SoPI 2018 – 19 Supplementary Paper II

Chronic Disease Risk Factors

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Tasmanian
Government

Contents

1. Abstract

The objective of the State's public sector health system is to deliver safe, high quality services to improve, promote, protect and maintain the health of Tasmanians[1]. This objective supports the vision for Tasmania to have the healthiest population in Australia by 2025.

This Supplementary Chronic Disease Risk Factors Research and Discussion Paper outlines current evidence on health risk factors and burden of chronic disease across Tasmania including Local Government Areas (LGAs).

This paper will guide further burden of disease research and support service co-ordination initiatives that could be purchased in future *Statement of Purchaser Intent* (SoPI) and Service Agreement (SA) cycles.

The intended audience of this paper is both Department of Health and Human Services (DHHS) and Tasmanian Health Service (THS) service planners.

The SoPI acts as a bridge between the Strategic Priorities of the Health System and the transactional activity of purchasing. The strategic intent behind this is to create a common language between the DHHS as purchaser, the Government as funder, clinicians as service providers and the Tasmanian community as users.

The *SoPI for 2017-18* identifies risk factors and chronic conditions as a future priority to review and develop purchasing intentions and activity.

Developing a sound evidence base is consistent with the DHHS *One Health System* 2015 White Paper Reform purchasing principles and is one of the key enablers to support shifting service provision, where appropriate, away from acute services towards health promoting and community based care services.

> The papers preliminary findings are that chronic disease is prevalent across Tasmania with remote communities having the greatest burden of disease and associated biomedical and behavioural risk factors. The paper supports a population-based approach to purchasing, where service co-ordination and resources are directed to the patients with greatest need in their local regions and LGAs.

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[1] As reflected in the *Tasmanian Health Organisations Act 2011 (section 3).*

2. Introduction

As part of the Strategic Purchasing Framework, a rolling 5 year *Statement of Purchaser's Intent* (SoPI) is developed by Department of Health and Human Services (DHHS) Planning Purchasing and Performance (PPP) to plan and purchase health services. Each year, the SoPI will widen the focus of purchasing intent from acute care to anticipatory and preventative care in the community and private sectors to reduce the overall burden of chronic disease in Tasmania.

As part of this development, this paper summarises and references current national and Tasmanian burden of disease data. In particular the research focuses on the links between health risk factors and the prevalence of chronic disease. The paper includes national evidence to the prevalence of chronic disease, all hospital chronic disease admission data and available risk factor data by Tasmanian Local Government Area (LGA).

The use of information and data on health impacts and distribution of different risk factors, diseases and injuries is crucial in providing an evidence base to inform health policy, program and service delivery. In turn, this helps to ensure health resources are directed towards services that are cost-effective, equitable and optimise the health of Tasmanians.

Continuity of care across the health system is important for patients, their families and carers, and health care providers. It is increasingly recognised that community engagement in health prevention can also be highly influential in improving the overall health of communities and, by extension, the individuals within those communities.

The DHHS has a responsibility to contribute to keeping Tasmanians healthy and out of hospital. In part, this is achieved through configuring the health system to provide better access to quality health care appropriate to individual needs, and fostering partnerships between the Tasmanian Health Service (THS) and service providers (Departmental, non-government and private sector). Partnering between General Practitioners (GPs) and other clinical providers is key to the sustainability and effective operation of both the primary and acute care sectors.

This early research and discussion has been grounded by a consultation mapping trip where the Acute Strategy (AS), PPP visited all Tasmanian rural inpatient facilities and most community health centres to better understand the people who use these services and their health needs.

The activities that occur in the primary and community sectors impact upon the kinds and levels of demand experienced by the acute sector, and it is therefore important to understand and measure the needs of the community so that we can purchase the most appropriate services for the greatest positive effect.

It should be noted that Tasmania is in the early stages of activity data collection for most primary care and community-based services. PPP will need to build a greater knowledge of service activity, cost and quality data to inform a robust SoPI purchasing model.

As the SoPI modelling matures service type level data and networked population data will be required to compliment the tools of the purchasing function (e.g. DHHS Purchasing Framework, DHHS/THS Service Agreement and Tasmanian Role Delineation Framework (TRDF) and Clinical Services Profile (CSP).

3. DHHS Principles and Strategic Priorities

The DHHS will work in accordance with the vision, principles and strategic priorities outlined in the *'DHHS Corporate Plan 2016-18'* to keep Tasmanians safe, healthy and well.

The Tasmanian Health System Purchasing Framework (see Figure 1) outlines the Purchaser Principles to support the DHHS to guide health service planning and delivery in Tasmania that:

- **targets the health needs of Tasmanians** by:

    o   focusing on the broader health burden across the State

    o   supporting the Tasmanian community to become healthier and focusing on promoting healthy habits and behaviours and improved health literacy, and

    o   reducing avoidable hospitalisations to improve patient outcomes.

- **supports access to quality care** through:

    o   purchasing services that meet the needs of Tasmanians at the right time and are delivered as close to home as safely and sustainably practicable

    o   ensuring agreed standards are met and minimum service volumes are maintained, and

    o   putting in place measures that ensure Tasmanians are obtaining value for money from service Providers.

- **prioritises access to care that is fair and affordable** by:

    o   ensuring that care is delivered at a location that meets the needs of most people in a reasonable manner

    o   providing holistic, evidence-based health services that deliver the best patient outcomes at affordable costs

    o   strengthening the safety and efficiency of delivered clinical services through an agreed role delineation framework, and

    o   fostering and enhancing high value-for-money improvements and innovations.

- **new innovative and affordable models of care are supported**, which are:

    o   innovative and flexible enough to adapt to changing circumstances and to meet new challenges, and

    o   clinically integrated and coordinated for better care.

Figure 1: Tasmanian Health System Purchasing Framework

DHHS Vision

To deliver services, policies, programs and legislation that improve the health, safety and wellbeing of Tasmanians.

DHHS Principles

Client and Community Focus	Effective Governance	Strategic Collaboration	Intelligent Decision-making	Leadership and Culture

DHHS Strategic Priorities

Healthy and safe Tasmanians

- Strengthen preventative health activities
- Reduce avoidable hospitalisations
- Provide better access to palliative care for Tasmanians

Well Governed Systems

- Fulfil the system manager role
- Ensure cost effectiveness of preventative health programs

Integrated Services

- Building a joined up human service support system
- Deliver community care reform
- Completing *One State* health system reforms
- Responding better to the needs of complex clients

Evidence based Services

- Monitoring public health in Tasmania
- Building health intelligence capacity

Engaged Workforce

- Analysing and planning workforce needs
- Creating an engaged and skilled workforce

Purchaser Principles

- Targets the Health needs of Tasmania
- Access to quality care
- Prioritisation of access is fair and affordable
- New affordable and innovative models of care are supported

4. Burden of Disease

Burden of disease is the measured impact of a health problem including chronic diseases. The term chronic disease applies to conditions that last a year or more and require ongoing medical attention and/or limit activities of daily living[2]. This is opposed to acute diseases, which have a quick onset and are often brief, intense and/or severe.

Burden of disease is measured by examining the financial cost incurred to the health system and the patient, the rate of mortality and morbidity, or other indicators. It is often quantified in terms of quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs), both of which quantify the number of years lost due to disease (YLDs)[3]. This impact can be broadly divided into non-fatal (living with a disease) and fatal (dying from a disease).

Burden of disease analysis enables comparison of the impact of different diseases, conditions or injuries at a population level. Information on the impact of various risk factors (such as smoking, physical inactivity or high blood pressure) on the health of the population can be used to measure the proportion of the burden of disease due to these risk factors. Burden of disease studies are useful for informing health policy and service planning[4].

In 2011, chronic diseases contributed to 4.5 million years lost to premature death or living with illness in Australia. As depicted in Figure 2, 66 per cent of the total burden of disease was due to:

- cancer,
- cardiovascular diseases,
- mental & substance use disorders,
- musculoskeletal conditions and
- injuries.

Figure 2: Burden of disease, by disease group and sex, 2011[5]

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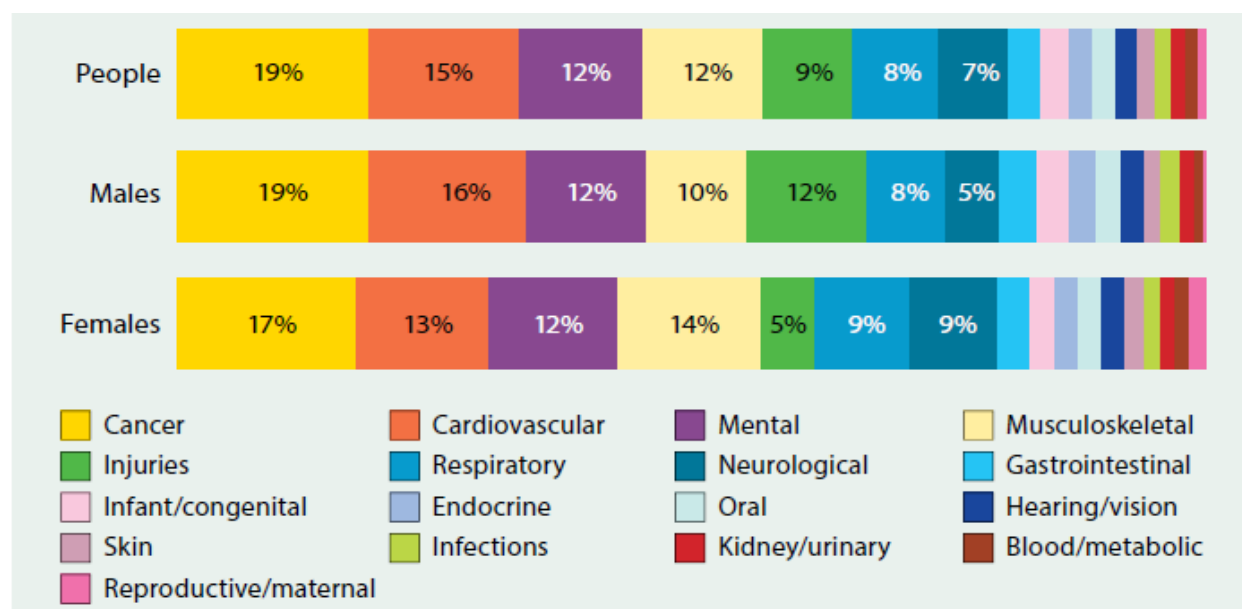
[2] Hwang et al (2001) Out-Of-Pocket medical spending For Care of Chronic Conditions, Health Affairs

[3] Australian Institute of Health and Welfare (2011) *Australian Burden of Disease Study- Impact and causes of illness and deaths in Australia 2011*

[4] Ibid

[5] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief,* page 59 (source Australian Burden of Disease Study 2011; Table S3.1.2)

4.1 Burden of disease and risk factors

Risk factors (discussed in more detail in section 5) affect health with varied levels of severity, and measuring this can be quite complex. Burden of disease studies attempt to quantify the impact of selected risk factors (individually and in combination) on individual and population health.

Table 1 shows the top five risk factors (tobacco use, dietary risks, high body mass, high alcohol use, physical inactivity and high blood pressure) and the associated proportion of total burden attributed to them. This 2011 AIHW data indicates smoking is attributable for the greatest disease burden in Australia or 9 per cent of the total burden. Then the joint effects of all dietary risk factors are attributable for 7.2 per cent of the total burden. Obesity (high body mass), high alcohol use, physical inactivity and high blood pressure contribute to a similar total burden of around 5 per cent.

Table 1: Proportion of total burden, and burden of selected disease groups, attributable to the leading risk factors causing the most burden, 2011[6]

Disease group	Tobacco use	High body mass	Alcohol use	Physical inactivity	High blood pressure	Dietary risks (joint effect)[a]
Proportion of total burden						
All diseases	9.0	5.5	5.1	5.0	4.9	7.2
Proportion of disease group burden						
Cancer	22.0	4.5	3.3	6.4	..	7.0
Cardiovascular	12.0	21.0	4.8	21.0	32.0	35.0
Mental	..	..	12.0	..	..	..
Injuries	..	..	21.0	..	..	..
Respiratory	36.0	..	..	..	..	..
Endocrine	3.5	49.0	2.0	30.0	..	32.7
Kidney/urinary	..	28.0	..	..	22.0	..

(a) Estimates for diet are based on an analysis of the joint effects of all dietary risk factors included in the study following methods used in recent global burden of disease studies.

Note: Blank cells '..' indicate that the risk factor has no associated diseases or injuries in the disease group.

Table 1 also shows the proportion of disease group burden attributed to the leading risk factors. It is apparent there is strong correlation between:

- high body mass and endocrine disease (49% the highest proportion)
- tobacco use and respiratory disease (36%)
- dietary risks and cardiovascular disease (35%)
- dietary risks and endocrine disease (32.7%)
- high blood pressure and cardiovascular disease (32%)
- physical inactivity and endocrine disease (30%)

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[6] Ibid

Risk factors carry different levels of burden and the benefits of reducing them vary for individuals and the community. For example, a person who increases their physical activity may not derive as much of an overall health benefit as someone who gives up smoking or high alcohol use.

For people who have specific chronic disease/s or susceptibility to a specific disease/s it means that there is a benefit in targeting a reduction in health risk factors that impact on the greatest burden of their disease/s.

The Report on the Tasmanian Population Health Survey 2016

"Key Findings" from the 2016 TPHS when compared to the 2013 & 2009 surveys:

- **There has been limited progress towards healthier lifestyles measured against indicators of key risk factors, including the metabolic risk factor of obesity.**

- **There was a substantive increase in some chronic conditions, particularly diabetes, eye diseases and depression/anxiety.**

- **Preventative chronic disease screening rates for bowel cancer and chronic disease management including a rise in asthma plans, recorded a small, but significant, improvement.**

4.1.1   Risk Factors over a life span

The burden of disease changes throughout our lives. The various life stages between childhood and death are accompanied by different health challenges.

Table 2 shows the leading causes of fatal, non-fatal and total burden of disease for Australian males and females, from infancy to older age groups[7].

Table 2: Leading causes of fatal, non-fatal and total burden of disease in Australia for males[8]

Males	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
Leading cause of fatal burden	Pre-term/low birthweight complications	Road traffic injuries/ accidents	Suicide	Suicide	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease
Leading cause of non-fatal burden	Asthma	Asthma	Alcohol use disorders	Back pain	Other musculo-skeletal conditions	Chronic obstructive pulmonary disease	Coronary heart disease	Dementia
Leading cause of total burden	Pre-term/low birthweight complications	Asthma	Suicide/ intentional self-harm	Suicide/ intentional self-harm	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease

The leading cause of total burden of disease for adult men aged between 15 to 44 is suicide/intentional self-harm while for older male's (45 to 85+) it is coronary heart disease.

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[7] Shows the top-ranked conditions only

[8] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief,* page 9

As evidenced in Table 1, coronary heart disease (CVD) is directly associated with six preventable health risk factors. The direct association between depression/anxiety/suicide and intentional self-harm and preventable health risk factors is more complex.

When combined with health determinants like low socio-economic status, remote location, health behaviours and safety factors, chronic disease and risk factors are inseparable.

Table 2: Leading causes of fatal, non-fatal and total burden of disease in Australia for females[9]

Females	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
Leading cause of fatal burden	Birth trauma/ asphyxia	Brain/ central nervous system cancer	Suicide	Suicide	Breast cancer	Lung cancer	Coronary heart disease	Coronary heart disease
Leading cause of non-fatal burden	Other mental disorders	Anxiety disorders	Anxiety disorders	Anxiety disorders	Other musculo-skeletal conditions	Other musculo-skeletal conditions	Dementia	Dementia
Leading cause of total burden	Birth trauma/ asphyxia	Anxiety disorders	Anxiety disorders	Anxiety disorders	Other musculo-skeletal conditions	Coronary heart disease	Coronary heart disease	Dementia

The leading cause of total burden of disease for adult women aged between15 to 44 is anxiety disorders while for older female's (45 to 85+) the leading causes are other musculoskeletal conditions, coronary heart disease and dementia.

The anxiety disorders experienced by women between the ages of 5 to 44 profoundly impact their health and well-being in later life.

Understanding the similarities and differences in chronic diseases, injuries and risk factor associated with chronic diseases between males and females at different life stages are critical for health planning. There are risk factors, other than those referenced that can affect the development or management of chronic disease, for example, impaired glucose regulation[10] or sun protection behaviours.

In Tasmania the dispersed population, ageing population, lower levels of education and employment and low socio-economic status has a significant impact on Tasmanians health outcomes and access to health services. However, the rate of disease burden across the lifespan (Graph 1) in Tasmania does not differ materially from the rest of the country, with the exception of the Northern Territory:

Graph 1: Rate of Disease Burden across lifespan

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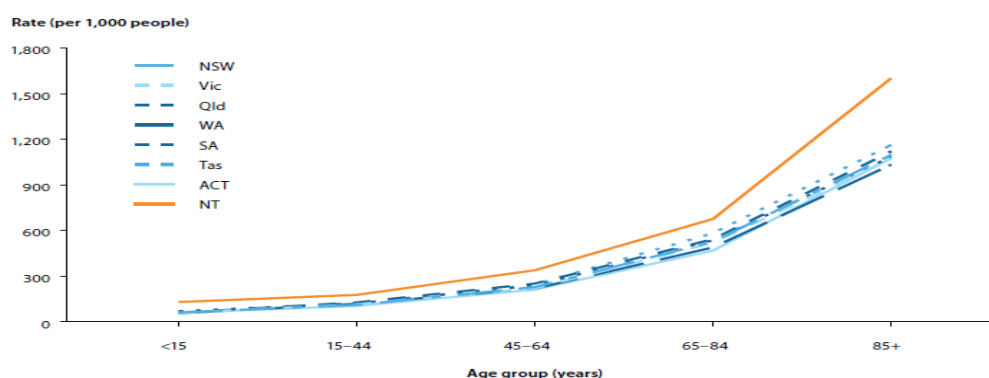
[9] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief,* page 9

[10] Where blood glucose is raised beyond normal levels it increases a person's chance of developing diabetes and cardiovascular disease.

The total burden for Tasmania across the life span, with the Fatal / Non-Fatal disease burden separated, is shown below in Graph 2.

Graph 2: Total Burden of Fatal & Non-Fatal Disease across lifespan
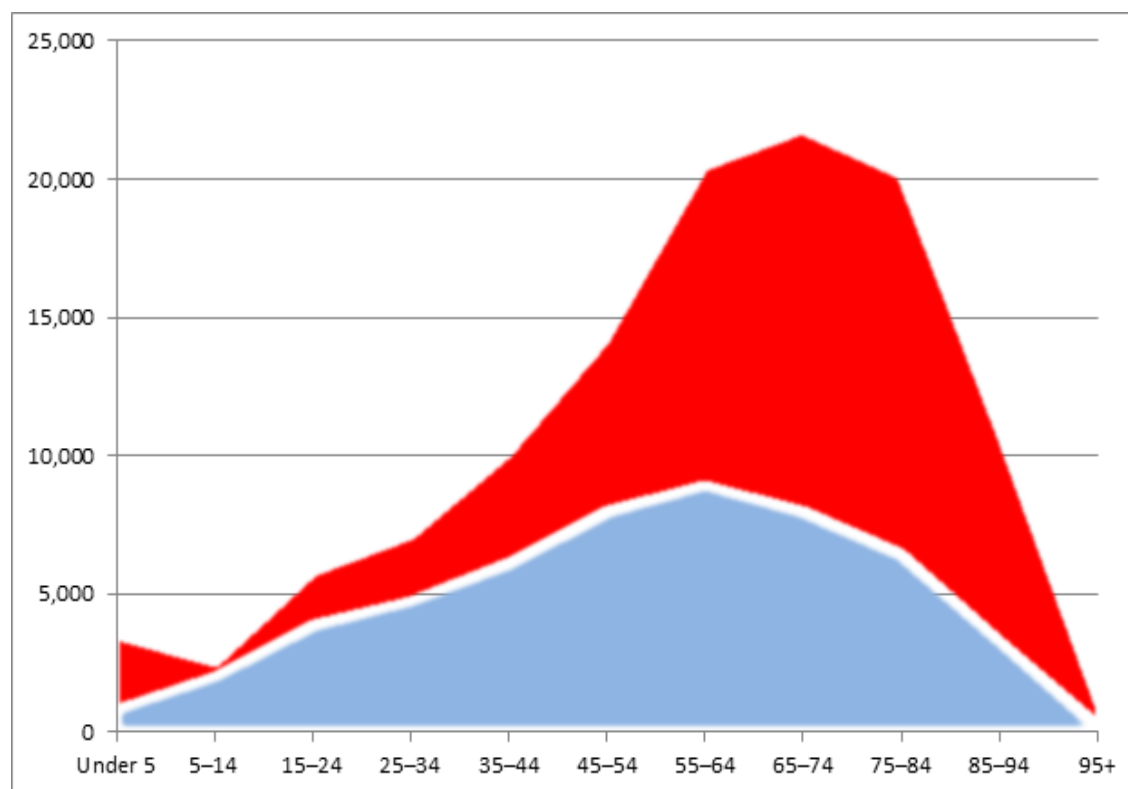
Graph 2 shows that for Tasmania the Non-Fatal burden increases significantly at the start of the working age (approximately 15-24) and peaks at the end of this period when people are close to or at retirement age (approximately 65). The Fatal Burden also peaks around retirement age.

4.1.2   Chronic conditions increase with age

Compared to Australia, Tasmania has a higher proportion of people over the age of 45 years, and a smaller proportion of younger people than nationally. Tasmania also has the oldest population nationally. In 2016 Tasmania's median age was 42 compared with the national figure of 38[11] .

The proportion of Tasmanians aged 65 years and over is expected to grow from around 19.5 per cent in 2016 to 27 per cent by 2056[12].   This shift has profound implications for the health care system, a number of which are already being experienced -Tasmania's age-standardised mortality rates for cancer, diabetes mellitus, ischaemic heart disease, strokes and intentional self-harm are the highest nationally.

Further, with an ageing population and people living longer, cancers are becoming more prevalent and are now overtaking all other conditions as a leading cause of disease burden.   In Tasmania this translates to a significantly greater health care burden for the community than is generally appreciated.

The DHHS *State of Public Health 2013 Report* identifies that Tasmania's ageing demographic means it is indeed the bellwether state for other jurisdictions, which will face similar issues over time. The opportunity is there for the Tasmanian community to develop new ways of working to manage this transition.

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[11] Australian Bureau of Statistics (2016) Census Website, viewed 19 July, 2017,
http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/6?opendocumen
[12] Ibid

The DHHS *Health Indicators Tasmania 2013 Report* highlighted the health status of the population aged 60 years and over to reflect its significant impact on the general health and health care use of the total population. The Reports findings included:

- Chronic conditions and/or low socio-economic status are known to result in reduced physical activity levels. Both chronic conditions and low socio-economic status are much more common in the 60 years and over group, particularly affecting those on aged pensions.

- There is a strong statistical association between the number of chronic conditions, financial status and self-assessed health. Of those 60 years and over who were financially insecure, 53.8% reported having three or more chronic conditions, compared to only 34.8% of those reporting financial security. These differences were statistically significant.

- That arthritis was the most frequently reported diagnosed chronic health condition by Tasmanians aged 60 years, with more than one in two Tasmanians reporting being diagnosed with arthritis. The second most common condition was cataracts (28.6%) followed by depression/anxiety (19.1%). Asthma was reported by 17.1per cent of that 60 and over age group with 13.8 per cent reported being diagnosed with diabetes.

- At a total population level across the lifespan, those with excess body weight report significantly less physical activity than their normal weight counterparts. This adverse outcome impacts on a greater percentage of people in the older age group, with close to 40 per cent reporting being sedentary or insufficiently active to achieve a health benefit.

- Excess body weight has an adverse impact on the management of all these chronic conditions and limits the ability of older people to achieve sufficient physical activity to gain a health benefit and improve their quality of life. A significant proportion of people aged 60 years with diabetes or hypertension, are overweight or obese.

4.1.3   Chronic Disease Indicator Framework

The Chronic Disease Indicator Framework[13], illustrated in Figure 3, identifies six core domains into which health indicators can be grouped across a person's life course: social and environmental determinants (in green), early life/childhood risk and protective factors (in blue), behavioural risk and protective factors (in orange), risk conditions (in yellow), disease prevention practices (secondary prevention) (in olive) and health outcomes/status (in grey). As depicted this approach commences from birth through to the end of life.

This Framework allows service providers and decision makers to:

- identify key areas on which to focus preventative measures and develop health policies and strategies
- increase public and stakeholder understanding of the health of the population and the factors that affect it. Tasmania has an opportunity to use a similar approach to focus on health prevention and take into account risk and biological factors as well as the broader determinants of health when purchasing services. This approach moves beyond single disease reporting and includes the impact of multimorbidity. That impact should factor in decreased quality of life, increased health care costs, disability and premature mortality. This framework provides an aspirational model for the inclusion of iterative risk factors, chronic disease and multimorbidity indicators into the SoPI.

Figure 3: Chronic Disease Indicator Framework

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[13] Betancourt at el (2014), *Monitoring chronic diseases in Canada; the Chronic Disease Indicator Framework,* Chronic Dis Inj Can, Suppl 1:1-30, pages 2-3
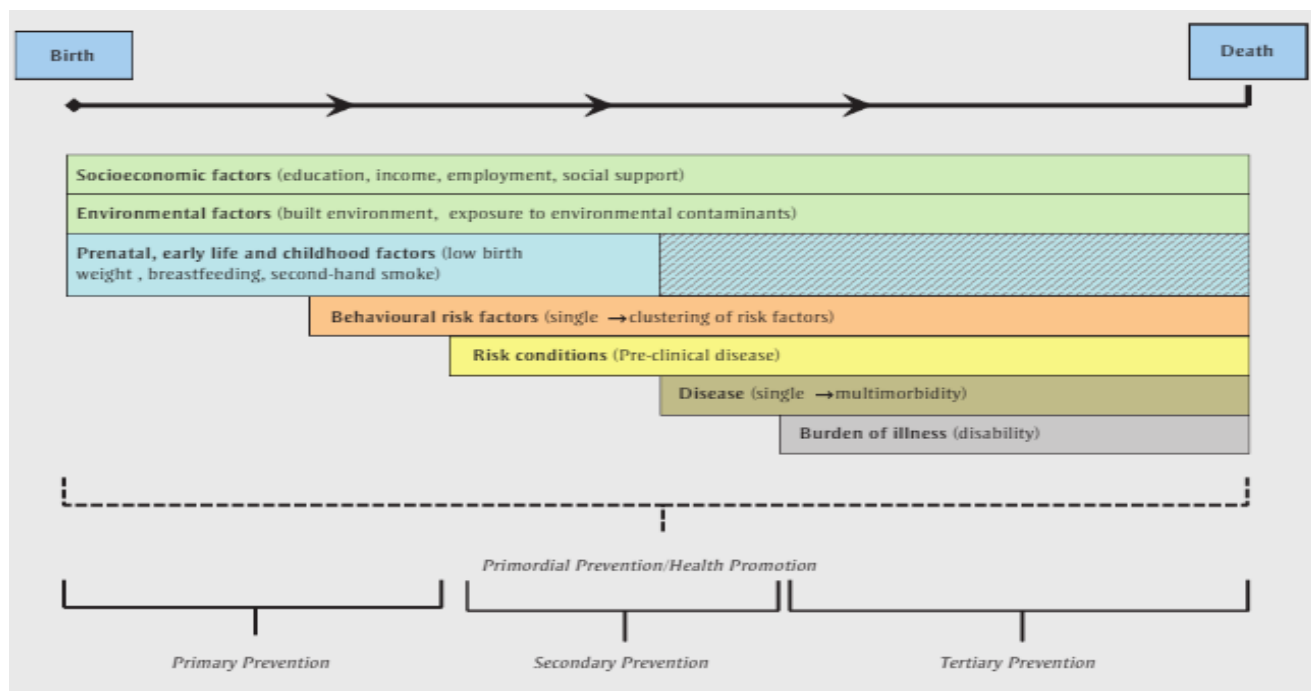
At this time the Tasmanian context demands a simplified framework with a set of limited indicators and supporting data[14] .

4.2   Multimorbidity

Multimorbidity is defined as the co-existence in one patient (person) of two or more concurrent chronic conditions (e.g. diseases, risk factors, or symptoms)[15]. This includes any combination of diseases or conditions. Comorbidity is commonly defined as more than one illness (health condition) or disease occurring in one person at the same time[16]. In this paper comorbidity specifically refers to the chronic conditions that co-occur with a reference disease.

While the existence of multimorbidity may be unrelated, in many instances and particularly in relation to chronic diseases, there is some association between them, referred to as co-morbidity.

Further, a range of chronic diseases share the same risk factors. The rate of multimorbidity and co-morbidity increases with age. Understanding more about concurrent chronic conditions can provide vital information for prevention, management and treatment of chronic diseases[17].

- High rates of lifestyle-related risk factors contribute to **Tasmania** having among the highest percentage of multimorbid and comorbid patients

- In 2016, 21.5 per cent of **Tasmanians** had three or more chronic diseases, increasing from 19.2 per cent in 2013 and 16.3 per cent in 2009[18]

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[14] The Framework has 283 indicator measures.

[15] Willadsen et al (2016) *The role of diseases, risk factors and symptoms in the definition of multi-morbidity, page 1*

[16] Mc George S, (2012) British Geriatrics Society Morbidity, Practice Questions NOP, website

[17] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief*, page 76

[18] DHHS *Report on the Tasmanian Population Health Survey 2016*

In Australia, the most common co- morbidity combination is arthritis with cardiovascular disease (32%). Arthritis and back pain (17%) is the second and back pain and CVD (16%) is the third most common co- morbidities.

Table 3: Most common co-morbidities of selected chronic diseases, by age, 2014-15[19]

Source: ABS 2015 (Table 19.1).
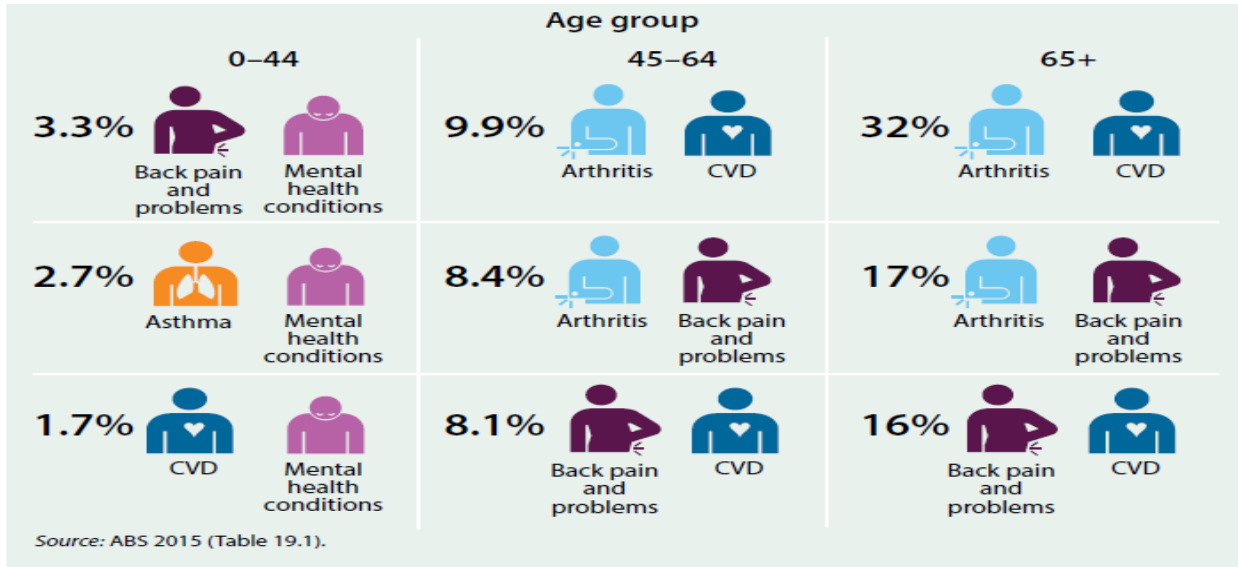
Figure 4: Groups at higher risk of having multiple chronic diseases

Overall, 1 in 4 (23%) Australians—5.3 million people—had two or more of the eight selected chronic diseases in 2014–15. The rate was higher for:

- People aged 65 and over (60%) compared with people aged 0–44 (9.7%).
- Females (25%) compared with males (21%).
- People living in the lowest socioeconomic areas (30%) compared with the highest socioeconomic areas (19%).
- People living in *Regional* and *Remote* areas (28%) compared with *Major cities* (21%).

Some chronic diseases may act as a precursor or as a risk factor for other chronic diseases. For example, having diabetes is known to be a risk factor for developing cardiovascular disease[20] and people with asthma are at greater risk of developing Chronic Obstructive Pulmonary Disease (COPD) later in life.

Other chronic diseases affect similar parts of the body and may manifest as multimorbidity. For example, both arthritis and back pain and problems cause pain in muscles, bones and joints[21]. This is also confirmed in the AIHW Figure 5 below identifying the most common co-morbidities.

- 5.1 % of Australians or 1.2 million people report having both arthritis and back pain problems
- 3.2 % of Australians or 742,000 people report having both cardiovascular disease and diabetes
- 1.1% of Australians or 250,000 people report having both asthma and COPD.

Figure 5: Common comorbidities of the eight selected chronic diseases by broader body system groupings include:

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[19] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief*, page 78

[20] AIHW – Australia's health 2016

[21] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief*, page 79

Vascular diseases
742,000 people (3.2%) reported having both cardiovascular disease and diabetes.

| Cardiovascular disease 18% | both 3.2% | Diabetes 5.1% |

Musculoskeletal conditions
1.2 million people (5.1%) reported having both arthritis and back pain and problems.

| Arthritis 15% | both 5.1% | Back pain and problems 16% |

Chronic respiratory conditions
250,000 people (1.1%) reported having both asthma and COPD.

| Asthma 11% | both 1.1% | COPD 2.6% |

Multimorbidity creates special challenges for health systems and the delivery of health care. Patients with multimorbidity and complex healthcare needs often receive care that is fragmented, incomplete, inefficient and ineffective[22]. Multimorbidity is an issue that will require planning with a view to specific purchasing actions in the near future. Please refer to the DHHS PPP-AS SoPI 2018-19 Supplementary Paper III "*Multimorbidity Method Paper*" for more detailed data.

4.3   Hospitalisations

People with chronic conditions are more likely to experience episodes of hospitalisation due to complications and ineffective management of their conditions.

In 2011there were approximately 191,449 hospitals admissions to Tasmanian hospitals. The number of patients being treated in both public and private hospitals each year continues to rise[23].

A significant number of hospitalisations occur in persons aged 65 years and over. In this age group, all-cause hospitalisations have increased by a total of 13,946 hospitalisations in males (58%) and 9,770 hospitalisations (42%) in females between 2002 and 2011[24].

4.3.1 Tasmanian Chronic Disease Hospitalisation

Tasmanian hospitalisation data was analysed for the following chronic conditions to support the 2017-18 SoPI chronic disease purchasing priorities (refer to section 4.5):

- Cardiovascular disease
- Respiratory disease
- Stroke
- Dementia
- Cancer
- Diabetes
- Musculoskeletal conditions
- Mental Health disorders
- Alcohol attributable separations[25].

The data analysed is sourced from the DHHS Epidemiology Unit data derived from ICD10 mapped codes between 2011- 2015 public and private hospital separation data. The data is provided at the Local Government Area (LGA) level[26] and presents the 12 LGAs with the highest hospital separation rate for the selected conditions.

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[22] Boyd & Fortin 2010– Future of Multimorbidity Research, page 457

[23] DHHS State of Public Health 201, page 8

[24] PHT 2014 Primary Health Indicators Tasmania Report , page 10

[25] Unpublished DHHS Epidemiology Unit data derived from ICD10 mapped public and private hospital separation data (including public and private hospitals) and cancer data is the latest available at the time of data analyses.

Refer to Appendix B for tables providing a breakdown of the 12 LGAs with the highest average annual rate of hospital separations for each of the selected chronic condition. Chronic disease separation data for all LGAs is available on request.

By LGA, the analysis of chronic disease hospital separations shows that in general:

- Many of the LGAs that have high rates of hospital separations for respiratory, cardiovascular and cerebrovascular disease (stroke – links to neurological and cardiovascular disease) are located in North and North-West Tasmania.

- High diabetes hospital separation rates are found remote, rural and urban LGAs. Glenorchy, Flinders Island, Southern Highlands and Brighton recorded the highest separations. With exception of West Coast and Break O Day, the other six LGAs are centred in the South.

- The highest musculoskeletal separation rates were clustered in four adjacent LGAs: Sorell, Tasman, Glamorgan Spring Bay and Clarence. Tasman and Glamorgan Spring Bay have a significantly higher than average median age of 55 while Sorell and Clarence have a median age closer to the Tasmanian median age of 42. With the exception of Flinders Island, all of the other top LGAs for musculoskeletal separations are centred in the South and share physical boundaries with each other.

- Sorell, Glenorchy, Hobart and Clarence have the highest hospital separations due to mental disorders and alcohol. This pattern is consistent with the higher prevalence rate observed for depression and anxiety in Southern Tasmania as shown in Table 4 (refer to section 4.6.1).

The following findings were also observed by specific LGA:

- Flinders Island has the highest rates of hospitalisation for cardiovascular disease and dementia. Overall Flinders has the highest crude rate of hospital separation for the selected combined chronic conditions out of all the LGAs (ranking as either number one or two for six out of the ten chronic conditions).

- King Island has the high hospital separations for respiratory, cardiovascular and neurological diseases.

  o This data is important given the gaps in the chronic disease risk factor and prevalence data for both Flinders and King Islands.

- Break O Day has the high rates of admissions for respiratory, cardiovascular and cerebrovascular disease.

- With the exception of the neurological diseases, Derwent Valley features in six of the eight chronic disease hospital separation tables.

- Brighton, Huon Valley and Tasman had a high rate of chronic disease featuring in five out of the ten tables.

- Glamorgan/Spring bay with its ageing population also has higher rates of chronic disease and is in five tables.

Hospital separation data for cancers was not included in this epidemiology data.

4.3.1.1 Cancer Incidence rate by LGA

Incidence refers to the number of people who develop a specific disease or experience a specific health-related event during a particular time period (such as a month or year).

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[26] The data has been aggregated over five years to calculate the average annual rates to reduce the effect of random fluctuations by single years.

Thus, **incidence** conveys information about the risk of contracting the disease, whereas **prevalence** indicates how widespread the disease is.

DHHS Epidemiology Unit data 2010 - 2014 incidence rate data by LGA for 'all cancers' showed that Glamorgan/Spring Bay had the highest crude incidence rate of cancer by a significant margin (1082.9 per 100,000) followed by Flinders Island (907.3) and Break O Day (888.0) (for further details refer to Appendix C).

Within a number of the LGAs there are pockets of outlying rates of specific cancer prevalence. For example:

- Flinders Island has a much high rate of prostate cancer and lung cancer than the other 11 top placed LGAs.

- Break O Day has a much higher rate for melanoma than the other LGAs.

- King Island and Tasman have almost double the rate of Lymphoma compared to the other top 10 placed LGAs.

Individual cancer incidence data including separations for prostate, colorectal, lung, and breast cancers and melanoma and lymphomas by LGA is available on request.

4.3.1.2   LGAs with lower than expected chronic disease hospital separations

Based on remoteness and risk factor estimate data and chronic disease prevalence survey data it might be expected that the LGAs of West Coast, George Town, Circular Head, Southern Midlands and Central Highlands would have higher rates of chronic disease hospital separations than indicated in this epidemiology data.

These LGAs may be an example of the 'inverse care law'. This principle, proposed by British GP and researcher Julian Tudor Hart in 1971[27], describes how those who need medical care the most are least likely to receive it. There is considerable evidence that many populations, particularly those living in low socio-economic areas, suffer on three counts: they use poor quality services (due to affordability), to which they have relative difficulty securing access and they suffer multiple socio-economic disadvantage.

Exposure to market forces and the challenges of retaining appropriate health workforce capacity [28] in Tasmanian regional, remote and very remote communities may amplify the effects of the 'inverse care law'.

4.3.2   Potentially Preventable Hospitalisations

Potentially Preventable Hospitalisations (PPHs) are those conditions where hospitalisation is thought to be avoidable if timely and adequate non-hospital care had been provided.

Over the period 2010-11, Tasmania's rate for total PPHs was the second lowest of all states and territories at 20.2 per 1,000 people. Low separation rates for PPHs in Tasmania are mainly due to the coding change for diabetes complications, and partially as a result of low hospital admissions experienced by Tasmanian residents.

The below figures highlight that nationally:

- PPHs increase with remoteness – this is due to chronic conditions not being managed effectively to prevent complications resulting in an avoidable hospitalisation, and

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[27] Julian Tudor Hart (1971) *The Inverse Care Law* - The Lancet, Volume 297, Issue 7696, *Pages 405-412*
[28]   Kings Fund (2017) Website : Inverse care law

- people living in very remote areas had the highest rates of PPHs potentially for chronic and acute conditions.

Figure 5: Potentially preventable hospitalisations by remoteness area of usual residence, all hospitals, 2014-15[29]

Potentially preventable hospitalisations by remoteness area of usual residence, all hospitals, 2014–15
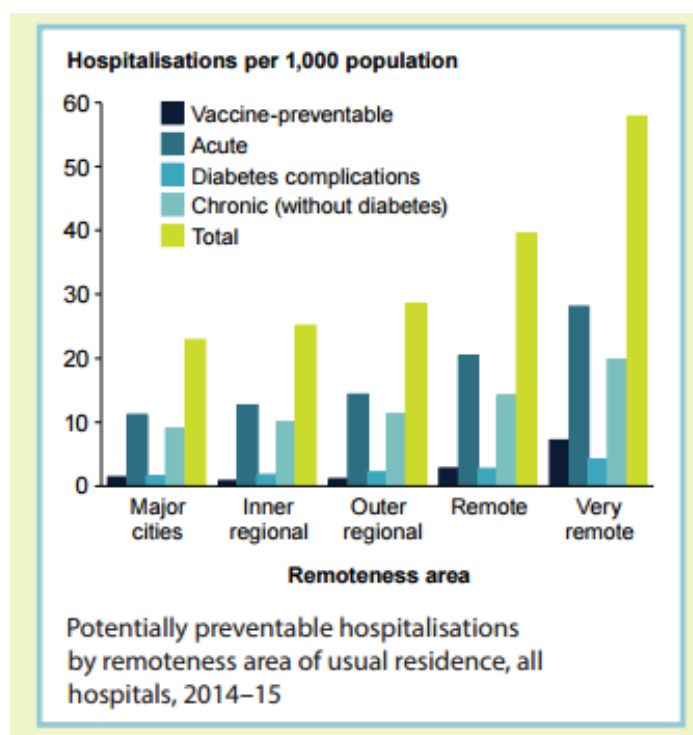
Nationally, chronic conditions accounted for 48 per cent of selected PPH, with diabetes accounting for the 13% or the largest share of PPHs. Chronic conditions accounted for 51 per cent (5,800) of the selected PPHs in Tasmania.

During 2010 -11 across all Tasmanian hospitals, there were 11,399 PPHs. COPD accounted for the largest share of Tasmanian PPHs at 14%. Acute conditions accounted for 48 per cent (5,423), and vaccine preventable conditions accounted for 2per cent (213) of the total PPHs in Tasmania over this period.'[30]

In Tasmania, waiting for residential aged care is also a strong antecedent for PPH's. Nationally, in 2014-15, ten out of every 1,000 patient days (1%) reported were for patients waiting for a residential aged care place with the highest rate reported for patients living in remote areas and those living in the two most disadvantaged socioeconomic status groups[31]. Regional and remote areas like the East Coast of Tasmania have a proportionally older population who live a considerable distance from Tasmania's two major tertiary hospitals and specialist care.

4.4 SoPI 2018-19 Chronic Disease Priorities

The SoPI 2018-19 purchasing priorities focus and analysis was undertaken to understand the relative contribution of the diseases that contributed to 80 per cent of the burden in Tasmania for both Fatal and Non-Fatal burdens. The analysis identified the following groupings of health diseases as priorities:

Figure 6: SoPI 2018-19 Chronic Disease Burden Conditions

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[29] Australian Institute of Health and Welfare (2016) *Australia's hospitals at a glance* 2014-15, Figure 27

[30] Medicare Local Tasmania (2014) *Primary Health Indicators Tasmania Report*; Volume 6, Issue 1, August 2014

[31] Australian Institute of Health and Welfare (2016) *Australia's hospitals at a glance* 2014-15
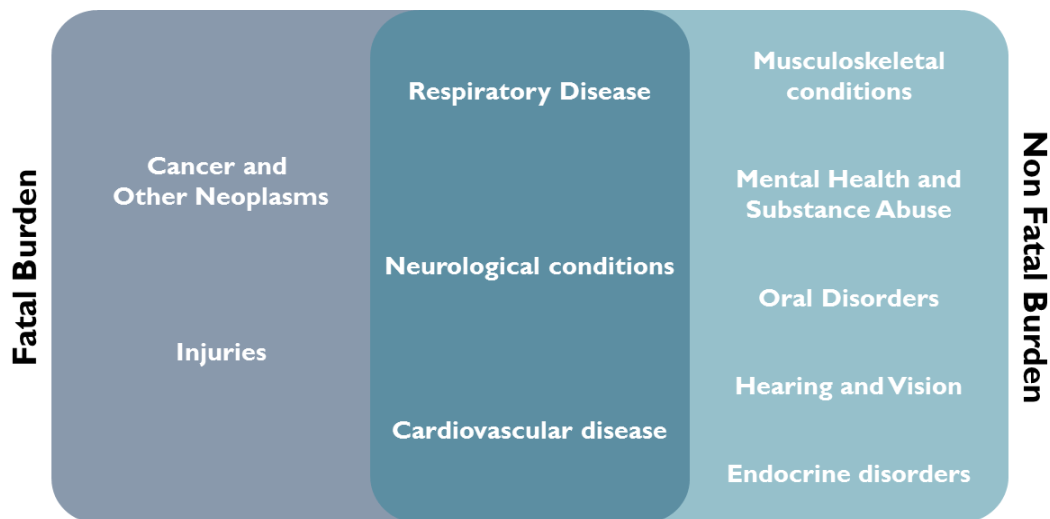
Of the above diseases identified, respiratory diseases, neurological conditions and cardiovascular disease contributed significantly to both Fatal and Non-Fatal burdens of disease.

Figure 7: Tasmanian Non-Fatal Burden of Disease for Chronic Disease Priorities[32]
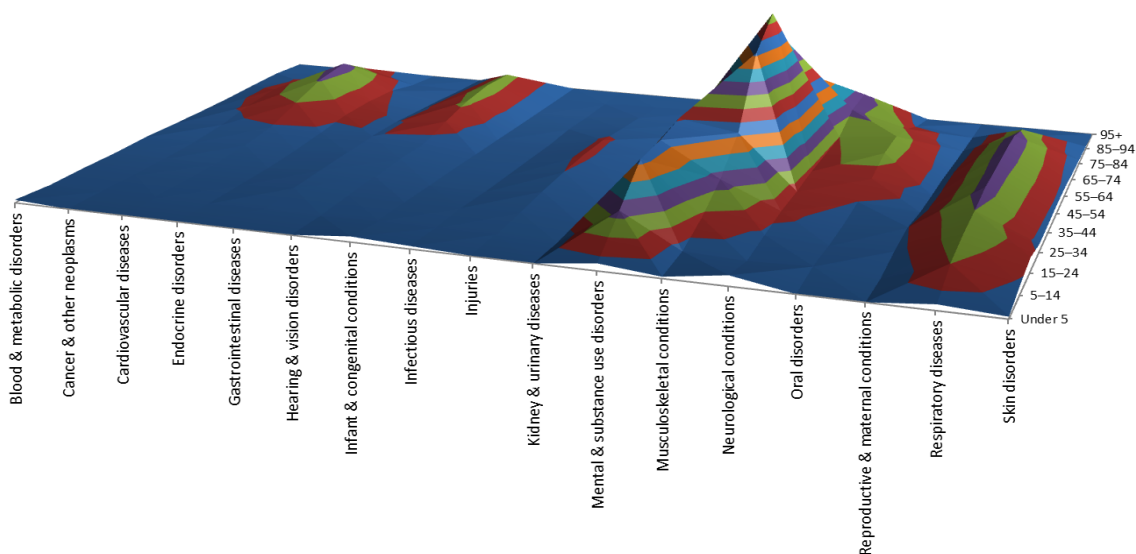
The spread of non-fatal disease burden and its impact at various stages across the lifespan for Tasmania is shown above and is particularly important in service planning and early intervention.

As a result of this analysis, the Department will centre its purchasing actions on the ten conditions identified above and on reducing the burden these conditions have on the Tasmanian population.

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[32] Australian Institute of Health and Welfare (2011) *Australian Burden of Disease Study- Impact and causes of illness and deaths in Australia 2011*

4.5 Prevalence of Chronic Disease in Tasmania

Prevalence refers to the number of people experiencing risk factors (or each disease) at a given point in time.

Acute Strategy, PPP, DHHS will mainly use prevalence data recognising that incidence data is limited to cancer and communicable diseases registers.

4.5.1 Prevalence by Tasmanian regions (North West, North and South)

Further analysis of the identified chronic disease priorities, using DHHS Epidemiology Unit data in Table 3 provides a greater understanding of the prevalence of these diseases by region. The data shows:

- chronic disease is most prevalent for seven out of the ten selected chronic diseases in the North in comparison with the other regions

- cancers and depression/anxiety are most prevalent in the South; and

- osteoporosis and arthritis are most prevalent in the North West.

Table 3: Prevalence of selected chronic disease by region for persons aged 18 and over in Tasmania 2016

Diagnosed Chronic disease	North	North West	South
Asthma	25.5%	22.6%	24.2%
Heart disease	9.4%	9.0%	8.7%
Stroke	4.0%	3.2%	3.2%
Cancer	10.3%	9.7%	11.3%
Diabetes	10.9%	10.1%	8.7%
Arthritis	30.7%	30.7%	28.0%
Osteoporosis	7.6%	8.5%	8.0%
Depression/anxiety	27.2%	27.0%	30.8%
Hypertension	30.8%	29.6%	29.0%
Three or more chronic conditions	23%	22.1%	20.4%

All regions experienced an increase in some self-reported chronic disease since 2009. *The Report on the Tasmanian Public Health Survey 2016* (refer to Table 4) shows that the North (4 diseases) and the South (3 diseases) had significant increases in self-reported ever diagnosed chronic diseases.

While the single significant increase in depression/anxiety for the North West was the highest increase of any of the self-reported ever diagnosed chronic disease by region between 2009 and 2016.

North
Lifetime prevalence of diabetes (9.9%), cancer (8.0%), heart disease (7.7%) and depression/anxiety (27.1%) significantly increased since 2009.

North West
Lifetime prevalence of depression/anxiety (29.4%) significantly increased from 2009 and 2013

South
Lifetime prevalence of eye diseases (13.5%), diabetes (7.1%) and depression/anxiety (32.5%) increased significantly compared since 2009.

Table 4: Self-reported ever diagnosed chronic conditions by region, age standardised, Tasmania 2009 to 2016

Chronic conditions (ever diagnosed)	2009 %	2009 95% CI	2013 %	2013 95% CI	2016 %	2016 95% CI
North	-	-	-	-	-	-
Asthma	23.1%	[20.5%,25.9%]	26.7%	[23.2%,30.4%]	26.3%	[22.7%,30.1%]
Hypertension	26.5%	[24.6%,28.5%]	25.2%	[23.0%,27.6%]	25.1%	[22.5%,27.8%]
Diabetes	5.8%	[4.9%,6.7%]	7.0%	[5.9%,8.3%]	9.9%#	[8.0%,12.2%]
High blood sugar	3.9%	[3.0%,5.1%]	3.8%	[2.7%,5.2%]	4.1%	[3.0%,5.6%]
Cancer	5.1%	[4.4%,6.0%]	6.9%	[5.6%,8.3%]	8.0%#	[6.6%,9.6%]
Arthritis	21.0%	[19.5%,22.6%]	23.5%	[21.7%,25.3%]	23.6%	[21.5%,25.8%]
Osteoporosis	4.8%	[4.1%,5.6%]	5.0%	[4.2%,5.8%]	5.5%	[4.7%,6.4%]
Heart disease	5.5%	[4.7%,6.3%]	6.3%	[5.5%,7.4%]	7.7%#	[6.3%,9.3%]
Stroke^	2.8%	[2.2%,3.4%]	2.6%	[2.1%,3.3%]	3.2%	[2.4%,4.2%]
Depression/Anxiety	20.1%	[17.9%,22.3%]	24.6%	[21.5%,27.9%]	27.1%#	[23.7%,30.8%]
Eye diseases	8.3%	[7.5%,9.1%]	9.8%	[8.8%,10.8%]	9.8%	[8.7%,10.9%]
North West	-	-	-	-	-	-
Asthma	20.5%	[18.1%,23.3%]	22.6%	[19.3%,26.4%]	23.6%	[19.8%,27.9%]
Hypertension^	26.2%	[24.3%,28.0%]	25.6%	[23.2%,28.1%]	23.5%	[21.3%,25.8%]
Diabetes	6.7%	[5.6%,7.9%]	7.2%	[5.8%,8.8%]	8.5%	[6.7%,10.8%]
High blood sugar	3.9%	[3.0%,5.2%]	2.7%	[2.0%,3.5%]	4.3%	[3.1%,5.8%]
Cancer	7.2%	[6.2%,8.2%]	7.4%	[6.5%,8.5%]	7.3%	[6.2%,8.6%]
Arthritis	20.6%	[19.1%,22.2%]	22.3%	[20.6%,24.2%]	24.3%	[21.9%,26.9%]
Osteoporosis	4.6%	[4.0%,5.4%]	5.1%	[4.5%,5.9%]	6.4%	[5.3%,7.7%]
Heart disease	5.9%	[5.1%,6.8%]	6.5%	[5.7%,7.4%]	6.6%	[5.3%,8.2%]
Stroke^	3.3%	[2.7%,4.1%]	2.9%	[2.2%,3.8%]	2.6%	[1.9%,3.5%]
Depression/Anxiety	20.0%	[17.9%,22.3%]	22.7%	[20.0%,25.6%]	29.4%#	[24.8%,34.5%]
Eye diseases	8.7%	[7.8%,9.8%]	10.4%	[9.4%,11.5%]	10.0%	[9.0%,11.1%]
South	-	-	-	-	-	-
Asthma	21.4%	[19.0%,24.1%]	23.6%	[20.3%,27.2%]	25.8%	[22.3%,29.7%]
Hypertension	25.1%	[23.2%,27.1%]	24.3%	[22.2%,26.5%]	23.4%	[21.1%,25.9%]
Diabetes	4.8%	[4.0%,5.7%]	5.1%	[4.3%,6.1%]	7.1%#	[5.7%,8.8%]
High blood sugar	3.7%	[2.7%,5.0%]	3.8%	[2.8%,5.2%]	5.6%	[4.1%,7.7%]
Cancer	7.0%	[6.0%,8.1%]	8.2%	[6.9%,9.7%]	9.3%	[7.7%,11.3%]
Arthritis	21.2%	[19.7%,22.7%]	21.9%	[20.1%,23.9%]	22.7%	[20.6%,24.9%]
Osteoporosis	5.7%	[4.9%,6.5%]	5.4%	[4.8%,6.2%]	6.4%	[5.3%,7.7%]
Heart disease	5.5%	[4.7%,6.4%]	7.1%	[5.7%,8.8%]	6.8%	[5.5%,8.3%]
Stroke^	2.6%	[2.0%,3.5%]	1.9%	[1.5%,2.5%]	2.7%	[2.0%,3.8%]
Depression/Anxiety	22.7%	[20.6%,25.0%]	26.9%	[23.6%,30.4%]	32.0%#	[28.5%,35.8%]
Eye diseases	9.9%	[9.0%,10.9%]	10.1%	[9.3%,10.9%]	13.5%*#	[12.1%,14.9%]

Tasmanian Population Health Survey 2009, 2013, 2016 *statistically significantly higher compared with 2013; #statistically significantly higher compared with 2009

4.5.2   Prevalence by Local Government Area

The Public Health Information Development Unit (PHIDU) from Torrens University produces the Social Health Atlas of Australia (the Atlas). This web-based source of data on health and its determinants is unique in Australia, and has been acknowledged internationally by agencies such as the World Health Organisation. The Atlas

methodology is the model for the Australian Health Tracker maps and tables, which provide more recent but limited sets of risk factor and early chronic disease death estimates.

The Atlas estimates are provided for certain chronic diseases and conditions from the 2011–12 Australian Health Survey, conducted by the Australian Bureau of Statistics (ABS).This data estimates use indirectly age-standardised rate per 100 population; and/or indirectly age-standardised ratio, based on the Australian standard.

The Atlas indicators of chronic diseases and conditions have not been updated to include information from the 2014 -15 National Health Survey at time of this papers publication. The data maps (refer to Appendix D) provide chronic prevalence estimates by LGA not available in other epidemiology or estimate data sets. They were published in 2017.

Data estimates for respiratory system disease, musculoskeletal disease and diabetes mellitus have been included. Comparative estimates for persons with a mental and behavioural problem and adults with high or very high psychological distress levels are provided. Comparative tables for circulatory disease and arthritis estimates for people aged over 44 are provided as an indicator of the most common comorbidity combination, cardiovascular disease and arthritis.

For many of these chronic diseases, full data sets for Flinders and King Islands are not available. Atlas estimates have not been published for areas with population's less than 1000 people; very remote areas, discreet Aboriginal and Torres Strait Islander communities and where the relative root mean square errors on the estimates were one or more.

4.5.2.1   Summary of Atlas estimates.

The data show some associations between selected chronic diseases.

For example:

- There was a strong association between the prevalence of both respiratory and musculoskeletal diseases in Sorrel. In most of the other LGAs the association was less pronounced.

- An association between mental/behavioural problems and high psychological distress was most noticeable in the LGAs of Derwent Valley, Launceston and Devonport.

- An association between circulatory disease and arthritis is most noticeable in the LGAs of Glamorgan Spring Bay, West Coast and Derwent Valley.

Further analysis of the Social Health Atlas also showed the following LGAs in Table 5 had the highest age standardised prevalent rate per 100 people for the chronic disease that most closely match the SoPI priority conditions:

Table 5: Chronic Disease	Highest estimated rate by LGA – Social Health Atlas (LGAs with 3 or more high estimated rates of chronic disease are in colour)
Respiratory	- Huon Valley (37.2) **Sorell (37.0)** - West Tamar (36.5) - Launceston (36.2) - Kingborough (35.5)
Musculoskeletal	**Brighton (34.7)** **Sorell (33.9)** - Tasman (32.3) - Latrobe (31.8) - Kentish (31.7)
Arthritis	**Sorell (19.5)** **West Coast (19.3)** - Glamorgan Spring Bay (19.1) - Central Highlands (19.1) - Southern Midlands (19.1) **Derwent Valley (19.1)**
Diabetes Mellitus	- Glenorchy (6.7) - Huon Valley (5.7) - Central Highlands (5.6) - Southern Midlands (5.6) - Burnie (5.5) **Brighton (5.4)**
Mental & Behavioural Problems	- Tasman (16.9) **Derwent Valley (16.5)** - Flinders Island (16.2) - Break O Day (16.2) - Dorset (16.2) - Georgetown (16.2) - Devonport (16.1) - Burnie (16)
High or Very High Psychological Distress	**West Coast (20.5)** **Brighton (19)** - Glenorchy (18.6) **Derwent Valley (16.8)** - Launceston (15.8) - Devonport (15.1)
Circulatory System Disease (Cardiovascular)[33]	- Glamorgan Spring Bay (24.1) **West Coast (22.7)** **Derwent Valley (22.4)** **Brighton (22.3)** - Circular Head (22.0)

For more detail refer to the individual Atlas data maps found in Appendix D.

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[33] The heart and circulatory system make up the cardiovascular system. Among the most common circulatory system disorders are: high blood pressure; atherosclerosis; aneurysms; thrombotic disorders and congenital defects.

4.5.3   Diabetes

In the 2018-19 SoPI diabetes has been identified as a chronic condition that needs to be explored further by Acute Strategy for its impact on the non-fatal burden of disease for Tasmania. In Tasmania, an estimated 26,600 (5.3%) people had diabetes in 2014-15[34].

Diabetes can result in a range of short- and long-term complications which are the major causes of associated morbidity and mortality in people with diabetes. The presence of complications also greatly increases the cost of managing diabetes. Improving the management and care of diabetes, particularly the early identification and reduction of risk factors, can delay the onset or slow the progression of complications.

The Australian National Diabetes Strategy 2016-20120 (the Strategy) is an opportunity to consider current approaches to diabetes services and care; consider the role of governments at all levels, as well as other stakeholders; evaluate whether current efforts and investments align with identified needs; maximise the efficient use of existing limited health care resources; and articulate a vision for preventing, detecting and managing diabetes and for diabetes research efforts. This Strategy recognises the social and economic burden of disease.

The Diabetes Australia *A National Diabetes Strategy and Action Plan* figure below shows that macrovascular complications of diabetes (heart disease, stroke, peripheral vascular disease) may begin even before people develop diabetes.

Figure 8: Preventing the Diabetes Burden[35]
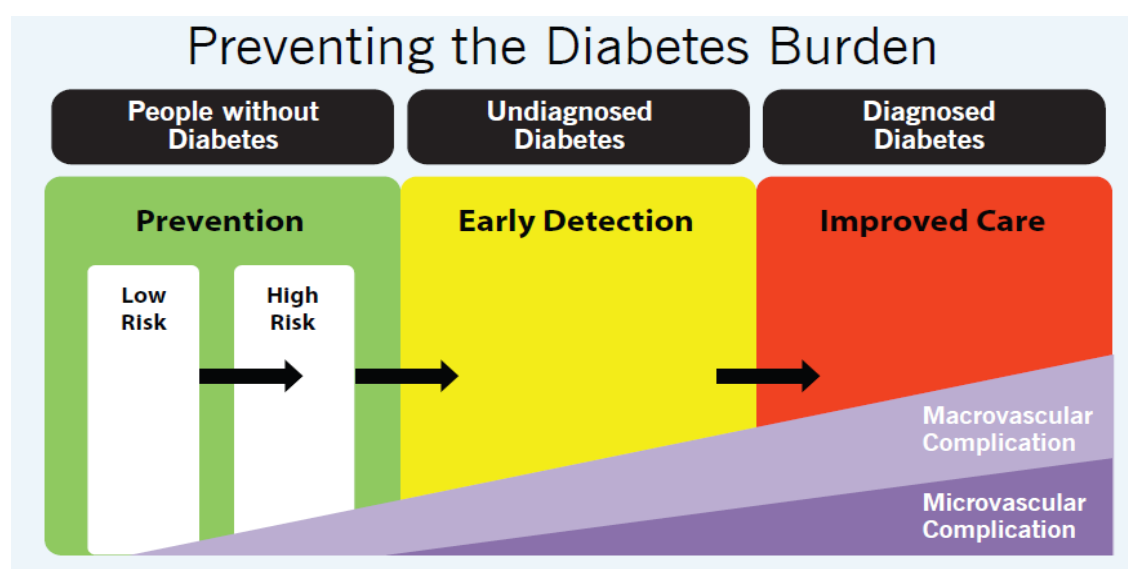
The microvascular complications (eye, kidney and nerve damage) begin when diabetes develops but many people will have complications when they are diagnosed because of a delay in diagnosis. Solid evidence exists for the effectiveness and benefits of diabetes prevention, earlier diagnosis and better care.

The implementation of the 2016 – 2020 Strategy will reduce the diabetes burden, prevent the development of diabetes, detect those with undiagnosed diabetes earlier, and improve the care for those with diabetes to prevent complications.

The DHHS PPP-AS SoPI 18-19 Supplementary Paper 1 *"Chronic Disease: Diabetes"* Research and Discussion Paper provides more detailed data and is available on request.

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[34] Australian Bureau of Statistics – National health Survey: First Results 2014-15
[35] Diabetes Australia – National Diabetes Strategy and Action Plan, 2013 page 5

4.5.4   Mental Health

Mental health, while a chronic condition itself, can also be a risk factor for developing other chronic diseases. For example, depression, anxiety, self-harm and suicide all have a direct association with an individual's physical health and capacity to lead a fulfilling and contributing life.

Mental health, in turn, is affected by many of the risk factors outlined above; including age, demographics, biological, cultural and occupational factors. A significant proportion of the Australian population will experience mental illness at some time in their lives. Mental and behavioural conditions affect 4.0 million Australians.

Tasmania has the highest rate at **20.8** per cent (approximately 107,449 Tasmanians) [1].

Western Australia has the lowest rate of population at **14.6** per cent.
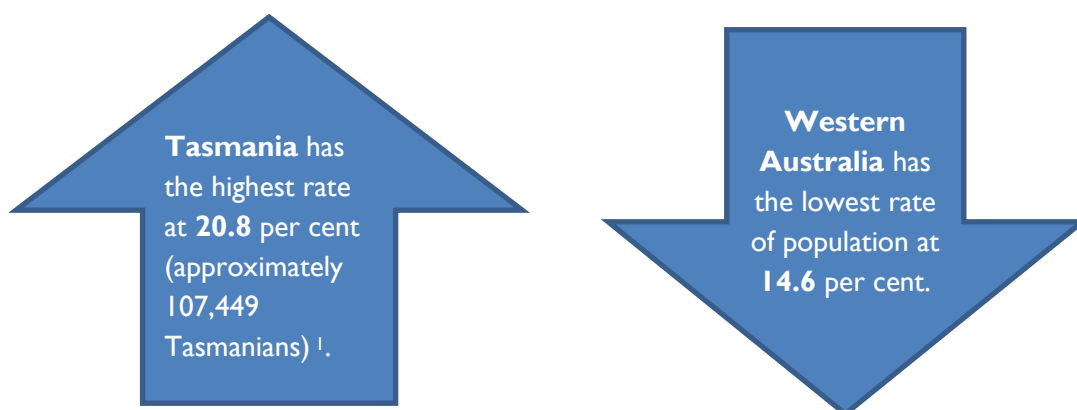
Chronic mental health conditions make up 12 per cent of the national chronic disease burden. This burden comes at a significant economic and social cost. The leading cause of death for young people aged 15-24 in 2011-13 was suicide (11 per 100,000)[36].

The *Report on the Tasmanian Population Health Survey 2016* identified that more Tasmanians reported high/very high levels of psychological distress in 2016 at 13.7 per cent than in previous years, with a significant increase in 2009. In comparison 22.8 per cent of Aboriginal and Torres Strait Islanders reported high/very high levels of psychological distress in 2016 which is statistically significant. As outlined in the Table 11 of the *Survey* also identified Tasmanians aged 18-24 years reported significantly more psychological distress in 2016 than in 2013 and 2009.

Table 6: High/very high level of psychological distress by age, Tasmania 2009 to 2016

Age	2009 %	2009 95% CI	2013 %	2013 95% CI	2016 %	2016 95% CI
18-24	11.3%	[7.8%,15.9%]	16.6%	[11.4%,23.7%]	22.4%*	[15.8%,30.9%]

The DHHS *Rethink Mental Health Plan 2015- 2025* brings together actions to strengthen mental health promotion, prevention and early intervention, actions to improve care and support for people with mental illness, their families and carers and sets a path for integrating Tasmania's mental health system. Purchasing deliverable strategies to increase mental health protective factors is a future SoPI goal.

The SoPI planning strategies could include a focus on further research into risk and protective factors impacting children and young adults between the ages of 12 and 18 years who are at risk of mental illness. These include a wide range of factors that include: peri-natal, genetic, alcohol or drugs, bullying or cyberbullying, discrimination, physical health problems, lesbian, gay, bisexual, transgender, and/or intersex (LGBTI) communities, loss, grief, traumatic events, low self-esteem and body image.

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[36] AIHW Australia's health 2016

4.5.5   Oral Disorders

Oral health refers to the health of teeth and gums. Tooth decay and gum disease can lead to tooth loss, and poor dental health is linked to several chronic conditions.

Oral disorders are a SoPI 'chronic disease purchasing priority [37] for which there is limited national, statewide or LGA level data.

The *Report on the Tasmanian Public Health Survey 2016* identified that a quarter of all Tasmanians aged 18 years and over assessed their oral health as fair or poor. Males reported statistically significantly poorer oral health (29.0 per cent) than females (21.9 per cent), but significantly more females than males reported complete tooth loss.

As seen in Table 5 from the Survey, Tasmanians in the North West region had the highest proportion of fair or poor oral health, and a significantly higher prevalence of complete tooth loss compared with other regions and state-wide.

Table 7: Self-assessed oral health by region, 18 years and over, Tasmania 2016

Oral health status	North %	North 95% CI	North-West %	North-West 95% CI	South %	South 95% CI
Excellent/Very Good	37.1%	[33.7%,40.6%]	39.5%	[35.8%,43.4%]	39.5%	[36.0%,43.1%]
Good	37.3%	[33.9%,40.8%]	31.8%	[28.4%,35.4%]	36.1%	[32.7%,39.7%]
Fair/Poor	25.5%	[22.6%,28.6%]	28.3%	[25.1%,31.8%]	24.3%	[21.4%,27.5%]
Complete tooth loss	5.9%	[4.9%,7.1%]	10.2%*	[8.8%,11.7%]	5.1%	[4.1%,6.4%]

Tasmanian Population Health Survey 2016; *statistically significantly different compared with other regions and state-wide

Significantly more fair and poor oral health was reported by Tasmanians in the most disadvantaged socio-economic quintile (29.8 per cent) compared with Tasmanians in the least disadvantaged quintile (20.2 per cent).

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[37] Due to a lack of current national and Tasmanian data and analysis the SoPI 'burden of disease' chronic conditions: Hearing and Vision Disorders and Injuries have not been included in this paper.

5. Risk Factors

Risk factors carry different levels of burden for our health system. The benefits of reducing risk factors vary for individuals and the community. The DHHS recognises the benefit in systematically targeting a reduction in health risk factors that impact on the burden of chronic disease/s.

Examples of risk factors include:

- Smoking

- Being overweight and/or obese

- Alcohol consumption

- Dietary risks

- Physical inactivity, and

- Environmental risks (including occupational hazards and sun exposure)

In general, most Australians have at least one risk factor[38]

For example:

- Over 90 per cent of Australian's fail to consume the recommended amounts of vegetables each day and about 50 per cent do not consume the recommended amounts of fruit, increasing their risks of certain chronic diseases.

- Almost 60 per cent of Australians do not undertake sufficient physical activity[39] to maintaining a healthy body weight and a healthy musculoskeletal system.

- Insufficient exercise affects 21 million Australians. The Australian Capital Territory has the highest rate of physical activity at 60.3per cent while **Tasmania** has the lowest at 43.4 per cent (approximately 224,198 Tasmanians) [40].

- Further, more than 80% of Australians spend more than 3 hours each day sitting during their leisure time, regardless of whether they undertake sufficient physical activity. A sedentary lifestyle is increasingly being recognised as being detrimental to health, as it can contribute too many chronic diseases as well as an increased risk of mortality.

- Being overweight and obese affects 11.2 million Australians. Western Australia has the lowest rate of population affected at 60.3 per cent. **Tasmania** has the highest rate affected at 67.5 per cent (approximately 348,695 Tasmanians) [41].

5.1 Risk Factors: Statewide

Based on the Tasmanian Population Health Survey 2016 Report (March 2017) most of the modifiable risk factors remained similar to 2013 levels with the exception of fruit consumption.

Smoking
Smoking has declined significantly since 2009, with no further improvements noted since 2013.

Obesity -BMI

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[38] Ibid

[39] Sufficient activity is defined as at least 150 minutes in one week over at least five sessions.

[40] ABS National Health Survey: First Results, 2014-15

[41] Ibid

Obesity has increased significantly compared to 2009 but not compared to 2013. The most substantial increases in obesity rates since 2009 have been among females and Tasmanians aged 65 years and over. Table 8 shows the increase across the 3 surveys periods.

Table 8: Self-reported BMI, age standardised, 18 years +, TAS 2009 - 2016

BMI category	2009 %	2009 95% CI	2013 %	2013 95% CI	2016 %	2016 95% CI
Underweight	2.3	[1.7,3.1]	2.0	[1.3, 3.0]	1.1%#	[0.8%,1.6%]
Normal weight	43.4	[41.4,45.4]	39.1	[36.7,41.5]	38.9%	[36.3%,41.6%]
Overweight	35.3	[33.4,37.2]	36.9	[34.5,39.3]	35.6%	[33.2%,38.2%]
Obese	19.0	[17.7,20.4]	22.0	[20.3,23.9]	24.3%#	[22.2%,26.6%]
Overweight/Obese	54.3	[52.4,56.3]	58.9	[56.5,61.3]	60.0%#	[57.3%,62.6%]

Tasmanian Population Health Survey 2009, 2013, 2016; estimates are age-standardised; #statistically significantly different compared to 2009

Alcohol

Alcohol consumption causing risk of life-time harm at least weekly was 20.8 per cent in 2016 compared to 22.7 per cent in 2011- 2012 with double the rates for males (28.5%) compared to females (13.3%). Alcohol consumption causing risk or harm on a single occasion was 45 per cent in 2016 compared to 48.9 per cent in 2011-12.

Table 9: Alcohol consumption causing risk of life-time harm by sex, Tasmania 2016

Level of Risk	Males %	Males 95% CI	Females %	Females 95% CI	Persons %	Persons 95% CI
Abstain/No longer drink alcohol	11.5%	[9.7%,13.5%]	20.4%	[18.4%,22.5%]	16.0%	[14.6%,17.4%]
Reduced risk	12.1%	[10.4%,14.1%]	23.7%	[21.6%,26.0%]	18.0%	[16.6%,19.5%]
Increased risk at least yearly but not monthly	24.6%	[21.8%,27.6%]	24.8%	[22.4%,27.4%]	24.7%	[22.8%,26.6%]
Increased risk at least monthly but not weekly	21.0%*	[18.3%,24.0%]	14.5%	[12.5%,16.8%]	17.7%	[16.0%,19.6%]
Increased risk at least weekly	28.5%*	[25.7%,31.4%]	13.3%	[11.4%,15.5%]	20.8%	[19.1%,22.6%]

Tasmanian Population Health Survey 2016; ^>2 standard drinks for males/females on any day; *statistically significantly higher compared to females

Physical Activity

Physical activity has been maintained at similar levels since 2009, with two-thirds of Tasmanians gaining a health benefit from their activity.

Dietary Risks

The 2016 Survey reported a statistically significant decline in fruit consumption since 2013, with Table 7 showing the proportion of Tasmanians reporting adequate fruit consumption (i.e. 2 serves daily) decreasing from 44.2 per cent to 39.3 per cent in 2016.

Vegetable consumption has also shown a decline, but this was not statistically significant between 2013 and 2016. Less than one in ten (7.5 per cent) of Tasmanians met the recommended five to six serves of vegetables daily in 2016.

Table 10: Met NHMRC guidelines for fruit & vegetables, 18 years +, TAS 2009 to 2016

2013 Guidelines	2009^ %	2009^ 95% CI	2013 %	2013 95% CI	2016 %	2016 95% CI
Met fruit consumption guidelines	49.8%	[48.2%,51.4%]	44.2%	[42.4%,46.1%]	39.3%*#	[37.3%,41.4%]
Mean serves of fruit daily	1.70	[1.66,1.74]	1.59	[1.55,1.64]	1.46*#	[1.41,1.50]
Met vegetable consumption guidelines	10.9%^	[10.1%,11.9%]	8.5%	[7.6%, 9.4%]	7.5%	[6.5%,8.6%]
Mean serves of vegetables daily	2.54	[2.49,2.59]	2.51	[2.46,2.56]	2.34*	[2.27,2.40]

Tasmanian Population Health Survey 2009, 2013, 2016; ^2003 guidelines; *statistically significantly different compared with 2013; #statistically significantly different compared to 2009

5.2 Risk Factors: LGA

The Australian Health Policy Collaboration (AHPC) at Victoria University in collaboration with the Public Health Information Development Unit (PHIDU) from Torrens University produces national risk factor, screening, illness and mortality data in its *Australia's Health Tracker* 2017[42]. Provided by Local Government Areas,

The Tracker produces maps and Xcel data for the main internationally and nationally recognised health risk factors. The AHPC supports the national policy agenda for the prevention of chronic diseases while advocating for a platform for interventions using World Health Organisation (WHO) disease targets to ensure accountable changes by 2025.

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[42] Australian Health Policy Collaboration – Australia's Health Tracker by Area, 2017 does not provide risk factor data for dietary risks or inadequate consumption of fruit or vegetables

Figure 10: The Tasmanian LGAs with highest estimated rates of risk factors – Australian Health Tracker 2017[43]

Tobacco smoking

LGAs with the highest ASR rate of people per 100 who smoke are:

- West Coast (27.1)
- Brighton (26.6)
- Circular Head (24.5)
- Glenorchy (24.3)

Excessive alcohol consumption

LGAs with the highest ASR rate of people per 100 who consume alcohol at levels considered risky to health are:

- Tasman (22.2)
- Central Highlands and Southern Midlands (both 21.1)
- Latrobe (20.4)

Tasmanian LGAs with the highest risk factor rates

Insufficient physical activity

LGAs with the highest ASR rate of people per 100 who experienced no or low activity in the previous week are:

- Circular Head, Central Highlands and Southern Midlands (both 75.6)
- West Coast (74.4)
- Northern Midlands (72.8)
- Meander Valley (72.4)
- Kentish, Break O-Day, Dorset and Georgetown (72.3)

Adults who are obese

LGAs with the highest ASR rate of obese people per100 are:

- Central Highlands and Southern Midlands (both 40)
- West Coast (38.2)
- Derwent Valley (36)
- Break O-Day, Dorset, Georgetown and Circular Head (35.8)

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43 For many of these risk factors, data for Flinders and King Island is not available. Tracker estimates are not available for populations below 1000; very remote areas, for discreet aboriginal communities and where the relative root mean square errors on the estimates were 1or more.

The *2016 Tasmanian Population Health Survey* (TPHS)[44] derived from DHHS Epidemiology Unit data is summarised in this section. The data is expressed by estimated percentage of population who are: daily smokers; have an overweight Body Mass Index (BMI); Obese BMI: lifetime risky alcohol consumption; inadequate fruit consumption and inadequate vegetable consumption and insufficient physical activity.

Table 11: 2016 Tasmanian Population Health Survery Risk Factor Estimates

LGA	Daily Smoker		Overweight BMI		Obese BMI		Lifetime risky alcohol consumption (a)		Inadequate fruit consumption		Inadequate vegetable consumption		Insufficient physical activity (b)		Three or more chronic conditions (c)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Break O'Day	25.1%^	[12.7%,43.7%]	34.4%	[20.4%,51.8%]	38.1%	[22.3%,56.9%]	27.5%^	[15.1%,44.7%]	57.8%	[41.0%,73.0%]	95.7%	[89.8%,98.3%]	n/a		47.2%	[31.3%,63.6%]
Brighton	26.7%	[16.7%,39.7%]	46.4%	[34.2%,59.0%]	30.7%	[20.3%,43.6%]	18.2%^	[10.5%,29.5%]	65.3%	[53.6%,75.5%]	91.7%	[81.2%,96.6%]	21.9%^	[12.9%,34.6%]	21.6%	[13.8%,32.2%]
Burnie	11.5%	[7.2%,17.7%]	33.0%	[25.9%,41.0%]	35.9%	[27.5%,45.3%]	16.4%	[11.4%,23.0%]	63.6%	[54.6%,71.7%]	94.4%	[91.0%,96.6%]	15.1%	[10.1%,22.0%]	21.8%	[16.7%,28.0%]
Central Coast	11.5%^	[6.9%,18.5%]	42.9%	[34.6%,51.5%]	26.5%	[20.6%,33.3%]	20.8%	[15.1%,27.9%]	62.4%	[54.9%,69.3%]	91.2%	[86.7%,94.2%]	14.9%	[10.1%,21.6%]	22.1%	[17.3%,27.7%]
Circular Head	24.2%^	[13.5%,39.7%]	41.7%	[28.8%,55.8%]	23.8%	[14.3%,36.8%]	29.2%	[18.5%,42.8%]	67.7%	[53.1%,79.5%]	93.9%	[87.4%,97.2%]	19.3%^	[11.1%,31.6%]	23.6%^	[13.2%,38.6%]
Clarence	9.6%	[5.9%,15.2%]	35.9%	[29.1%,43.4%]	26.0%	[19.8%,33.3%]	19.6%	[14.6%,25.8%]	58.5%	[51.1%,65.6%]	91.1%	[86.3%,94.4%]	12.8%	[8.3%,19.3%]	25.4%	[20.1%,31.6%]
Derwent Valley	24.3%^	[11.0%,45.6%]	54.6%	[36.8%,71.2%]	20.3%^	[11.4%,33.7%]	37.1%^	[20.3%,57.7%]	68.1%	[51.3%,81.2%]	90.6%	[76.0%,96.7%]	12.2%^	[4.7%,28.4%]	15.7%^	[8.6%,27.0%]
Devonport	16.4%	[11.5%,22.8%]	35.2%	[28.6%,42.5%]	23.9%	[18.9%,29.9%]	18.0%	[13.4%,23.8%]	58.7%	[51.4%,65.7%]	92.1%	[88.0%,94.9%]	16.6%	[11.6%,23.3%]	23.4%	[18.9%,28.6%]
Dorset	12.7%^	[5.0%,28.8%]	29.2%	[18.6%,42.6%]	45.6%	[32.0%,59.9%]	24.9%^	[14.2%,40.0%]	47.7%	[34.7%,61.1%]	75.0%	[61.4%,85.0%]	19.3%^	[9.7%,34.6%]	43.1%	[30.1%,57.1%]
Flinders	n/a		74.7%	[35.7%,94.0%]	n/a		45.7%^	[17.8%,76.5%]	60.2%^	[27.8%,85.5%]	99.2%	[93.8%,99.9%]	n/a		n/a	
George Town	21.7%^	[11.8%,36.7%]	57.4%	[42.4%,71.2%]	20.8%^	[11.6%,34.4%]	29.4%^	[17.2%,45.6%]	67.7%	[53.0%,79.6%]	85.2%	[72.1%,92.7%]	22.1%^	[10.1%,41.9%]	23.3%	[14.2%,35.8%]
Glamorgan/Spring Bay	n/a		41.8%^	[20.7%,66.3%]	11.6%^	[4.7%,25.9%]	22.3%^	[9.3%,44.5%]	65.8%	[41.9%,83.7%]	98.9%	[92.1%,99.8%]	n/a		47.1%^	[25.0%,70.3%]
Glenorchy	15.8%	[9.6%,24.8%]	38.3%	[29.1%,48.5%]	27.5%	[20.3%,36.1%]	19.6%	[12.8%,28.7%]	67.4%	[58.1%,75.5%]	92.0%	[83.0%,96.5%]	17%^	[10.1%,27.2%]	21.1%	[15.5%,28.0%]
Hobart	5.1%^	[2.5%,10.3%]	34.8%	[27.3%,43.2%]	12.8%	[8.6%,18.5%]	27.1%	[20.6%,34.7%]	47.1%	[39.2%,55.1%]	87.2%	[80.5%,91.8%]	6.4%^	[3.3%,12.2%]	8.9%	[6.0%,12.9%]
Huon Valley	5.8%^	[3.1%,10.8%]	39.0%	[26.7%,52.8%]	32.0%	[20.2%,46.7%]	18.6%^	[11.0%,29.6%]	57.0%	[44.2%,69.0%]	96.3%	[92.7%,98.1%]	12.7%^	[6.2%,24.2%]	29.4%	[19.6%,41.6%]
Kentish	11.7%^	[5.5%,23.1%]	37.8%	[25.4%,52.2%]	27%^	[15.8%,42.0%]	n/a		56.6%	[42.8%,69.5%]	89.5%	[78.5%,95.2%]	9.8%^	[4.7%,19.2%]	28.0%	[17.8%,41.1%]
King Island	n/a		37.7%^	[18.0%,62.5%]	29%^	[9.8%,60.4%]	n/a		58.6%	[33.6%,79.8%]	90.8%	[56.2%,98.7%]	n/a		33.6%^	[14.5%,60.1%]
Kingborough	5.4%^	[2.6%,10.9%]	39.9%	[31.9%,48.5%]	24.8%	[17.8%,33.3%]	20.1%	[14.1%,27.7%]	50.7%	[42.4%,58.9%]	94.2%	[89.4%,96.8%]	21.1%	[13.5%,31.3%]	20.7%	[15.5%,27.0%]
Latrobe	10.8%^	[6.6%,17.3%]	46.8%	[36.2%,57.7%]	15.4%	[10.0%,23.1%]	18.9%^	[11.2%,30.0%]	58.3%	[47.8%,68.1%]	91.4%	[85.2%,95.1%]	11.8%^	[6.6%,20.0%]	16.7%	[11.3%,23.9%]
Launceston	11.1%	[8.6%,14.2%]	34.5%	[30.0%,39.2%]	25.6%	[21.6%,30.1%]	20.3%	[16.8%,24.3%]	61.3%	[56.5%,65.9%]	90.9%	[87.7%,93.3%]	14.9%	[11.3%,19.4%]	19.2%	[16.3%,22.4%]
Meander Valley	17.5%^	[10.2%,28.5%]	28.8%	[20.5%,38.8%]	36.3%	[26.2%,47.8%]	18.0%	[11.0%,28.0%]	64.2%	[54.3%,73.0%]	91.3%	[84.4%,95.3%]	13.1%^	[6.2%,25.5%]	26.5%	[19.0%,35.6%]
Northern Midlands	12.3%^	[6.3%,22.7%]	39.4%	[29.0%,50.8%]	32.5%	[22.3%,44.7%]	13.2%^	[7.7%,21.7%]	65.7%	[55.1%,74.9%]	84.9%	[75.5%,91.2%]	16.6%^	[9.4%,27.7%]	22.5%	[15.4%,31.7%]
Sorell	13.7%^	[5.9%,28.7%]	40.4%	[26.7%,55.8%]	24.5%^	[13.8%,39.8%]	20.8%^	[11.0%,35.8%]	59.2%	[44.7%,72.2%]	93.2%	[79.1%,98.1%]	12.5%^	[4.7%,29.4%]	32.2%	[20.5%,46.8%]
Southern Midlands	n/a		20.9%^	[8.4%,43.4%]	40.1%^	[15.2%,71.5%]	n/a		78.4%	[54.6%,91.6%]	90.0%	[62.8%,97.9%]	n/a		n/a	
Tasman	n/a		28.8%^	[10.5%,58.3%]	23.1%^	[8.6%,49.2%]	n/a		51.4%^	[24.5%,77.5%]	n/a	0.0%	n/a		30.5%^	[12.6%,57.3%]
Waratah/Wynyard	8.1%^	[4.4%,14.2%]	39.0%	[29.0%,50.1%]	23.0%	[16.1%,31.8%]	18.2%^	[9.9%,30.9%]	66.3%	[56.2%,75.2%]	87.1%	[75.5%,93.7%]	20.6%^	[11.9%,33.1%]	21.8%	[15.0%,30.5%]
West Coast	24.2%^	[10.9%,45.5%]	24.3%^	[12.0%,42.9%]	42.7%	[24.6%,62.9%]	10.5%^	[4.3%,23.4%]	71.1%	[50.6%,85.6%]	96.5%	[90.1%,98.8%]	23.9%^	[10.4%,45.9%]	17.1%^	[8.2%,32.3%]
West Tamar	16%^	[9.3%,26.0%]	31.3%	[22.7%,41.4%]	33.5%	[24.0%,44.4%]	24.1%	[16.7%,33.4%]	66.1%	[56.5%,74.5%]	90.8%	[84.5%,94.7%]	14.9%^	[8.3%,25.1%]	25.4%	[18.3%,34.0%]
Tasmania	12.1%	[10.7%,13.6%]	37.3%	[35.2%,39.4%]	25.6%	[23.8%,27.6%]	20.8%	[19.1%,22.6%]	59.6%	[57.5%,61.7%]	91.0%	[89.7%,92.2%]	14.9%	[13.2%,16.8%]	21.5%	[20.1%,23.0%]

Source: DHHS Epidemiology Unit, unpublished data, derived from the 2016 Tasmanian Population Health Survey, June 2017, persons aged 18 years and over

(a) daily consumption in excess of 2 standard drinks on at least a weekly basis; (b) Persons aged 18-64 years, 2014 guidelines (excluding strength training);

(c) Only selected chronic conditions (asthma, heart disease, hypertension, stroke, cancer, diabetes, arthritis, osteoporosis, depression/anxiety)

^Estimate to be used with caution (RSE≥25%); n/a estimate unable to be provided due to extreme data unreliability (RSE≥50%)

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[44] This data is the most recent population health data available for persons aged 18 and over and is derived by telephone interview. There is also a separate data set that estimated the percentage of population that had three or more chronic conditions.

The data outlined in the above Table 11 found that[45]:

- The LGAs with the highest estimated rates across multiple risk factors are Brighton, George Town, Derwent Valley, Break O Day, Southern Midlands, West Coast and Circular Head.

    o These LGAs also have the highest rates of smokers and overweight and obesity rates.

- The LGAs with intermediate estimated risk rates are West Tamar, Glenorchy, Dorset, Sorell and Meander Valley.

- Conversely the LGAs with a significantly lower estimated risk rates across the eight risk factors (allowing for data gaps[46]) were Hobart, Clarence, Kingborough, Launceston, Latrobe and Kentish.

- The LGAs with the highest combined rates of inadequate fruit and vegetable consumption are Southern Midlands, West Coast, Glamorgan Spring Bay and Circular Head.

- The LGAS with the highest percentage of three or more chronic conditions are Break O Day, Glamorgan Spring Bay and Dorset.

It should be noted that despite the lack of data, provided for Flinders and King Island, due to their small populations their isolation, lack of access to health services and other services, and high population of Aboriginal and Torres Strait Islander residents place both Islands in the top percentile for risk factors.

Regional differences for behavioural risk factor, persons aged 18 and over, Tasmania 2016[47]

- Daily Smoking – the South has the lowest rate (10.8 %) compared to North-West (13.4%) and North (13.3%)

- Lifetime risky alcohol consumption –the North West has the lowest rate (18.4%) compared to the North (21%) and South (21.7%)

- Inadequate Fruit and Vegetable Consumption – high comparable rate across the state with the South having an higher rate of adequate fruit consumption and the North a higher rate of vegetable consumption.

- Insufficient Physical Activity – the South has the lowest rate (14.2%) followed by North (15.3%) and North West (16.2%)

- Combined Overweight and Obese BMI – the South has the lowest rate (61.4%) compared to the North (64.3%) and North West (64.4%).

    o The largest difference exists between the obesity rates for the South (23.3%) the North West at (26.4%), and the North (29.2%).

This data reflects a greater behavioural and bio-medical risk factor differential in the North compared to the South in most factors. The exception is that the South has a higher diagnosis of estimated lifetime risky alcohol consumption than the North and North West. The North West sits in between the other two regions having the highest estimated rate of insufficient physical activity and marginally higher rates for combined overweight and obese BMI.

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[45] The data for LGAs with the highest percentage of insufficient physical activity have not been included in this summary as the estimates   are only to be used with caution.
[46] Note: Data for Central Highlands is not represented due to small numbers of respondents.   Data for Flinders Island, King Island, Southern Midlands, Tasman, Glamorgan Spring Bay, Kentish and Break O Day are represented but are incomplete.
[47] DHHS Epidemiology Unit, data, derived from the 2016 Tasmanian Population Health Survey, June 2017, persons aged 18 years and over. The regional behavioural risk factor and chronic disease prevalence data is available by age breakdown on request.

5.3 Risk Factor and Chronic disease associations

Risk factors can increase the likelihood of developing a chronic disease, or interfere in the management of existing conditions.

The more risk factors an individual has, the greater than chance of having a chronic disease[48]

- For example, males with five or more risk factors are three times more likely to report COPD than males with two or fewer risk factors.

- Females with five or more risk factors are three times more likely to report stroke, and two and half times more likely to report depression, than females with two or less risk factors.

- Males are more likely to have five or more risk factors than females (17% compared with 11%).

Common combinations of risk factors [49] include:

- People who consume alcohol at risky levels are more likely to report daily smoking than those who don't drink at those levels.

- Daily smoking is also more commonly reported by those who have insufficient levels of physical activity.

- For people who are obese, high blood pressure is more common as a co-risk factor than for people who are not obese.

Studies have also shown links between certain risk factors and chronic conditions. Table 9, produced by the AIHW[50], shows the associations between selected chronic diseases and behavioural and biomedical risk factors.

As seen from the Table 9, tobacco smoking is directly linked to 12 of the 15 chronic disease listed, while obesity has eight. Excessive alcohol consumption and dietary risks both have five direct chronic disease associations.

Of the chronic diseases, cardiovascular disease and stroke have six direct associations with behavioural and biomedical risk factors while type 2 diabetes, osteoporosis and colorectal cancer each have four direct associations. Oral Health and chronic kidney disease each have three direct associations with behavioural and biomedical risk factors.

Looking at what combinations of risk factors people have can assist those who advise about lifestyle behaviors and can also help predict the likelihood of them developing a chronic disease during their lifetime.

Some chronic diseases themselves are considered to be risk factors for other conditions. For example, diabetes, where there are known links between diabetes and the increased likelihood of developing cardiovascular, eye and/or kidney disease.

The data shows there is strong evidence that obesity, nutrition and insufficient physical activity have a direct association with many of the most prevalent chronic diseases.

In Tasmania there is a direct association between obesity, poor nutrition and insufficient physical activity and cardiovascular disease which accounts for the highest fatal burden of disease across the Tasmanian lifespan[51].

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[48] Australian Institute of Health and Welfare (2012) *Risk factors contributing to Chronic disease Report*,

[49] Ibid

[50] Australian Institute of Health and Welfare (2017) *Chronic disease risk factors*: http://www.aihw.gov.au/chronic-diseases/risk-factors/

[51] Australian Institute of Health and Welfare (2011) *Australian Burden of Disease Study- Impact and causes of illness and deaths in Australia 2011*

Table 12: Strong evidence of direct associations between selected chronic diseases and behavioural and biomedical risk factors

Chronic disease	Behavioural Tobacco smoking	Behavioural Insufficient physical activity	Behavioural Excessive alcohol consumption	Behavioural Dietary risks	Biomedical Obesity	Biomedical High blood pressure	Biomedical Abnormal blood lipids
Cardiovascular disease	•	•	—	•(a)	•	•	•
Stroke	•	•	•	Nb; Assoc to HBP & Stroke?	•	•	•
Type 2 diabetes	•	•	—	•(a)	•	—	—
Osteoporosis	•	•	•	•(b)	—	—	—
Colorectal cancer	•	—	•	•(c)	•	—	—
Oral health	•(d)	—	•(e)	•(f)	—	—	—
Chronic kidney disease	•	—	—	—	•	•	—
Breast cancer (female)	—	—	•	—	•(g)	—	—
Depression	—	—	—	—	•	—	—
Osteoarthritis	—	—	—	—	•	—	—

Table 12: Strong evidence of direct associations between selected chronic diseases and behavioural and biomedical risk factors

Chronic disease	Behavioural Tobacco smoking	Behavioural Insufficient physical activity	Behavioural Excessive alcohol consumption	Behavioural Dietary risks	Biomedical Obesity	Biomedical High blood pressure	Biomedical Abnormal blood lipids
Rheumatoid arthritis	•	—	—	—	—	—	—
Lung cancer	•	—	—	—	—	—	—
Cervical cancer[h]	•	—	—	—	—	—	—
Chronic obstructive pulmonary disease	•	—	—	—	—	—	—
Asthma	•	—	—	—	—	—	—

• =   Strong evidence in support of a direct association between the chronic disease and risk factor.

— =   There is either not a direct association or the evidence for a direct association is not strong.

a. For coronary heart disease and type 2 diabetes, dietary risks relates to high intake of saturated fat.

b. For osteoporosis, dietary risks relates to insufficient calcium and vitamin D. The recommendation is to enhance vitamin D levels through adequate sun exposure and/or supplements if required.

c. For colorectal cancer, dietary risks relates to high intakes of processed (preserved) meat. In addition, a high intake of red meat is associated with an increased risk of colorectal cancer. The Australian Dietary Guidelines (ADGs) therefore recommend that processed meat intake should be limited (also because of its high saturated fat content). In addition, to enhance dietary variety and reduce some of the health risks associated with consuming red meat, the ADGs recommend Australian adults should consume up to a maximum of 455g per week (one serve [65 g] per day) of lean red meats.

d. The evidence for tobacco smoking and oral health relates to oral cancer and adult periodontal diseases.

e. The evidence for excessive alcohol consumption and oral health relates to oral cancer.

f. For oral health, dietary risks relates to amount and frequency of free sugars for dental caries; soft drinks and fruit juices for dental erosion; excess fluoride for enamel developmental defects; deficiency of vitamin C for periodontal disease.

g. The evidence for obesity and breast cancer is for post-menopausal women.

h. Persistent infection with the human papillomavirus (HPV) is a central cause of cervical cancer. HPV infection is not identified in Table 1 as it only includes those risk factors that are implicated in more than one chronic disease and have the greatest prevalence within the population. It is important to recognise that the behavioural risk factors of multiple sexual partners and early age at initiation of sexual activity reflect the probability of being infected with HPV.

Notes:

1. The chronic diseases included in Table 1 are those that currently contribute the most to burden of disease and/or are the focus of ongoing national surveillance efforts.

2. The behavioural and biomedical risk factors included in Table 1 are those that are implicated in more than one chronic disease and have the greatest prevalence within the population.

6. Health Determinants

Many factors influence how healthy we are and whether we are likely to develop a chronic condition. Some of these factors are specific to an individual, for example, certain health behaviours or an individual's genetic make-up, while others function at a broader societal level, such as the availability of health services, socioeconomic factors, vaccination programs or a clean and healthy environment.

Collectively, these influencing factors are known as determinants of health. A conceptual map of the pathways involved in the health and functioning of individuals and the population is represented in Figure 9[52].

Figure 9: Influence of the Determinants of Health

Figure 3: Influence of the Determinants of Health
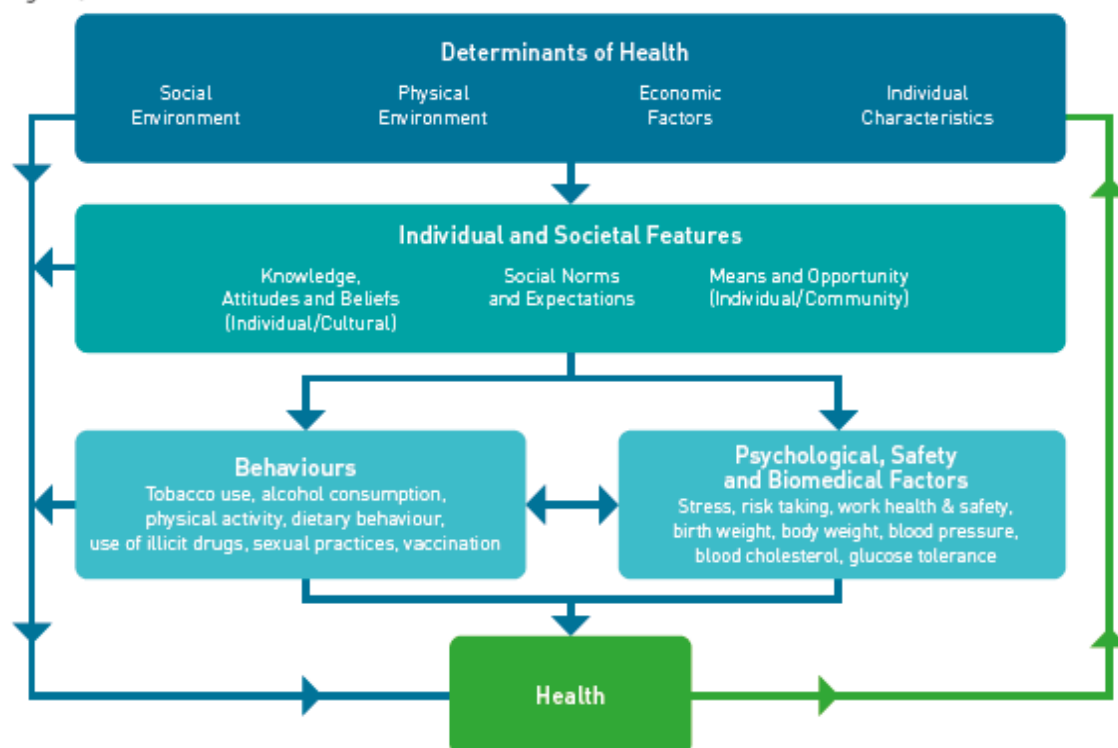
Diagram adapted from the Australia Institute of Health and Welfare
(AIHW 2014, *Australia's Health 2014*. Australia's Health series no. 14. Cat no. AUS 178. Canberra; AIHW).

Health determinants influence health in either a positive or negative way. Determinants affecting health in a negative way are commonly referred to as **risk factors**.

Where an individual lives, their age and their socioeconomic status (refer to section 5.3.3) can influence their chance of developing a chronic condition as well the likelihood of them engaging in risky behaviours (e.g. smoking and not exercising).

Health differences associated with regionality are in large part linked to socio-economic and cultural conditions. These contribute in turn to health inequalities that are preventable.

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[52] National Strategic Framework for Chronic Conditions, page 12

6.1   Health rates by remoteness

Evidence shows that Australians living outside major cities tend to have higher rates of disease and injury than people in major cities, and they are also more likely to engage in health behaviours that can lead to adverse health outcomes, as shown by Table 10.

Outer regional and remote populations have approximately significantly higher rates of disease across the seven indicators than people living in inner regional and major cities.

Table 13: National variation in rates of selected disease and risk factors by three remoteness levels[53]

	Arthritis	Diabetes	Cardiovascular Disease	Mental health conditions	Current daily smoker	No/low levels of exercise	Lifetime risky drinking
Major cities	14%	4.7%	4.7%	17%	13%	64%	16%
Inner regional	20%	6.0%	6.7%	19%	17%	70%	18%
Outer regional/ Remote	18%	6.7%	5.8%	19%	21%	72%	23%

Compared to the national average, Tasmania has the highest proportion of its population (57%)[54] residing outside of a major city in Australia; 176,355 or 34 per cent of Tasmanians live in outer regional (165,985), remote (8,010) and very remote areas (2,360). The below map illustrate the remoteness of Tasmanian's population.

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[53] Australian Bureau of Statistics (2016) *Australia's Health 2016 in brief*
[54] Australian Bureau of Statistics (2016) Regional Population Growth 2014-15

Map 1: 2011 Australian Bureau Statistics *Australian Statistical Geography Standard: Remoteness Structure* boundaries map
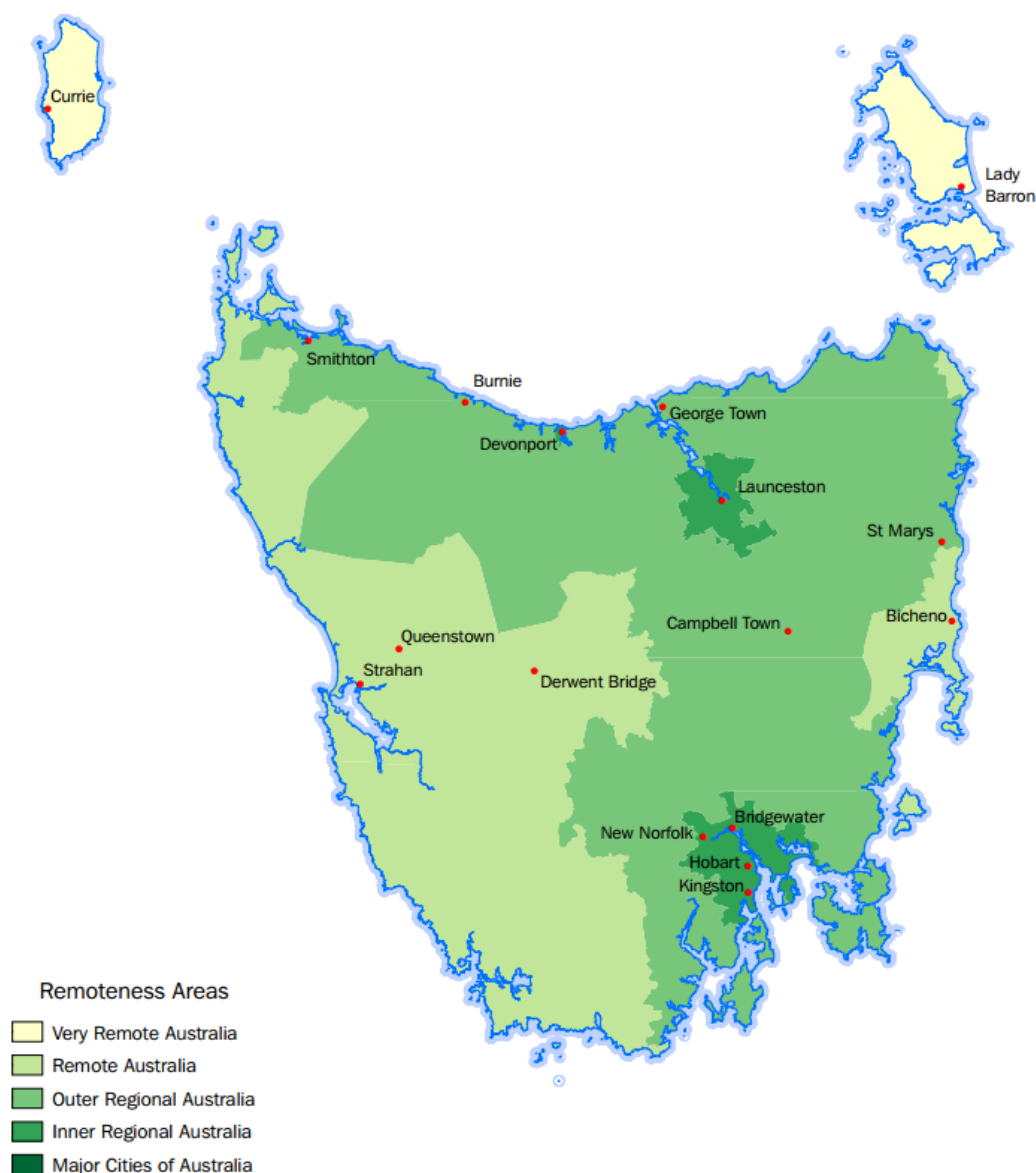
A number of Tasmanian LGA's stand out for their consistent high burden of disease and multimorbidity. LGA's with high risk factors and poor health outcomes identified in the *2009 Tasmanian Population Health Survey* were again prominent in the *2016 Tasmanian Population Health Survey*. In this geographical snapshot the LGA's are divided into five remoteness areas. This paper generalises and places these 5 areas into three clusters: outer regional and remote; inner regional and very remote LGA's. These remoteness clusters recognise the difference: in access to health services; availability of health professionals and the variable levels of social capital between remoteness areas that influence health and chronic disease rates.

Outer regional and remote LGA's with persistent chronic health conditions and risk factors

These include Georgetown and Break O' Day in the North-East; Circular Head in the North West; the West Coast; the Central Highlands, Southern Midlands, Derwent Valley and Tasman in the South.

In all these LGA's there were significant cohorts of people with more than three health risk factors and five reported common chronic conditions which is higher than the Tasmanian average.

This is not an exclusive list, with Sorell having higher than average chronic conditions, risk factors and Socio-Economic Indexes for Areas (SEIFA) scores along with the LGA's of Devonport, Burnie, Dorset, Kentish, Northern Midlands and Waratah/Wynyard.

Inner regional LGA's with persistent chronic health conditions and risk factors

In Brighton and Glenorchy there were significant cohorts who were reported to have more than three health risk factors and five common chronic conditions which is higher than the Tasmanian average.

Very remote LGA's with persistent chronic health conditions and risk factors

Based on the Accessibility/Remoteness Index of Australia (ARIA) these two LGA's are classified as very remote. These LGA's have unique chronic health profiles, population needs and health service funding. Flinders Island (which includes Cape Barron Island) has among the highest mortality of any Tasmanian LGA with a range of chronic disease and risk factors impacting the health of the smaller population of which approximately 16.5 per cent is indigenous. Flinders Island has a large number of visiting and commissioned health services. The larger King Island population has multiple preventable chronic disease risk factors developing at an earlier age. The island experiences ongoing health prevention and allied health service gaps. Due to the small population numbers of both islands health data is sometimes not available or published.

LGA's with significantly lower chronic health conditions and risk factors

In contrast the two out of the 29 LGA's in Tasmania with lower estimated multiple risk factors and related chronic disease were Hobart and Clarence. The data for Meander Valley, which reflected a lack of chronic disease in earlier prevalence and risk factor estimates, has been proved to be mixed in the latest *2016 Tasmanian Population Health Survey* data summarised in Table 8 (page 32).

6.2   Chronic Disease by socioeconomic status

People who live in areas of more socioeconomic disadvantage are more likely to take part in risky health behaviors, and in particular combinations of risk factor behaviors. It is estimated socio-economic variability accounts for 21per cent of the difference in disease burden nationally (refer to section 4), with chronic disease and injuries predominating. Or in other words, a 21per cent reduction of burden could be achieved if all of the five socioeconomic groups experienced the same disease burden as the highest socio-economic group.[55]

Compared to the rest of Australia, Tasmania has the highest proportion of people living below the poverty line as a result of very low median incomes and a high reliance on government income support payments.

The *Report on the Tasmanian Population Health Survey 2016* key findings included that:

- significantly more Tasmanians reported financial hardship and food insecurity compared to previous years.

- socio-economic disadvantage significantly contributed to poor self-assessed health, poor dental health and low health literacy.

The estimated unemployment rate for Tasmania in 2011was the highest of all jurisdictions at 7.4%, compared with 5.2 per cent nationally[56]. Additionally, the estimated long-term unemployment rate for Tasmania (1.5%) was the highest in the country, as was the estimated under-employment rate (9.3%).

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[55] Australian Institute of Health and Welfare (2011) *Australian Burden of Disease Study- Impact and causes of illness and deaths in Australia 2011, page* pvii
[56] 2016 ABS figures have not been released.

Further, the highest education level obtained on average in Tasmania is, for the most part, well below most other jurisdictions. These combined factors have the effect of lowering the health status of Tasmanians with a subsequent higher prevalence of behavioural risk factors and hospitalisations.

Five out of the 29[57] LGAs[58] were included in the lowest 53 SEIFA ranked LGAs in Australia[59]. These LGAs are indicated in the Map 2 by the dark red shading. In order of socio-economic disadvantage they are:

1. Brighton
2. George Town
3. Break O Day
4. Derwent Valley and
5. West Coast.

Low ranking across one or more of the indexes is a strong indicator of probable health risk factors and chronic disease. For example, smoking and obesity are strongly related to socio-economic status, with smoking and obesity around twice as common for Tasmanians living in the most disadvantaged areas.

Self-assessed health, as well as PPHs and avoidable mortality, also showed significantly better health for Tasmanians living in higher socio-economic areas. Socio-economic disadvantage also adversely affects participation in cancer screening and cancer survival rates.

Map 2: 2011 Index of Relative Socio-Economic Advantage and Disadvantage by LGA

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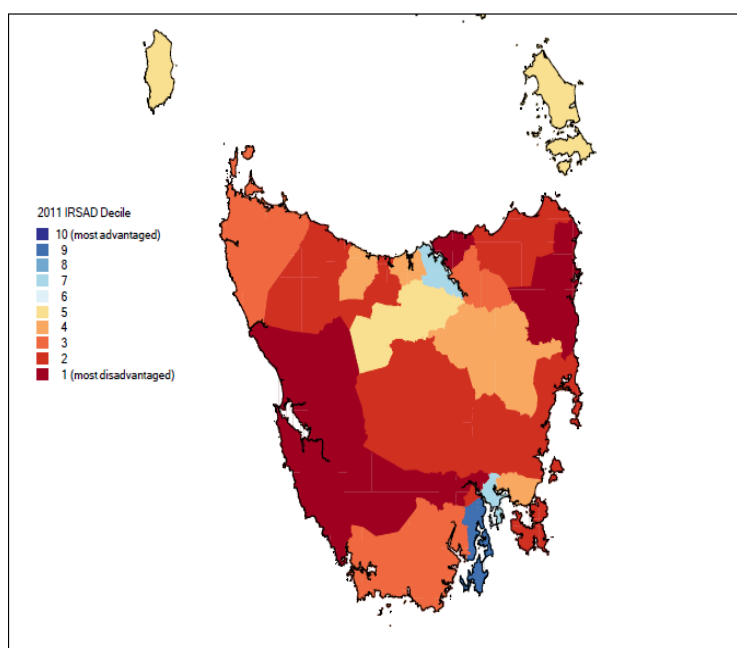
[57] Refer to Appendix A for a detailed map of Tasmania's LGAs.

[58] LGAs are different to Socio Economic Index for Areas (SEIFA). However, by using LGAs for Tasmania allows service planners to better target and analyse the presence of risk factors and chronic diseases prevalent in the community.

[59] The SEIFA is an Australian Bureau of Statistics indicator that ranks geographic areas across Australia in terms of their relative socio-economic advantage and disadvantage. It is derived from the Australian Bureau of Statistics Census of Population and Housing. The table of the Relative Socio-Economic Advantage and Disadvantage index is one of four indexes used by the ABS to explore different aspects of socioeconomic conditions by geographic areas. This index is often used to find areas of disadvantage for allocation of services.

[59] Australian Institute of Health and Welfare (2011) *Australian Burden of Disease Study - Impact and causes of illness and deaths in Australia 2011, page* pvii

6.3   Chronic disease and Aboriginal and Torres Strait Islander Population

On average Aboriginal and Torres Strait Islander Australians report having lower incomes, higher rates of unemployment, lower educational attainment, and more overcrowded households than other Australians. Many of these inequities find their origin in greater socio-economic disadvantage, with Indigenous people generally being worse off than non-Indigenous people when it comes to the social determinants of health.

There are significant health inequities between the Indigenous and non-Indigenous populations.

Aboriginal and Torres Strait Islander people have higher prevalence rates of many health conditions, particularly circulatory diseases (including heart disease), diabetes, respiratory diseases, and kidney disease. They also have a lower life expectancy and more disabilities.

In 2016, 4.6 per cent (23,572 residents) of Tasmania's population identified as being of Aboriginal, Torres Strait Islander, or both Aboriginal and Torres Strait Islander origin, well above the Australian proportion of 2.8 per cent[60].

The *Report on the Tasmanian Population Health Survey 2016* key findings identified that more Tasmanians reporting high levels of psychological distress in 2016 than in 2009, particularly among Aboriginal and Torres Strait Islanders and young people.

The health of Tasmanian Indigenous communities continues to be worse than non-Indigenous Tasmanians with a lower life expectancy. Further, Tasmanians Indigenous population has core mobility limitations nearly three times the non-Indigenous rate and much poorer self-assessed health status compared to non-Indigenous Tasmanians.

Reliable estimates of Aboriginal and Torres Strait Islander life expectancy in Tasmania are also confounded by identification issues such as uncertainty regarding Indigenous identification in deaths data and Census data collections.

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[60] Australian Bureau of Statistics (2016) Census Website, viewed 19 July, 2017,
http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/6?opendocumen

7. Prevention

At least 31per cent of the burden of disease in Australia in 2011 was preventable, due to modifiable risk factors. The risk factors causing the most burdens were:

- daily smoking

- dietary risks (joint effect of all dietary risks)

- physical inactivity

- risky alcohol consumption (for long-term health)

- inadequate consumption of fruit and vegetables, and consumption of whole milk

- obesity (described by both BMI and waist circumference)

- high blood pressure (also known as hypertension).

These risk factors align with those in the column headings in Table 1, and reflect data collected by the National Health Survey (NHS). In treating or preventing chronic diseases, it is often important to target associated behavioural risk factors to limit the diseases' development or progression.

7.1 WHO Global Action Plan

As a member state of the World Health Organisation (WHO) Australia has an international commitment to address chronic diseases in line with the *WHO Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013-2020*.

Noncommunicable diseases (NCDs) – mainly cardiovascular diseases, cancers, chronic respiratory diseases and diabetes – are the biggest cause of death worldwide. More than 36 million die annually from NCDs (63 per cent of global deaths), including 14 million people who die too young before the age of 70. More than 90 per cent of these premature deaths from NCDs occur in low- and middle-income countries, and could have largely been prevented. Most premature deaths are linked to common risk factors, namely tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol[61].

The NCD Global Monitoring Framework (the Framework) comprises 9 voluntary WHO member global targets and 25 indicators. The framework is expected to drive progress in prevention and control of NCDs and provide the foundation for advocacy, raising awareness, reinforcing political commitment and promoting global action to tackle these deadly diseases.

7.2 National Strategic Framework for Chronic Conditions

The National Strategic Framework for Chronic Conditions (the Framework) supports Australia's international commitments and provides national guidance for a multi-sectoral response in the prevention and management of chronic conditions. The Framework is an Australian Health Ministers' Advisory Council (AHMAC) high level agreed guide to work towards the delivery of a more effective and coordinated national response to chronic conditions. A focus on prevention can significantly reduce the volume and severity of chronic conditions and provide long-term savings and better health outcomes[62].

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[61] As referenced in *WHO Global Action Plan for the Prevention and Control of NCDs 2013-20120 - website 2017*

[62] COAG (2017) National Strategic Framework for Chronic Conditions, page 5

Targeting interventions to particular places only, or basing funding models solely on providing care and protection services only for the most disadvantaged groups does not necessarily alter the structural forces or social determinants of health impacting on those groups. A stronger emphasis on population-based primary health approaches and population health strategies is required, and policies and regulations in non-health sectors are needed to address the underlying social causes of unhealthy behaviours and inequitable health outcomes.

On the following page Figure 11the *National Strategic Framework for Chronic Conditions* provides a concept map of the Framework that will guide the long term sustainability of Australia's health system and reduce the impact of chronic disease, and provide access to better care for people with, chronic conditions.

Figure 11: National Strategic Framework for Chronic Conditions Concept Map
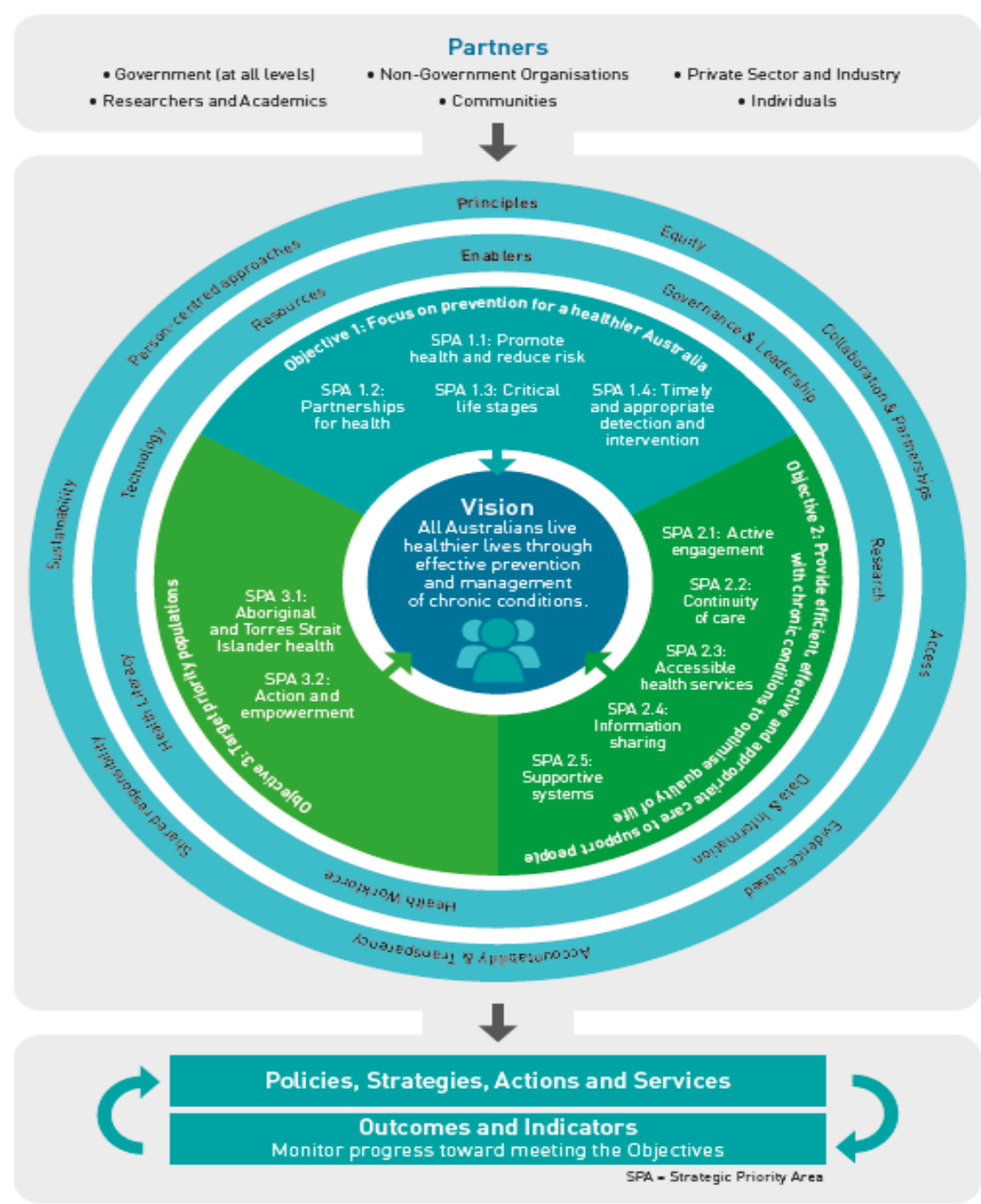
7.3 Protective Factors

Protective factors are health determinants that affect health in a positive way. For example, regular physical activity has definite health benefits as it can help with the control of blood pressure or excess body weight.

A good diet can also be protective; for example, diets high in fruits and vegetables, and low in saturated fat, can protect against certain cancers and heart disease (NHMRC 2003)[63].

Protective factors are often the focus of advertising campaigns that encourage positive health behaviours. Both government (state and territory and Australian) and non-government organisations conduct health campaigns that target improvements in health behaviours. Broader government initiatives, such as better public health education or reformulation of foods to reduce salt content.

For some risk factors their absence may be indicative of a protective factor, but not in all cases. For example, if a person smokes they have a much greater risk of developing lung cancer, but if they do not smoke they are not necessarily protected from developing lung cancer.

7.4 Health Promotion

The DHHS *working in health promoting way* 2016 Summary Paper identifies health is a positive concept. It includes people's social and personal resources, as well as physical capacities. Health promotion is the process of enabling people to increase control over, and to improve their health. It is about promoting wellbeing, preventing disease building resilience and developing protective factors[64].

The DHHS *Healthy Tasmanian Five Year Strategic Plan* identified four community led priority areas that include healthy eating and physical activity. Purchasing deliverable strategies to increase these protective factors is a future SoPI goal.

Social gradient is the strongest predictor of health and wellbeing. In promoting health and wellbeing service planners need to focus on the issues most relevant to people's lives. Essential to addressing the determinants of health is a cross-sectoral and cross-departmental approach[65].

The WHO recognises that influencing public policies in sectors outside of health which tackle the determinants of health, will enable health systems to respond more effectively and equitably to the health care needs of people with chronic conditions.

7.5 Chronic disease screening in Tasmania

The aim of preventive screening is to reduce the burden of chronic diseases, such as cardiovascular diseases, diabetes, and bowel cancer with an early diagnosis and treatment.

The *Report on the Tasmanian Population Health Survey* 2016 indicates that screening rates for blood pressure, cholesterol and diabetes have remained relatively stable since 2009.Screening participation increases with age for all types of preventive health screening, with higher proportions of Tasmanians aged 45 years and over participating in all types of preventive health screening compared to younger age groups.

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[63] As referenced in AIHW Chronic disease risk factors - *Health behaviors and their role in prevention of chronic disease* –online version

[64] DHHS *Working in health promoting ways* – a framework for health and community services - Summary Paper page 6

[65] DHHS *Working in health promoting ways* – a framework for health and community services - Background Paper page 22

Bowel cancer screening has increased significantly compared to both 2009 and 2013, possibly as a result of more Tasmanians being eligible to participate in the National Bowel Cancer Screening Program.

Table 14: Participation in preventive health screening^, 18 years and over, Tasmania 2009 to 2016

Screening type	2009 %	2009 95% CI	2013 %	2013 95% CI	2016 %	2016 95% CI
Blood pressure	81.5%	[80.2%,82.8%]	83.3%	[81.6%,84.9%]	82.4%	[80.5%,84.1%]
Cholesterol	53.2%	[51.8%,54.6%]	57.2%	[55.6%,58.8%]	54.9%	[53.0%,56.9%]
Diabetes/hyperglycaemia	50.7%	[49.3%,52.2%]	52.7%	[51.0%,54.3%]	50.3%	[48.3%,52.2%]
Bowel cancer	20.7%	[19.7%,21.8%]	25.4%	[24.3%,26.6%]	32.1%*#	[30.5%,33.8%]

Tasmanian Population Health Survey 2009, 2013, 2016; ^during the previous 2 years; *statistically significant compared with 2013; #statistically significant compared with 2009

7.6 Primary Health Care and Health Prevention

Primary health care is generally the first point of contact that people (those who are healthy and people who have chronic conditions) have with the health system. 'Primary health' broadly encompasses health care that is not related to a hospital visit, and includes activities such as health promotion, prevention, early intervention, treatment of acute conditions, and management of chronic conditions.

The primary health system is undergoing constant reform and facing the challenges of increasing chronic disease prevalence, an ageing population, treatment of increasingly complex mental health conditions and limited shared data to guide decision making.

Acute Strategy is particularly interested in evidence and data that can:

• facilitate more effective co-ordination between primary health care and acute care; and

• sponsor models of effective health prevention and health promotion that will reduce Tasmania's chronic disease burden and reliance on the acute hospital system

It is useful to make the distinction between primary, secondary and tertiary health prevention.

Primary health prevention reduces the incidence of disease and health problems within the population, either through universal measures that reduce lifestyle risks and their causes or by targeting high risk groups. More systematic primary prevention in general practice has the potential to improve health outcomes and save costs.

Evidence-based interventions include: supporting individuals to change behaviours, for example, through brief advice during a consultation; systematic community interventions in schools to reduce childhood obesity; and regulatory actions, such as controlling the density of alcohol outlets[66].

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[66] NHS Kings Fund *transforming our health care system* C Naylor et al 2015 page 4

Secondary health prevention systematically detects the early stages of disease and intervenes before full symptoms develop. Secondary prevention is based on a range of interventions that are often highly cost-effective and that, if implemented at scale, would rapidly have an impact on life expectancy. Secondary prevention largely involves the systematic application of standard, low-technology and low-cost interventions and screening[67]. Evidence suggests that this is an area where the 'inverse care law' applies and those in greatest need are least likely to receive beneficial services.

Tertiary health prevention aims to soften the impact of long term disease and disability, minimise suffering and maximise potential years of life[68]. Examples include chronic disease management programs and support groups that allow members to share strategies for living well.

7.7   Primary and Community Sector Purchasing

Health services provided in the primary and community sectors are essential to health care delivery in Tasmania. These services assist the well to remain so, prevent acute events, and, where possible, avoid or mitigate chronic health conditions. The activities that occur in the primary and community sectors impact upon the kinds and levels of demand experienced by the acute sector, and it is therefore important to understand and measure the needs and service usage of these services so the most appropriate services are purchased/commissioned for the greatest positive effect.

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[67] NHS Kings Fund *transforming our health care system* C Naylor et al 2015 page 5

[68] Betancourt at el (2015), *Monitoring chronic diseases in Canada; the Chronic Disease Indicator Framework,* Chronic Dis Inj Can, Suppl 1:1-30**,**   page 4

8. Chronic Disease Future Purchasing Strategies

8.1 Chronic Disease Purchasing Rationale

Building on national evidence and local research consolidated over the last 18 months, PPP-AS will plan the purchase of health services based on the rationale that **health risk factors and chronic disease in Tasmania are:**

Table 15: Chronic Disease Purchasing Rationale	
Prevalent	Prevalent as evidenced by 5.2 per cent reported increase in Tasmanians diagnosed with three or more chronic conditions between 2016 (21.5%) and 2009 (16.3 %)[69].
Severe	The high number of multimorbid patients and Tasmanians with years of life lost for both non-fatal (living with disease) and fatal (dying from a disease). The cost on the health system and reliance on the acute care system is unsustainable.
Not Selective	Affect large numbers of Tasmanians across all regions as well as targeted priority populations.
Best planned at an LGA level as well as the regional level	LGA and regional level planning including rural inpatient facility health users. It is anticipated that common risk factors & chronic diseases and the delineated clinical services and service gaps by LGA, will be become available on *The LIST* health facility portal geo-spatial maps under development by PPP and DPIWE in the future.
Amenable to intervention	For ongoing discussion and analysis. DHHS is interested in targeting risk factors that lead to the reduction of the greatest burden of disease that are amenable to a range of brief, anticipatory and long-term interventions. This includes early intervention; community led approaches and service purchasing linked to the TRDF/CSP expansion as well as Government priority and opportunistic purchasing strategies. LGAs and hospitals which do not have effective local risk factor prevention/promotion services or do not have a network of chronic disease linked primary, allied and acute services should be prioritised by the THS and DHHS.

Future purchasing strategies should be guided by a consideration of health needs. Need is an important concept in public health. It is used in the planning and management of health services including health improvement, resource allocation and equity. However, need is a multi-faceted concept with no one universal definition. Hawe et al (1990) describe how gathering evidence using Bradshaw's 'four dimensions of need' provides a starting point to evaluate needs. The greater integration of these four dimensions of needs will lead to better targeting of services.

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[69] DHHS (2016) *Tasmanian Population Health Survey 2016,* Public Health Services *website:* http://www.dhhs.tas.gov.au/publichealth/epidemiology/tasmanian_population_health_survey_2016

Jonathan Bradshaw developed this seminal model of social health need in his 1972 paper '*The concept of social need*' of which the four dimensions are summarised in the table below.

Table 16: Bradshaw's four dimensions of needs

Type of social health need	Limitations of each single need dimension
Normative need – refers to what expert opinion defines as need.	Normative standards differ over time and vary between peak bodies and experts.
Expressed need – refers to what can be inferred about the need based on service utilisation.	Only measures services that are being provided. Therefore may not capture service gaps. Can be misinterpreted based on supply/demand factors; efficiency/inefficiency factors and data availability, alignment and coding.
Comparative need – derived from examining the services provided in one area and using as a basis to determine services needed in another area with a similar population.	Similarity may not reflect adequate or appropriate service provision.
Felt need – what people in a community say they need or what they think are the problems. Sourced directly or through surveys.	Are the needs representative? Are they solution focused and do they capture the expectations of a majority of the community?

To ground the SoPI purchasing intention process, PPP has in addition to its national and local data analysis (expressed and comparative need) and literature review (normative need) visited all the rural inpatient hospitals (RIFs) and many community health centres (assessing felt need). These rural and remote facilities sit in many of the LGAs most affected by chronic disease and form the bridge between community based chronic disease services (including a range of private and community health providers) and the four acute public hospitals.

The joint DHHS/THS expansion of the 2017 TRDF and CSP will support the SoPI. Role delineation can guide hospitals and health facilities within a multi-hospital health system to plan and develop their services to the level that is necessary to meet the needs of their catchment population, thus ensuring services are configured for quality care, while also improving local access.

The integration of 'needs' and delivering targeted services to the right populations will be a challenge for the DHHS and THS. This challenge can be addressed through clear and common SoPI chronic disease purchasing intents.

Consultation within the DHHS, THS and cross-sectoral stakeholders is ongoing. A future goal is to engage with service users in the development of future versions of the SoPI with a particular focus on improving access to better health services, health prevention (primary, secondary and tertiary) and chronic disease self-management.

8.2   Future Purchasing Strategies

Further monitoring and surveillance of chronic disease is crucial for guiding preventive measures, determining clinical care and informing health policy and service planning. Research efforts need to be further focused on strengthening evidence-based practice for the prevention of risk factors and multi-morbidity and guide inter-sectoral collaboration and commissioning of health promotion and anticipatory approaches.

The diagram below represents high level purchasing strategies that could be considered by the service provider and service delivery planner in collaboration with all health sectors, including acute, community and primary care:

Figure12: High level future SoPI purchasing strategies

Access & Prevention	• Improve equitable access to quality health care particularly for remote communities and people who don't regularly access primary & preventitive services. • Implement population-based health programs to reduce lifestyle-related risk factors • Support the development of statewide Models of Care to assist in reducing lifetsyle related risk factors prevalant within region and/or LGA.
Early Detection & Education	• Establish and promote risk factor related programs to understand the early detection and screening of chronic disease. • Structured lifestyle education sessions in primary and secondary schools involving the family, local recreational, community and sporting organisations. • Promote health literacy linking risk factors and chronic disease.
Chronic Disease Self-management	• Improve options for informed and active chronic disease self-management and family & peer support. • Support the transition from acute care to a culture that supports patient-centered care, hospital avoidance, self-managment and increased primary and allied health care options.
Health Promotion Capacity Building	• Promote 'continuity of care' and 'anticipatory care' through cross sector collaboration, data sharing and community involvement. • Support the development of shared 'care' planning between DHHS, THS, Primary Health Tasmania, local Councils, service providers and innovators.
Chronic Disease Purchasing	• Align Government strategic directions and health system purchasing priorities. • Report and evaluate the purchasing actions and intent.

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10. **Appendices**

Appendix A: Tasmania Local Government Areas

Appendix B: Hospital Separations by LGA

Appendix C: Cancer Incidence rates by LGA

Appendix D: Tasmanian Chronic Disease Prevalence Data by LGA

Appendix E: Table of prevalence & burden of chronic disease data sources

Appendix A: Tasmania Local Government Areas

The map of the 29 Tasmanian LGAs is reproduced from the Local Government Association Tasmania website.

Appendix B: Hospital Separations by LGA

Respiratory Disease

The 12 LGAs with the highest average annual rates of hospital separations for respiratory diseases[70] as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
King Island	201	25.0	21.6-28.7
Flinders	97	24.4	19.8-29.8
George Town	710	20.8	19.3-22.4
Devonport	2637	20.5	19.8-21.3
Derwent Valley	983	19.8	18.6-21.1
Break O Day	635	19.7	18.2-21.3
Dorset	674	18.8	17.4-20.3
Tasman	217	18.1	15.8-20.7
Brighton	1368	17.3	16.4-18.3
Glenorchy	3929	17.3	16.7-17.8
Circular Head	697	16.8	15.6-18.1
Latrobe	861	16.3	15.3-17.5

Cardiovascular Disease

The 12 LGAs with the highest average annual rates of hospital separations for cardiovascular diseases[71] as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
Flinders	158	39.8	33.9-46.5
King Island	271	33.7	29.8-37.9
Break O Day	1084	33.7	31.7-35.7
Tasman	306	25.6	22.8-28.6
Devonport	3207	25.0	24.1-25.9
Glamorgan/Spring Bay	551	24.9	22.8-27.0
Glenorchy	5549	24.4	23.8-25.1
Central Coast	2714	24.3	23.4-25.2
Latrobe	1266	24.0	22.7-25.4
Waratah/Wynyard	1702	23.8	22.7-25.0
Dorset	848	23.7	22.1-25.4
Derwent Valley	1171	23.6	22.3-25.0

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[70] ICD-10-AM J00-J99

[71] ICD-10-AM I00-I99

Cerebrovascular Disease

The 12 LGAs with the highest average annual rates of hospital separations for cerebrovascular diseases[72] as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
King Island	60	7.5	5.7-9.6
Flinders	23	5.8	3.7-8.7
Break O Day	174	5.4	4.6-6.3
Devonport	464	3.6	3.3-4.0
Central Coast	382	3.4	3.1-3.8
Latrobe	178	3.4	2.9-3.9
Dorset	119	3.3	2.8-4.0
Circular Head	138	3.3	2.8-3.9
West Coast	77	3.2	2.6-4.0
Glamorgan/Spring Bay	70	3.2	2.5-4.0
Southern Midlands	93	3.0	2.4-3.6
Waratah/Wynyard	210	2.9	2.6-3.4

Dementia

The 12 LGAs with the highest average annual rates of hospital separations for dementia[73] as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
Flinders	14	3.5	1.9-5.9
Huon Valley	262	3.3	2.9-3.7
King Island	26	3.2	2.1-4.7
Clarence	826	3.1	2.9-3.3
Hobart	774	3.1	2.9-3.3
Glenorchy	690	3.0	2.8-3.3
Devonport	345	2.7	2.4-3.0
Dorset	94	2.6	2.1-3.2
Brighton	207	2.6	2.3-3.0
Kingborough	444	2.5	2.3-2.8
George Town	85	2.5	2.0-3.1
Sorell	162	2.4	2.1-2.8

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[72] ICD-10-AM I60-I69

[73] ICD-10-AM F00-F03

Musculoskeletal Disease

The 12 LGAs with the highest average annual rates of hospital separations for musculoskeletal diseases as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
Sorell	2384	35.4	34.0-36.8
Tasman	422	35.2	32.0-38.8
Glamorgan/Spring Bay	758	34.2	31.8-36.7
Clarence	8715	32.7	32.0-33.4
Central Highlands	383	32.5	29.3-35.9
Derwent Valley	1550	31.3	29.7-32.9
Glenorchy	6932	30.5	29.8-31.2
Southern Midlands	939	29.9	28.0-31.9
Flinders	117	29.5	24.4-35.3
Kingborough	5171	29.5	28.7-30.3
Huon Valley	2143	26.7	25.5-27.8
Hobart	6597	26.2	25.5-26.8

Diabetes

The 12 LGAs with the highest average annual rates of hospital separations for diabetes[74] as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
Glenorchy	788	3.5	3.2-3.7
Flinders	13	3.3	1.7-5.6
Southern Midlands	101	3.2	2.6-3.9
Brighton	242	3.1	2.7-3.5
Sorell	185	2.7	2.4-3.2
Clarence	701	2.6	2.4-2.8
West Coast	62	2.6	2.0-3.3
Break O Day	79	2.5	1.9-3.1
Tasman	26	2.2	1.4-3.2
Derwent Valley	106	2.1	1.8-2.6
Hobart	483	1.9	1.8-2.1
Huon Valley	144	1.8	1.5-2.1

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[74] ICD-10-AM E10-E14

Mental Disorders

The 12 LGAs with the highest average annual rates of hospital separations for mental disorders[75] as a principle diagnosis from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
Glenorchy	9144	40.2	39.4-41.0
Hobart	9990	39.6	38.8-40.4
Clarence	10428	39.1	38.4-39.9
Sorell	2136	31.7	30.4-33.1
Kingborough	4689	26.7	26.0-27.5
Derwent Valley	1276	25.7	24.4-27.2
Huon Valley	1849	23.0	22.0-24.1
Burnie	2265	22.6	21.7-23.5
Brighton	1760	22.3	21.3-23.4
Waratah/Wynyard	1384	19.4	18.4-20.4
Glamorgan/Spring Bay	398	18.0	16.2-19.8
Central Coast	1992	17.8	17.1-18.6

Alcohol Attributable Hospital Separations

The 12 LGAs with the highest average annual rates of alcohol attributable hospital separations from 2011 to 2015

LGA	Separations	Crude rate/1,000	95% CI
Sorell	893	13.3	12.4-14.2
Clarence	3231	12.1	11.7-12.5
Hobart	3029	12.0	11.6-12.4
Glenorchy	2596	11.4	11.0-11.9
Derwent Valley	560	11.3	10.4-12.3
Glamorgan/Spring Bay	219	9.9	8.6-11.3
Break O Day	317	9.8	8.8-11.0
Huon Valley	791	9.8	9.2-10.5
King Island	77	9.5	7.5-11.9
Flinders	37	9.2	6.5-12.7
Brighton	707	9.0	8.3-9.6
Tasman	106	8.8	7.2-10.7

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[75] ICD-10-AM F00-F99

Appendix C: Cancer Incidence rates by LGA

All Cancer incidence rates

The 12 LGAs with the highest average annual incidence rates of cancer (all-cause) from 2010 to 2014

LGA	Incident cases	Crude rate/100,000	95% CI
Glamorgan/Spring Bay	240	1082.9	950.3-1229.0
Flinders	36	907.3	635.4-1256.0
Break O Day	286	888.0	788.0-997.1
Tasman	93	776.8	627.0-951.7
Devonport	958	746.3	699.8-795.1
King Island	58	720.4	547.0-931.3
George Town	240	703.2	617.0-798.0
Clarence	1870	701.3	669.9-733.8
West Coast	166	697.4	595.3-811.9
Waratah/Wynyard	496	693.9	634.2-757.8
North Midlands	429	673.1	610.9-739.9
Dorset	240	670.7	588.5-761.1

Appendix D: Tasmanian Chronic Disease Prevalence Data by LGA

Estimated Prevalence of Respiratory System Diseases:

Chronic disease (modelled estimates), 2011–12 - Age-standardised rate per 100 >>
Respiratory system diseases, all ages

Select data for M...		Filter to an area		Data notes

Local Government Areas
- 30.7 - 32.0
- 32.1 - 32.6
- 32.7 - 33.1
- 33.2 - 35.4
- 35.5 - 37.2
- ^

Hobart/Non-metropolitan Ta

Note: The extent to which these estimates may vary is shown by the upper and lower limits. These can be seen by hovering the mouse pointer over the bar chart.
^ modelled estimates not produced for Very Remote
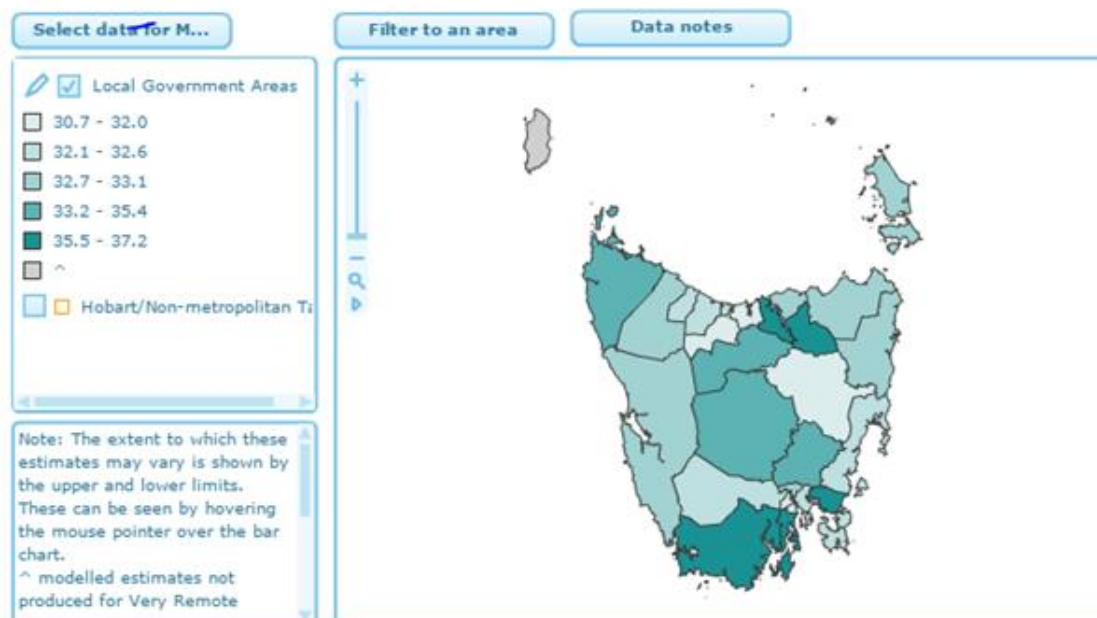
Chronic disease (modelled estimates), 2011–12 - Age-standardised rate per 100 >>
Musculoskeletal system diseases, all ages

Estimated Prevalence of Musculoskeletal System Diseases:

Click to toggle the data menu
- 25.0 - 29.7
- 29.8 - 30.1
- 30.2 - 30.5
- 30.6 - 31.5
- 31.6 - 34.7
- ^

Hobart/Non-metropolitan Ta

Note: The extent to which these estimates may vary is shown by the upper and lower limits. These can be seen by hovering the mouse pointer over the bar chart.
^ modelled estimates not produced for Very Remote

© Copyright
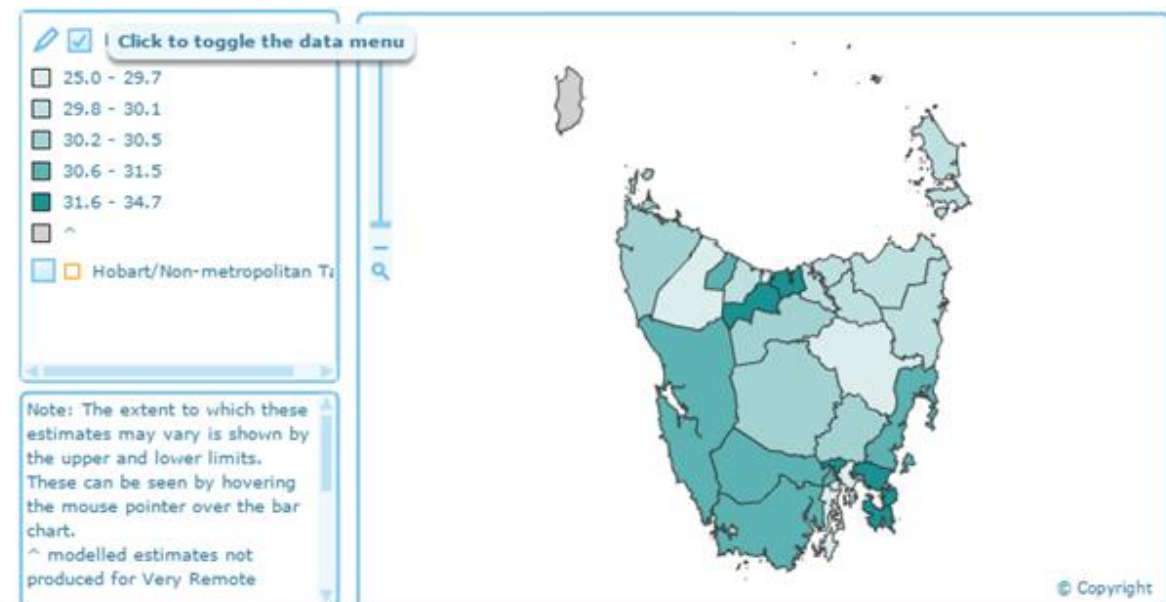
Estimated Prevalence of Diabetes Mellitus:

Chronic disease (modelled estimates), 2011–12 - Age-standardised rate per 100 >> Diabetes mellitus, people aged 18 years and over

Legend:
- Local Government Areas
- 4.1 - 4.8
- 4.9 - 5.0
- 5.1 - 5.3
- 5.4 - 5.5
- 5.6 - 6.7
- ^
- Hobart/Non-metropolitan Tas

Estimated Prevalence of Mental & Behavioural Problems:

Chronic disease (modelled estimates), 2011–12 - Age-standardised rate per 100 >> Persons with mental and behavioural problems, all ages

Select data for M...   Filter to an area   Data notes

Legend:
- Local Government Areas
- 13.5 - 14.1
- 14.2 - 14.7
- 14.8 - 15.3
- 15.4 - 16.2
- 16.3 - 16.9
- ^
- Hobart/Non-metropolitan Ta

Note: The extent to which these estimates may vary is shown by the upper and lower limits. These can be seen by hovering the mouse pointer over the bar chart.
^ modelled estimates not produced for Very Remote

Health risk factors, adults (modelled estimates), 2014–15 - Age-standardised rate per 100 >> High or very high psychological distress levels (K-10), people aged 18 years and over

Estimated Prevalence of High or Very High Psychological Distress:

Health risk factors, adults (modelled estimates), 2014–15 - Age-standardised rate per 100 >>
High or very high psychological distress levels (K-10), people aged 18 years and over

Select data f...

Local Government Areas
- 9.7 - 11.7
- 11.8 - 12.1
- 12.2 - 13.0
- 13.1 - 15.4
- 15.5 - 20.5
- ^

☐ Hobart/Non-metropolitan Ta

Note: The extent to which these estimates may vary is shown by the upper and lower limits. These can be seen by hovering the mouse pointer over the bar chart.

^ modelled estimates not

© Copyright

Estimated Prevalence of Circulatory System Disease:

Chronic disease (modelled estimates), 2011–12 - Age-standardised rate per 100 >>
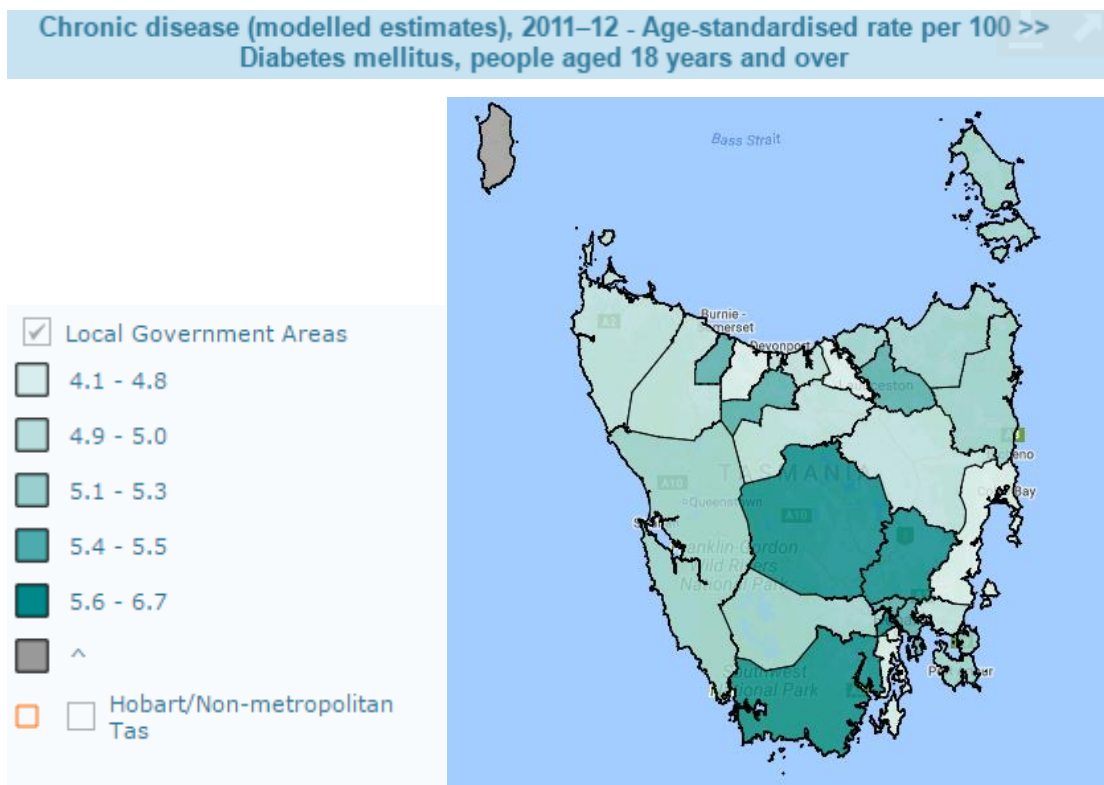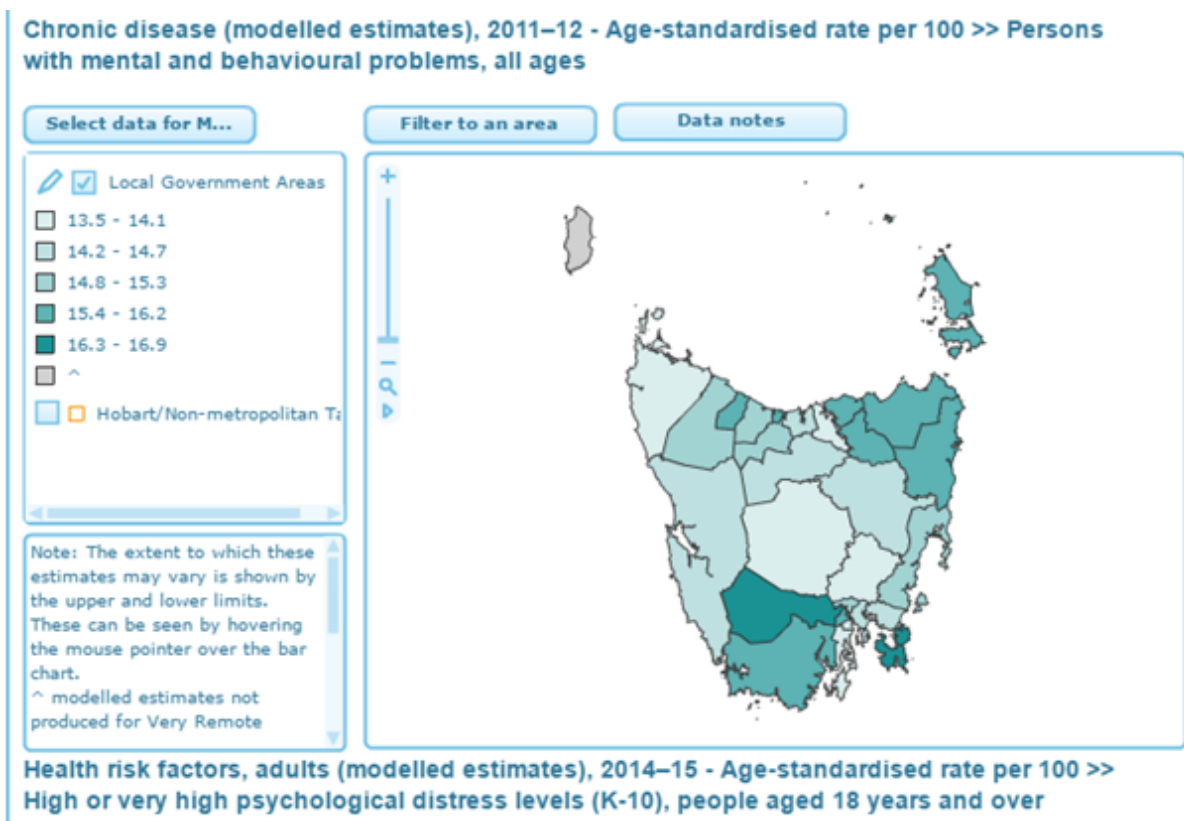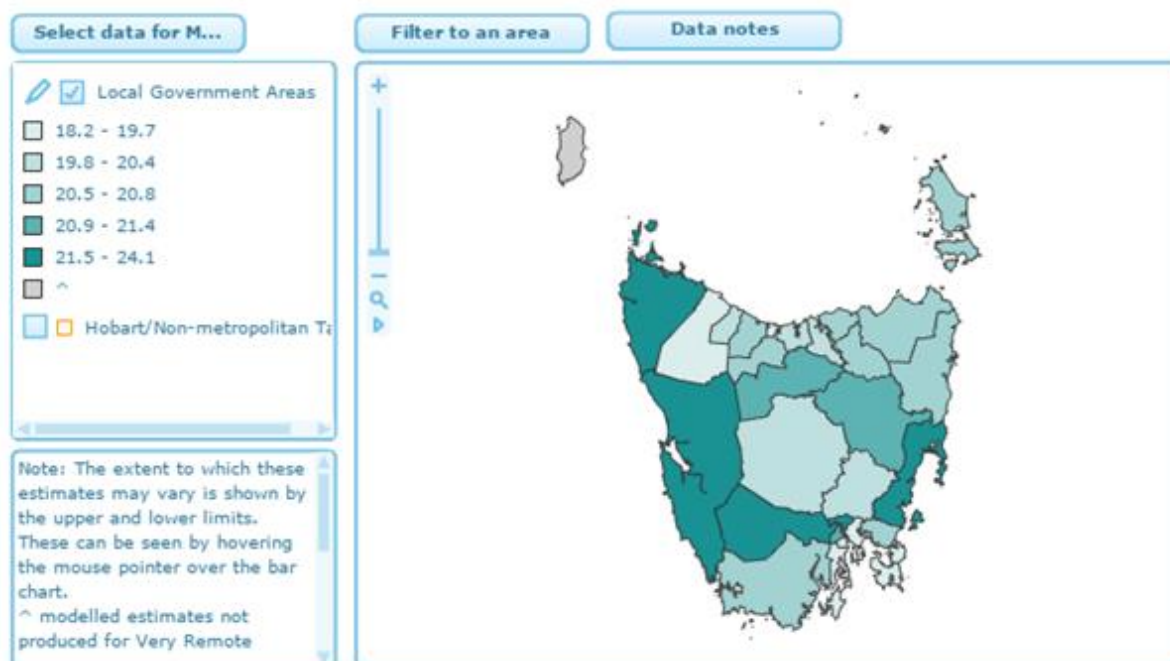Circulatory system diseases, people aged 2 years and over

Select data for M...   Filter to an area   Data notes

Local Government Areas
- 18.2 - 19.7
- 19.8 - 20.4
- 20.5 - 20.8
- 20.9 - 21.4
- 21.5 - 24.1
- ^

☐ Hobart/Non-metropolitan Ta

Note: The extent to which these estimates may vary is shown by the upper and lower limits. These can be seen by hovering the mouse pointer over the bar chart.
^ modelled estimates not produced for Very Remote

Estimated Prevalence of Arthritis:

Chronic disease (modelled estimates), 2011–12 - Age-standardised rate per 100 >> - Arthritis, all ages

Select data f...

	Local Government Areas
☐	13.9 - 16.8
☐	16.9 - 18.2
☐	18.3 - 18.6
☐	18.7 - 19.1
☐	19.2 - 19.5
☐	^
☐	Hobart/Non-metropolitan Ta

Note: The extent to which these estimates may vary is shown by the upper and lower limits. These can be seen by hovering the mouse pointer over the bar chart.
^ modelled estimates not produced for Very Remote

© Copyright
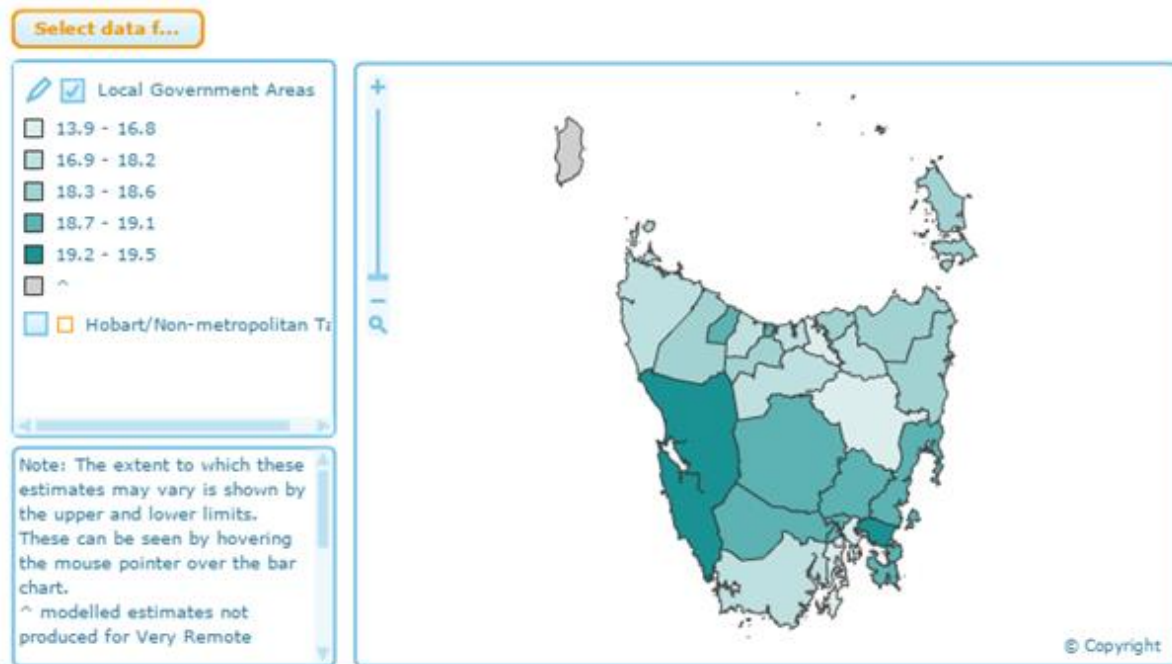
Appendix E: Table of prevalence & burden of chronic disease data sources

Data Focus	Source of Data	Web or Intranet Link
Global health and equity data	WHO	http://www.who.int/gho/en/
Economic and social wellbeing data	OECD	https://data.oecd.org/
Health system data	NHS	https://www.england.nhs.uk/ourwork/tsd/data-info/open-data/
National & high level State health and welfare data	AIHW & DoH	http://www.aihw.gov.au/chronic-diseases/ http://www.aihw.gov.au/australias-health-publications/ http://www.health.gov.au/internet/main/publishing.nsf/content/nsfcc
National & high level State health, economic, social, population data and trends	ABS	http://www.abs.gov.au/Health-Conditions-and-Risk-Factors http://www.abs.gov.au/Mental-Health http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2014-15~Main%20Features~About%20the%20National%20Health%20Survey~3
Social Health Atlas – health and health determinants by population health areas; local govt areas & primary health networks	Public Health Information Development Unit (PHIDU) – Torrens University	http://phidu.torrens.edu.au/
Australian Health Tracker – risk factor and early death estimates determinants by population health areas; local govt areas & primary health networks	Australian Health Policy Collaboration (AHPC at Victoria University & PHIDU)	http://www.atlasesaustralia.com.au/ahpc/
Australian Atlas of Healthcare (Provision) Variation data	Australian Commission on Safety and Quality in Health Care	https://www.safetyandquality.gov.au/atlas/
Public Health Service – DHHS	Recent Reports, Data and Epidemiology Publications	https://www.dhhs.tas.gov.au/__data/assets/pdf_file/0019/132283/Health_Indicators_Tasmania_2013.pdf http://www.dhhs.tas.gov.au/publichealth/about_us/publications/epidemiology_publications

		http://www.dhhs.tas.gov.au/publichealth/about_us/publications
Tasmanian Health Survey 2016 Epidemiology risk factor data by region & LGA	EPI-PPP-DHHS	Upon request
Tasmanian Health Survey 2016 ICD10 mapped hospital chronic disease & cancer prevalence data by LGA	EPI-PPP-DHHS	Upon request
Specialised population data including GP, children and Aboriginal and Torres Strait Island populations	BEACH - Bettering the Evaluation and Care of Health – longitudinal GP data (Sydney University)	Upon request
Acute admitted activity RAW episodes (service level data) & projection modelling:	EPI/FYI/Hardes - DHHS	Upon request
Multi-morbidity data	FYI/Hardes/ PPP-coding - DHHS	Upon request