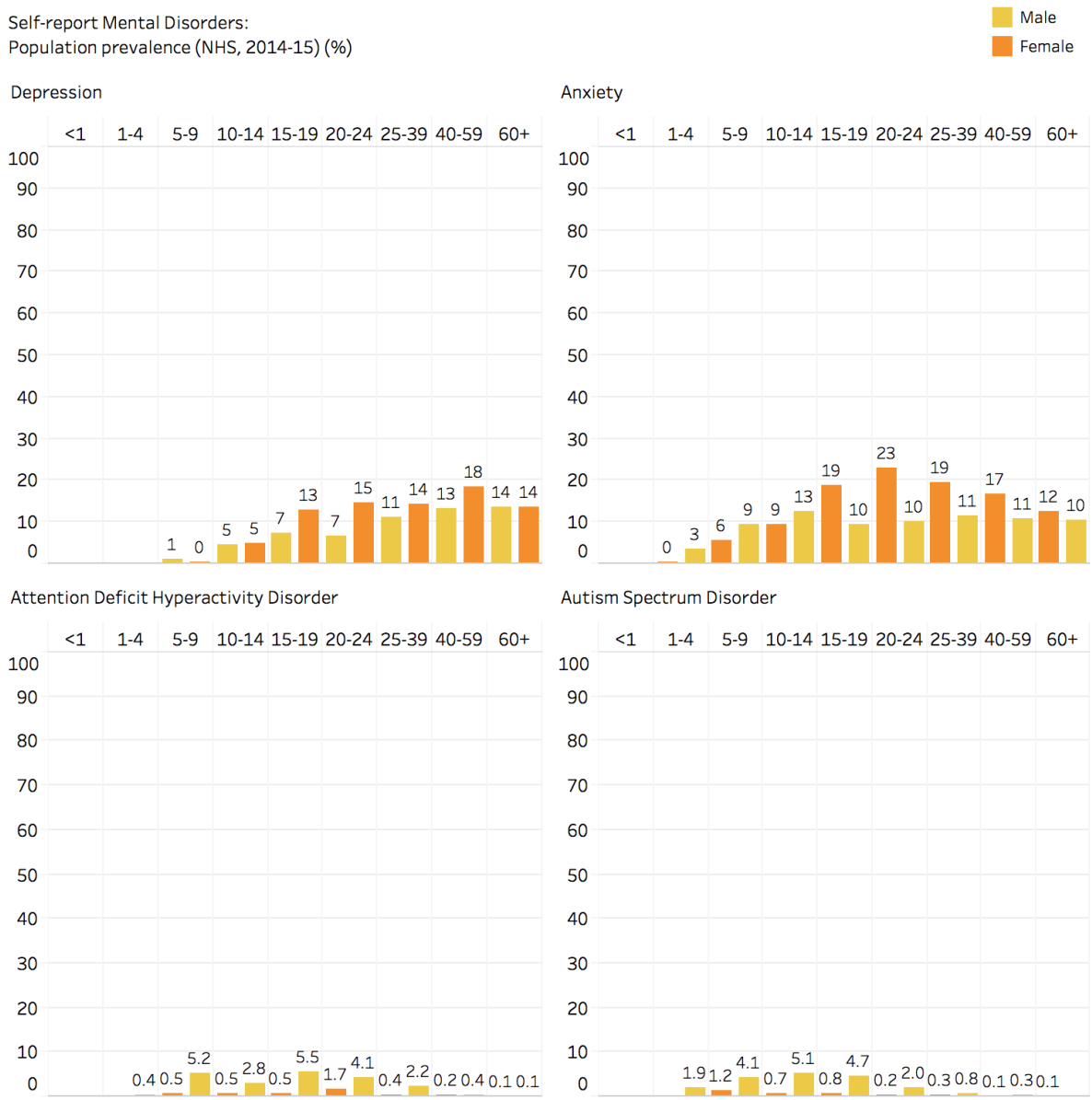
Sex disaggregated estimates for bipolar, schizophrenia and conduct disorder have not been included here due to low sample size, however further estimates are included in appendix 3.

Overall psychological distress (reported from age 18) is highest in females aged 18-24, and slightly decreases over the life-course. The prevalence of mental disorders in childhood and adolescence as shown in the various self-report items here indicate that a well validated tool measuring overall psychological distress in these age groups would be a useful addition to the NHS, especially for consistent reporting over time.

A note on psychological distress: For this indicator, we used the Kessler-5 data from NHS. The Kessler-5 (K5) measure of psychological distress is a subset of five questions from the Kessler Psychological Distress Scale-10 (K10). Responses to the K5 questions were put together, resulting in a minimum possible score of 5 and a maximum possible score of 25. The high/ very high group reported here received a score between 12 and 25. The same measure and scoring is used for the AATSIHS.

Figure 3.6.





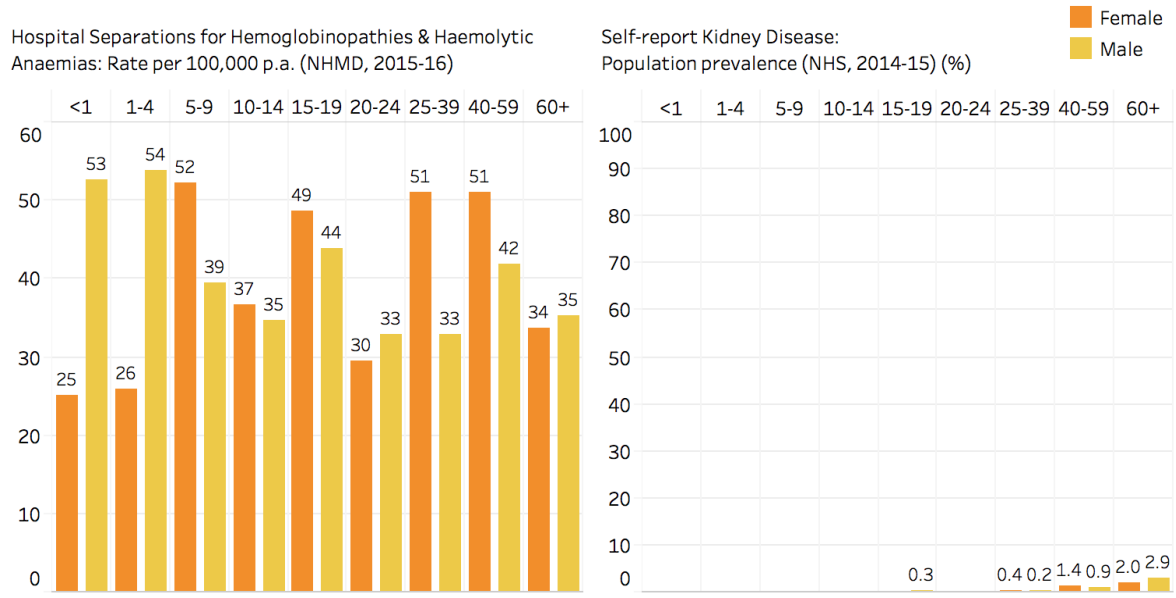
Substance use disorders

Sex disaggregated data for substance use disorders has not been included here due to low sample size and high relative standard error for those estimates. The total proportions for each age group are included in appendix 3, including confidence intervals.

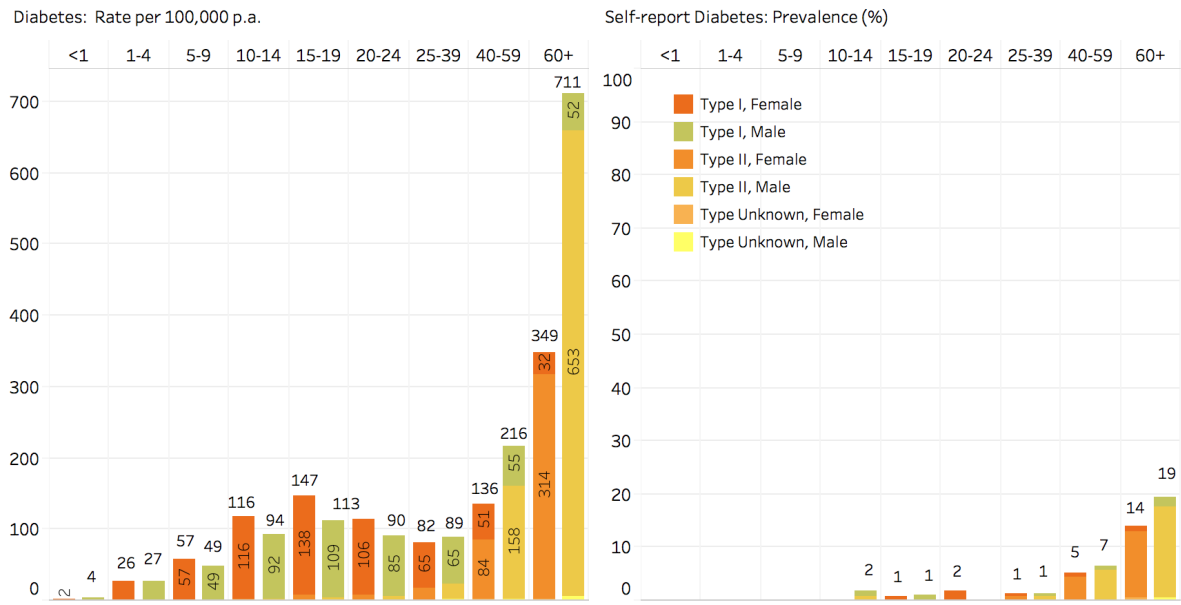
Diabetes, urogenital, blood, and endocrine diseases

Hospital separations for chronic anaemia indicates this is an issue across the life-course, with sex differences evident at different life stages. The data presented here for chronic kidney disease indicates a higher burden in males aged 60 years and over. For diabetes mellitus, the burden of type 1 is more evident across the life course until age 40, then type 2 has a significant leap in prevalence, especially for males. The difference between the hospital separation rate and the prevalence, especially across childhood and adolescence, also signals the prevalence of self-report diabetes is likely to be an underestimation. This is also consistent with what we know from the Australian Health Survey biomedical results; in which one in five people with diabetes did not know they had diabetes, prior to being tested for the survey [38].

Figure 3.7.



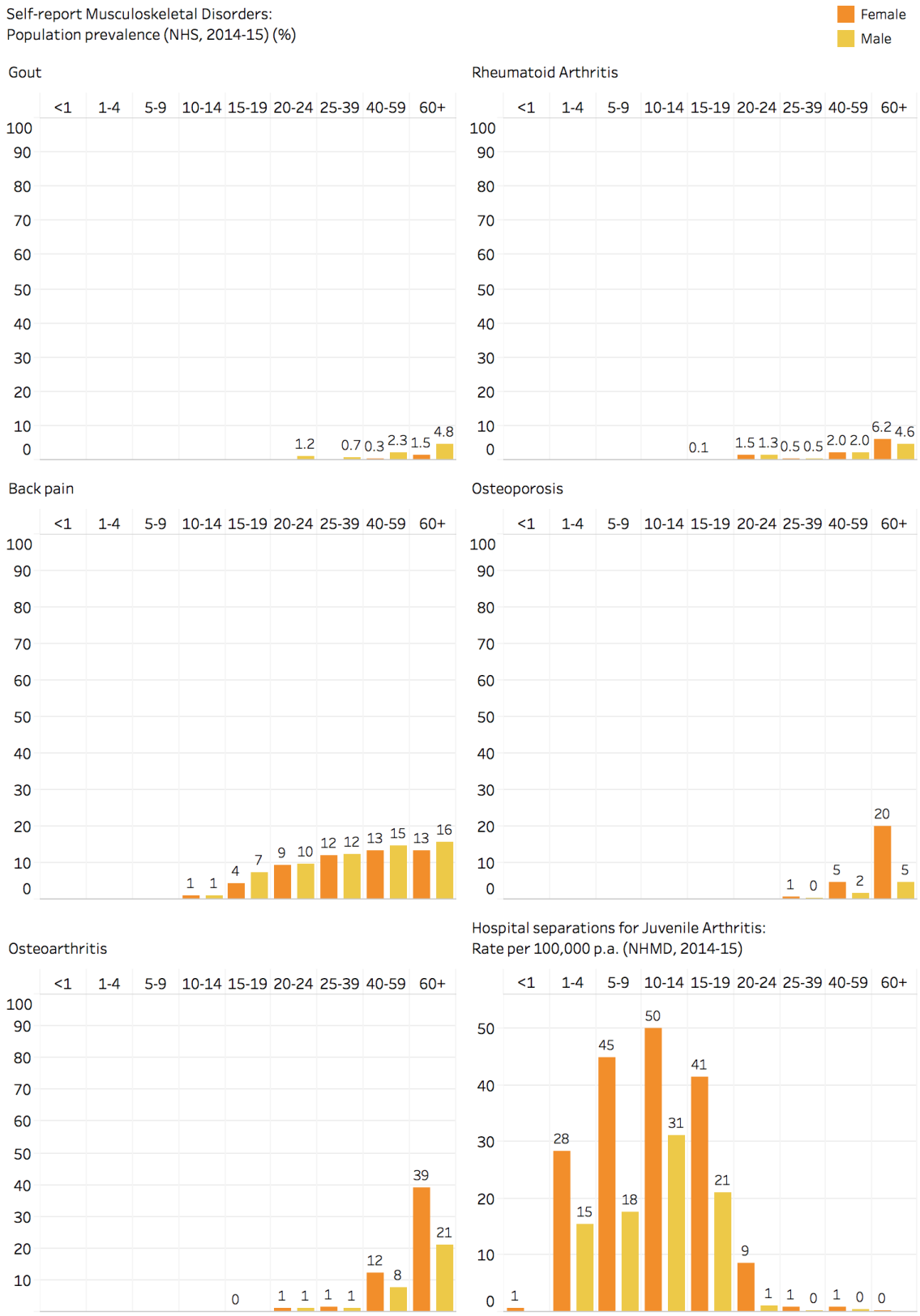
Diabetes Mellitus, by type.



Musculoskeletal disorders

Self-report back pain is consistent between sexes and gradually increases across the life-course from age 15. Osteoporosis and osteoarthritis appear more prevalent in women, and gout in men. Rates for juvenile arthritis appear to be higher in female than males.

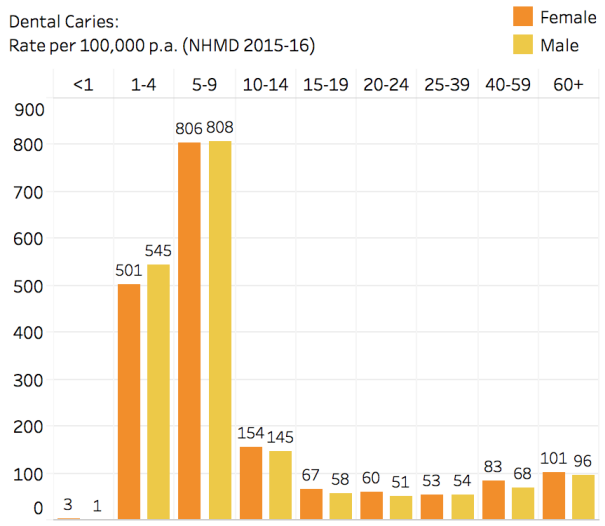
Figure 3.8.



Dental Caries

Hospital separation rates for dental caries are higher in 1-14 year olds, then drop and continue at a steady rate across the life-course. There appears to be little difference across sex.

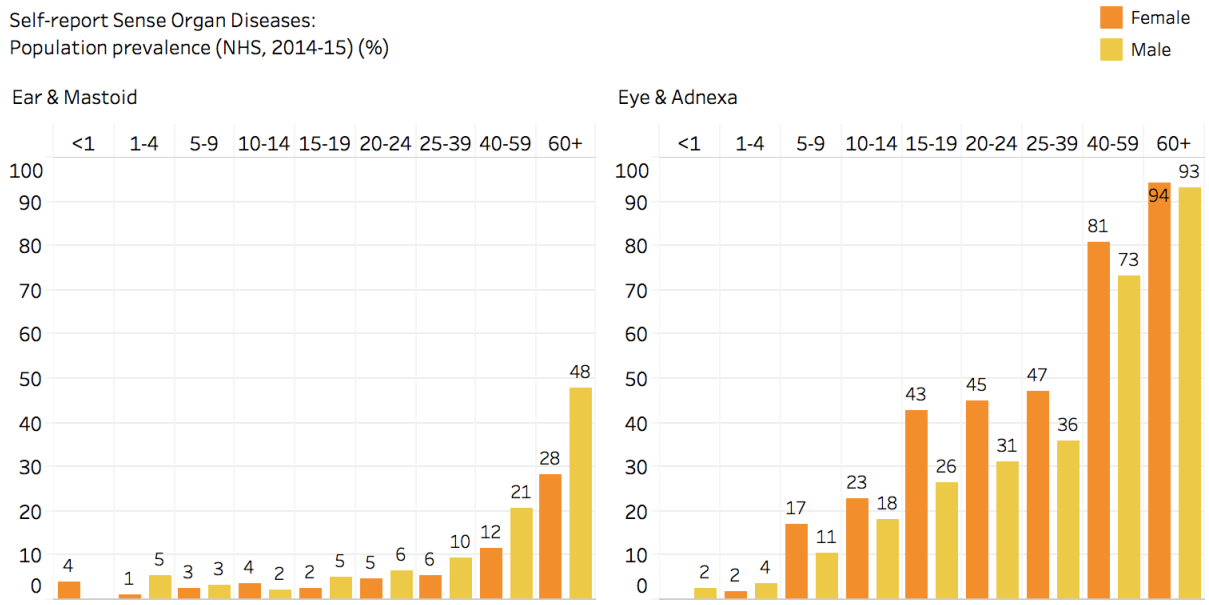
Figure 3.9.



Sense organ diseases

Self-report sense organ disorders are prevalent across the life-course, gradually increasing with age. Hearing issues and diseases of the ear are 1.7 times more prevalent in males, while vision loss and disease of the eye are more slightly more prevalent in females, until the 60+ age group where this difference diminishes.

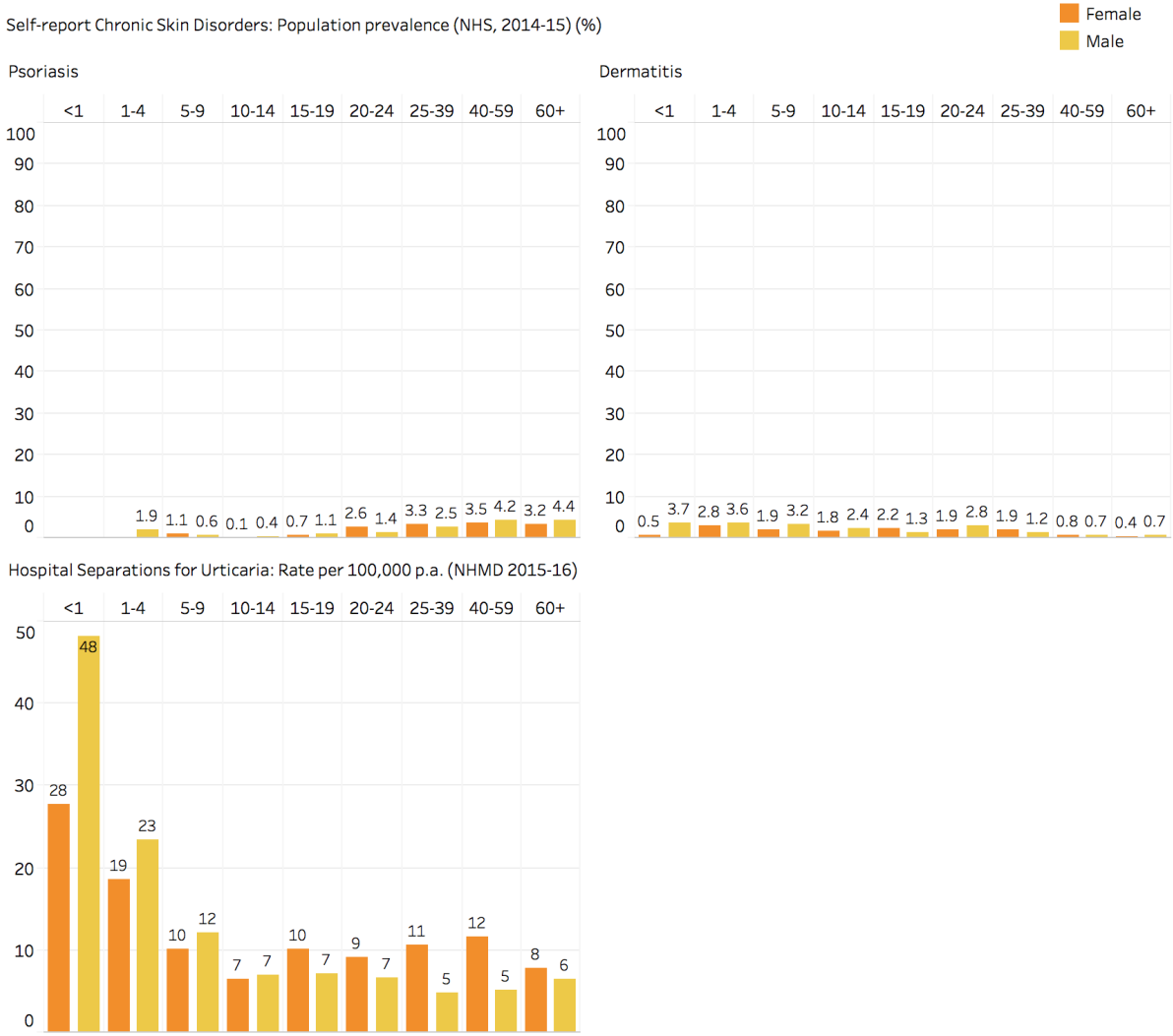
Figure 3.10.



Chronic skin diseases

The self-report estimates for chronic skin conditions indicate they effect both sexes across the life-course. Separation rates for Urticaria are higher for male infants and children, and higher in females later in life.

Figure 3.11.



Behavioural Risk Factors

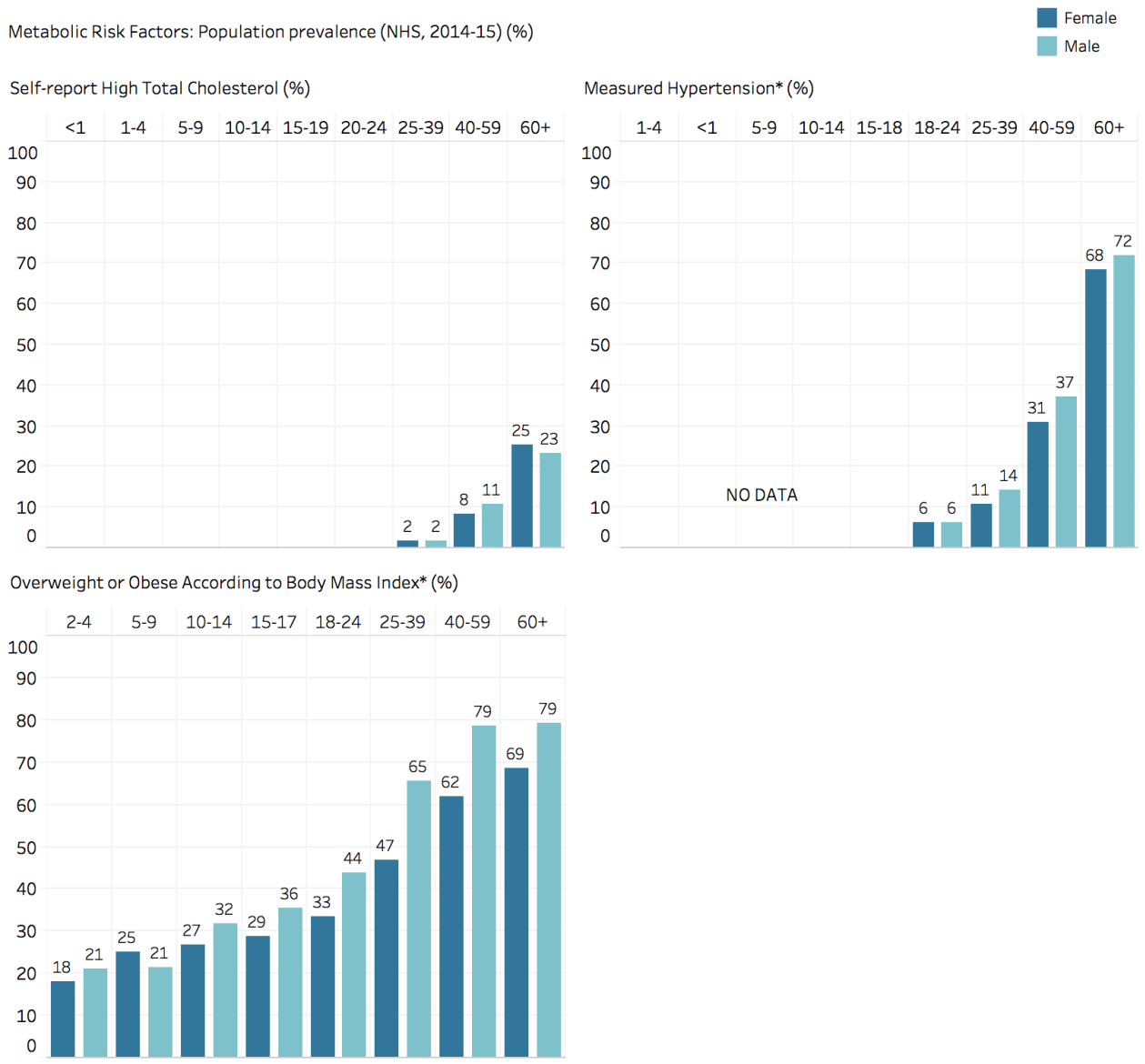
Single occasion risky alcohol use and lifetime risky alcohol use were both more prevalent in males, and particularly high across the measured age groups. Current daily smoking is more prevalent in females in the 15-19 age group, but the reverse trend is true for older age groups, with the male prevalence being 1.3-1.8 times that of the female prevalence. Males are also more likely to not meet the fruit and vegetable guidelines. Most males and females are not meeting the physical activity guidelines, with no differences between the sexes.

Figure 3.12.

Metabolic Risk Factors

The prevalence of overweight and obesity is estimated to be 25% for children and adolescents and 63% for adults. Over the life-course the prevalence steadily increases, and generally males have a higher prevalence. Measured hypertension follows a similar pattern, but with a sudden increase for the age 60+ group. Self-report cholesterol also has a sudden increase in the 60+ group, with around 25% of males and females over 60 reporting to have high cholesterol.

Figure 3.13.



**Note: Overweight or obese is defined as >=85th centile for children (centiles are age and sex specific), and BMI >=25 for adults 18 and over. Measured hypertension is >140/90mmHg or normal blood pressure controlled with medication.*

Key Findings, Part B: The refined reporting framework.

The tables below demonstrate how we have refined the reporting framework following data analysis. We have used the available primary data, presented above, to inform and shape the reporting framework to provide better specificity around NCD Outcomes; Risks and Determinants remain unchanged. This provides better clarity around relevant ages for targeted prevention, data collection and reporting. See reporting framework legend, Box D below.

Box D. Reporting Framework Legend

Key Acronyms:

DATA = Where primary data have indicated the framework should be extended
GBD = Global Burden of Disease Study
ABD = Australian Burden of Disease Study
NSFCC = National Strategic Framework for Chronic Conditions
NHPA = National Health Priority Areas
AHT = Australian Health Tracker
WHO = World Health Organisation
AG = Advisory Group

Sex Differences:

Colour coding: when sex varies between age groups: orange for females, yellow for males, green for both. In some cases, sex varies within age groups, and between priority areas/ data sources: (m) denotes priority for males and (f) for females.

The 'Brief Rationale' column gives a short overview of which ages and sexes have been prioritised, and (where necessary) sometimes identifies a specific outcome where a disease group has been listed.

Refinements:

Where primary data have indicated that the disease outcome may not be a priority in a specific age group or sex, we have greyed out writing and colour coded to white. Where data have indicated that the disease outcome should be extended, we have added the **DATA** notation and shaded as per the colour coding above.

Table 3.0. *NCD Outcomes*

NCD Outcomes in Males & Females Across the Life-course											
L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neoplasms		NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC AHT, WHO	NSFCC AHT, WHO	NSFCC AHT, WHO	All cancers- AHT: age 30-70yrs, NSFCC: age not specified
	Brain and nervous system cancer	**DATA**	GBD	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	GBD top 10: age 1-4 **ACD: data indicates relevant 0+**
	Breast cancer						**DATA**	GBD, ABD	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD top 10: age 35-79, ABD top 10: age 45-74, NHPA: age 50+, AHT: age 50-74, WHO: age 50-70. **ACD: data indicates relevant 20+**
	Cervical cancer					AHT	NHPA, AHT	NHPA, AHT, WHO	NHPA, AHT, WHO	NHPA, AHT	NHPA: adults, age not specified, AHT: age 18-70, WHO: age 30-49.
	Colorectal cancer				**DATA**	**DATA**	**DATA**	**DATA**	GBD, ABD, NHPA, AHT	GBD, ABD, NHPA, AHT	GBD top 10: age 50+, ABD top 10: age 45+, NHPA: age 50-74, AHT: age 50-74. **ACD: data indicates relevant 10+**

	Leukaemia	GBD	GBD	GBD	DATA	DATA	DATA	DATA	DATA	DATA	GBD top 10: post neonatal - age 9. **ACD: data indicates relevant 0-60+**
	Malignant skin melanoma	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified. **ACD: data indicates relevant 15+**
	Non-melanoma skin cancer	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified. **ACD: data indicates relevant 15+**
	Non-Hodgkin lymphoma	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified, NHS data indicates 1-15 (m only), and 15+ both. **ACD: data indicates relevant 0+ (m) 15+ (f)**
	Prostate cancer								GBD, NHPA	GBD, ABD, NHPA	GBD top 10: age 55-80+, ABD top 10: 65+, NHPA cancer
	Tracheal, bronchus and lung cancer						DATA	DATA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD top 10: age 50-80+, ABD top 10: age 45+, NHPA cancer. **ACD: data indicates relevant 20+ (f) 25+ (m)**

L2 L3 >>L4		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cardiovascular diseases							NSFCC, NHPA, AHT	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	NHPA: priority for adults, AHT: age 30-70yrs, NSFCC*: age not specified
	Atrial Fibrillation	DATA				DATA	DATA	DATA	DATA	ABD	ABD top 10: age 85-95+ **NHMD: data indicates relevant <1 & 15+**
	Cardiomyopathy and myocarditis	GBD	DATA	DATA	DATA	DATA	DATA	DATA	DATA	DATA	GBD top 10: age <1. **NHMD: data indicates relevant across the life-course**
	Cerebrovascular disease	DATA	DATA	DATA	DATA	DATA	DATA	DATA	GBD	GBD, ABD	GBD top 10: age 55-80+, ABD top 10: age 65+, **NHMD: data indicates relevant across the life-course**
	Ischemic heart disease					DATA	DATA	GBD_m, ABD_m	GBD, ABD	GBD, ABD	GBD top 10: age 35-80+, ABD top 10: age 45-95+ **NHMD: data indicates relevant 15+**
	Non-rheumatic vascular disease					DATA	DATA	DATA	DATA	ABD	ABD top 10: age 95+ **NHMD: data indicates relevant 15+**

** These disease groupings (Cancer and Cardiovascular disease) are recognised as a priority but specific diseases are not prioritised.*

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cirrhosis											
	Chronic liver disease	DATA	DATA	DATA	DATA	DATA	DATA	DATA	ABD_m	ABD_m	ABD top 10: age 45-64. **NHMD: data indicates relevant across the life-course**

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Chronic respiratory diseases		NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC, AHT, WHO	NSFCC, AHT, WHO	NSFCC, AHT, WHO	AHT/WHO*: age 30-70yrs, NSFCC*: age not specified
	Asthma	NHPA	GBD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	ABD, NHPA	NHPA	GBD top 10: age 1-39, ABD top 10: age 5-44, NHPA: age not specified
	Chronic obstructive pulmonary disease								ABD	GBD, ABD	GBD top 10: age 60-80+, ABD top 10: age 45-95+

	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neurological disorders										
Alzheimer disease and other dementias								**DATA**	GBD, ABD, NHPA, NFD	GBD top 10: age 75-80+, ABD top 10: age 65+, NHPA priority for 65+, NFD noted. **NHMD: data indicates relevant 40+**
Epilepsy	GBD	GBD	ABD	ABD	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	GBD top 10: age <1-4, ABD top 10: age 5-14. **NHS: data indicates relevant 5+**
Migraine			GBD	GBD	GBD	GBD	GBD	GBD	**DATA**	GBD top 10: age 5-59. **NHS: data indicates relevant 5+**
Motor neuron	GBD	**DATA**					**DATA**	**DATA**	**DATA**	GBD top 10: age <1 **NHMD: data indicates relevant 1-4 & 25+**

	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Mental disorders	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NHPA/ NSFCC* age not specified
Anxiety disorders		**DATA**	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	ABDf	GBD top 10: age 5-59, ABD top 10: age 5-64. **NHS: data indicates relevant 1+ both m+f**
Attention-deficit/ hyperactivity disorder			ABD	ABD	**DATA**	**DATA**				ABD top ten: age 5-14 (m only). **NHS: data indicates relevant 5-39**
Autistic spectrum disorders	GBD	GBD	GBD, ABD_m	GBD, ABD_m	**DATA**	**DATA**				GBD top 10: age <1(m only) 1-14 (m&f), ABD top 10: age 5-14 (m only) **NHS: data indicates relevant 1-39**
Bipolar disorders					GBD, ABD	GBD, ABD_f	GBD, ABD_f	ABD	**DATA**	GBD top 10: age 15-29, ABD top 10: age 15-44 (f only) **NHS: data indicates relevant 15+**
Conduct disorder		**DATA**	GBD, ABD	GBD, ABD	GBD					GBD top 10: age 5-19, ABD top 10: age 5-14. **NHS: data indicates relevant 1-19**
Depressive disorders			ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD	GBD, ABD_f	GBD top 10: age 10-69, ABD top 10: age 5-64

	Schizophrenia							GBD	GBD		GBD top 10: age 30-49
	Self-harm (inc. Suicide)					GBD, ABD, AHT	GBD, ABD, AHT	GBD, ABD, AHT	GBD, ABD, AHT	ABD_m,	GBD: (Injury, not NCD) top 11 all-cause DALY rank age 15-59, ABD top10: age 15-64, AHT: age 15-44

** These disease groupings (Chronic respiratory disease and mental disorders) are recognised as a priority but specific diseases are not prioritised.*

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Substance use disorders											
	Alcohol use disorders					ABD	ABD	GBD_m, ABD_m	ABD_m,		GBD top 10: age 25-34 (m only), ABD top 10: age 15-44
	Drug use disorders					GBD	GBD	GBD, ABD_m	GBD, ABD_m		GBD top 10: age 15-54, ABD top 10: age 25-44 m only

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Diabetes, urogenital, blood, and endocrine diseases											
	Diabetes mellitus	GBD, NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	NSFCC, NHPA, AHT, WHO	GBD, ABD_m, NSFCC, NHPA, AHT, WHO	GBD, ABD, NSFCC, NHPA, AHT, WHO	GBD top 10: <1 and 45-80+, ABD top 10: age 45-95+, AHT/WHO: 18+, NHPA/ NSFCC: no age **NHS & NHMD: data indicates T1 most prevalent 0-24, T2 25+, combined prevalent across life-course.**
	Gynaecological diseases~					ABD	GBD, ABD	GBD	GBD		GBD top 10: age 20-49, ABD top 10: age 15-24 (PCOS).
	Chronic kidney disease					**DATA**	**DATA**	**DATA**	**DATA**	GBD, ABD,	GBD top 10: age 80+, ABD top 10: age 85+, **NHS: data indicates relevant 25+**
	Hemoglobinopathies and haemolytic anaemias	GBD	GBD	GBD	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	GBD top 10: age <1-9 **NHMD: data indicates relevant across life-course**
	Urinary diseases	GBD									GBD top 10: age <1

~Note: Gynaecological disease includes uterine fibroids, polycystic ovarian syndrome, Female infertility due to other causes, Endometriosis, Genital prolapse, Premenstrual syndrome, other gynaecological diseases.

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Musculoskeletal disorders											
	Gout	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified, **NHS: data indicates relevant 20+(m) 40+(f)**
	Juvenile Arthritis	NHPA	NHPA	NHPA	NHPA	NHPA	**DATA**				NHPA: age <16 **NHMD: data indicates relevant 0-24**
	Low back & neck pain	NHPA	NHPA	NHPA	GBD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD top 10: age 10-80+, ABD top 10: age 15-74, NHPA: age not specified, **NHS: back pain data 10+**.
	Osteoarthritis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	ABD, NHPA	ABD, NHPA	ABD top 10: age 45-94, NHPA: age not

											specified, **NHS: data indicates 20+**
	Osteoporosis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA: age not specified, **NHS: data indicates 25+**
	Rheumatoid arthritis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	ABD, NHPA	ABD, NHPA	ABD, NHPA	ABD top 10: age 25-74, NHPA: age not specified, **NHS data suggests 15+**

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Other non-communicable diseases											
	Congenital birth defects	GBD, ABD	GBD, ABD	GBD	GBD	GBD	**DATA**	**DATA**	**DATA**	**DATA**	GBD top 10: age <1-19, ABD top 10: age <5. **NHS data suggests most relevant 0-4, but also in ages 5-60+**
	Oral disorders	**DATA**	**DATA**	ABD, AHT	ABD, AHT	AHT	AHT	AHT	AHT	GBD_f, AHT	GBD top 10: age 60-64 (f only), ABD top 10: age 5-14 (dental caries specified for ABD), AHT: age 5+ **NHMD: data indicates relevant across the life-course**
	Sense organ diseases (see note below)	GBDf	GBD	GBD	GBD	**DATA**	**DATA**	GBDm	GBD	GBD, ABD	GBD top 10: age <1 (f only)1-14 & age 25-39(m) 40-80+, ABD top 10: age 75-95+ (hearing: 75-95+, vision: 95+ only) **NHS: Primary data indicates relevant across the life-course for m+f**
	Skin diseases~ >>Acne vulgaris			ABD	GBD, ABD	GBD, ABD	GBD_f, ABD				GBD L4- top 11: age 10-24, ABD top 10: age 5-24
	Skin diseases >>Dermatitis	**DATA**	GBD	GBD, ABD_f	GBD, ABD_f	GBDf	**DATA**	**DATA**	**DATA**	**DATA**	GBD L4- top 11: age 1-19, ABD top 10: age 5-14 **NHS: data indicates relevant over life-course for m+f**
	Skin diseases >>Psoriasis		**DATA**	GBD	GBD	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	GBD L4- top 11: age 5-14 **NHS: data indicates relevant 1+(m) 5+(f)**
	Skin diseases >>Urticaria	GBD	GBD	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	**DATA**	GBD L4- top 11: age <1- 4 **NHS: data indicates relevant 0+**
	Sudden infant death syndrome	GBD, ABD,	ABD,								GBD top 10: age <1, ABD top 10: age <5

~Note: *Sense organ disease (SOD): In GBD mostly all attributed to level 4 age-related and other hearing loss, however SOD does include cataract, glaucoma, macular degeneration, refraction and accommodation disorders, other vision loss, and other sense organ diseases. In ABD, this only represents hearing loss.*
Skin diseases: some skin diseases measured in GBD and classified within non-communicable disease are not NCDs. Therefore, we examined the skin diseases list at L4 and refined it to examine the DALY estimates for only those which are NCDs. e.g. Acne, Alopecia areata, Decubitus ulcer, Dermatitis, Other skin & subcutaneous diseases, Pruritus, Psoriasis, and Urticaria.

Section 3 Discussion: An Updated NCD Profile for Australia

The next step in accountability for NCDs is 'sharing the account' or communicating findings around the NCDs impacting the population. We have found that the profile of NCD in Australia absolutely extends beyond the traditional focus of policy (cardiovascular disease (CVD), diabetes, cancer and chronic respiratory diseases (CRD)) and there is significant burden evident across the life-course. Current data systems do cover important NCDs at different stages of the life-course, however there is a need to extend and invest in further objective measures of NCD outcomes, risks and determinants, at different ages .

The data presented here, and the framework we have developed, has effectively illustrated that NCDs extend beyond cardiovascular disease, diabetes, cancer and chronic respiratory disease. Reporting of NCDs in Australia should include these important NCDs, but also include a focus on musculoskeletal disorders, poor mental health, neurological disease, chronic skin conditions, vision and hearing defects, and gynaecological conditions. These conditions are preventable, and key to successful prevention is also the rigorous measurement of risk factors and determinants.

In Section 3 we have identified specific data gaps in the 2014-15 National Health Survey

- Diseases: Gynaecological diseases, Neck pain, Chronic Liver Disease, Urinary diseases, Skin diseases (partially covered).
- Risk factors: Mental wellbeing for under 18s, Impaired Kidney function, Sexual abuse, Intimate partner violence, Occupational risks.
- Quality of measures: Mental health in children and adolescents and Substance use/ abuse are self-report from 18 (or 15 with parent's permission). Questions about alcohol, tobacco and drug use, and mental health questions should be self-report from ages 10-14.
- Biomedical component: the NHS includes some physical measurements, however key blood and urine tests to provide markers of chronic disease and nutritional deficiencies are missing.

These identified gaps are limitations to our analysis. The missing data, along with problems with sample size and quality of the data are also limitations to how well data presented represents NCD across the life-course. The focused age groups highlighted issues of smaller sample size in the younger age groups. Despite these issues, we see that NCDs which emerge in childhood and adolescence provide a particularly important target for intervention as this can improve the health of young people now, their health as adults, and the health of the next generation.

Our framework, and the outcomes, risks and determinants it highlights, could be used as a road-map to better accountability for NCDs. Despite the limitations, there is robust data available on some important NCDs, and we have used the data analysed here to take the reporting framework developed in Section 1, and to refine it in Section 3. In many instances the primary data indicated the framework should be extended, rather than refined. Examples of which include oral disorders, motor neuron disease, chronic liver disease, cerebrovascular disease, cardiomyopathy and myocarditis, chronic liver disease and several cancers. The section which saw the most refinement was musculoskeletal disorders; however, this was largely due to the general way the main disorders were initially included in the framework, due to a lack of specificity defined in the NHPA's.

Summary.

The profile of NCD in Australia includes musculoskeletal disorders, poor mental health, neurological disease, chronic skin conditions, vision and hearing defects, and gynaecological conditions, alongside

the more common focus on: CVD, diabetes, cancer, and CRD. The primary data we analysed showed that age groups effected by these outcomes and their risks was perhaps even broader than modelled data had suggested. Despite data limitations, we could begin to visualise a more comprehensive picture than ever before, of NCD across the life-course, for Australians. This profile and the refined reporting framework will help to inform where there is the greatest need for improved data collection, transparency in reporting and action on NCDs in Australia.

Section 4

Suitability of the framework for Indigenous Australians

Section 4 Contents

- Subsection a) Modifying the reporting framework for Indigenous Australians - including method, stakeholder consultation and key findings
- Subsection b) Data availability and quality - including description of the main data source
- Subsection c) NCD profile for Indigenous Australians - including method and key findings
- Subsection d) Findings and discussion - including refined reporting framework and discussion

Subsection a)

Modifying the reporting framework for Indigenous Australians

Subsection A looks at the method employed to construct the framework and the key finding of this subsection, the draft framework itself.

Method: Prioritising NCD outcomes, risks and determinants

In assessing the suitability of the reporting framework for Indigenous Australians we followed much the same method that we had for the earlier framework in Section 1, using a modified priority setting approach [3]. Using the key age-groups across the life course (refined in section 1), we defined the **key NCD outcomes** by considering public health relevance (contribution to modelled burden of disease using the Indigenous Burden of Disease analysis from Australian Burden of Disease Study 2011) and policy relevance (review of Indigenous specific national policy frameworks). We reviewed current data collection systems (on the assumption that data are collected for conditions previously defined as important) and consulted with stakeholder groups. We undertook a similar approach for **NCD risks,** defined initially by the top risk factors attributed to the burden of NCDs (again using modelled burden of disease data), and policy relevance (again, by reviewing national policy frameworks). For **NCD determinants** as with the Australian framework we used the Commission on Social Determinants of Health (Closing the Gap in a generation) for considering key determinants [27] and incorporated determinants from Indigenous specific national policies.

Contribution of Stakeholders

At project inception, throughout the project and as outlined above, we consulted with a broad range of stakeholders. We sent out draft documentation for consultation and received written feedback from various stakeholders. This valuable consultation was with the following strategic groups:

- The leadership group of the Centre of Research Excellence in Aboriginal Chronic Disease Knowledge Translation and Exchange (CREATE). CREATE is a national collaboration with a focus on translating research (with a specific focus on chronic disease) to improve health outcomes for Aboriginal and Torres Strait Islander peoples. For more information, please see: https://create.sahmri.org/
- The technical advisory group for the Landscape project. The Landscape project aims to report on the health and social conditions of Aboriginal people in South Australia, to better understand their needs and inform service planning. For more information, please

see: https://www.sahmriresearch.org/our-research/themes/aboriginal-health/research-list/south-australian-aboriginal-health-landscape

- Selected members of the Australian Health Tracker expert working groups were consulted. For more information on Australia's Health Tracker and the Australian Health Policy Collaboration please see: https://www.vu.edu.au/australian-health-policy-collaboration/who-are-we

Key Findings, Part A: The reporting framework for Indigenous Australians

Below we have plotted the preliminary reporting framework for NCD in Indigenous Australians. As described in the method above, the reporting framework has 3 main parts: Outcomes, Risk Factors and Determinants.

As with the NCD framework for Australia, we have arranged the reporting framework by disease grouping for outcomes, and risk factors are grouped by type. For both disease outcomes and risk factors the framework is split by age groups, and gender is denoted by colour coding or notations (see reporting framework legend, Box E below). In the NCD Determinants section we have proposed the use of the framework described in the Commission on Social Determinants of Health (CSDH) as a part of a surveillance system for health equity [27]. The purpose of this framework is to highlight data and policy gaps, as well as to provide a structure around which to base future data collection and reporting.

Box E. Reporting Framework Legend

Key Acronyms:
IBD = Indigenous Burden of Disease Study
HPF = Aboriginal and Torres Strait Islander Health Performance Framework
NIRA = National Indigenous Reform Agreement
NHP = National Aboriginal and Torres Strait Islander Health Plan
GBD = Global Burden of Disease Study
ABD = Australian Burden of Disease Study
NSFCC = National Strategic Framework for Chronic Conditions
NHPA = National Health Priority Areas
AHT = Australian Health Tracker
WHO = World Health Organisation
AG = Advisory Group

Indigenous only:
Where an outcome has been highlighted as important for the Indigenous population only (as opposed to both Australia overall as well as Indigenous), the box is highlighted in bold outline.
The greyed-out lettering refers to the Australian reporting framework, not indigenous specific but left in for reference. For example, NSFCC in 'Neoplasms' below.

Sex Differences:
Colour coding: when sex varies between age groups: orange for females, yellow for males, green for both.
In some cases, sex varies within age groups, and between priority areas/ data sources: (m) for males and (f) for females. E.g. IBD_f would refer to the Indigenous Burden of Disease study identifying females as a priority in this age group.

The 'Brief Rationale' column gives a short overview of which ages and sexes have been prioritised, and (where necessary) sometimes identifies a specific outcome where a disease group has been listed. E.g. for gynaecological diseases, where ABD specified polycystic ovarian syndrome, while GBD referred to a group of gynaecological diseases, not one specifically.

Table 4.0. NCD Outcomes in Indigenous Australians

NCD Outcomes in Males & Females Across the Life-course										
L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neoplasms		NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC AHT, WHO	NSFCC AHT, WHO	NSFCC AHT, WHO	
	Brain and nervous system cancer		GBD								
	Breast cancer	HPF	HPF	HPF	HPF	HPF	HPF	GBD, ABD, HPF	GBD, ABD, NSFCC, NHPA, AHT, HPF	GBD, ABD, NSFCC, NHPA, AHT, HPF	ATSI HPF: Females, no age specified, AHT: Females aged 50-74
	Cervical cancer	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	NHPA, HPF, NIRA	NHPA, HPF, NIRA	NHPA, HPF, NIRA	NHPA, HPF, NIRA	ATSI HPF: Females, no age (all female genital organs including the cervix), NIRA: all ages, cervical only.
	Colorectal cancer	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	GBD, ABD, NHPA, AHT, HPF, NIRA	GBD, ABD, NHPA, AHT, IBD, HPF, NIRA	IBD top 10: age 65+, ATSI HPF: age 45+, NIRA: All ages
	Digestive cancer (not including colorectal)	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	HPF, NIRA	HPF, NIRA	ATSI HPF: age 45+, NIRA: All ages
	Hodgkin's Lymphoma	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSI HPF: No age specified
	Leukaemia	GBD, HPF	GBD, HPF	GBD, HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSI HPF: No age specified
	Lip, oral cavity and pharynx	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSI HPF: No age specified
	Malignant skin melanoma	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	
	Non-melanoma skin cancer	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	
	Non-Hodgkin lymphoma	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	ATSI HPF: No age specified
	Prostate cancer	HPF	HPF	HPF	HPF	HPF	HPF	HPF	GBD, NHPA, HPF	GBD, ABD, NHPA, IBD, HPF,	IBD top 10: 75+, m only (prostate). ATSI HPF: Males, no age specified (all male genital organs including prostate)
	Tracheal, bronchus and lung cancer	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	GBD, ABD, NHPA, IBD, HPF, NIRA	GBD, ABD, NHPA, IBD, HPF, NIRA	IBD top 10: 45+, ATSI HPF: age 45+, NIRA: All ages
	Urinary Tract	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF: No age specified

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cardiovascular diseases		HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	NSFCC, NHPA, AHT, HPF, NIRA	NSFCC, NHPA, AHT, WHO, HPF, NIRA	NSFCC, NHPA, AHT, WHO, HPF, NIRA	NSFCC, NHPA, AHT, WHO, HPF, NIRA	ATSIHPF: Age 0-65+, NIRA: All ages
	Atrial Fibrillation									ABD	
	Cardiomyopathy and myocarditis	GBD									
	Cerebrovascular disease	HPF	HPF	HPF	HPF	HPF	HPF	HPF	GBD, IBD_m, HPF	GBD, ABD, IBD, HPF	IBD top 10: age 45+ (male 45+, female 65+), ATSIHPF: Age 0-65+
	Ischemic heart disease	HPF	HPF	HPF	HPF	HPF	HPF	GBD_m, ABD_m, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	IBD top 10: age 25-75+, ATSIHPF: Age 0-65+
	Non-rheumatic vascular disease									ABD	
	Rheumatic heart disease	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSIHPF: Age 0-65+

** These disease groupings (Cancer and Cardiovascular disease) are recognised as a priority but specific diseases are not prioritised.*

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Chronic respiratory diseases		NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, AHT, WHO, NIRA	NSFCC, AHT, WHO, NIRA	NSFCC, AHT, WHO, NIRA	NIRA: all ages.
	Asthma	NHPA, IBD_m, HPF	GBD, NHPA, IBD_m, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD_f, HPA	ABD, NHPA, IBD_f, HPA	NHPA IBD_f, HPA,	IBD top 10: age <5-24 (males) age 5-74 (females), ATSIHPF: Age 0-65+
	Chronic obstructive pulmonary disease	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ABD, IBD, HPF	GBD, ABD, IBD, HPF	IBD top 10: age 45+, ATSIHPF: Age 0-65+
	Chronic sinusitis	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSIHPF: Age 0-65+

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cirrhosis & Digestive Diseases											
	Chronic liver disease							IBD_f	ABD_m, IBD	ABD_m, IBD	IBD top 10: age 25-64 (males 45-64, females 25-64)
	Digestive Diseases~	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA: all ages

~Note: Digestive diseases include: Peptic ulcer disease, Gastritis and duodenitis, Appendicitis, Paralytic ileus and intestinal obstruction, Inguinal, femoral, and abdominal hernia, Inflammatory bowel disease, Vascular intestinal disorders, Gallbladder and biliary diseases, Pancreatitis, Other digestive diseases

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neurological disorders		NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA: all ages
	Alzheimer disease and other dementias									GBD, ABD, NHPA, IBD	IBD top 10: age 65+
	Epilepsy	GBD	GBD	ABD, IBD_f	ABD, IBD_f						IBD top 10: age 5-14
	Migraine			GBD	GBD	GBD	GBD	GBD	GBD		

	Motor neuron	GBD									

	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Mental disorders	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	ATSIHPF: all ages
Anxiety disorders			GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	ABD, IBD_f	IBD top 10: age 5-64 (females only 45-64)
Attention-deficit/ hyperactivity disorder			ABD, IBD_m	ABD, IBD_m						IBD top ten: age 5-14 (males only)
Autistic spectrum disorders	GBD	GBD	GBD, ABD_m, IBD_m	GBD, ABD_m, IBD_m						IBD top 10: age 5-14 (males only)
Bipolar disorders					GBD, ABD, IBD_f	GBD, ABD_f, IBD_f	GBD, ABD_f	ABD		IBD top 10: 15-24 (females only)
Conduct disorder			GBD, ABD, IBD	GBD, ABD, IBD	GBD					IBD top 10: age 5-14
Depressive disorders			ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD_f, IBD_f	IBD top 10: age 5-44, (45-64 females only)
Schizophrenia					IBD_m	IBD_m	GBD, IBD_m	GBD, IBD_m		IBD top 10: age 15-44 (males only)
Self-harm (inc. Suicide)			IBD, HPF	IBD, HPF	GBD, ABD, IBD, HPF, AHT	GBD, ABD, IBD, HPF, AHT	GBD, ABD, IBD, HPF, AHT	GBD, ABD, IBD, HPF, AHT	ABD_m, HPF	IBD top 10: age 5-44, ATSIHPF: Age 5+ (all ages reported, data from 5), AHT: age 15-44.

** These disease groupings (Chronic respiratory, and mental disorders) are recognised as a priority but specific diseases are not prioritised*

L2 L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Substance use disorders										
Alcohol use disorders					ABD, IBD	ABD, IBD	GBD_m, ABD_m, IBD	ABD_m, IBD	IBD_m	IBD top 10: age 15-64 (males only 45-64)
Drug use disorders					GBD, IBD_m	GBD, IBD_m	GBD, ABD_m	GBD, ABD_m		IBD top 10: age 15-24 (males only)

	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Diabetes, urogenital, blood, and endocrine diseases										
Diabetes mellitus	GBD, NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, AHT, WHO, IBD_f, HPF, NIRA	NSFCC, NHPA, AHT, WHO, IBD_f, HPF, NIRA	NSFCC, NHPA, AHT, WHO, IBD_f, HPF, NIRA	GBD, ABD_m, NSFCC, NHPA, AHT, WHO, IBD, NIRA	GBD, ABD, NSFCC, NHPA, AHT, WHO, IBD, NIRA	IBD top 10: age 15+ (female only 15-45), ATSIHPF: all ages, NIRA: all ages.
Gynaecological diseases~					ABD	GBD, ABD	GBD, AHT	GBD, AHT		
Chronic kidney disease	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	IBD, HPF, NIRA	GBD, ABD, IBD, HPF, NIRA	IBD top 10: age 45+, ATSIHPF: Age 0-65+ (end-stage kidney disease), NIRA: all ages.

	Hemoglobinopathies and haemolytic anaemias	GBD	GBD	GBD							
	Urinary diseases	GBD									

~Note: Gynaecological disease includes uterine fibroids, polycystic ovarian syndrome, Female infertility due to other causes, Endometriosis, Genital prolapse, Premenstrual syndrome, other gynaecological diseases.

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Musculoskeletal disorders						IBD	IBD	IBD	IBD	IBD	IBD top 10: age 15+
	Gout	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	
	Juvenile Arthritis	NHPA	NHPA	NHPA	NHPA	NHPA					
	Low back & neck pain	NHPA	NHPA	NHPA	GBD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	GBD, ABD, NHPA	
	Osteoarthritis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	ABD, NHPA	ABD, NHPA	
	Osteoporosis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	
	Rheumatoid arthritis	NHPA	NHPA	NHPA	NHPA	NHPA	NHPA	ABD, NHPA	ABD, NHPA	ABD, NHPA	

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Other non-communicable diseases											
	Congenital birth defects	GBD, ABD, IBD, NIRA	GBD, ABD, IBD, NIRA	GBD, IBD$_f$	GBD, IBD$_f$	GBD					IBD top 10: age <5 (birth defects) IBD top 10: age 5-14 (Cerebral palsy, f only), NIRA: age 0-4
	Oral disorders	HPF	HPF	ABD, AHT, IBD, HPF	ABD, AHT, IBD, HPF	AHT, IBD$_f$, HPA	AHT, IBD$_f$, HPA	AHT, HPA	AHT, HPA	GBD, AHT, HPA	IBD top 10: age 5-24 dental caries specified (females only 15-24), ATSIHPF: all ages.
	Sense organ diseases (see note below)	GBD, HPF	GBD, HPF	GBD, HPF	GBD, HPF	HPF	HPF	GBD, HPF	GBD, HPF	GBD, ABD, IBD$_f$, HPF	IBD top 10: 75+ (vision loss, f only), ATSIHPF: Ear health- all ages, Eye health- no age specified.
	Skin diseases~ >>Acne vulgaris			ABD, IBD$_f$	GBD, ABD, IBD$_f$	GBD, ABD	GBD$_f$, ABD				IBD top 10: age 5-14 (females only)
	Skin diseases >>Dermatitis		GBD	GBD, ABD$_f$	GBD, ABD$_f$	GBD					
	Skin diseases >>Psoriasis			GBD	GBD						
	Skin diseases >>Urticaria	GBD	GBD								
	Sudden infant death syndrome	GBD, ABD, IBD, NIRA	ABD, IBD, NIRA								IBD top 10: age <5, NIRA: age 0-4

~Note: *Sense organ disease (SOD): In GBD mostly all attributed to level 4 age-related and other hearing loss, however SOD does include cataract, glaucoma, macular degeneration, refraction and accommodation disorders, other vision loss, and other sense organ diseases. In ABD, this only represents hearing loss. Skin diseases: some skin diseases measured in GBD and classified within non-communicable disease are not NCDs. Therefore, we included only those which are NCDs. e.g. Acne, Alopecia areata, Decubitus ulcer, Dermatitis, Pruritus, Psoriasis, and Urticaria.*

Table 4.1. *Risk Factors for NCD*

Top Risk Factors for NCDs in Males & Females										
	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Brief Rationale
Metabolic										
Dietary Risks (inadequate fruit & veg, salt intake,		GBD, ABD, NSFCC, WHO, IBD, HPF, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	Attributable RF for Neoplasms; CVD; and Diabetes, urogenital, blood, & endocrine diseases.
Low physical activity			GBD, ABD, NSFCC, WHO, IBD, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	Attributable RF for Neoplasms; CVD; and Diabetes, urogenital, blood, & endocrine diseases.
High blood pressure					GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	Attributable RF for CVD and Diabetes, urogenital, blood, & endocrine diseases.
High fasting plasma glucose					GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	Attributable RF for CVD; and Diabetes, urogenital, blood, & endocrine diseases.
High body-mass index		HPF, NIRA	GBD, ABD, NSFCC, NHPA, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	Attributable RF for Neoplasms; CVD; Diabetes, urogenital, blood, & endocrine diseases; and Musculoskeletal disorders.
High total cholesterol					GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	Attributable RF for CVD.
Impaired kidney function						GBD, AG	GBD, AG	GBD, AG	GBD, AG	Attributable RF for CVD and Diabetes, urogenital, blood, & endocrine diseases.
Environmental										
Occupational risks (ergonomic, particulates, noise, asthmagens, carcinogens & injury)					GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	Attributable RF for Neoplasms; Chronic respiratory diseases; Musculoskeletal disorders; and Other NCDs.

Top Risk Factors for NCDs in Males & Females										
	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Brief Rationale
Behavioural										
Tobacco (smoking, smoking while pregnant & second-hand smoke)	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	Attributable RF for Neoplasms; CVD; Chronic respiratory diseases; Diabetes, urogenital, blood, & endocrine diseases; and Other NCDs.
Alcohol (total per capita, heavy episodic drinking)				GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	Attributable RF for Neoplasms; Mental & substance use disorders; and Self-harm.
Drug use				GBD, ABD, IBD	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	Attributable RF for Neoplasms; Mental & substance use disorders; and Self-harm.
Unsafe sex				GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	Attributable RF for Neoplasms (cervical cancer)
Other										
Sexual abuse & violence (childhood sexual abuse & intimate partner violence)		GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	Attributable RF for Mental & substance use disorders and Self-harm.

Table 4.2. *Determinants of NCD*

Modified from: Commission on Social Determinants of Health (Closing the Gap in a generation) [27]. The policy column notes which other Indigenous specific policy has identified this determinant as a priority, along with the Commission on Social Determinants of Health.

The Social Determinants for NCDs in Males & Females			Policy
Daily living conditions	Health behaviours: Already covered in RF above.	Smoking	
		Alcohol	
		Physical activity	
		Diet and nutrition	
	Physical & social environment:	Water and sanitation	HPF
		Housing conditions	HPF
		Infrastructure, transport, and urban design	HPF
		Air quality	HPF
		Culture	HPF
		Access to traditional lands	HPF
		Social capital	
	Working Conditions:	Material working hazards	

		Stress	
	Health Care:	Coverage	HPF
		Health-care system infrastructure	HPF, NHP
	Social protection:	Coverage	
		Generosity	
Structural drivers of health inequity	Gender:	Norms & values	
		Economic participation	
		Sexual & reproductive health	
	Social inequities:	Social exclusion	HPF
		Income and wealth distribution	HPF
		Justice	HPF
		Racism	
		Education	HPF, CTG-NIRA
	Socio-political context:	Civil rights	
		Employment conditions	HPF, CTG-NIRA
		Governance & public spending priorities	HPF
		Macroeconomic conditions	

Subsection b)

Subsection B contains the data availability and quality of the main data source selected for the Indigenous Australian framework.

Data and indicators to measure NCDs in Indigenous Australians

In this section, we have explored how well our NCD framework for Indigenous Australians can be populated by sound, nationally representative, data. We also consider here the completeness of the data, the quality of the measures and the suitability to the population measured. We then defined indicators to apply to the reporting framework.

The primary data source selected for inclusion in this project was the Australian Aboriginal and Torres Strait Islander Health Survey (AATSIHS). As described above for the National Health Survey, the AATSIHS is designed to measure the health of Australia's Indigenous people approximately every six years, allowing for comparision over time. There are other sound data sources available for Indigenous Australians, however the purpose of this work was not to piece together the minimum health data to populate every indicator. The other key data sets used in this report, the National Hospital Morbidity Database and the Australian Cancer Database can be obtained by Indigeous status. However there are significant barriers to accessing the data which made it unfeasible for the current project, whereas data for 'Australia' not disaggregated by Indigenous status, is freely available online for download. Rather, we have focussed on how well Australia's key Indigenous health survey describe NCD in Australia's Indigenous people.

Description of the data source

Australian Aboriginal and Torres Strait Islander Health Survey 2014-15

The 2012-2013 AATSIHS was conducted with around 12,900 individuals, in all states an territories of Australia, including urban, rural and remote areas across nearly 8,300 private dwellings. This survey

combines the existing ABS National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) together with two new elements - a National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS) and a National Aboriginal and Torres Strait Islander Health Measures Survey (NATSIHMS). The survey was intended to measure a broad range of health information, including prevalence of chronic health conditions and their risk factors, such as smoking, overweight and obesity, alcohol consumption and exercise. The survey also covers use of health services and actions people have taken for their health, and demographic and socioeconomic characteristics. The survey includes self-reported interview items and objectively measured items (anthropometric measures, biomedical samples).
The AATSIHS summary data are publically available via the ABS website as publication reports and Data Cubes. University students and researchers may also access more detailed data throug the Universities Australia Agreement. Further ABS products available under the agreement, for the extraction of AATSIHS survey data, are TableBuilder, Microdata and DataLab.

Subsection c)

Subsection C comprises data visualisations for key NCD outcomes and risk factors for Indigenous Australians.

An Updated NCD Profile for Indigenous Australians

In this section, we have analysed data from the Australian Aboriginal and Torres Strait Islander Health Survey. We have selected key outcomes and risk factors from the proposed indicators in the reporting framework. Data tables can be found in appendix 4 and data visualisations below. Please see appendix 2 for a detailed overview of how we accessed available data for analysis.

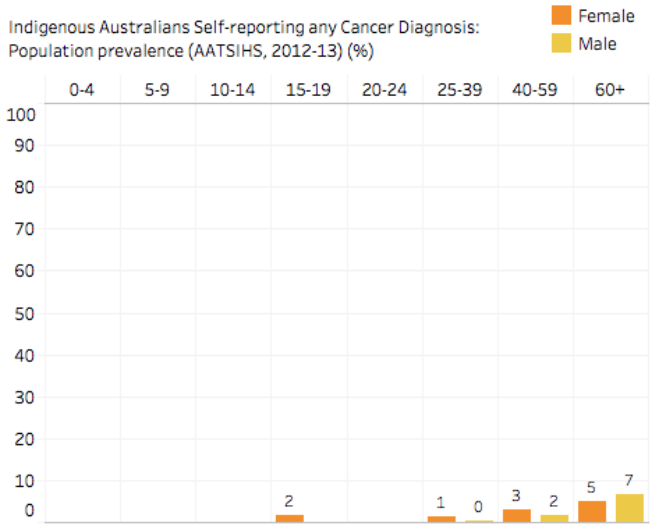
Key Findings, Part B: Profile of NCD for Indigenous Australians

Outcomes

Neoplasms

The prevalence for any cancer diagnosis is shown below in figure 4.0. The prevalence reported here is quite low, not reflective of incidence rates reported for Indigenous Australians.

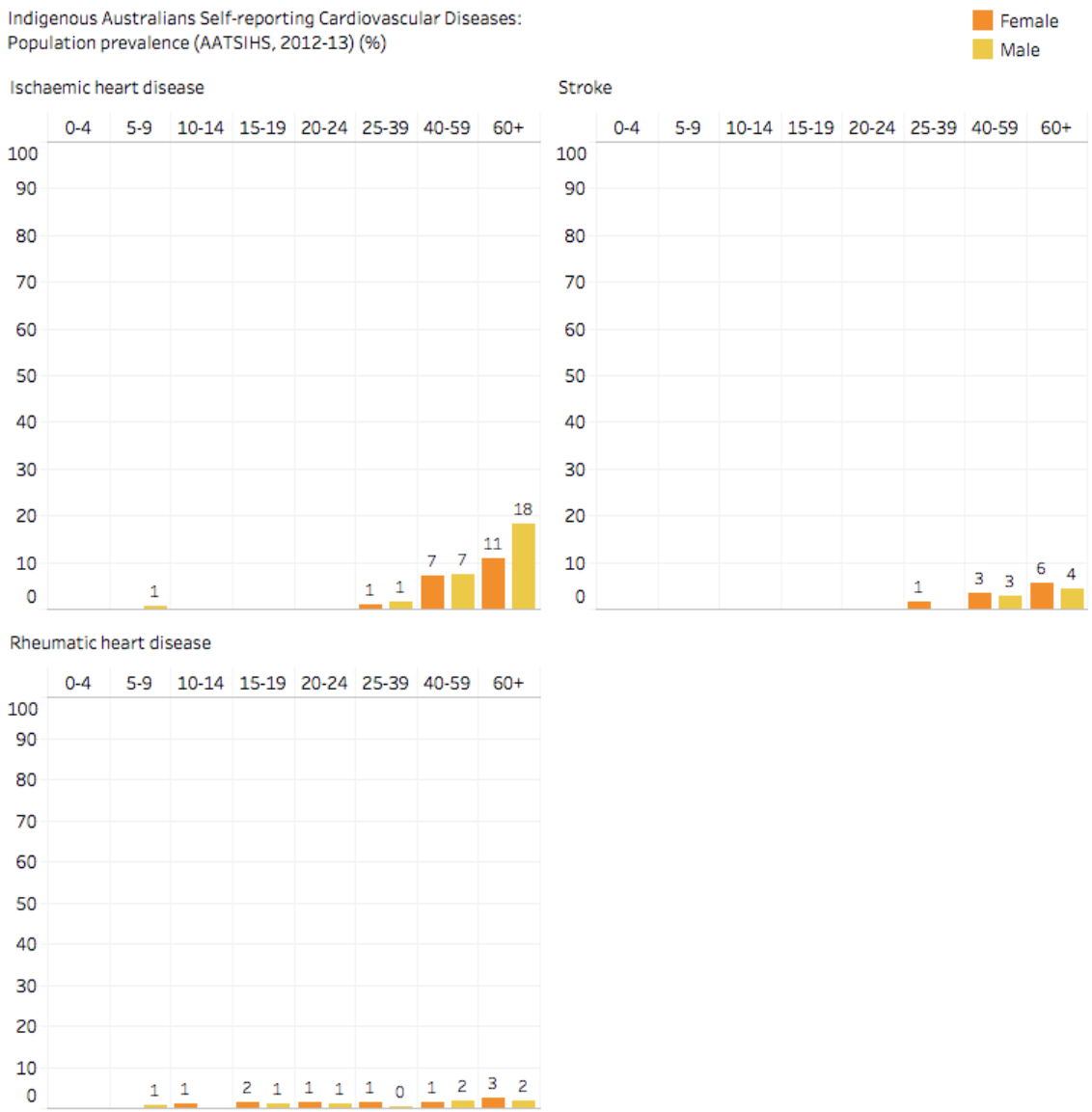
Figure 4.0.



Cardiovascular Diseases

The prevalence of self-report CVD here show ischaemic heart disease and stroke are more prevalent in the 25+ age groups, whereas rheumatic heart disease is evident across the life-course.

Figure 4.1.

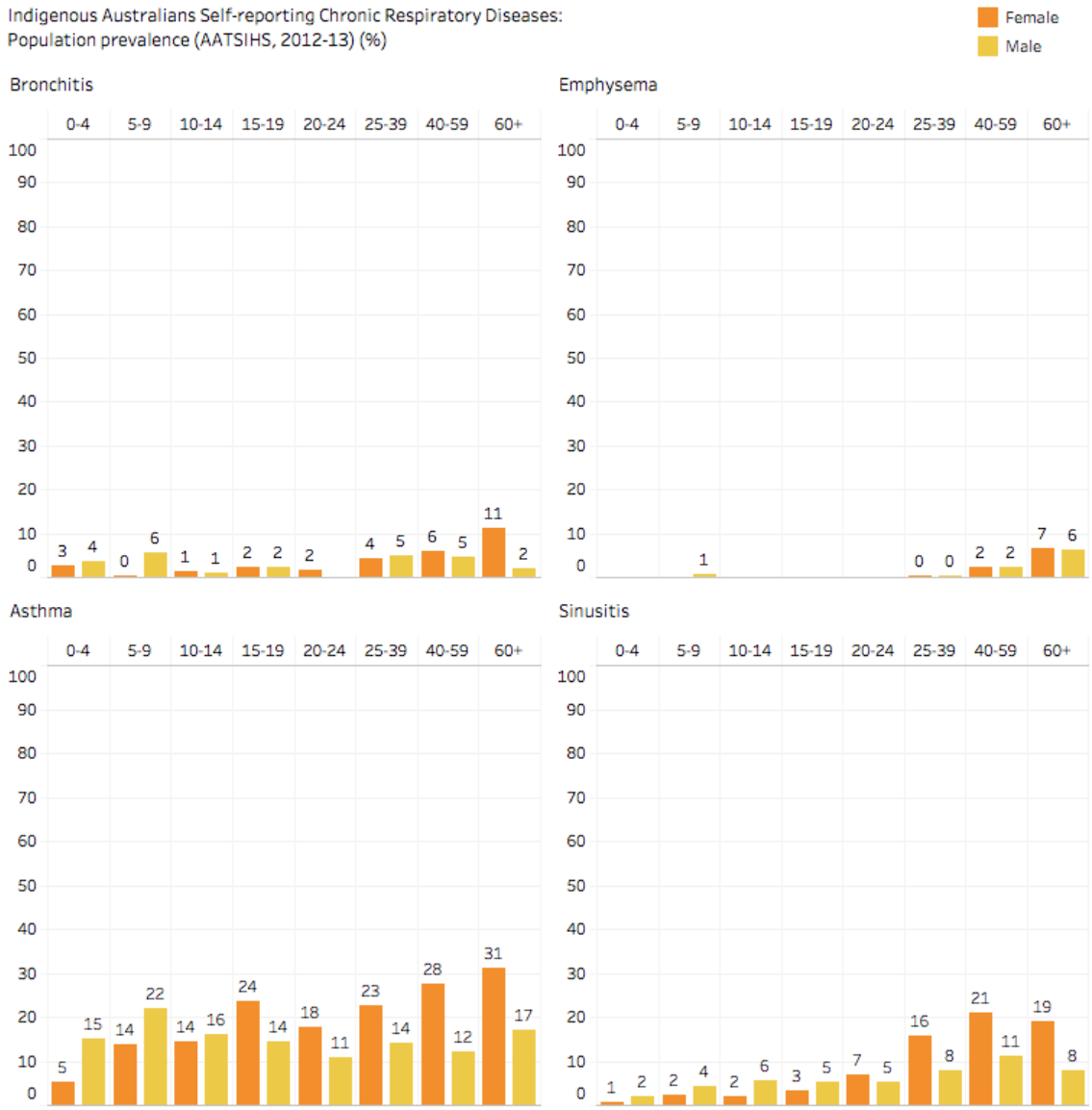


Chronic Respiratory Diseases

For chronic obstructive pulmonary disease (COPD) we have presented the population prevalence for chronic bronchitis and emphysema in figure 4.2. The estimates below age 40 for emphysema and age 25 for bronchitis should be interpreted with care. Like NHS estimates the prevalence seems lower than expected. Despite the lower prevalence, the data follows the trend we would expect for COPD, increasing around age 40.

Asthma has a consistent burden across the life-course, with an overall lifetime prevalence of 17.5%. Asthma is more common in young males, from age 1 to 14 the prevalence for males is higher than for females. However later in life this trend reverses and we see the prevalence in males is about half that of females. Sinusitis has a similar pattern to asthma, with regards to sex. This outcome is also prevalent across the whole life-course.

Figure 4.2.

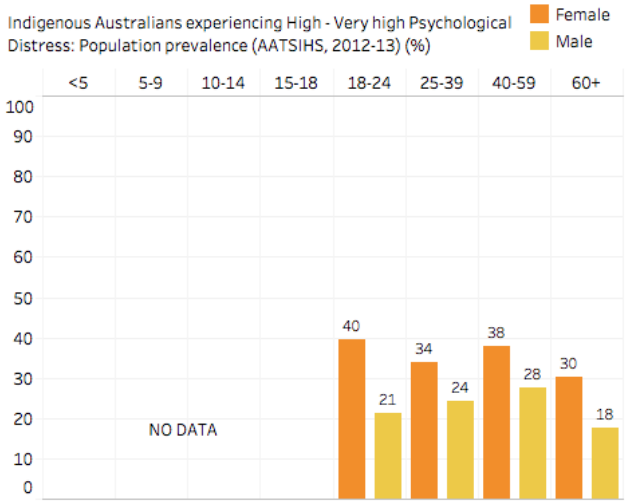


Mental Health

Overall psychological distress (reported below from age 18) is very high in the Indigenous population. As with NHS estimates, the highest prevalence is in females aged 18-24, and slightly decreases over

the life-course. As mentioned previously, the measure used here for psychological distress is the Kessler-5, and AATSIHS data is comparable to the NHS data.

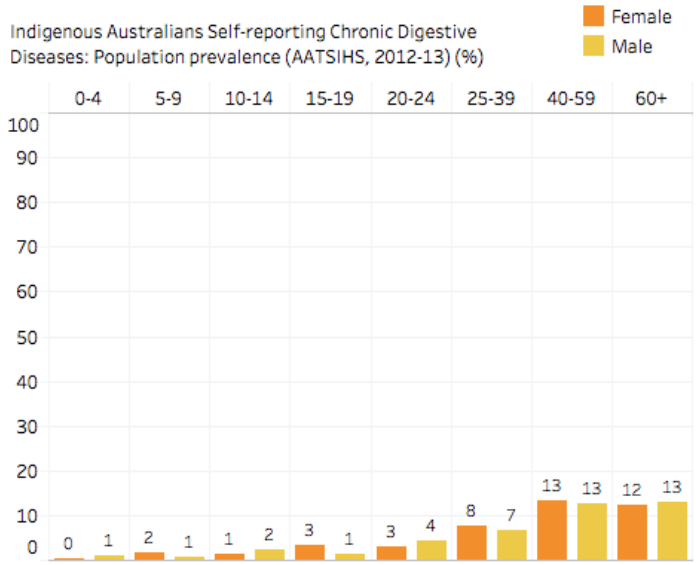
Figure 4.3.



Digestive Diseases

Chronic digestive diseases are prevalent across the life-course, however estimates for <19 years should be interpreted with care. There doesn't appear to be any difference between males and females.

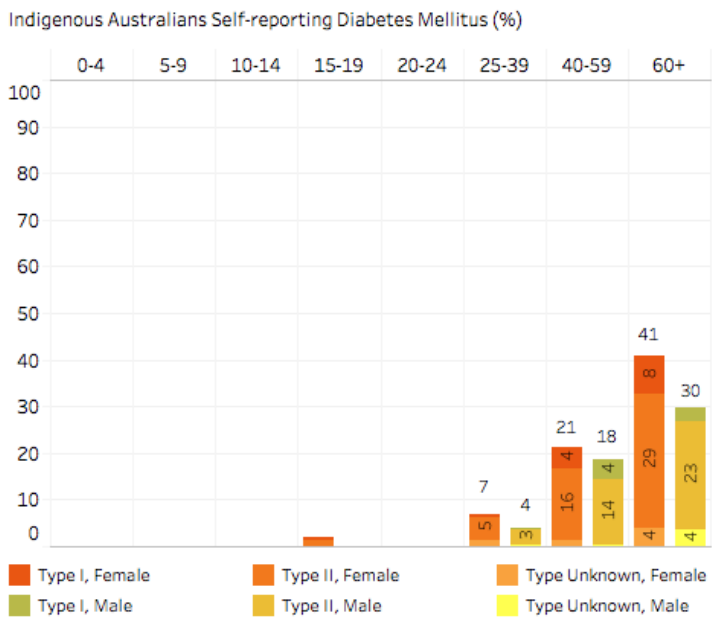
Figure 4.4.



Diabetes

The prevalence of diabetes mellitus shown below in figure 4.5 shows a rapid increase in prevalence from age 25. This is mostly attributable to type 2 diabetes, however type 1 is present. Prevalence in females is higher than in males.

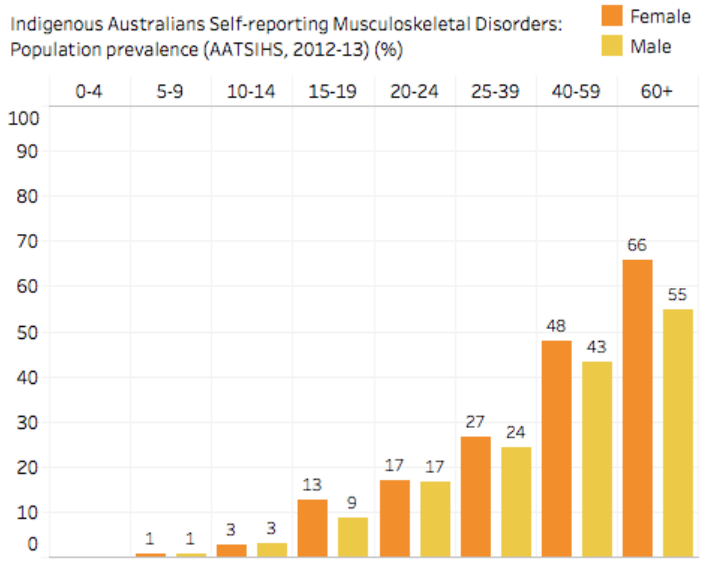
Figure 4.5.



Musculoskeletal disorders

The prevalence estimate for musculoskeletal disorders below include all types of musculoskeletal disorders, and is not disease-specific. The prevalence for both sexes increase with age with a rapid increase around age 15 and again at age 40. From age 15 onwards females have a marginally higher prevalence, but this increases with age.

Figure 4.6.

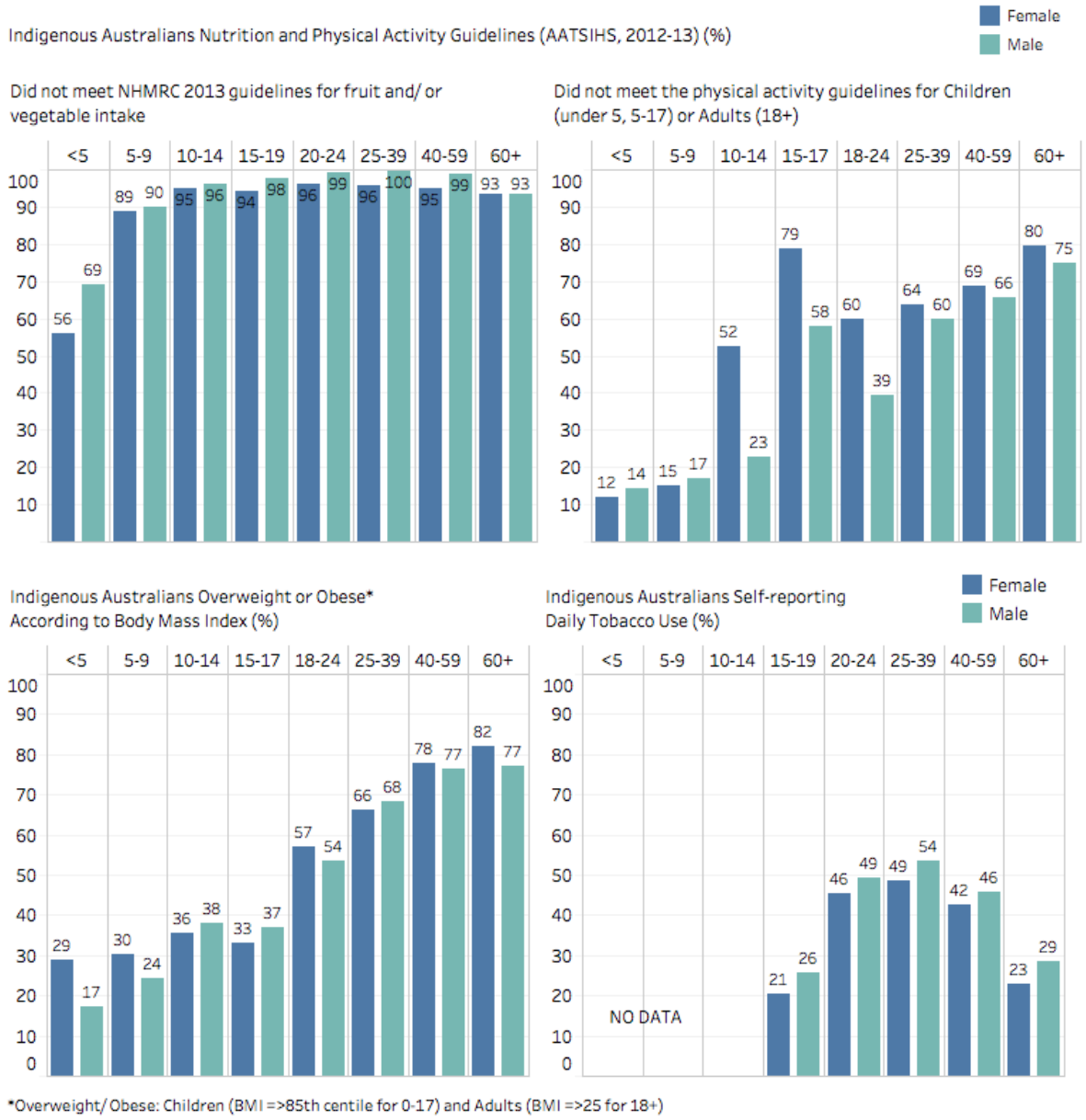


Risk Factors

Poor diet is an attributable risk factor for many NCDs and we see below in figure 4.7 the guidelines for fruit and vegetable consumption are not being met across the life-course. Males have a slightly higher prevalence of not meeting the fruit and vegetable guidelines than females. More Indigenous Australians are meeting the physical activity guidelines than in all-Australian estimates from the NHS. Lack of physical activity steadily increases over the life-course, however there were spikes of inactivity in female adolescents (10-24 years).

The prevalence of overweight and obesity is estimated to be 30% for children and adolescents and 69% for adults. Over the life-course the prevalence steadily increases, and overall there was no difference between sexes, although it did vary between age groups. Current daily smoking is most prevalent in the 25 - 39 age group, with little difference between males and females.

Figure 4.7.



Subsection d)

Key Findings, Part C: A refined reporting framework for Indigenous Australians

The tables below demonstrate how we have refined the Indigenous reporting framework following data analysis. We have used the available primary data to inform and shape the reporting framework to provide better specificity around NCD Outcomes, Risks and Determinants. This provides better clarity around relevant ages for targeted prevention, data collection and reporting. See reporting framework legend, Box F. below.

Box F. Reporting Framework Legend

Key Acronyms:
IBD = Indigenous Burden of Disease Study
HPF = Aboriginal and Torres Strait Islander Health Performance Framework
NIRA = National Indigenous Reform Agreement
NHP = National Aboriginal and Torres Strait Islander Health Plan
GBD = Global Burden of Disease Study
ABD = Australian Burden of Disease Study
NSFCC = National Strategic Framework for Chronic Conditions
NHPA = National Health Priority Areas
AHT = Australian Health Tracker
WHO = World Health Organisation
AG = Advisory Group

Indigenous only:
Where an outcome has been highlighted as important for the Indigenous population only (as opposed to both Australia overall as well as Indigenous), the box is highlighted in bold outline.
The greyed-out lettering refers to the Australian reporting framework, not indigenous specific but left in for reference. For example, NSFCC in 'Neoplasms' below.

Sex Differences:
Colour coding: when sex varies between age groups: orange for females, yellow for males, green for both.
In some cases, sex varies within age groups, and between priority areas/ data sources: (m) for males and (f) for females. E.g. IBD_f would refer to the Indigenous Burden of Disease study identifying females as a priority in this age group.

The 'Brief Rationale' column gives a short overview of which ages and sexes have been prioritised, and (where necessary) sometimes identifies a specific outcome where a disease group has been listed. E.g. for gynaecological diseases, where ABD specified polycystic ovarian syndrome, while GBD referred to a group of gynaecological diseases, not one specifically.

Table 4.3. *NCD Outcomes in Indigenous Australians*

NCD Outcomes in Males & Females Across the Life-course											
L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neoplasms		NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC	NSFCC AHT, WHO	NSFCC AHT, WHO	NSFCC AHT, WHO	
	Breast cancer	HPF	HPF	HPF	HPF	HPF	HPF	GBD, ABD, HPF	GBD, ABD, NSFCC, NHPA, AHT, HPF	GBD, ABD, NSFCC, NHPA, AHT, HPF	ATSI HPF: Females, no age specified, AHT: Females aged 50-74
	Cervical cancer	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	NHPA, HPF, NIRA	NHPA, HPF, NIRA	NHPA, HPF, NIRA	NHPA, HPF, NIRA	ATSI HPF: Females, no age (all female genital organs including the cervix), NIRA: all ages, cervical only.
	Colorectal cancer	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	GBD, ABD, NHPA, AHT, HPF, NIRA	GBD, ABD, NHPA, AHT, IBD, HPF, NIRA	IBD top 10: age 65+, ATSI HPF: age 45+, NIRA: All ages
	Digestive cancer (not including colorectal)	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	HPF, NIRA	HPF, NIRA	ATSI HPF: age 45+, NIRA: All ages
	Hodgkin's Lymphoma	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSI HPF: No age specified
	Leukaemia	GBD, HPF	GBD, HPF	GBD, HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSI HPF: No age specified
	Lip, oral cavity and pharynx	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSI HPF: No age specified
	Non-Hodgkin lymphoma	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	NHPA, HPF	ATSI HPF: No age specified
	Prostate cancer	HPF	HPF	HPF	HPF	HPF	HPF	HPF	GBD, NHPA, HPF	GBD, ABD, NHPA, IBD, HPF,	IBD top 10: 75+, m only (prostate). ATSI HPF: Males, no age specified (all male genital organs including prostate)
	Tracheal, bronchus and lung cancer	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	GBD, ABD, NHPA, IBD, HPF, NIRA	GBD, ABD, NHPA, IBD, HPF, NIRA	IBD top 10: 45+, ATSI HPF: age 45+, NIRA: All ages
	Urinary Tract	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF: No age specified

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Cardiovascular diseases*		HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	NSFCC, NHPA, AHT, HPF, NIRA	NSFCC, NHPA, AHT, WHO, HPF, NIRA	NSFCC, NHPA, AHT, WHO, HPF, NIRA	NSFCC, NHPA, AHT, WHO, HPF, NIRA	ATSIHPF: Age 0-65+, NIRA: All ages
	Cerebrovascular disease	HPF	HPF	HPF	HPF	HPF	HPF	HPF	GBD, IBD_m, HPF	GBD, ABD, IBD, HPF	IBD top 10: age 45+ (male 45+, female 65+), ATSIHPF: Age 0-65+
	Ischemic heart disease	HPF	HPF	HPF	HPF	HPF	HPF	GBD_m, ABD_m, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	IBD top 10: age 25-75+, ATSIHPF: Age 0-65+
	Rheumatic heart disease	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSIHPF: Age 0-65+

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Chronic respiratory diseases*		NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, NIRA	NSFCC, AHT, WHO, NIRA	NSFCC, AHT, WHO, NIRA	NSFCC, AHT, WHO, NIRA	NIRA: all ages.
	Asthma	NHPA, IBDm, HPF	GBD, NHPA, IBD_m, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD, HPF	GBD, ABD, NHPA, IBD_f, HPA	ABD, NHPA, IBD_f, HPA	NHPA IBD_f, HPA,	IBD top 10: age <5-24 (males) age 5-74 (females), ATSIHPF: Age 0-65+
	Chronic obstructive pulmonary disease	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ABD, IBD, HPF	GBD, ABD, IBD, HPF	IBD top 10: age 45+, ATSIHPF: Age 0-65+
	Chronic sinusitis	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	HPF	ATSIHPF: Age 0-65+

** These disease groupings (Cardiovascular & Chronic Respiratory) are recognised as a priority but specific diseases are not prioritised.*

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
	Chronic liver disease							IBD_f	ABD_m, IBD	ABD_m, IBD	IBD top 10: age 25-64 (males 45-64, females 25-64)
	Digestive Diseases	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA: all ages

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Neurological disorders		NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA	NIRA: all ages
	Alzheimer disease and other dementias									GBD, ABD, NHPA, IBD	IBD top 10: age 65+
	Epilepsy	GBD	GBD	ABD, IBD_f	ABD, IBD_f						IBD top 10: age 5-14

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Mental disorders		NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	NSFCC, NHPA, HPF	ATSIHPF: all ages
	Anxiety disorders			GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	ABD, IBD_f	IBD top 10: age 5-64 (females only 45-64)

	Attention-deficit/ hyperactivity disorder			ABD, IBD_m	ABD, IBD_m						IBD top ten: age 5-14 (males only)
	Autistic spectrum disorders	GBD	GBD	GBD, ABD_m, IBD_m	GBD, ABD_m, IBD_m						IBD top 10: age 5-14 (males only)
	Bipolar disorders					GBD, ABD, IBD_f	GBD, ABD_f, IBD_f	GBD, ABD_f	ABD		IBD top 10: 15-24 (females only)
	Conduct disorder			GBD, ABD, IBD	GBD, ABD, IBD	GBD					IBD top 10: age 5-14
	Depressive disorders			ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD_f, IBD_f	IBD top 10: age 5-44, (45-64 females only)
	Schizophrenia					IBD_m	IBD_m	GBD, IBD_m	GBD, IBD_m		IBD top 10: age 15-44 (males only)
	Self-harm (inc. Suicide)			IBD, HPF	IBD, HPF	GBD, ABD, IBD, HPF, AHT	GBD, ABD, IBD, HPF, AHT	GBD, ABD, IBD, HPF, AHT	GBD, ABD, IBD, HPF, AHT	ABD_m, HPF	IBD top 10: age 5-44, ATSIHPF: Age 5+ (all ages reported, data from 5), AHT: age 15-44.

** These disease groupings (Chronic respiratory disease and mental disorders) are recognised as a priority but specific diseases are not prioritised.*

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Substance use disorders											
	Alcohol use disorders					ABD, IBD	ABD, IBD	GBD_m, ABD_m, IBD	ABD_m, IBD	IBD_m	IBD top 10: age 15-64 (males only 45-64)
	Drug use disorders					GBD, IBD_m	GBD, IBD_m	GBD, ABD_m	GBD, ABD_m		IBD top 10: age 15-24 (males only)

		<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Diabetes, urogenital, blood, and endocrine diseases											
	Diabetes mellitus	GBD, NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, HPF, NIRA	NSFCC, NHPA, AHT, WHO, IBD_f, HPF, NIRA	NSFCC, NHPA, AHT, WHO, IBD_f, HPF, NIRA	NSFCC, NHPA, AHT, WHO, IBD_f, HPF, NIRA	GBD, ABD_m, NSFCC, NHPA, AHT, WHO, IBD, NIRA	GBD, ABD, NSFCC, NHPA, AHT, WHO, IBD, NIRA	IBD top 10: age 15+ (female only 15-45), ATSIHPF: all ages, NIRA: all ages.
	Chronic kidney disease	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	HPF, NIRA	IBD, HPF, NIRA	GBD, ABD, IBD, HPF, NIRA	IBD top 10: age 45+, ATSIHPF: Age 0-65+ (specifies end-stage kidney disease, not CKD), NIRA: all ages.

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Musculoskeletal disorders					DATA	IBD	IBD	IBD	IBD	IBD	IBD top 10: age 15+

L2	L3 >>L4	<1	1-4	5-9	10-14	15-19	20-24	25-39	40-59	60+	Brief Rationale
Other non-communicable diseases											

	Congenital birth defects	GBD, ABD, IBD, NIRA	GBD, ABD, IBD, NIRA	GBD, IBD_f	GBD, IBD_f	GBD					IBD top 10: age <5 (birth defects) IBD top 10: age 5-14 (Cerebral palsy, f only), NIRA: age 0-4
	Oral disorders	HPF	HPF	ABD, AHT, IBD, HPF	ABD, AHT, IBD, HPF	AHT, IBD_f, HPA	AHT, IBD_f, HPA	AHT, HPA	AHT, HPA	GBD, AHT, HPA	IBD top 10: age 5-24 dental caries specified (females only 15-24), ATSIHPF: all ages.
	Sense organ diseases (see note below)	GBD, HPF	GBD, HPF	GBD, HPF	GBD, HPF	HPF	HPF	GBD, HPF	GBD, HPF	GBD, ABD, IBD_f, HPF	IBD top 10: 75+ (vision loss, f only), ATSIHPF: Ear health- all ages, Eye health- no age specified.
	Skin diseases~ >>Acne vulgaris			ABD, IBD_f	GBD, ABD, IBD_f	GBD, ABD	GBD_f, ABD				IBD top 10: age 5-14 (females only)
	Sudden infant death syndrome	GBD, ABD, IBD, NIRA	ABD, IBD, NIRA								IBD top 10: age <5, NIRA: age 0-4

~Note: *Sense organ disease (SOD): In GBD mostly all attributed to level 4 age-related and other hearing loss, however SOD does include cataract, glaucoma, macular degeneration, refraction and accommodation disorders, other vision loss, and other sense organ diseases. In ABD, this only represents hearing loss. Skin diseases: some skin diseases measured in GBD and classified within non-communicable disease are not NCDs. Therefore, we included only those which are NCDs. e.g. Acne, Alopecia areata, Decubitus ulcer, Dermatitis, Pruritus, Psoriasis, and Urticaria.*

Table 4.4. *Risk Factors for NCD in Indigenous Australians*

Top Risk Factors for NCDs in Males & Females										
	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Brief Rationale
Metabolic										
Dietary Risks (inadequate fruit & veg, salt intake,		GBD, ABD, NSFCC, WHO, IBD, HPF, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	Attributable RF for Neoplasms; CVD; and Diabetes, urogenital, blood, & endocrine diseases.
Low physical activity			GBD, ABD, NSFCC, WHO, IBD, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NHP, AHT	Attributable RF for Neoplasms; CVD; and Diabetes, urogenital, blood, & endocrine diseases.
High blood pressure					GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	GBD, ABD, NSFCC IBD, HPF, NHP, AHT	Attributable RF for CVD and Diabetes, urogenital, blood, & endocrine diseases.
High fasting plasma glucose					GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	GBD, ABD, NSFCC, AHT, IBD	Attributable RF for CVD; and Diabetes, urogenital, blood, & endocrine diseases.
High body-mass index		HPF, NIRA	GBD, ABD, NSFCC, NHPA, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	GBD, ABD, NSFCC, NHPA, WHO, AHT, IBD, HPF, NIRA, NHP	Attributable RF for Neoplasms; CVD; Diabetes, urogenital, blood, & endocrine diseases; and Musculoskeletal disorders.
High total cholesterol					GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	GBD, ABD, NSFCC, AHT, IBD, NHP	Attributable RF for CVD.
Impaired kidney function						GBD	GBD	GBD	GBD	Attributable RF for CVD and Diabetes, urogenital, blood, & endocrine diseases.
Environmental										
Occupational risks (ergonomic, particulates, noise, asthmagens, carcinogens & injury)					GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	Attributable RF for Neoplasms; Chronic respiratory diseases; Musculoskeletal disorders; and Other NCDs.

	<1	1-4	5-9	10-14	15-19	20-24	25-40	40-59	60y+	Brief Rationale
Behavioural										
Tobacco (smoking, smoking while pregnant & second-hand smoke)	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	Attributable RF for Neoplasms; CVD; Chronic respiratory diseases; Diabetes, urogenital, blood, & endocrine diseases; and Other NCDs.
Alcohol (total per capita, heavy episodic drinking)				GBD, ABD, NSFCC, IBD, NIRA, NHP	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	GBD, ABD, NSFCC, WHO, IBD, HPF, NIRA, NHP, AHT	Attributable RF for Neoplasms; Mental & substance use disorders; and Self-harm.
Drug use				GBD, ABD, IBD	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	GBD, ABD, IBD, HPF	Attributable RF for Neoplasms; Mental & substance use disorders; and Self-harm.
Unsafe sex				GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	Attributable RF for Neoplasms (cervical cancer)
Other										
Sexual abuse & violence (childhood sexual abuse & intimate partner violence)		GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	GBD, ABD, IBD	Attributable RF for Mental & substance use disorders and Self-harm.

Table 4.5. *Determinants of NCD*

The Social Determinants for NCDs in Males & Females			Policy
Daily living conditions	Health behaviours: Already covered in RF above.	Smoking	
		Alcohol	
		Physical activity	
		Diet and nutrition	
	Physical & social environment:	Water and sanitation	HPF
		Housing conditions	HPF
		Infrastructure, transport, and urban design	HPF
		Air quality	HPF
		Culture	HPF
		Access to traditional lands	HPF
		Social capital	
	Working Conditions:	Material working hazards	
		Stress	
	Health Care:	Coverage	HPF
		Health-care system infrastructure	HPF, NHP
	Social protection:	Coverage	
		Generosity	

Structural drivers of health inequity	Gender:	Norms & values	
		Economic participation	
		Sexual & reproductive health	
	Social inequities:	Social exclusion	HPF
		Income and wealth distribution	HPF
		Justice	HPF
		Racism	
		Education	HPF, CTG-NIRA
	Socio-political context:	Civil rights	
		Employment conditions	HPF, CTG-NIRA
		Governance & public spending priorities	HPF
		Macroeconomic conditions	

Section 4 Discussion: Suitability of the framework for Indigenous Australians

Revising the reporting framework for Indigenous Australians.

The method we used for developing the framework mirrored the priority setting approach used in for the Australian reporting framework. Similar issues emerged with a lack of specificity in key policies and frameworks. Overall there was reasonably good covering in policies and priority areas for the 'typical' NCD, Cancer, Cardiovascular disease, Chronic respiratory and Diabetes. Mental health and substance abuse are largely absent from key policies and frameworks, despite the modelled data indicating a burden in these areas. Chronic Liver disease, Alzheimer's, Epilepsy and Musculoskeletal disorders were also areas largely missing from key frameworks, despite a significant burden.
The National Indigenous Reform Agreement (NIRA) reports on key mortality data, however the data is not disaggregated by age. NIRA lacked detail for disease outcomes, reporting at a disease-group level (e.g. all respiratory conditions). Aboriginal & Torres Strait Islander Health Performance Framework 2017 (ATSIHPF), again lacks specificity for age across many outcomes and does not always disaggregate data by gender.

There are a few main points of difference between the Australian framework and the Australian Indigenous framework. The Cardiovascular disease section for Indigenous people includes Rheumatic heart disease, which was absent from the Australian framework. Several Cancers were added to the Indigenous framework from the ATSIHPF, as was Chronic Sinusitis. Non-specific Digestive diseases were added from the NIRA. Some of the perhaps less prevalent diseases noted in the Australian framework were not prioritized for Indigenous people in the policies and frameworks we reviewed, such as skin diseases and haemolytic anaemias. Risk factors were unchanged.

Data availability and quality.

The most recent Aboriginal and Torres Strait Islander health survey is the 2012-13 AATSIHS. This survey combines the existing ABS National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) together with two new elements - a National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS) and a National Aboriginal and Torres Strait Islander Health Measures Survey (NATSIHMS). This survey is more comprehensive than the National Health survey, however there is still deficits especially around data for children and young people.

There is also a lack of data for mental wellbeing, for any respondent under 18. Much like for the NHS we call into question the sensitivity of the survey for capturing accurate data for children and adolescents under 15 for health risk behaviours such as smoking and even less-sensitive daily recall questions such as dietary recall; when parents are answering for their children or in the room whilst their child is answering. As previously discussed this method, by contrast, is satisfactory for capturing health outcomes such as Asthma, which have clear diagnoses and treatment.

Profile of NCD for Indigenous Australians.

Selected data indicators were comparable between AASTIHS and NHS. Overall, K5 scores representing high or very high levels of psychological distress were higher in the Indigenous population, approximately double when examined by age group and sex. Self-report diabetes mellitus starts dramatically increasing in prevalence at age 25-39 for Indigenous Australians, whereas the NHS data showed the self-report prevalence generally increasing around the 40-59 age group for the Australian population. Asthma prevalence was higher for Indigenous people, in particular the 60+ female group. In terms of risk factors, Indigenous Australians had higher prevalence of people not consuming enough fruit and vegetables, and self-reported higher prevalence of daily tobacco use.

The increased prevalence of these outcomes and risk factors suggest early intervention targeting risks and determinants is key to reducing and managing the burden of NCD in the Indigenous population. These findings highlight the need to report NCDs for Indigenous Australians separately, to enable an effective policy response.

Section 5

Discussion and recommendations

NCDs are the leading causes of death and ill-health in Australia. These outcomes are chronic, insidious and stigmatizing, and yet are largely preventable. The profile of NCD in Australia includes musculoskeletal disorders, poor mental health, neurological disease, chronic skin conditions, vision and hearing defects, and gynaecological conditions, as well as the more commonly reported on outcomes: cardiovascular disease, diabetes, cancer, and chronic respiratory diseases. Key to prevention strategies are objective measures of risks and determinants.

A strong national reporting framework for NCD is the key to action.
Population based national data is vital to our understanding of these NCD outcomes, risk factors and social determinants; and informing our efforts to prevent sudden death and chronic ill-health. Key to informing national data collection is a strong reporting framework which comprises well-defined indicators. Indicators can then be measured, reported on and used to monitor and track progress to goals.

Current frameworks are inadequate.
A major barrier to policy has been the inadequacy of NCD measurement and reporting to date. Current frameworks in Australia are limited in their definition of NCD, the coverage of NCD across the life-course and their consideration of the differing needs of Indigenous Australians. The three key frameworks in Australia, AHT, NSFCC and NHPA, vary in quality and contribution to accountability on NCDs. Similarly, the key Indigenous frameworks had some serious limitations, including a limited coverage of NCDs. NIRA reports on key mortality data but lacks age disaggregation and ATSIHPF also lacks specificity for age across many outcomes and does not always disaggregate data by sex.

NCDs occur across the life-course and not just in adulthood.
NCDs that emerge in childhood and adolescence provide a particularly important target for intervention as this can improve the health of young people now, their health as adults, and the health of the next generation.

While a national, dedicated child and youth health behaviour data collection system is ideal, expansion of the current National Health Survey is likely to be a more cost-effective option. Ideally there could be an expansion of the sampling frame used, to be inclusive of children, adolescents and adults not in standard household situations. Such as those experiencing severe mental illness, chronic physical illness, homeless youth, justice involved youth, children and adolescents in out of home care and other groups experiencing adversity.

Aboriginal and Torres Strait Islander Australians have a distinct profile of NCD.
NCDs can occur earlier in the life-course and at greater severity for Indigenous Australians compared to their non-Indigenous counterparts. There is also a premature onset of risk, for example, 20% of Indigenous 15-19 year olds reporting smoking, compared to less than 10% of all Australians. Yet measurement of these key NCD risk factors is often not collected at a national level before age 15. There is a distinct policy context for Indigenous Australians, and unique opportunities for response. As such, require distinct NCD reporting framework.

Current data systems need to be extended.

There is a pressing need to extend our national data collection to have better coverage of key NCD outcomes, risks and determinants. The Australian Health Survey (AHS) conducted in 2011-13 had better coverage of NCDs than the NHS and continues to be widely utilised by researchers, health sector planners and policy makers. Repeating the AHS regularly, extending it to include neglected NCDs and investing in objective measures (self-report survey, anthropometric and biomedical) for children and adolescents will address many of the current gaps in NCDs and be of significant value to building accountability for NCDs.

Using the AHS as a core instrument there could also be further reorientation of the survey to better suit the needs of the population, based on:

1. The findings from large national and international studies such as ABoD 2011 and the GBD study;
2. Stakeholder engagement from important groups such as the Australian Health Policy Collaboration and Indigenous stakeholder groups;
3. Identified government priorities and proposed targets;

The current project covers all 3 elements described above, and findings presented here could be used as the first step in reorientating the survey.

Currently available data should be presented in a transparent, accessible way.
The technology exists to make fully interactive and downloadable data visualisations from complex multidimensional datasets. GBD Compare Viz Hub (https://vizhub.healthdata.org/gbd-compare/) is a great example of this, and the National Cancer Control Indicators website (https://ncci.canceraustralia.gov.au/) is a good Australian example, Australia's Health Tracker by Area (http://www.atlasesaustralia.com.au/ahpc/) is another. There is absolutely a need for better access to integrated data on NCD outcomes, risk factors and determinants. The NCCI does this for Cancer, providing high quality data which allows for monitoring and reporting of national trends over time, guiding national cancer control in Australia.

High quality data which allows for transparency and accountability around the reporting on national trends, by measures of inequity, and against national and international health prevention targets, will provide the evidence needed to properly address accountability for NCDs. Better access to quality data will benefit researchers, educators, health care providers, service planners, policy makers and decision makers.

The profile of NCD in Australia extends beyond cardiovascular disease, diabetes, cancer and chronic respiratory disease. The focus of NCD in Australia should include those outcomes, risks and determinants identified here as significant. As a priority, these outcomes, risks, and determinants should be measured and reported across the life-course and not just in adults. Indigenous Australians have a different profile of NCD, which requires a separate national reporting framework, and compels a distinct policy response.

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Appendix 1. Changes to the GBD 2015 cause list

Skin and subcutaneous diseases:
The Level 3 GBD2015 cause 'Skin and subcutaneous diseases' groups together several skin conditions, some of which are communicable. We refined the list and examined the DALY estimates at Level 4 for only those which are NCDs. Acne, Alopecia areata, Decubitus ulcer, Dermatitis, Other skin & subcutaneous diseases, Pruritus, Psoriasis & Urticaria were the final list of skin diseases included. We followed the method used with the level 3 causes and selected those which fell into the top 10 (by DALY rate) for each location, sex and age grouping.

Intentional self-harm:
In the GBD2015 study intentional self-harm is grouped under the level 1 category of 'Injury'. For the purpose of this reporting framework we grouped intentional self-harm under mental disorders. Globally, self-harm and suicide comprises a significant proportion of the burden of disease, specifically for 15-39 year-olds [1]. In Australia, for both genders, self-harm and road injuries are the only two causes not classified as NCD which fall into the top ten for 15-49 year olds. Given the strong link between self-harm, suicide, mental ill-health and poor psycho-social outcomes we have chosen to include it in our framework under mental disorders [2, 3].

'Other' causes:
At Level 3 GBD2015 several level 4 causes are sometimes grouped together and listed as 'other' non-communicable diseases e.g. other neurological disorders, other neoplasms. Given the difficulty of defining indicators and reporting data on groups of disorders these have been excluded.

Appendix 2. Method - Data Access and Analysis

Accessing the Data

TableBuilder.

TableBuilder is an online portal run by the ABS. It is designed to facilitate the use of complex survey data. We accessed the National Health Survey through TableBuilder [REF Table builder user manual]. The data are weighted to allow for population estimation. Table builder includes sets of pre-defined summation options, allows the user to create custom ranges, re-group already categorised data or simply use the survey variables as provided by ABS. Table options include zero suppression, presentation as summary counts or percentages, and reporting of relative standard error (RSE). Table builder also protects individuals by randomly adjusting tables to avoid the release of confidential data, and suppressing small cell counts/ large RSEs [REF Survey data confidentiality].

Example TableBuilder output.

Displayed are demographic data from the National Health Survey 2014-15. The table shows the population counts for each age group (user generated category), by sex (inbuilt survey variable), with RSE's reported in red.

all ages by Sex of person

Filters:
Default Summation : Selected persons (3) #

Wafers:

Cell count, **30** (3 columns x 10 rows x 1 wafers) total.

Sex of person	Male	Female	Total
all ages			
Less than 1	168.1 (6.65%)	117.7 (9.54%)	286.6 (5.40%)
1 to 4	610.2 (1.84%)	616.7 (1.83%)	1,222.8 (1.27%)
5 to 9	765.1 (0.30%)	725.1 (0.35%)	1,484.1 (0.16%)
10 to 14	714.9 (0.34%)	678.9 (0.37%)	1,388.9 (0.18%)
15 to 19	722.1 (4.61%)	766.3 (3.82%)	1,492.4 (2.85%)
20 to 24	810.7 (4.13%)	702.4 (4.17%)	1,529.8 (2.78%)
25 to 39	2,448.0 (0.12%)	2,481.0 (0.09%)	4,929.0 (0.05%)
40 to 59	2,996.9 (0.08%)	3,105.7 (0.07%)	6,100.3 (0.04%)
60 plus	2,171.4 (0.10%)	2,366.9 (0.08%)	4,542.5 (0.04%)
Total	11,410.1 (0.02%)	11,561.3 (0.02%)	22,969.0 (0.01%)

AIHW Data Cubes.

Separation statistics by principal diagnosis data cubes were accessed via the AIHW's online portal. Users can disaggregate by age and sex easily using a pre-defined 'drag and drop' menu [REF data cubes user guide]. The data is provided in counts, and to calculate the incidence rate for the population, the population (denominator) must be estimated using ABS total population counts by single year of age (ABS Data Cube 3101.0- table 59 [REF web address]). The age variable pre-defined in the hospital separation data cube are set to 5-year age bands (with the exception of <1yr), so counts were summed to reach the total count for our age groupings which spanned greater than 5 years.

Example Principal diagnosis data cube output. Displayed are separation counts for malignant melanoma of the skin from the Australian National Hospital Morbidity data set. The table shows the number of separations by age group and sex (both categories are inbuilt options).

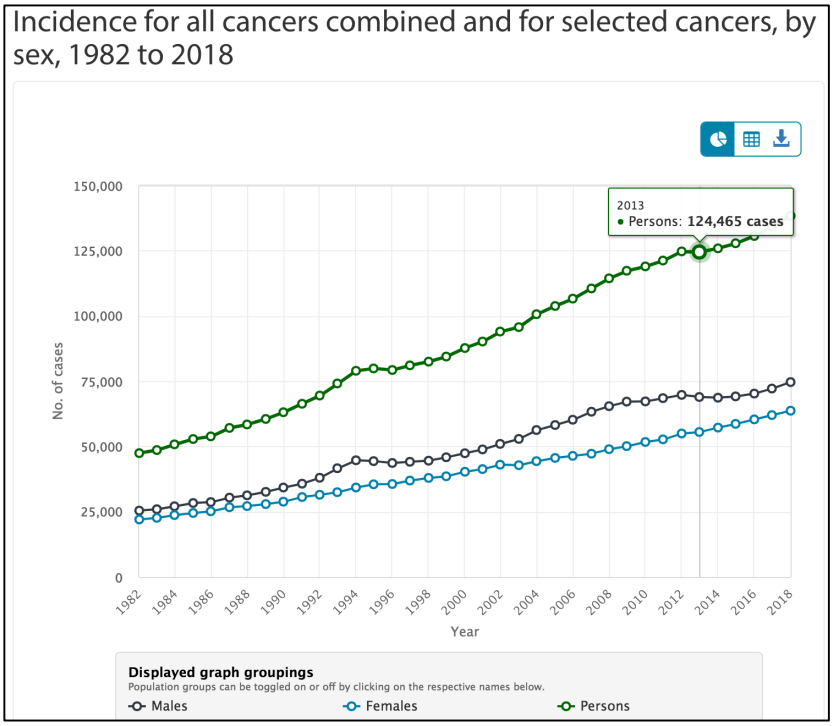
Separation statistics by principal diagnosis (ICD-10-AM 8th edition), Australia, 2013-14 to 2014-15
Principal diagnosis > 2 Neoplasms (C00-D48) > Melanoma and other malignant neoplasms of skin (C43-C44)
Applied filters: None

Year		2013-14 Separations	2014-15 Separations
3 digit diagnosis	Age group		
	<1	1	1
	1-4	6	7
	5-9	3	7
	10-14	8	6
	15-19	27	40
	20-24	90	70
	25-29	156	132
	30-34	226	253
	35-39	299	286
⊞ ⊞ C43 Malignant melanoma of skin	40-44	532	454
	45-49	590	627
	50-54	823	857
	55-59	978	1,019
	60-64	1,268	1,242
	65-69	1,507	1,601
	70-74	1,404	1,385
	75-79	1,245	1,308
	80-84	1,103	1,068
	85+	1,069	1,136

AIHW National Cancer Registry / The National Cancer Control Indicators Website.

The AIHW National Cancer Registry data is available using the Australian Cancer Incidence and Mortality (ACIM) books available from the AIHW website, by downloading a pivot table or individual cancer tables. This data is complete for Australia from 1982 - 2013, with 2014 data being partially complete (NSW data are estimates, all other states and territories have actual incidence and mortality data). The National Cancer Control Indicators (NCCI) website reports the ACIM books data along with the projected data to 2017, found in the Cancer in Australia 2017 report supplementary tables. The NCCI website is an excellent tool which allows researchers to quickly access data visualisations and tables for various cancer indicators, including (but not limited to) incidence and mortality.

Example NCCI website output. The graph shows the incidence rate for all cancers combined, by sex, over time. Data reported are sourced from AIHW ACIM books (for 1982 to 2013) and Cancer in Australia 2017 - Supplementary data tables (for 2014 to 2018 estimates). Accessed from https://ncci.canceraustralia.gov.au/diagnosis/cancer-incidence/cancer-incidence]



Appendix 3. Results Tables for All Australians

The following tables show the non-communicable disease outcomes and risk factors for the Australian population, disaggregated by age. Prevalence estimates are reported for survey data (National Health Survey [NHS] and Australian Aboriginal and Torres Strait Islander Health Survey [AATSIHS]), with rate ratios reported by sex, and 95% confidence interval shown in parentheses. For administrative data (National Hospital Morbidity Database [NHMD], or Australian Institute of Health and Welfare Cancer Database [AIHW]), incidence rates are reported, disaggregated by age and sex, and estimated using population count data from the Australian Bureau of Statistics. Standard errors were not provided for administrative data.

Asterisk indicates where estimates are unstable (high relative standard error) or there were no participants reporting said outcome. High relative standard error or zero percentages for a single sex occasionally prevented calculating the rate ratio for sex. Where data were unavailable for a specific age group 'NO DATA' is written. If there was no data available for a complete outcome or risk factor, we have not included them in these tables.

Indicator		**National Estimates**		
Neoplasms		**Estimates**	**Males**	**Females**
Brain and nervous system cancer	***Total***	**7.5 per 100,000**	**8.6 per 100,000**	**6.5 per 100,000**
Incidence of brain and nervous system cancer (ICD10 C71-C72) per 100,000 p.a. (National: AIHW, 2013)	*0 to 4*	3.3 per 100,000	3.9 per 100,000	2.7 per 100,000
	5 to 9	2.7 per 100,000	2.9 per 100,000	2.5 per 100,000
	10 to 14	1.5 per 100,000	1.3 per 100,000	1.7 per 100,000
	15 to 19	1.0 per 100,000	0.9 per 100,000	1.2 per 100,000
	20 to 24	1.6 per 100,000	1.6 per 100,000	1.6 per 100,000
	25 to 39	3.4 per 100,000	4.1 per 100,000	2.8 per 100,000
	40 to 59	7.8 per 100,000	9.1 per 100,000	6.4 per 100,000
	60+	20.4 per 100,000	24.3 per 100,000	16.9 per 100,000
Breast Cancer	***Total***	**140.9 per 100,000**	**1.2 per 100,000**	**140.9 per 100,000**
Incidence of breast cancer (ICD10 C50) per 100,000 p.a. (National: AIHW, 2014)	*0 to 4*	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	5 to 9	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	10 to 14	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	15 to 19	0.3 per 100,000	0.0 per 100,000	0.3 per 100,000
	20 to 24	0.9 per 100,000	0.0 per 100,000	0.9 per 100,000
	25 to 39	30.6 per 100,000	0.1 per 100,000	30.6 per 100,000
	40 to 59	214.0 per 100,000	0.9 per 100,000	214.0 per 100,000
	60+	367.1 per 100,000	4.9 per 100,000	367.1 per 100,000
Cervical Cancer	***Total***	**7.6 per 100,000**	**-**	**7.6 per 100,000**
Incidence of cervical cancer (ICD10 C53) per 100,000 p.a. (National: AIHW, 2014)	*1 to 4*	0.0 per 100,000	-	0.0 per 100,000
	5 to 9	0.0 per 100,000	-	0.0 per 100,000
	10 to 14	0.0 per 100,000	-	0.0 per 100,000
	15 to 19	0.2 per 100,000	-	0.2 per 100,000
	20 to 24	1.5 per 100,000	-	1.5 per 100,000
	25 to 39	11.2 per 100,000	-	11.2 per 100,000
	40 to 59	11.4 per 100,000	-	11.4 per 100,000
	60+	10.0 per 100,000	-	10.0 per 100,000
Colorectal Cancer	***Total***	**66.8 per 100,000**	**74.5 per 100,000**	**61.8 per 100,000**
Incidence of colorectal cancer (ICD10 C18-C21, C26) per 100,000 p.a. (National: AIHW, 2014)	*1 to 4*	0.1 per 100,000	0.0 per 100,000	0.1 per 100,000
	5 to 9	0.2 per 100,000	0.1 per 100,000	0.3 per 100,000
	10 to 14	1.4 per 100,000	0.9 per 100,000	2.1 per 100,000

	15 to 19	2.6 per 100,000	2.0 per 100,000	3.3 per 100,000
	20 to 24	3.4 per 100,000	2.6 per 100,000	4.2 per 100,000
	25 to 39	7.8 per 100,000	8.0 per 100,000	7.8 per 100,000
	40 to 59	48.3 per 100,000	54.1 per 100,000	43.4 per 100,000
	60+	258.3 per 100,000	304.7 per 100,000	227.5 per 100,000
Leukaemia Incidence of leukaemia (ICD10 C95-C91) per 100,000 p.a. (National: AIHW, 2014)	***Total***	**15.8 per 100,000**	**19.0 per 100,000**	**12.5 per 100,000**
	1 to 4	9.1 per 100,000	10.2 per 100,000	8.0 per 100,000
	5 to 9	4.9 per 100,000	5.3 per 100,000	4.5 per 100,000
	10 to 14	3.2 per 100,000	3.7 per 100,000	2.6 per 100,000
	15 to 19	3.2 per 100,000	3.7 per 100,000	2.7 per 100,000
	20 to 24	2.8 per 100,000	3.4 per 100,000	2.2 per 100,000
	25 to 39	3.1 per 100,000	3.3 per 100,000	2.9 per 100,000
	40 to 59	11.0 per 100,000	13.2 per 100,000	8.9 per 100,000
	60+	53.3 per 100,000	68.7 per 100,000	39.5 per 100,000
Malignant skin melanoma	***Total***	**55.9 per 100,000**	**66.1 per 100,000**	**45.9 per 100,000**
Incidence of malignant skin melanoma (ICD10 C43) per 100,000 p.a. (National: AIHW, 2014)	*1 to 4*	0.1 per 100,000	0.0 per 100,000	0.2 per 100,000
	5 to 9	0.1 per 100,000	0.0 per 100,000	0.1 per 100,000
	10 to 14	0.2 per 100,000	0.2 per 100,000	0.1 per 100,000
	15 to 19	2.5 per 100,000	2.3 per 100,000	2.8 per 100,000
	20 to 24	6.7 per 100,000	5.5 per 100,000	8.0 per 100,000
	25 to 39	19.7 per 100,000	17.7 per 100,000	21.7 per 100,000
	40 to 59	61.8 per 100,000	65.7 per 100,000	57.9 per 100,000
	60+	173.1 per 100,000	233.3 per 100,000	119.2 per 100,000
Non-melanoma skin cancer	***Total***	**4.0 per 100,000**	**5.0 per 100,000**	**2.9 per 100,000**
Incidence of Non-melanoma skin cancer (ICD10 C44) per 100,000 p.a. (National: AIHW, 2014). **NB: This estimate should be used with caution. It only includes rare non-melanoma skin cancers and excludes the two most common, BCC and SCC.**	*1 to 4*	0.0 per 100,000	0.1 per 100,000	0.0 per 100,000
	5 to 9	0.0 per 100,000	0.1 per 100,000	0.0 per 100,000
	10 to 14	0.2 per 100,000	0.1 per 100,000	0.2 per 100,000
	15 to 19	0.3 per 100,000	0.2 per 100,000	0.3 per 100,000
	20 to 24	0.4 per 100,000	0.4 per 100,000	0.5 per 100,000
	25 to 39	0.8 per 100,000	0.7 per 100,000	0.8 per 100,000
	40 to 59	2.2 per 100,000	2.8 per 100,000	1.7 per 100,000
	60+	15.6 per 100,000	21.3 per 100,000	10.4 per 100,000
Non-Hodgkin lymphoma	***Total***	**22.8 per 100,000**	**25.8 per 100,000**	**19.9 per 100,000**
Incidence of Non-Hodgkin lymphoma (ICD10 C82-C88) per 100,000 p.a. (National: AIHW, 2014)	*1 to 4*	0.5 per 100,000	0.7 per 100,000	0.2 per 100,000
	5 to 9	0.9 per 100,000	1.4 per 100,000	0.3 per 100,000
	10 to 14	1.1 per 100,000	1.9 per 100,000	0.3 per 100,000
	15 to 19	1.9 per 100,000	2.1 per 100,000	1.6 per 100,000
	20 to 24	2.6 per 100,000	2.9 per 100,000	2.3 per 100,000
	25 to 39	4.3 per 100,000	5.1 per 100,000	3.6 per 100,000
	40 to 59	19.7 per 100,000	23.4 per 100,000	16.0 per 100,000
	60+	80.8 per 100,000	93.8 per 100,000	69.2 per 100,000
Prostate cancer	***Total***	**77.9 per 100,000**	**156.6 per 100,000**	**-**
Incidence of Prostate cancer (ICD10 C61) per 100,000 p.a. (National: AIHW, 2014)	*0 to 4*	0.0 per 100,000	0.0 per 100,000	-
	5 to 9	0.0 per 100,000	0.0 per 100,000	-
	10 to 14	0.1 per 100,000	0.1 per 100,000	-
	15 to 19	0.0 per 100,000	0.0 per 100,000	-
	20 to 24	0.1 per 100,000	0.1 per 100,000	-

	25 to 39	0.1 per 100,000	0.2 per 100,000	-
	40 to 59	54.3 per 100,000	109.7 per 100,000	-
	60+	316.2 per 100,000	669.2 per 100,000	-
Tracheal, bronchus and lung cancer	***Total***	**49.2 per 100,000**	**57.3 per 100,000**	**41.2 per 100,000**
Incidence of Tracheal, bronchus and lung cancer (ICD10 C33-C34) per 100,000 p.a. (National: AIHW, 2014)	*1 to 4*	0.1 per 100,000	0.0 per 100,000	0.2 per 100,000
	5 to 9	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	10 to 14	0.1 per 100,000	0.0 per 100,000	0.2 per 100,000
	15 to 19	0.2 per 100,000	0.1 per 100,000	0.3 per 100,000
	20 to 24	0.4 per 100,000	0.3 per 100,000	0.6 per 100,000
	25 to 39	1.6 per 100,000	1.4 per 100,000	1.7 per 100,000
	40 to 59	28.8 per 100,000	30.1 per 100,000	27.4 per 100,000
	60+	205.2 per 100,000	257.2 per 100,000	158.6 per 100,000

Indicator		**National Estimates**		
Cardiovascular Diseases		**Estimates**	**Males**	**Females**
Atrial Fibrillation	***Total***	***279.7 per 100,000***	**318.8 per 100,000**	**241.0 per 100,000**
Hospital separations due to atrial fibrillation (ICD10 I48) per 100,000 p.a. (National: NHMD, 2014-15)	*<1*	1.6 per 100,000	1.9 per 100,000	1.4 per 100,000
	1 to 4	0.2 per 100,000	0.2 per 100,000	0.2 per 100,000
	5 to 9	0.1 per 100,000	0.3 per 100,000	0.0 per 100,000
	10 to 14	0.8 per 100,000	1.2 per 100,000	0.4 per 100,000
	15 to 19	3.7 per 100,000	6.2 per 100,000	1.1 per 100,000
	20 to 24	10.7 per 100,000	16.8 per 100,000	4.3 per 100,000
	25 to 39	28.2 per 100,000	43.7 per 100,000	12.7 per 100,000
	40 to 59	198.5 per 100,000	289.3 per 100,000	109.8 per 100,000
	60+	1,080.4 per 100,000	1,197.1 per 100,000	975.8 per 100,000
	Total	**27.0 per 100,000**	**30.6 per 100,000**	**23.4 per 100,000**
Cardiomyopathy and myocarditis	*<1*	10.9 per 100,000	9.0 per 100,000	12.9 per 100,000
Hospital separations due to cardiomyopathy and myocarditis (ICD10 I40 & I42) per 100,000 p.a. (National: NHMD, 2014-15)	*1 to 4*	1.1 per 100,000	1.3 per 100,000	1.0 per 100,000
	5 to 9	0.7 per 100,000	0.8 per 100,000	0.7 per 100,000
	10 to 14	2.3 per 100,000	2.5 per 100,000	2.2 per 100,000
	15 to 19	2.0 per 100,000	3.2 per 100,000	0.8 per 100,000
	20 to 24	3.4 per 100,000	4.8 per 100,000	1.9 per 100,000
	25 to 39	8.8 per 100,000	11.6 per 100,000	6.0 per 100,000
	40 to 59	31.2 per 100,000	41.1 per 100,000	21.4 per 100,000
	60+	79.4 per 100,000	85.0 per 100,000	74.4 per 100,000
Cerebrovascular disease (Stroke)	***Total***	**299.8 per 100,000**	**327.3 per 100,000**	**272.5 per 100,000**
Hospital separations due to cerebrovascular disease (ICD10 I60-69) per 100,000 p.a. (National: NHMD, 2014-15)	*<1*	15.5 per 100,000	19.9 per 100,000	10.8 per 100,000
	1 to 4	6.1 per 100,000	7.1 per 100,000	5.2 per 100,000
	5 to 9	3.6 per 100,000	3.9 per 100,000	3.4 per 100,000
	10 to 14	5.5 per 100,000	6.6 per 100,000	4.3 per 100,000
	15 to 19	11.9 per 100,000	14.1 per 100,000	9.6 per 100,000
	20 to 24	20.0 per 100,000	16.3 per 100,000	23.9 per 100,000
	25 to 39	52.7 per 100,000	47.1 per 100,000	58.3 per 100,000
	40 to 59	192.7 per 100,000	214.6 per 100,000	171.2 per 100,000

	60+	1,150.2 per 100,000	1,328.9 per 100,000	990.0 per 100,000
Ischemic heart disease Hospital separations due to Ischemic heart disease. (ICD10 I20-25) per 100,000 p.a. (National: NHMD, 2014-15)	***Total***	**659.9 per 100,000**	**910.7 per 100,000**	**411.9 per 100,000**
	<1	0.7 per 100,000	1.3 per 100,000	0.0 per 100,000
	1 to 4	0.2 per 100,000	0.0 per 100,000	0.5 per 100,000
	5 to 9	0.2 per 100,000	0.0 per 100,000	0.4 per 100,000
	10 to 14	0.1 per 100,000	0.3 per 100,000	0.0 per 100,000
	15 to 19	1.3 per 100,000	2.0 per 100,000	0.6 per 100,000
	20 to 24	3.8 per 100,000	4.2 per 100,000	3.3 per 100,000
	25 to 39	38.4 per 100,000	56.0 per 100,000	20.8 per 100,000
	40 to 59	569.6 per 100,000	861.6 per 100,000	284.6 per 100,000
	60+	2,459.6 per 100,000	3,472.4 per 100,000	1,551.3 per 100,000
	Total	**72.9 per 100,000**	**91.0 per 100,000**	**55.1 per 100,000**
Non-rheumatic vascular disease Hospital separations due to Non-rheumatic vascular disease. (ICD10 I34-I36) per 100,000 p.a. (National: NHMD, 2014-15)	*<1*	2.0 per 100,000	1.9 per 100,000	2.0 per 100,000
	1 to 4	0.2 per 100,000	0.2 per 100,000	0.3 per 100,000
	5 to 9	0.5 per 100,000	0.8 per 100,000	0.3 per 100,000
	10 to 14	0.5 per 100,000	0.8 per 100,000	0.1 per 100,000
	15 to 19	1.6 per 100,000	2.0 per 100,000	1.3 per 100,000
	20 to 24	2.9 per 100,000	4.1 per 100,000	1.7 per 100,000
	25 to 39	5.6 per 100,000	7.5 per 100,000	3.7 per 100,000
	40 to 59	33.5 per 100,000	48.8 per 100,000	18.6 per 100,000
	60+	306.4 per 100,000	392.1 per 100,000	229.6 per 100,000

Indicator		**National Estimates**	
Respiratory Diseases		**Estimate**	**Male: Female**
Asthma Self-report current asthma (population prevalence), (National: NHS, 2014-15)	***Total***	**10.8% (10.2-11.4)**	**0.8 (0.7-0.9)**
	<1	0.0%	-
	1 to 4	8.6% (6.7-10.6)	1.4 (0.8-2.5)
	5 to 9	14.5% (12.0-16.9)	1.3 (0.9-1.9)
	10 to 14	11.5% (9.1-13.8)	1.4 (0.9-2.1)
	15 to 19	10.3% (7.8-12.8)	1.1 (0.7-1.7)
	20 to 24	11.1% (8.6-13.7)	0.4 (0.2-0.7)
	25 to 39	10.6% (9.1-12.1)	0.8 (0.6-1.0)
	40 to 59	10.8% (9.5-12.0)	0.7 (0.5-0.9)
	60+	10.8% (9.7-12.0)	0.8 (0.7-1.0)
Chronic obstructive pulmonary disease (chronic bronchitis and emphysema)	***Total***	**1.8% (1.6-2.0)**	**0.9 (0.7-1.1)**
Self-report current Bronchitis >6mth duration (population prevalence), (National: NHS, 2014-15)	*<1*	-	-
	1 to 4	1.7% (0.6-2.7)*	-
	5 to 9	0.5% (0.1-0.9)*	-
	10 to 14	0.5% (0.1-1.0)*	-
	15 to 19	0.6% (0.1-1.0)*	-
	20 to 24	-	-
	25 to 39	1.1% (0.6-1.5)	1.0 (0.4-2.6)

	40 to 59	2.1% (1.6-2.7)	0.7 (0.4-1.2)
	60+	4.1% (3.3-4.8)	0.9 (0.6-1.3)
Self-report current Emphysema >6mth duration (population prevalence), (National: NHS, 2014-15)	***Total***	**1.0% (0.8-1.1)**	**1.2 (0.8-1.7)**
	<1	-	-
	1 to 4	-	-
	5 to 9	-	-
	10 to 14	-	-
	15 to 19	-	-
	20 to 24	-	-
	25 to 39	-	-
	40 to 59	0.9% (0.5-1.1)	1.2 (0.6-2.7)
	60+	3.7% (3-4.3)	1.4 (1.0-2.0)

Indicator		**National Estimates**		
		Estimate	**Male**	**Female**
Chronic liver disease Hospital separations due to chronic liver disease (ICD10 K70-76) per 100,000 p.a. (National: NHMD, 2014-15)	***Total***	**62.6 per 100,000**	**75.2 per 100,000**	**50.1 per 100,000**
	<1	7.9 per 100,000	5.1 per 100,000	10.8 per 100,000
	1 to 4	4.7 per 100,000	6.1 per 100,000	3.2 per 100,000
	5 to 9	3.5 per 100,000	3.3 per 100,000	3.7 per 100,000
	10 to 14	5.7 per 100,000	6.0 per 100,000	5.4 per 100,000
	15 to 19	8.6 per 100,000	5.5 per 100,000	11.8 per 100,000
	20 to 24	8.9 per 100,000	7.5 per 100,000	10.4 per 100,000
	25 to 39	23.1 per 100,000	23.1 per 100,000	23.2 per 100,000
	40 to 59	105.1 per 100,000	129.5 per 100,000	81.3 per 100,000
	60+	137.3 per 100,000	178.7 per 100,000	100.2 per 100,000

Indicator		**National Estimates**	
Neurological Disorders		**Estimate**	**Male: Female**
Epilepsy Self-report/proxy report Epilepsy (population prevalence), (National: NHS, 2014-15)	***Total***	**0.6% (0.4-0.7)**	**1.1 (0.6-1.7)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.7% (0.1-1.3)*	-
	10 to 14	0.0%*	-
	15 to 19	0.7% (0.1-1.3)*	-
	20 to 24	0.2%*	-
	25 to 39	0.6% (0.3-0.9)	0.7 (0.3-1.8)
	40 to 59	0.7% (0.3-1.1)	1.8 (0.7-4.8)
	60+	0.8% (0.4-1.2)	1.7 (0.6-4.7)
Migraine Self-reported chronic migraine (>6mth duration) (population prevalence), (National: NHS, 2014-15)	***Total***	**6.2% (5.8-6.7)**	**0.4 (0.3-0.5)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.7% (0.1-1.3)*	-

	10 to 14	2.6% (1.3-3.9)*	-	
	15 to 19	4.7% (3.1-6.4)	0.4 (0.2-0.9)	
	20 to 24	9.2% (6.8-11.5)	0.4 (0.2-0.8)	
	25 to 39	9.2% (8.2-10.2)	0.4 (0.3-0.5)	
	40 to 59	8.7% (7.6-9.8)	0.3 (0.2-0.4)	
	60+	4.4% (3.6-5.3)	0.6 (0.4-0.9)	
Alzheimer disease and other dementias Hospital separations due to Alzheimer disease (ICD10 F00-G30) per 100,000 p.a. (National: NHMD, 2014-15)	***Total***	**52.6 per 100,000**	**Male**	**Female**
			51.4 per 100,000	**53.8 per 100,000**
	<1	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	1 to 4	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	5 to 9	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	10 to 14	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	15 to 19	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	20 to 24	0.1 per 100,000	0.0 per 100,000	0.1 per 100,000
	25 to 39	0.1 per 100,000	0.1 per 100,000	0.2 per 100,000
	40 to 59	3.6 per 100,000	4.2 per 100,000	3.0 per 100,000
	60+	253.1 per 100,000	259.3 per 100,000	247.5 per 100,000
Motor neuron Hospital separations due to Motor neuron disease (ICD10 G12.2) per 100,000 p.a. (National: NHMD, 2014-15)	***Totals***	**8.5 per 100,000**	**Male**	**Female**
			10.2 per 100,000	**6.8 per 100,000**
	<1	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	1 to 4	0.5 per 100,000	0.3 per 100,000	0.7 per 100,000
	5 to 9	0.1 per 100,000	0.1 per 100,000	0.0 per 100,000
	10 to 14	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	15 to 19	0.1 per 100,000	0.1 per 100,000	0.1 per 100,000
	20 to 24	0.1 per 100,000	0.0 per 100,000	0.1 per 100,000
	25 to 39	1.3 per 100,000	1.2 per 100,000	1.5 per 100,000
	40 to 59	8.6 per 100,000	10.5 per 100,000	6.8 per 100,000
	60+	28.9 per 100,000	36.9 per 100,000	21.6 per 100,000

Indicator		**National Estimates**	
Mental Disorders		**Estimate**	**Male: Female**
Psychological Distress- K10 Self-report/proxy report high levels of psychological distress (K10 ≥ 22/50) Sample includes age 18 + only	***Total***	**11.7% (11.1-12.3)**	**0.7 (0.7-0.8)**
	0-17	NO DATA	
	18 to 24	15.8% (13.3-18.3)	0.7 (0.5-0.9)
	25 to 39	10.7% (9.6-11.8)	0.9 (0.7-1.1)
	40 to 59	12.4% (11.4-13.4)	0.6 (0.5-0.8)
	60+	10.0% (8.9-11.2)	0.8 (0.6-1.0)
Psychological Distress- K5 Self-report/proxy report high levels of psychological distress (K5 ≥ 12/25) Sample includes age 18 + only	***Total***	**12.2% (11.5-12.9)**	**0.8 (0.7-0.8)**
	0-17	NO DATA	
	18 to 24	16.7% (13.9-19.5)	0.6 (0.4-0.9)
	25 to 39	12.2% (10.9-13.4)	0.9 (0.8-1.1)
	40 to 59	12.7% (11.7-13.7)	0.7 (0.6-0.7)

	60+	9.8% (8.6-10.9)	0.8 (0.7-1.0)
Anxiety disorders Self-report/proxy report current Anxiety disorder (population prevalence), (National: NHS, 2014-15)	***Total***	**12.5% (11.8-13.2)**	**0.7 (0.6-0.8)**
	<1	0.0%*	-
	1 to 4	1.3% (0.4-2.2)*	-
	5 to 9	7.9% (5.7-10.1)	1.7 (0.9-3.0)
	10 to 14	11.2% (8.3-13.1)	1.4 (0.8-2.2)
	15 to 19	14.3% (11.3-17.3)	0.5 (0.3-0.8)
	20 to 24	16.0% (13.5-18.5)	0.4 (0.3-0.7)
	25 to 39	15.4% (13.9-16.9)	0.6 (0.5-0.7)
	40 to 59	13.8% (12.6-15)	0.7 (0.5-0.8)
	60+	11.3% (10-12.6)	0.8 (0.7-1.0)
Attention-deficit/ hyperactivity disorder Self-report/proxy report current Attention-deficit/hyperactivity disorder (population prevalence), (National: NHS, 2014-15)	***Total***	**1.0%**	**4.0 (2.5-6.3)**
	<1	0.0%*	-
	1 to 4	0.5%*	-
	5 to 9	2.7% (1.7-3.7)	-
	10 to 14	2.2% (1.2-3.3)	-
	15 to 19	2.9% (1.6-4.2)	-
	20 to 24	1.9% (0.1-3.7)	-
	25 to 39	1.1% (0.7-1.6)	5.5 (2.2-13.4)
	40 to 59	0.3% (0.1-0.5)	1.9 (0.7-5.4)
	60+	0.1% (0.0-0.2)	-
Autistic spectrum disorders Self-report/ proxy report current Autistic spectrum disorder (population prevalence), (National: NHS, 2014-15)	***Total***	**0.84% (0.7-1.0)**	**3.7 (2.3-6.1)**
	<1	0.0%*	-
	1 to 4	1.0% (0.3-1.6)	-
	5 to 9	3.0% (1.7-4.3)	-
	10 to 14	3.0% (1.9-4.1)	-
	15 to 19	2.7% (1.4-4.1)	-
	20 to 24	1.4% (0.5-2.2)	-
	25 to 39	0.6% (0.2-0.9)	-
	40 to 59	0.1% (0.0-0.3)	-
	60+	0.1%*	-
Bipolar disorders Self-report/proxy report current Bipolar disorder (population prevalence), (National: NHS, 2014-15)	***Total***	**0.8%**	**0.6 (0.4-1.0)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.0%*	-
	15 to 19	0.4%*	-
	20 to 24	0.2%*	-
	25 to 39	0.8% (0.4-1.2)	0.9 (0.3-2.4)
	40 to 59	1.3% (0.9-1.8)	0.5 (0.2-1.0)
	60+	0.9% (0.5-1.2)	0.5 (0.2-1.0)
Conduct disorder Self-report/proxy report current Conduct disorder (population prevalence), (National: NHS, 2014-15)	***Total***	**0.3% (0.2-0.4)**	**2.2 (1.0-4.9)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	1.9% (0.7-3.1)	-
	10 to 14	0.7% (0.1-1.4)	-

	15 to 19	0.6%*	-
	20 to 24	0.0%*	-
	25 to 39	0.0%*	-
	40 to 59	0.0%*	-
	60+	0.0%*	-
Depressive disorders Current Depressive disorder/ feeling depressed (population prevalence), (National: NHS, 2014-15)	***Total***	**11.3% (10.8-11.8)**	**0.8 (0.7-0.8)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.4%*	-
	10 to 14	4.4% (2.8-6.0)	1.0 (0.5-2.0)
	15 to 19	9.9% (7.8-12.0)	0.6 (0.4-0.9)
	20 to 24	10.5% (8.3-12.7)	0.4 (0.3-0.7)
	25 to 39	12.7% (11.4-14.0)	0.8 (0.6-1.0)
	40 to 59	15.9% (14.6-17.2)	0.7 (0.6-0.8)
	60+	13.6% (12.3-14.9)	1.0 (0.8-1.2)
Schizophrenia Self-report/proxy report current Schizophrenia (population prevalence), (National: NHS, 2014-15)	***Total***	**0.3% (0.2-0.4)**	**3.0 (1.2-7.4)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.0%*	-
	15 to 19	0.0%*	-
	20 to 24	0.2%*	-
	25 to 39	0.5% (0.1-0.9)	-
	40 to 59	0.4% (0.2-0.6)	1.0 (0.3-3.2)
	60+	0.2%*	-

Indicator		**National Estimates**	
Substance use Disorders		**Estimate**	**Male: Female**
Alcohol use disorders Current harmful use or dependence on alcohol (population prevalence), (National: NHS, 2014-15)	***Total***	**0.7% (0.5-0.9)**	**2.0 (1.2-3.2)**
	0-15	NO DATA	
	15 to 19	0.0%*	-
	20 to 24	0.3%*	-
	25 to 39	1.0% (0.6-1.4)	1.6 (0.7-3.8)
	40 to 59	1.3% (0.8-1.8)	1.5 (0.8-2.7)
	60+	0.7% (0.4-1.0)	2.4 (1.1-5.4)
Drug use disorders	***Total***	**0.4% (0.3-0.5)**	**1.0 (0.5-1.8)**
Current harmful use or dependence on illicit drugs (population prevalence), (National: NHS, 2014-15)	*0-15*	NO DATA	
	15 to 19	1.1%*	-
	20 to 24	0.2%*	-
	25 to 39	0.5% (0.2-0.8)	1.0 (0.3-3.4)
	40 to 59	0.5% (0.3-0.7)	1.8 (0.7-4.5)
	60+		
	Total	**0.2% (0.1-0.3)**	**0.3 (0.1-0.8)**
	0-15	NO DATA	

Current harmful use or dependence on medicinal/prescription drugs (population prevalence), (National: NHS, 2014-15)	*15 to 19*	0.0%*	-
	20 to 24	0.2%*	-
	25 to 39	0.2% (0.0-0.4)	-
	40 to 59	0.3% (0.1-0.5)	-
	60+	0.3% (0.1-0.5)	-

Indicator		**National Estimates**	
Diabetes, urogenital, blood, and endocrine diseases		**Estimate**	**Male: Female**
Diabetes mellitus	***Total***	**5.1% (4.8-5.5)**	**1.2 (1.1-1.4)**
Type 1, 2 and unknown combined - Self-reported/ parent reported ever had or have Diabetes (population prevalence), (National: NHS, 2014-15)	*<1*	0%	-
	1 to 4	0%	-
	5 to 9	0.1%*	-
	10 to 14	0.4%*	-
	15 to 19	0.7%*	-
	20 to 24	0.5%*	-
	25 to 39	1.2% (0.7-1.6)	1.0 (0.4-2.2)
	40 to 59	5.7% (4.9-6.5)	1.3 (1.0-1.7)
	60+	16.4% (15.1-17.7)	1.4 (1.1-1.6)
Type 1 - Ever had or have type 1 Diabetes (population prevalence), (National: NHS, 2014-15)	***Total***	**0.7% (0.5-0.9)**	**1.2 (0.7-1.8)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.1%*	-
	10 to 14	0.5%*	-
	15 to 19	0.3%*	-
	20 to 24	0.9%*	-
	25 to 39	0.3% (0.1-0.5)	1.0 (0.4-2.8)
	40 to 59	0.9% (0.5-1.3)	1.3 (0.5-3.0)
	60+	1.4% (1-1.8)	1.6 (0.9-2.9)
Type 2 - Ever had or have type 2 Diabetes (population prevalence), (National: NHS, 2014-15)	***Total***	**4.4% (4.1-4.7)**	**1.3 (1.1-1.5)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.4%*	-
	15 to 19	0.0%*	-
	20 to 24	0.0%*	-
	25 to 39	0.8% (0.4-1.2)	-
	40 to 59	4.7% (4.0-5.4)	1.3 (0.9-1.7)
	60+	14.8% (13.5-16.1)	1.3 (1.1-1.6)
Chronic kidney disease Self-reported/ parent reported ever had or have kidney disease (population prevalence), (National: NHS, 2014-15)	***Total***	**0.9% (0.7-1.1)**	**1.0 (0.7-1.4)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.0%*	-
	15 to 19	0.0%*	-

	20 to 24	0.0%*	-
	25 to 39	0.3% (0.0-0.6)*	-
	40 to 59	1.1% (0.7-1.5)	0.6 (0.3-1.2)
	60+	2.4% (1.8-3.0)	1.5 (0.9-2.5)

Indicator		**National Estimates**		
Diabetes Hospital separations		**Estimate**	**Male**	**Female**
Hospital separations due to Type 1 Diabetes (ICD10 E10) per 100,000 p.a. (National: NHMD, 2014-15)	***Total***	**61.4 per 100,000**	**61.8 per 100,000**	**61.1 per 100,000**
	<1	3.0 per 100,000	3.9 per 100,000	2.0 per 100,000
	1 to 4	26.9 per 100,000	27.4 per 100,000	26.4 per 100,000
	5 to 9	53.2 per 100,000	49.2 per 100,000	57.4 per 100,000
	10 to 14	103.3 per 100,000	91.7 per 100,000	115.5 per 100,000
	15 to 19	123.3 per 100,000	109.0 per 100,000	138.4 per 100,000
	20 to 24	95.2 per 100,000	84.5 per 100,000	106.4 per 100,000
	25 to 39	65.0 per 100,000	65.3 per 100,000	64.7 per 100,000
	40 to 59	52.6 per 100,000	54.6 per 100,000	50.7 per 100,000
	60+	41.5 per 100,000	51.7 per 100,000	32.3 per 100,000
Hospital separations due to Type 2 Diabetes (ICD10 E11) per 100,000 p.a. (National: NHMD, 2014-15)	***Totals***	**133.4 per 100,000**	**173.5 per 100,000**	**93.7 per 100,000**
	<1	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	1 to 4	0.0 per 100,000	0.0 per 100,000	0.0 per 100,000
	5 to 9	0.3 per 100,000	0.0 per 100,000	0.7 per 100,000
	10 to 14	1.8 per 100,000	1.4 per 100,000	2.3 per 100,000
	15 to 19	5.1 per 100,000	3.0 per 100,000	7.4 per 100,000
	20 to 24	5.6 per 100,000	5.0 per 100,000	6.2 per 100,000
	25 to 39	19.2 per 100,000	22.2 per 100,000	16.3 per 100,000
	40 to 59	120.7 per 100,000	158.5 per 100,000	83.8 per 100,000
	60+	474.3 per 100,000	653.5 per 100,000	313.6 per 100,000
Hospital separations due to Unspecified Diabetes (ICD10 E14) per 100,000 p.a. (National: NHMD, 2014-15)	***Totals***	**1.7 per 100,000**	**2.1 per 100,000**	**1.3 per 100,000**
	<1	0.3 per 100,000	0.6 per 100,000	0.0 per 100,000
	1 to 4	0.4 per 100,000	0.5 per 100,000	0.3 per 100,000
	5 to 9	0.1 per 100,000	0.0 per 100,000	0.1 per 100,000
	10 to 14	0.2 per 100,000	0.4 per 100,000	0.0 per 100,000
	15 to 19	0.7 per 100,000	0.7 per 100,000	0.7 per 100,000
	20 to 24	0.7 per 100,000	0.6 per 100,000	0.7 per 100,000
	25 to 39	1.0 per 100,000	1.2 per 100,000	0.7 per 100,000
	40 to 59	2.1 per 100,000	2.5 per 100,000	1.8 per 100,000
	60+	4.0 per 100,000	5.4 per 100,000	2.7 per 100,000

Indicator		**National Estimates**	
Musculoskeletal disorders		**Estimate**	**Male: Female**
Gout	***Total***	**1.1% (0.9-1.3)**	**4.3 (2.7-6.6)**

Self-reported ever had Gout (population prevalence), (National: NHS, 2014-15)	*<1*	0.0%*	-	
	1 to 4	0.0%*	-	
	5 to 9	0.0%*	-	
	10 to 14	0.0%*	-	
	15 to 19	0.0%*	-	
	20 to 24	0.6%*	-	
	25 to 39	0.2%*	-	
	40 to 59	1.4% (1-1.8)	-	
	60+	3.1% (2.4-3.8)	3.2 (1.9-5.3)	
Back pain Self-reported chronic (>6mth) back pain (population prevalence), (National: NHS, 2014-15) NB: No data for Neck pain	***Total***	**10.3% (9.7-10.9)**		
	<1	0%*	-	
	1 to 4	0%*	-	
	5 to 9	0%*	-	
	10 to 14	0.8%*	-	
	15 to 19	5.6% (3.3-7.9)	1.7 (0.8-3.4)	
	20 to 24	9.5% (7.2-11.8)	1.0 (0.6-1.8)	
	25 to 39	12.2% (10.9-13.5)	1.0 (0.8-1.3)	
	40 to 59	14.0% (12.8-15.2)	1.1 (0.9-1.3)	
	60+	14.5% (13.1-15.9)	1.2 (1.0-1.4)	
Osteoarthritis Self-reported Osteoarthritis (population prevalence), (National: NHS, 2014-15)	***Total***	**9.0% (8.6-9.4)**	**0.5 (0.5-0.6)**	
	<1	0.0%*	-	
	1 to 4	0.0%*	-	
	5 to 9	0.0%*	-	
	10 to 14	0.0%*	-	
	15 to 19	0.0%*	-	
	20 to 24	0.5%*	-	
	25 to 39	1.5% (1.0-2.0)	0.9 (0.4-1.8)	
	40 to 59	10.0% (9.1-10.9)	0.6 (0.5-0.8)	
	60+	30.4% (28.5-32.3)	0.5 (0.5-0.6)	
Rheumatoid arthritis Self-reported/ parent reported Rheumatoid arthritis (population prevalence), (National: NHS, 2014-15)	***Total***	**1.8% (1.6-2.0)**	**0.8 (0.6-1.0)**	
	<1	0.0%*	-	
	1 to 4	0.0%*	-	
	5 to 9	0.0%*	-	
	10 to 14	0.0%*	-	
	15 to 19	0.1%*	-	
	20 to 24	0.6%*	-	
	25 to 39	0.4% (0.2-0.6)	1.0 (0.4-2.6)	
	40 to 59	2.0% (1.4-2.6)	1.0 (0.6-1.7)	
	60+	5.5% (4.6-6.4)	0.7 (0.5-1.0)	
Osteoporosis Self-reported/ parent reported Osteoporosis (population prevalence), (National: NHS, 2014-15)	***Total***	**3.5% (3.2-3.8)**	**0.3 (0.2-0.3)**	
	<1	0.0%*	-	
	1 to 4	0.0%*	-	
	5 to 9	0.0%*	-	
	10 to 14	0.0%*	-	
	15 to 19	0.0%*	-	
	20 to 24	0.0%*	-	
	25 to 39	0.6% (0.3-0.9)	-	
	40 to 59	3.2% (2.5-3.9)	0.4 (0.2-0.6)	
	60+	12.5% (11.4-13.6)	0.2 (0.2-0.3)	
Juvenile Arthritis	***Total***	**8.1 per 100,000**	**Male**	**Female**
			5.5 per 100,000	**10.6 per 100,000**

Hospital separations due to Juvenile Arthritis (ICD10 M08) per 100,000 p.a. (National: NHMD, 2014-15)	*<1*	0.3 per 100,000	0.0 per 100,000	0.7 per 100,000
	1 to 4	21.7 per 100,000	15.4 per 100,000	28.2 per 100,000
	5 to 9	30.9 per 100,000	17.6 per 100,000	44.9 per 100,000
	10 to 14	40.3 per 100,000	31.1 per 100,000	50.1 per 100,000
	15 to 19	31.0 per 100,000	21.1 per 100,000	41.3 per 100,000
	20 to 24	4.7 per 100,000	1.1 per 100,000	8.5 per 100,000
	25 to 39	0.6 per 100,000	0.3 per 100,000	0.8 per 100,000
	40 to 59	0.7 per 100,000	0.4 per 100,000	1.0 per 100,000
	60+	0.1 per 100,000	0.0 per 100,000	0.2 per 100,000

Indicator		**National Estimates**		
Other non-communicable diseases		**Estimate**	**Male: Female**	
Congenital birth defects Self-report/ proxy report congenital malformations, deformations & chromosomal abnormalities (population prevalence), (National: NHS, 2014-15)	***Total***	**0.6% (0.4-0.8)**	**1.1 (0.6-1.8)**	
	<1	2.7%*	-	
	1 to 4	1.1% (0.4-1.8)	1.1 (0.3-3.4)	
	5 to 9	1.0% (0.0-2.0)	-	
	10 to 14	0.7%*	-	
	15 to 19	0.7% (0.2-1.2)	-	
	20 to 24	0.6%*	-	
	25 to 39	0.8% (0.4-1.2)	1.2 (0.5-3.0)	
	40 to 59	0.3% (0.2-0.4)	-	
	60+	0.4% (0.1-0.7)	-	
Dental Caries Hospital Separations for Dental Caries (ICD10 K02) per 100,000 p.a. (National: NHMD, 2014-15)	***Total***	**146.6 per 100,000**	**Male** **146.7 per 100,000**	**Female** **146.5 per 100,000**
	<1	1.6 per 100,000	0.6 per 100,000	2.7 per 100,000
	1 to 4	523.4 per 100,000	544.7 per 100,000	500.9 per 100,000
	5 to 9	806.8 per 100,000	808.0 per 100,000	805.5 per 100,000
	10 to 14	149.7 per 100,000	145.2 per 100,000	154.4 per 100,000
	15 to 19	62.5 per 100,000	58.2 per 100,000	67.1 per 100,000
	20 to 24	55.5 per 100,000	51.1 per 100,000	60.1 per 100,000
	25 to 39	53.7 per 100,000	54.2 per 100,000	53.1 per 100,000
	40 to 59	75.3 per 100,000	68.0 per 100,000	82.5 per 100,000
	60+	98.2 per 100,000	95.6 per 100,000	100.6 per 100,000
Visual defects Self-reported corrected or uncorrected visual defect or eye problem (population prevalence), (National: NHS, 2014-15)	***Total***	**54.9% (54.2-55.6)**	**0.9 (0.8-0.9)**	
	<1	1.5%*	-	
	1 to 4	2.1% (1.0-3.2)	2.1 (0.8-5.4)	
	5 to 9	13.6% (11.2-16.0)	0.6 (0.4-0.9)	
	10 to 14	20.6% (17.3-23.9)	0.8 (0.6-1.1)	
	15 to 19	34.3% (29.7-38.9)	0.6 (0.5-0.8)	
	20 to 24	37.2% (33.6-40.8)	0.7 (0.6-0.9)	
	25 to 39	41.5% (39.7-43.3)	0.8 (0.7-0.8)	
	40 to 59	77.2% (75.8-78.6)	0.9 (0.9-0.9)	
	60+	93.7% (92.7-94.7)	1.0 (1.0-1.0)	
Hearing or ear defect Self-reported hearing or ear problem (population prevalence), (National: NHS, 2014-15)	***Total***	**14.4% (13.8-15.0)**	**1.7 (1.5-1.8)**	
	<1	1.9%*	-	
	1 to 4	2.7% (1.1-4.3)	5.4 (1.9-15.1)	
	5 to 9	2.9% (1.8-4.0)	1.2 (0.6-2.5)	
	10 to 14	3.0% (1.4-4.6)	0.6 (0.2-1.5)	
	15 to 19	2.9% (1.1-4.7)	2.1 (0.8-5.6)	
	20 to 24	5.1% (3.2-7.0)	1.4 (0.7-2.7)	
	25 to 39	7.6% (6.5-8.7)	1.7 (1.3-2.3)	
	40 to 59	16.2% (14.9-17.5)	1.8 (1.5-2.1)	
	60+	37.5% (35.7-39.3)	1.7 (1.5-1.9)	

Dermatitis & Eczema Self-reported Dermatitis & eczema (population prevalence), (National: NHS, 2014-15)	***Total***	**1.4% (1.2-1.6)**	**1.0 (0.7-1.4)**	
	<1	2.3% (0.2-4.4)	-	
	1 to 4	2.8% (1.4-4.2)	1.3 (0.5-3.2)	
	5 to 9	2.9% (1.8-4.0)	1.7 (0.7-4.2)	
	10 to 14	2.5% (1.1-3.9)	1.3 (0.4-4.8)	
	15 to 19	2.0% (0.9-3.1)	-	
	20 to 24	1.6% (0.4-2.8)	1.5 (0.5-4.6)	
	25 to 39	1.4% (0.9-1.9)	0.6 (0.3-1.3)	
	40 to 59	0.8% (0.4-1.2)	0.9 (0.3-2.5)	
	60+	0.6% (0.3-0.9)	1.8 (0.5-5.8)	
Psoriasis Self-reported Psoriasis (population prevalence), (National: NHS, 2014-15)	***Total***	**2.7% (2.4-3.0)**	**1.0 (0.8-1.2)**	
	<1	0%	-	
	1 to 4	1.1% (0.2-2.0)	-	
	5 to 9	0.7% (0.1-1.3)	-	
	10 to 14	0.3% (0.1-0.5)	-	
	15 to 19	1.1% (0.3-1.9)	-	
	20 to 24	1.3% (0.2-2.4)	0.5 (0.1-2.0)	
	25 to 39	3.0% (2.2-3.8)	0.8 (0.4-1.3)	
	40 to 59	3.9% (3.0-4.8)	1.2 (0.8-1.8)	
	60+	3.7% (3.1-4.3)	1.4 (1.0-1.9)	
Urticaria Hospital Separations for Urticaria (ICD10 L50)	***Total***	**9.1 per 100,000**	**Male**	**Female**
			7.7 per 100,000	**10.5 per 100,000**
	<1	38.2 per 100,000	48.2 per 100,000	27.8 per 100,000
	1 to 4	21.1 per 100,000	23.4 per 100,000	18.6 per 100,000
	5 to 9	11.2 per 100,000	12.2 per 100,000	10.2 per 100,000
	10 to 14	6.8 per 100,000	7.0 per 100,000	6.5 per 100,000
	15 to 19	8.6 per 100,000	7.1 per 100,000	10.2 per 100,000
	20 to 24	7.9 per 100,000	6.7 per 100,000	9.2 per 100,000
	25 to 39	7.7 per 100,000	4.8 per 100,000	10.6 per 100,000
	40 to 59	8.5 per 100,000	5.1 per 100,000	11.7 per 100,000
	60+	7.1 per 100,000	6.4 per 100,000	7.8 per 100,000

NCD Risk Factors

Indicator		**National Estimates**	
Dietary Risks & Physical Activity		**Estimate**	**Male: Female**
Fruit and Vegetable intake Self-report/ parent proxy inadequate fruit OR vegetable intake (population prevalence), (National: NHS, 2014-15)	***Total 5+***	**44.8% (43.9-45.7)**	**1.2 (1.2-1.3)**
	0-4	NO DATA	
	5 to 9	2.7% (1.8-3.6)	2.7% (1.8-3.6)
	10 to 14	43.4% (40.3-46.4)	43.4% (40.3-46.4)
	15 to 19	61.9% (58.8-65.0)	61.9% (58.8-65.0)
	20 to 24	55.2% (49.6-60.8)	55.2% (49.6-60.8)
	25 to 39	51.9% (49.8-54.0)	51.9% (49.8-54.0)
	40 to 59	47.8% (45.8-49.8)	47.8% (45.8-49.8)
	60+	38.2% (36.5-39.9)	38.2% (36.5-39.9)
Low physical activity Self-report/ parent proxy 2014 physical activity guideline for age group not met (population prevalence), (National: NHS, 2014-15) NB: no totals as these were grouped by age already.	*0 to 14*	NO DATA	
	15 to 17	98.1% (96.7-99.5)	1.0 (1.0-1.0)
	18 to 64	85.5% (84.7-86.4)	1.0 (1.0-1.0)
	65+	84.2% (82.2-86.2)	1.0 (0.9-1.0)

Indicator		National Estimates	
Metabolic risk factors		**Estimate**	**Male: Female**
High blood pressure Measured blood pressure ≥ 140 / 90 mmHg, population prevalence. 18+ (National: NHS, 2014-15)	***Total 18+***	**33.7% (32.8-34.7)**	**1.1 (1.0-1.2)**
	0 to 17	NO DATA	
	18 to 24	6.3% (4.0-8.5)	1.0 (0.5-1.9)
	25 to 39	12.4% (11.2-13.7)	1.3 (1.1-1.6)
	40 to 59	33.7% (32.0-35.4)	1.2 (1.1-1.3)
	60+	70.1% (68.3-71.9)	1.0 (1.0-1.1)
High total cholesterol Self-report/ parent proxy high cholesterol (population prevalence), (National: NHS, 2014-15)	***Total***	**7.8% (7.4-8.2)**	**1.0 (0.9-1.1)**
	<1	0.0%*	-
	1 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.0%*	-
	15 to 19	0.0%*	-
	20 to 24	0.2%*	-
	25 to 39	2.0% (1.5-2.5)	1.0 (0.6-1.8)
	40 to 59	9.6% (8.6-10.7)	1.3 (1.1-1.7)
	60+	24.5% (22.9-26.1)	0.9 (0.8-1.0)
High body mass index	***Total <17***	**25.8% (23.9-27.8)**	**1.1 (0.9-1.3)**
Measured BMI using age and sex specific cut off points for overweight and obese, population prevalence in 2-17 years. (National: NHS, 2014-15)	***Total 18+***	**63.4% (62.4-64.4)**	**1.3 (1.2-1.3)**
	1 to 4	20.0% (16.2-23.7)	1.2 (0.8-1.7)
	5 to 9	23.1% (20.3-26.0)	0.8 (0.7-1.1)
	10 to 14	29.5% (25.7-33.2)	1.2 (0.9-1.6)
	15 to 17	32.3% (27.8-36.8)	1.2 (0.9-1.6)
Measured BMI ≥ 25 (overweight) and 30 (obese), population prevalence in 18+ years (National: NHS, 2014-15)	*18 to 24*	38.9% (35.3-42.5)	1.3 (1.1-1.6)
	25 to 39	56.2% (54.2-58.1)	1.4 (1.3-1.5)
	40 to 59	70.1% (68.3-71.9)	1.3 (1.2-1.3)
	60+	73.6% (72.2-75.1)	1.2 (1.1-1.2)

Indicator		National Estimates	
Other risk factors		**Estimate**	**Male: Female**
Tobacco Daily smoke status: Self report daily smoker status, (population prevalence) (National: NHS, 2014-15) Age *15+*	***Total 15+***	**14.0% (13.2-14.8)**	**1.4 (1.3-1.5)**
	0 to 14	NO DATA	
	15 to 19	5.4% (3.2-7.7)	0.5 (0.2-1.0)
	20 to 24	16.0% (13.1-18.8)	1.0 (0.7-1.5)
	25 to 39	17.5% (15.9-19.2)	1.8 (1.5-2.1)
	40 to 59	16.9% (15.3-18.5)	1.3 (1.1-1.5)
	60+	8.2% (7.3-9.0)	1.5 (1.2-1.9)
Alcohol Use Self-report binge drinking (>5 or more drinks a day in the past 12 mths), (population prevalence) (National: NHS, 2014-15) Age *15+*	***Total 15+***	**0.4% (0.4-0.4)**	**1.8 (1.8-1.8)**
	0 to 14	NO DATA	
	15 to 19	0.3% (0.3-0.3)	1.0 (1.0-1.0)
	20 to 24	0.7% (0.7-0.7)	1.2 (1.2-1.2)
	25 to 39	0.5% (0.5-0.5)	1.7 (1.7-1.7)

	40 to 59	0.5% (0.5-0.5)	1.9 (1.9-1.9)
	60+	0.2% (0.2-0.2)	3.4 (3.4-3.4)
Alcohol Use Self-report lifetime risky use (average >2 standard drinks per day in past 12mths), (population prevalence) (National: NHS, 2014-15) Age *15+*	***Total 15+***	**16.7% (15.9-17.5)**	**2.8 (2.5-3.1)**
	0 to 14	NO DATA	
	15 to 19	6.4% (4.0-8.7)	3.0 (1.3-7.0)
	20 to 24	14.4% (11.6-17.2)	2.0 (1.3-3.1)
	25 to 39	16.7% (14.8-18.6)	3.4 (2.8-4.2)
	40 to 59	19.6% (18.2-21.0)	2.6 (2.2-3.1)
	60+	17.1% (15.5-18.6)	2.5 (2.0-3.1)

Appendix 4. Results Tables for Aboriginal and Torres Strait Islander Australians

The following tables show the non-communicable disease outcomes and risk factors for the Indigenous Australian population, disaggregated by age. Rate ratios are reported by sex, with 95% confidence interval shown in parentheses. Asterisk indicates where estimates are unstable (high relative standard error) or there were no participants reporting said outcome/ risk factor. High relative standard error or zero percentages for a single sex occasionally prevented calculating the rate ratio for sex. Where data were unavailable for a specific age group 'NO DATA' is written. If there was no data available for a complete outcome or risk factor, we have not included them in these tables.

Indigenous Australian Estimates - Outcomes

Indicator		**National Indigenous Estimates**	
Neoplasms		**Estimate**	**Male: Female**
Cancer (all) Self-report any cancer (population prevalence, AATSIHS 2012-2013)	***Total***	**1.0% (0.7-1.3)**	**0.7 (0.4-1.3)**
	0 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.0%*	-
	15 to 19	1.0%*	-
	20 to 24	0.2%*	-
	25 to 39	0.6% (0.2-1.1)	0.4 (0.1-1.2)
	40 to 59	2.1% (1.1-3.1)	0.5 (0.2-1.3)
	60+	5.3% (1.9-8.6)	1.3 (0.4-4.1)

Indicator		**National Indigenous Estimates**	
Cardiovascular diseases		**Estimate**	**Male: Female**
Rheumatic Heart Diseases Self-report acute or chronic Rheumatic Heart disease (population prevalence, AATSIHS 2012-2013)	***Total***	**0.9% (0.7-1.2)**	**0.8 (0.5-1.3)**
	0 to 4	0.0%*	-
	5 to 9	0.8% (0.8-0.8)	-
	10 to 14	0.3% (0.3-0.3)	-
	15 to 19	1.1% (0.3-2.0)	0.7 (0.2-2.8)
	20 to 24	1.0% (0.1-2.0)	0.7 (0.3-1.9)
	25 to 39	0.9% (0.4-1.5)	0.3 (0.2-0.7)
	40 to 59	1.7% (0.9-2.5)	1.2 (0.4-3.2)
	60+	1.7% (0.3-3.0)	0.7 (0.4-1.4)
Ischaemic Heart Diseases Self-report Ischaemeic heart disease (population prevalence, AATSIHS 2012-2013)	***Total***	**2.4% (2.0-2.8)**	**1.3 (0.9-1.8)**
	0 to 4	0.0%*	-
	5 to 9	0.3%*	-
	10 to 14	0.0%*	-
	15 to 19	0.0%*	-
	20 to 24	0.4%*	-
	25 to 39	1.0% (0.2-1.8)	-
	40 to 59	7.2% (5.6-8.9)	1.1 (0.7-1.7)
	60+	13.7% (10.2-17.1)	1.7 (1.0-2.8)
Stroke Self-report Stroke (including after-effects of stroke) (population prevalence, AATSIHS 2012-2013)	***Total***	**1.1% (0.8-1.3)**	**0.6 (0.4-1.1)**
	0 to 4	0.0%*	-
	5 to 9	0.0%*	-

	10 to 14	0.0%*	-
	15 to 19	0.0%*	-
	20 to 24	0.0%*	-
	25 to 39	0.7% (0.1-1.3)*	-
	40 to 59	3.1% (2.0-4.2)	0.8 (0.4-1.7)
	60+	5.9% (3.4-8.3)	0.8 (0.3-2.0)

Indicator		**National Indigenous Estimates**	
Mental Disorders		**Estimate**	**Male: Female**
Psychological Distress- Kessler Scale (K5) Self-report high or very high levels of psychological distress (K5 ≥ 12/25) Sample includes age 18 + only (population prevalence, AATSIHS 2012-2013)	***Total 18+***	**29.9% (27.8-31.9)**	**0.7 (0.6-0.8)**
	18 to 24	30.1% (26.3-33.9)	0.5 (0.4-0.7)
	25 to 39	28.8% (25.5-32.0)	0.7 (0.6-0.9)
	40 to 59	32.8% (29.2-36.5)	0.7 (0.6-0.9)
	60+	24.8% (20.4-29.2)	0.6 (0.4-0.9)

Indicator		**National Indigenous Estimates**	
Diabetes, urogenital, blood, and endocrine diseases		**Estimate**	**Male: Female**
Diabetes mellitus Type 1, 2 and unknown combined - Self-reported/ parent reported ever had or have Diabetes (population prevalence, AATSIHS, 2012-13)	***Total***	**7.0% (6.4-7.7)**	**0.7 (0.6-0.8)**
	2 to 4	0.0%*	-
	5 to 9	0.0%*	-
	10 to 14	0.4%*	-
	15 to 19	0.4%*	-
	20 to 24	0.4%*	-
	25 to 39	5.3% (3.9-6.6)	0.6 (0.3-1.0)
	40 to 59	20.1% (17.6-22.5)	0.9 (0.7-1.1)
	60+	35.7% (29.9-41.4)	0.7 (0.6-1.0)
Diabetes mellitus Diabetes mellitus indicated by measured fasting plasma glucose of ≥7.0 (mmol/L) (population prevalence, AATSIHS 2012-13)	***Total 18+***	**3.5% (2.9-4.0)**	**0.9 (0.7-1.3)**
	18 to 24	0.0%*	-
	25 to 39	1.1% (0.6-1.6)	0.6 (0.3-1.6)
	40 to 59	5.8% (4.7-6.9)	1.1 (0.7-1.6)
	60+	12.2% (9.3-15.0)	1.0 (0.7-1.7)

NCD Risk Factors- Indigenous Australian Estimates

Indicator		**National Indigenous Estimates**	
Dietary Risks & Physical Activity		**Estimate**	**Male: Female**
Inadequate Fruit & Veg consumption Daily fruit and vegetable intake does not meet NHMRC 2013 guidelines (population prevalence, AATSIHS 2012-2013)	***Total***	**93.1% (92.4-93.8)**	**1.0 (1.0-1.1)**
	2 to 4	62.3% (58.3-66.3)	1.2 (1.1-1.4)
	5 to 9	89.4% (86.6-92.2)	1.0 (1.0-1.1)
	10 to 14	95.7% (93.8-97.6)	1.0 (1.0-1.1)
	15 to 19	96.7% (95.3-98.1)	1.0 (1.0-1.1)

	20 to 24	98.3% (97.3-99.3)	1.0 (1.0-1.1)
	25 to 39	97.7% (96.2-99.2)	1.0 (1.0-1.1)
	40 to 59	96.6% (95.7-97.5)	1.0 (1.0-1.1)
	60+	92.8% (90.6-95.0)	1.0 (1.0-1.0)
Low physical activity Self-report/ parent proxy, physical activity guideline for age group not met (population prevalence), (Non-regional only: AATSIHS, 2012-13) Age 5-17: reported less activity than 60mins per day for past 7/7 days. Age 18+: reported less activity than 150 minutes of physical activity over 5 or more sessions per week.	***Total 5-17***	**35.3% (30.0-40.5)**	**0.7 (0.5-1.0)**
	Total 18+	**62.1% (58.4-65.8)**	**0.9 (0.8-1.0)**
	2 to 4	NO DATA	
	5 to 9	14.7% (7.8-21.6)	1.1 (0.5-2.9)
	10 to 14	36.1% (27.2-45.1)	0.4 (0.3-0.7)
	15 to 17	67.3% (53.3-81.2)	0.7 (0.5-1.1)
	18 to 24	52.6% (43.3-62.0)	0.7 (0.4-1.0)
	25 to 39	61.0% (54.3-67.7)	0.9 (0.8-1.2)
	40 to 59	66.1% (58.8-73.3)	1.0 (0.8-1.2)
	60+	78.8% (70.8-86.8)	0.9 (0.8-1.2)

Indicator		**National Indigenous Estimates**	
Behavioural		**Estimate**	**Male: Female**
Current Daily Smoker	***Total***	**41.3% (39.5-43.0)**	**1.1 (1.0-1.2)**
Self-report current daily smoker Sample includes age 15 + only (population prevalence, AATSIHS 2012-2013)	*2 to 4*	NO DATA	
	5 to 9	NO DATA	
	10 to 14	NO DATA	
	15 to 19	23.3% (20.0-26.7)	1.2 (0.9-1.7)
	20 to 24	47.5% (43.4-51.6)	1.1 (0.9-1.3)
	25 to 39	51.0% (48.2-53.8)	1.1 (1.0-1.2)
	40 to 59	44.1% (41.1-47.1)	1.1 (1.0-1.2)
	60+	24.9% (21.4-28.4)	1.3 (1.0-1.7)

Indicator		**National Indigenous Estimates**	
Metabolic		**Estimate**	**Male: Female**
Overweight or Obese	***Total <18***	**30.6% (28.3-32.8)**	**0.9 (0.8-1.1)**
Measured overweight or obesity: BMI Centile for <18, equivalent to ≥ 25 kg/m2 in adults; for over 18 years ≥ 25 kg/m2), (population prevalence, AATSIHS 2012 – 13)	***Total 18+***	**68.9% (67.3-70.5)**	**1.0 (0.9-1.0)**
	2 to 4	22.8% (18.5-27.0)	0.6 (0.4-0.9)
	5 to 9	26.9% (23.5-30.2)	0.8 (0.6-1.0)
	10 to 14	37.8% (33.7-41.9)	1.1 (0.8-1.4)
	15 to 17	34.5% (29.1-39.8)	1.1 (0.8-1.5)
	18 to 24	54.9% (50.8-58.9)	0.9 (0.8-1.1)
	25 to 39	67.3% (64.3-70.3)	1.0 (0.9-1.1)
	40 to 59	77.6% (75.5-79.7)	1.0 (0.9-1.0)
	60+	79.3% (75.2-83.4)	0.9 (0.9-1.0)

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