Working paper #1: The current health innovation and care ecosystem

Eastern Region Health Innovation and Care Economy Project

Victorian Government and Eastern Region Group of Councils, prepared by SGS Economics & Planning

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OFFICES IN CANBERRA, HOBART, MELBOURNE, AND SYDNEY ON THE COUNTRY OF THE NGAMBRI/NGUNNAWAL/NGARIGO, MUWININA, WURUNDJERI, AND GADIGAL PEOPLES.

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Executive summary

Introduction

The project is a region-wide research and engagement project to develop a strategy to advance regional priorities and inform advice to government on the development of a health innovation and care (HI&C) economy in the Eastern Region of Metropolitan Melbourne.

This working paper is the first in the series, it defines the HI&C economy, introduces the concept of economic development and how a regional economy functions, assesses the economic value to HI&C economy generates and maps the current health innovation and care ecosystem by identifying clusters of activity. The working papers provide background material that will be developed through stakeholder engagement.

Working paper findings

The major findings from the paper are outlined below.

A definition

The working paper first defines the HI&C economy as interconnected industries focused on improving health outcomes, delivering better quality care, and reducing the cost of health care delivery through innovation and technology. Four sectors are key to the region's HI&C economy – hospitals, health services, health science and research, and medical manufacturing.

The current HI&C economy in the Eastern Region

The Eastern Region of Melbourne's economy has long been a significant player in health care, with world-class health precincts. Five HI&C economy activity clusters have been identified based on employment across the four HI&C sectors; Monash, Box Hill, Ringwood, Knox and Angliss/Upper Ferntree Gully. In addition to these clusters, there is HI&C economy activity distributed throughout the region. Higher-order functions (like hospitals and research) tend to cluster in precincts, while health care services are more dispersed. Medical manufacturing in more mixed, co-locating in precincts with health assets but also dispersing throughout the region based, it is assumed, on the availability of suitable industrial/commercial land.

The HI&C economy can drive economic development in the region

A regional economy can be thought of as a bucket. A successful regional economy will have more money injected into it (the bucket) than leaking out. The money that is being injected into the economy creates a multiplier effect as local firms hire workers and buy goods and services. Major injections include exports, public investment and expenditure and private investment. In the Eastern Region, the largest export earner is wholesale trade ($5.4 billion), followed by technical, vocational and tertiary education ($2.1 billion) and retail trade ($1.8 billion).

Leakages occur when local firms import inputs to production or when the local economy is dominated by firms owned elsewhere, which sees the wealth generated (as profits and dividends) flowing to shareholders and investors outside the local economy. These leakages dilute the multiplier effect from export sales and other income injections. Sub-industries in the Eastern Region import more than $300 million of goods and services from outside the Eastern Region each year in their production processes

An objective for developing a health innovation and care economy and driving economic development is to maximise the injections from export income and public and private investment while recircling the money in the local economy by minimising income leakages.

The economic impact of the HI&C economy

The economic impact of the HI&C economy is significant and critical to the region's economic performance and prosperity. Economic analysis reveals that:

- The HI&C economy is essential to the people of the Eastern Region. These services help people to lead the life they want, regardless of age, language barriers or disability. Yet health care is also fundamentally an economic driver, generating billions of dollars' worth of economic activity in the region and growing.
- Health care services and medical product manufacturing are already large export earners for the region.
- Health care services (inclusive of hospitals and health care services) is the fourth largest export sub-industry (out of 114) in the region. It exports 27 per cent of its production, for an export value of $1.2 billion.
- Human pharmaceutical and medicinal product manufacturing is the fifth largest export sub-industry in the region. It exports 81 per cent of its production for an export value of $1 billion.
- Both sub-industries have supply chains in the region that contribute to flow-on activity. $866 million worth of goods and services purchasing flows to businesses in the region from the health services sub-industry and $312 million from medical product manufacturing. Key industry links include professional, scientific and technical services, administrative services (for health care services), and professional, scientist and technical services for medical product manufacturing.
- A considerable amount of private investment is already flowing into the region, including for the expansion of the private hospitals at Knox and Box Hill and for expanded and new research capabilities at Monash.
- Public expenditure in HI&C is also booming and is expected to continue. Both the federal and state governments are investing billions in infrastructure and research and recurrent spending for hospital and health services. In the 2022 Victorian budget alone $194.7 million was announced to redevelop the Box Hill public hospital, $44.9 million was announced to redevelop the Maroondah Hospital and $20 million was committed towards the Angliss Hospital upgrades.
- There is a high-level of income leakage. Health care services and medical manufacturing import $1.08 billion annually from outside the region in their supply chains. A 10 per cent reduction in

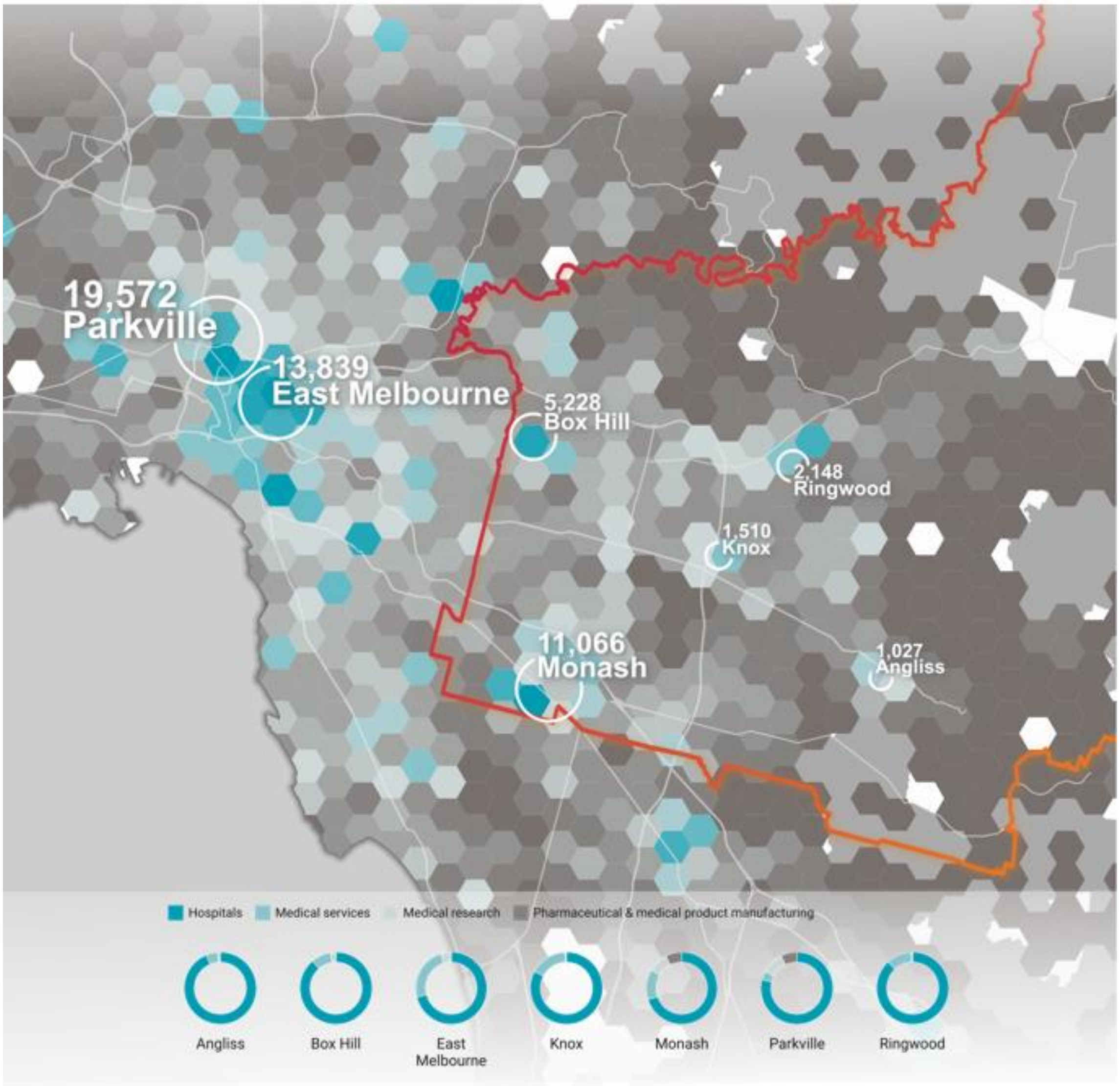
leakages would trap an additional $108 million in the local economy, which can flow to local businesses in the health innovation and care economy.

- The Eastern Region's workforce supports health care and innovation across Melbourne. In total, 52 per cent of health care professionals and natural and physical science professionals living in the region leave the ERG for work. More specifically, 16 per cent of the Eastern region's HI&C economy workforce work within the Melbourne LGA, at sites like Parkville.

Ecosystem map

Employment estimates from the 2021 ABS census were used for the four-health innovation and care economy sub-sectors (hospitals, medical services, medical research and pharmaceutical & medical product manufacturing) to determine the key clusters of activity across the Eastern Region (**FIGURE 1**).

FIGURE 1: ERG ECOSYSTEM MAP



Source: SGS Economics & Planning

Based on this analysis, the five most significant HI&C economy clusters in the Eastern Region are:

1. **Monash**, which has over 11,000 jobs, including 7,700 in hospitals, 1,500 in medical services, 1,000 in medical research and 800 in medical product manufacturing. The Monash precinct is a designated National Employment and Innovation Cluster (NEIC) in Plan Melbourne and has already established itself as a hub for the HI&C economy at both state and national level, but also globally.

   The Monash cluster services a wider area and population than just the Eastern Region due to the significance and specialisations found within the Monash precinct. The Monash cluster is the largest cluster of activity in the Eastern Region's health innovation and care economy and the third largest in Greater Melbourne. A strength of the cluster is that there is a deep mix of health assets including hospitals, education institutions, allied health services, manufacturing firms and research and clinal trial centres. This results in the Monash distinguishing itself from the other key Melbourne precincts through its diversity in the share of jobs across the four HI&C sectors – notably research and manufacturing.

2. **Box Hill**, which has over 5,200 jobs, including 4,600 in hospitals, 460 in medical services, and 130 in medical research. There are no jobs in medical product manufacturing in Box Hill. Box Hill is designated a Metropolitan Activity Centre (MAC) in Plan Melbourne. The Box Hill precinct has transformed significantly over recent years and has some of the highest-density residential areas outside Melbourne's CBD. Box Hill has a higher proportion of employment in medical services and medical research, pointing to an ecosystem of activity around and in the Box Hill Hospital, one of the area's most prominent health care providers. It is a major teaching hospital and research centre.

3. **Ringwood**, which has over 2,100 jobs, including 1,900 in hospitals, 240 in medical services, and 15 in medical research. Ringwood is designated a MAC in Plan Melbourne, playing a higher-order role in its suburban locality. Three significant hospitals are located in the area, including Melbourne Eastern Private Hospital, Mitcham Private Hospital and Maroondah Hospital. These hospitals and the many allied health services co-located in the area lead to a high share of jobs in hospitals and medical services. Though there are no health product manufacturing jobs directly in the centre, there are manufacturing firms in the immediate surrounding area.

4. **Knox,** which has over 1,500 jobs, including 1,250 in hospitals, 250 in medical services, and 11 in medical research. These numbers represent the significant presence of hospitals and allied health services in the Knox area. While not in the Knox cluster, many health-related medical manufacturing firms are in the broader Knox LGA.

5. **Angliss/Upper Ferntree Gully** has over 1,000 jobs, including 950 in hospitals, 50 in medical services, and 12 in medical research. Angliss Hospital is located just south of the Upper Ferntree Gully activity centre, a small suburban activity centre in the foothills of the Dandenong Ranges. There are no jobs in medical product manufacturing directly in the Upper Ferntree Gully cluster.

Outside of these clusters, pharmaceutical and medical product manufacturing is often located in industrial land on the periphery of centres. For example, there are medical product manufacturing firms located in Bayswater and Boronia, around Box Hill (Blackburn and Nanawading), Scoresby (including Rowville) and around Ringwood (Mitcham). The industrial and commercial precincts in these areas are critical to supporting and developing the HI&C economy.

Also important to growth is the co-location of advisory firms like venture capital businesses, lawyers, and finance and professional services. There is a high number of corporate and commercial law firms located around the Monash/Clayton area and in Box Hill, but there are few dedicated venture capital firms in the region. Most of Melbourne’s venture capital firms are located within central Melbourne, Richmond and Hawthorn.

Strengths of the HI&C economy in the Eastern Region

Strengths of the current regional HI&C economy include that:

- A skilled workforce: The Eastern Region has a highly skilled and educated workforce, making it an attractive location for businesses looking to recruit top talent. The Eastern Region shows higher concentrations than the national average in HI&C economy occupations, including health care workers, but also scientists, research and manufacturing technicians. This diversity in specialisation positions the region's workforce well to capitalise on further growth in the HI&C economy and points to a level of existing comparative advantage.
- Strategic location: The inner parts of the Eastern Region are located close to Melbourne's central business district while not having the same land and development costs.
- Infrastructure and transportation: The region has a well-developed infrastructure and transportation network for two of its main clusters, Monash and Box Hill, making it easy for businesses to connect with suppliers, customers, and employees in the locations. Accessibility will improve in the coming decades as the Suburban Rail Loop is developed. Other areas of the region, like Ringwood and Knox/Bayswater, have lower accessibility, which may impact the type of businesses attracted to those locations.
- A growing population: The region has a growing population, providing a large market for businesses and increasing demand for goods and services. The region also has an attractive lifestyle, attracting many residents and businesses (including from overseas).
- International recognition: The existing Monash NEIC is recognised on a state, national and international level for its research and innovation capabilities. This reputation is a major attractor for businesses and organisations and a strength for the region.
- Manufacturing: The Eastern Region supports significant levels of jobs and activity in the pharmaceutical and medical manufacturing sector. These jobs and businesses often fall outside the clusters centred around Hospitals and on the periphery of health precincts.

1. Introduction

1.1 Introduction to the project

The project is a region-wide research and engagement project to develop a strategy to advance regional priorities and inform advice to government.

This project seeks to understand the regional strengths and opportunities relevant to health and the role of the health economy in regional recovery and growth.

The project aims to position the region as a leader and to support future growth in health care and innovation for regional economic benefit through:

- Leveraging existing regional strengths (world-class health precincts, R&D capacity)
- Capitalising on current government investment and projected future growth and innovation (e.g. MedTech; active and future medical / health precincts; clinical trials)
- Futureproofing against regional vulnerabilities and health challenges (e.g. fastest ageing metropolitan region; COVID-19 recovery; key worker housing)
- Addressing current and projected workforce and skills shortages (nursing, aged care, disability care; highly-skilled innovative professionals and entrepreneurs)

The project's first stage will produce a series of five working papers to act as a resource to inform a co-design phase in 2023. The co-design phase will identify how regional stakeholders will respond to the opportunities and challenges presented.

1.2 Introduction to the paper

This working paper is the first in the series and maps the current health innovation and care economy in the Eastern Region of Melbourne, including the economic value it generates.

This paper is split into six chapters:

1. Introduction (this chapter)
2. Defining the health innovation and care economy
3. How a regional economy functions
4. The economic impact of the HI&C economy
5. Ecosystem map
6. Summary of strengths and gaps

1.3 Other papers in the series

This working paper is the first in the series. The following papers are:

- Working paper #2: health innovation and care trends assessment: This paper aims to understand the trends that will impact the development of a health innovation and care economy into the future locally, across Melbourne and nationally, and what the opportunities are for the Eastern Region.
- Working paper #3: developing a best-practice health care economy: This paper aims to understand how best-practice health innovation and care industry development is being done elsewhere and the lessons relevant to the Eastern Region.
- Working paper #4: best-practice innovation: This paper aims to understand the role of innovation in economic development. The focus is on understanding how innovation happens in places and creates new businesses, products or services and what government can do to support it.
- Working paper #5: community wealth building (CWB) diagnostic: This paper explores industry development outcomes. Though health care spending is booming, it's essential to consider where that money is going and whether it creates local wealth, local business opportunities and great jobs for residents.

2. Defining the HI&C economy

2.1 The health innovation and care economy

The health innovation and care (HI&C) economy refers to the interconnected industries focused on delivering care to patients, such as hospitals and allied health service providers, improving health outcomes, delivering better quality care, and reducing health care delivery costs through innovation and technology. The HI&C economy also includes developing, manufacturing, trialling, and distributing medical devices, biopharmaceuticals, digital health technologies, and other health products.

Investing in the health innovation and care economy offers economic benefits, including:

- Job creation: Health innovation and technology creates many jobs in the eastern region of Melbourne, many of which are skilled and highly paid.
- Improved health care outcomes: Health care and innovation lead to better patient health outcomes, reducing health care costs and improving productivity.
- Increased competitiveness: Investment in health innovation makes regions competitive in a global marketplace improving the region's ability to meet the needs of their local populations, attracting top talent and exporting globally.
- Economic growth: The health innovation and care economy can drive economic growth by increasing investment, spurring new industries, and supporting existing businesses.

The HI&C economy can improve the quality of life for individuals in the region while supporting strong economic development in the coming decades.

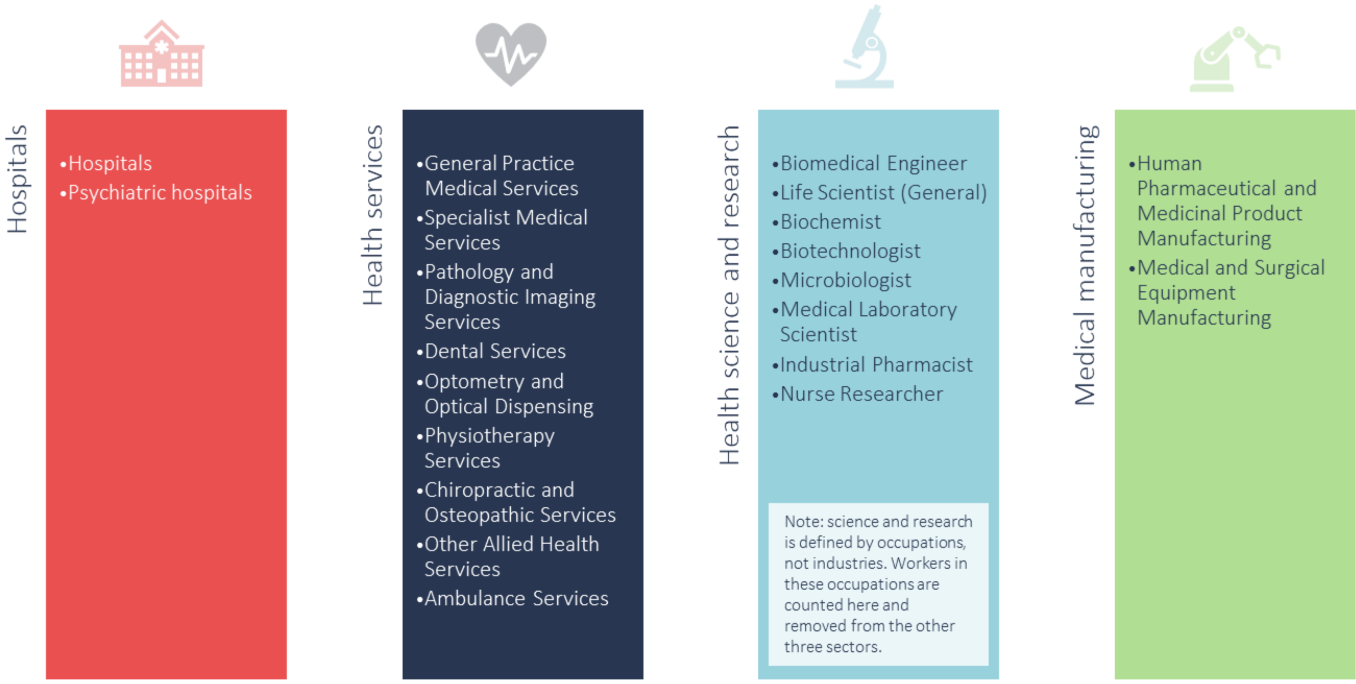
2.2 Statistical definition for the project

A definition has been developed, built from ABS industry and occupation categories (Figure 2) to estimate the economic impact and map the HI&C. The HI&C economy has been divided into four sectors – hospitals, health services, health science and research, and medical manufacturing. These sectors comprise smaller sub-sectors or occupations, as captured in Figure 2.

Some health-related sectors have been excluded from the study, including aged care, social assistance services and pharmacies.

Geographically, the Eastern Metro Region comprises six local government areas (LGAs): Knox, Monash, Maroondah, Whitehorse, Manningham and Yarra Ranges. The region extends from the inner suburbs of Doncaster, Chadstone and Oakleigh South to the eastern end of the Shire of Yarra Ranges.

FIGURE 2: STATISTICAL DEFINITION OF THE HEALTH INNOVATION AND CARE ECONOMY



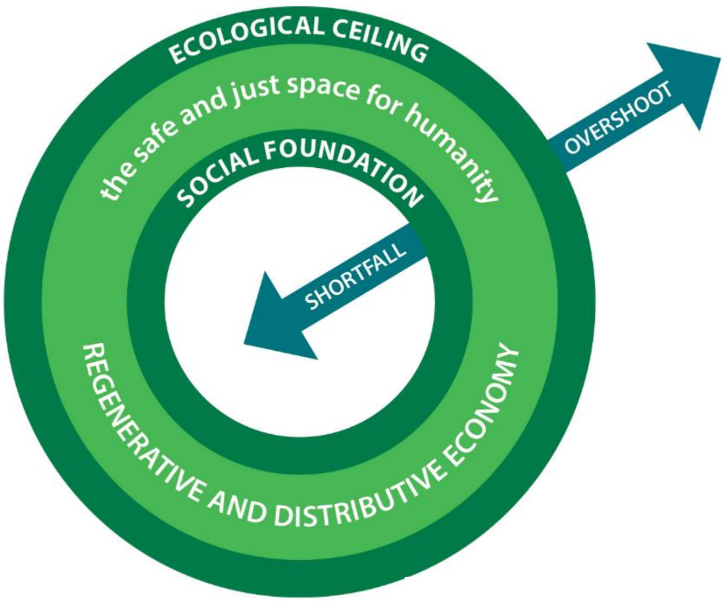
3. How a regional economy functions

3.1 What is economic and industry development?

‘Economic development’ typically refers to growing a local economy. This means growth in economic activity, such as more exports of local produce or manufactured products or more visitors spending money on tourist accommodation. Growth, in turn, allows businesses to invest in new equipment, hire more people and pay higher wages. Greater economic activity also means higher government revenues and more money to spend on better quality services for the community. Economic development enables a higher standard of living for people in a region.

In today’s policymaking, understanding how well a local economy functions also needs to go beyond simple measures of gross domestic product (GDP) growth and the number of jobs. A well-functioning economy also needs to include a just distribution of wealth and opportunity and the provision of life’s essentials (such as housing, education, health care, a political voice). It must also remain within environmental boundaries for a stable climate and healthy ecosystems.

FIGURE 3: THE DOUGHNUT ECONOMY



Source: Raworth, 2019

Figure 3 presents this idea in the shape of a doughnut. ‘Doughnut economics’ is a concept developed by Kate Raworth (Oxford University, Cambridge Institute for Sustainability Leadership) that provides a powerful framework to consider the economy as not just about business activity but the economy’s inter-relationships with social and environmental outcomes.

The Eastern Region economy is, after all, a collection of people (including government and businesses) trading goods and services to better their lives and community whilst protecting the natural environment that underpins life on earth and the economy itself.

3.2 The engines of local economic development

SGS applies a particular model of the local economy, developed over decades of experience, to understand economic performance, illustrated in Figure 4.

Starting on the left of the diagram, 'exports' are a major player in economic performance and prosperity. Exports in this context refer to any product or service traded to anyone outside of the Eastern Region, to the rest of Victoria, Australia or internationally. Exports include dollars spent by visitors to the area, such as people coming to use the region's health services. Income injected into the local economy creates a multiplier effect as exporting firms draw on local suppliers and workers to meet the demand from external customers.

External private investment provides capital to finance new and enhance existing industries, boosting infrastructure and productivity and creating employment opportunities. External private investment also brings new businesses with connections in different markets into the area, opening additional export opportunities. External public investment is similar but provided by State or the Commonwealth government to invest in services, infrastructure or businesses in the Eastern Region.

FIGURE 4: SGS MODEL OF A LOCAL ECONOMY

As well as money injected into the economy, the other side of the diagram shows that income can leak back out as local firms import inputs to production (for instance, hospitals importing essential health products like gloves or masks from overseas). Similarly, consumers also import goods and services, like products in nearby areas or online, or residents (not always by choice) needing to work outside the local area. These leakages dilute the multiplier effect from export sales and other income injections. Another leakage occurs when the local economy is dominated by firms owned elsewhere, which sees the wealth generated (as profits and dividends) flowing to shareholders and investors outside the local economy.

> An objective for developing a health innovation and care economy is to maximise the injections from export income and public and private investment while recircling the money in the local economy by minimising income leakages.

4. The economic impact of the HI&C economy

4.1 Introduction

Health care services are essential to the people of the Eastern Region. These services help people to lead the life they want, regardless of age, language barriers or disability. Yet health care is also fundamentally a major economic driver. The care economy generates billions of dollars worth of economic activity in the region and growing.

4.2 Economic injections from exports and public and private investment

Exports

Exports in this context refer to any product or service traded to anyone outside of the Eastern Region, to the rest of Victoria, Australia or internationally. Figure 5 overleaf shows the 32 sub-industries (ABS 2-digit) with an annual export value of over $200 million (there are 114 sub-industries in total) from the Eastern Region economy, plus the share of that industry's production that is exported.

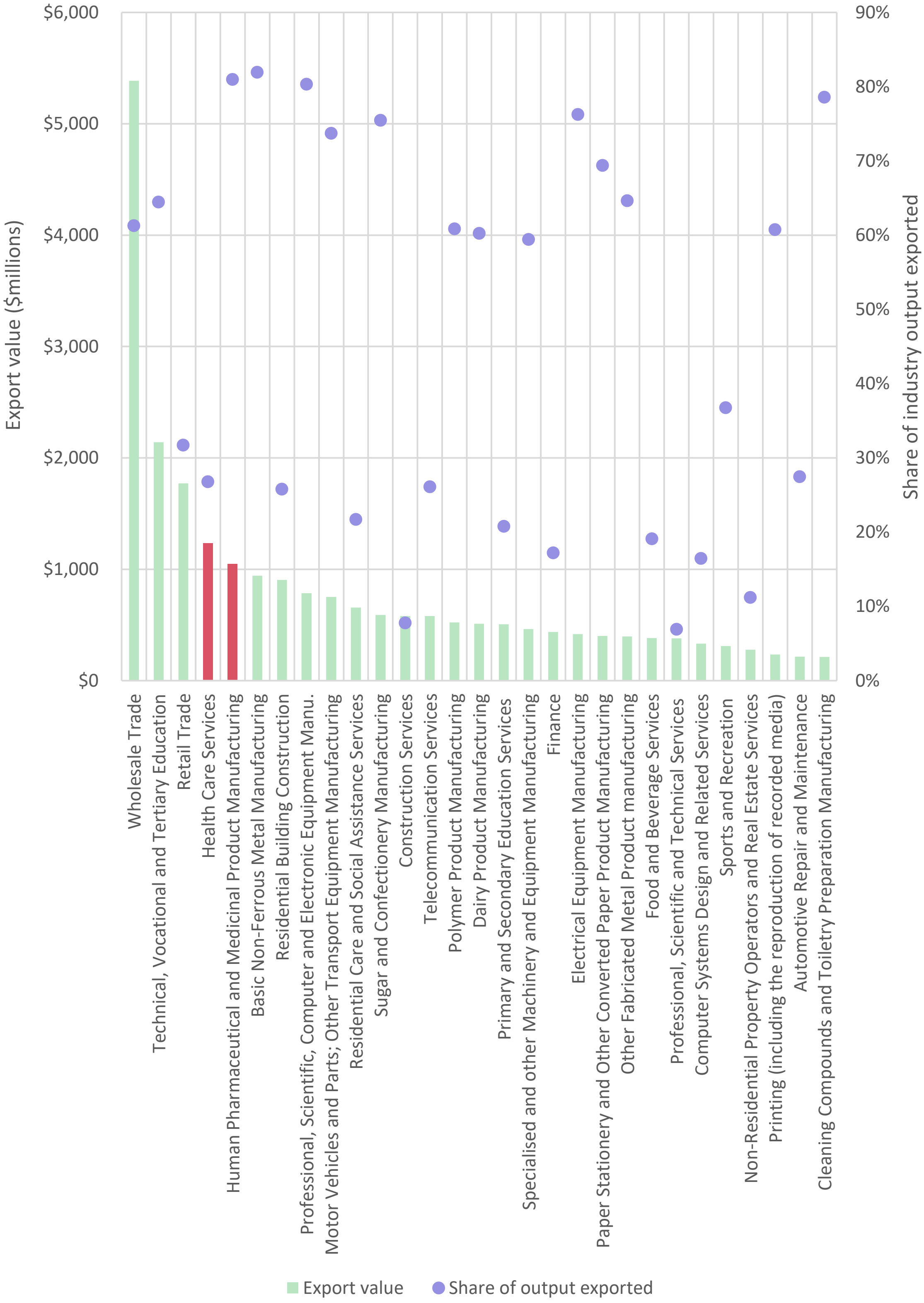
In the Eastern Region, the largest export earner is wholesale trade ($5.4 billion), followed by technical, vocational and tertiary education ($2.1 billion) and retail trade ($1.8 billion). These three sub-industries service local businesses and consumers, as well as being exporters. Sixty-one per cent of wholesale trade production is exported, 64 per cent of technical, vocational and tertiary education, and 32 per cent of retail trade.

The next largest sub-industries are directly related to the HI&C economy (indicated in red):

- Health care services (inclusive of hospitals and health care services) is the fourth largest export sub-industry in the region. It exports 27 per cent of its production for an export value of $1.2 billion.
- Human pharmaceutical and medicinal product manufacturing is the fifth largest export sub-industry in the region. It exports 81 per cent of its production for an export value of $1 billion.

Also related to the care economy, aged care and social assistance is the tenth largest export industry.

FIGURE 5: EXPORTS FROM THE EASTERN REGION BY INDUSTRY SUB-SECTOR



Source: SGS Economics and Planning (2023) using an internal input-output model of the Eastern Region economy

Taken together, health care services and medical product manufacturing, plus the research capabilities of the region's vocational and tertiary education sector, the HI&C economy is large and a critical player in the region's economy.

These HI&C sub-industries inject billions of dollars into the eastern region economy each year from exports alone. This income injected creates a multiplier effect as exporting firms and institutions in these sub-industries draw on local suppliers and workers to meet the demand from external customers.

The effect is shown in Figure 6. For:

- Health care services, the total output is equivalent to $4.6 billion. $2.4 billion (53%) of that revenue flows to employee wages in the region (compensation of employees), $866 million (19%) flows to other businesses in the region for inputs to production (intermediate uses), and $692 million (15%) is captured as company profits (gross operating surplus). $630 million (14%) leaks out of the region through importing goods and services for production. Very little money flows to government through taxation, as nearly all taxation revenue is captured by the federal and state government, located outside of the region.
- Medical manufacturing's total output is equivalent to $1.3 billion. $183 million (14%) of that revenue flows to employee wages, $312 million (24%) flows to other businesses in the region for inputs to production, and $337 million (26%) is captured as company profits (gross operating surplus). $458 million (35%) leaks out of the region through importing goods and services for production.

FIGURE 6: EXPENDITURE FLOWS FROM HI&C ECONOMY SECTORS

Source: SGS Economics and Planning (2023) using internal input-output model of the Eastern Region economy

Private investment

Private investments in the Eastern Regions' HI&C economy include:

- Knox Private Hospital Expansion: In 2019, Healthscope invested $70 million to expand the Knox Private Hospital in Wantirna South. The expansion adds 60 new beds, four new operating theatres, a new cardiac catheterisation lab, a new day procedure centre and a new emergency department.
- Epworth Eastern Hospital Expansion: In 2018, Epworth Health care invested $80 million in expanding the Epworth Eastern Hospital located in Box Hill. The $162 million expansion included constructing a new fourteen-story building that added 60 new beds, new operating theatres, and a new oncology suite.
- Monash Partners Academic Health Science Centre: Monash Partners is a collaborative academic health science centre that brings together leading health research organisations, hospitals, and universities. It was established in 2013 with a $17.2 million investment from the National Health and Medical Research Council (NHMRC) and other partners.
- APH Holding is investing $320 million to establish the ‘Wellinton Health’ hub in Box Hill. This includes a twin tower project providing over 100,000 square metres of medical and education facilities.

These and other private investments indicate a high confidence level in the region from private firms. These investments improve access to health services for patients in the region and inject income into the local economy, creating jobs (including in construction during the development phase) and growing the economy.

Public investment

Over recent years, a considerable amount of money has been injected into the Eastern Region economy through public investment in the health innovation and care industries, reaffirming the government's view of the Eastern Region as a priority area for the health sector. These injections include the ongoing funding of hospitals, health services and research, grants for projects and programs, and capital expenditure on new health infrastructure. Recent significant public investments in the Eastern Region include:

- Eastern Health: Eastern Health has six hospitals and a range of community health services across the region. Eastern Health has received significant funding from the Victorian Government in recent years for infrastructure projects and new health services, including a new cardiac catheterisation laboratory at Box Hill Hospital and a new mental health facility in Ringwood. Between 2020 to 2022 Eastern Health has received almost $65 million in capital grants from the Victorian Government.
- Monash Health: Monash Health has received significant funding from the Victorian Government for infrastructure projects and new health services, including expanding the Monash Children's Hospital and establishing the Monash Health Translation Precinct. Between 2020 and 2022 Monash Health has received over $150 million in capital grants from government.
- Australian Regenerative Medicine Institute: The Australian Regenerative Medicine Institute (ARMI) research centre was established in 2009 with a $153 million investment from the Australian Government, the Victorian Government, and Monash University. ARMI's research focuses on

regenerative medicine and stem cell biology to develop new therapies for various diseases and injuries.

- Box Hill Hospital: In the 2021-2022 Victorian Budget, the Government announced funding of $194.7 million to redevelop the Box Hill public hospital, including a new emergency department, operating theatres, and inpatient beds.
- Maroondah Hospital: Maroondah Hospital is a public hospital located in Ringwood. In the 2021-2022 Victorian Budget, the government announced funding of $44.9 million for the hospital's redevelopment, including a new short-stay unit and upgrades to the mental health facilities.
- Angliss Hospital: Angliss Hospital is a public hospital located in Upper Ferntree Gully. In the 2021-2022 Victorian Budget, the government announced funding of $20 million for the hospital's redevelopment, including a new acute medical and surgical ward. The government funding is going towards a $112 million expansion delivering a 32-bed inpatient unit, four operating theatres, a new central sterile supply department and spaces for outpatient services.
- Monash Medical Centre: Monash Medical Centre is part of the Monash Health network and provides specialist services, including cancer care, neuroscience, and trauma services. In the 2021-2022 Victorian Budget, the government announced funding of $9.9 million for the hospital's mental health services.
- Hudson Institute of Medical Research: The Hudson Institute is a leading medical research centre in Clayton. It was established in 1991 with support from the Victorian Government and other partners. The Institute's research focuses on reproductive health, cancer, and inflammation, and it has received funding from organisations such as the NHMRC, the Australian Research Council, and the Cancer Council Victoria.
- Monash University, in partnership with researchers from the University of Melbourne, received $5.4 million from the Victorian Government in 2022 to establish the Victorian mRNA Innovation Hub. The Hub is made up of four nodes and brings together mRNA experts from the Monash Institute of Pharmaceutical Sciences (MIPS), the Peter Doherty Institute for Infection and Immunity (Doherty Institute), the Monash Biomedicine Discovery Institute (BDI) and the University of Melbourne’s Faculty of Engineering and Information Technology. The headquarters for the hub is at MIPS and Monash RNA.
- Eastern Health Translation Precinct: The Eastern Health Translation Precinct is a research facility located at Box Hill Hospital. The Victorian Government and other partners helped establish the precinct in 2016 with a $20 million investment. The facility brings together health researchers, clinicians, and industry partners to develop new patient treatments and therapies.

Public expenditure

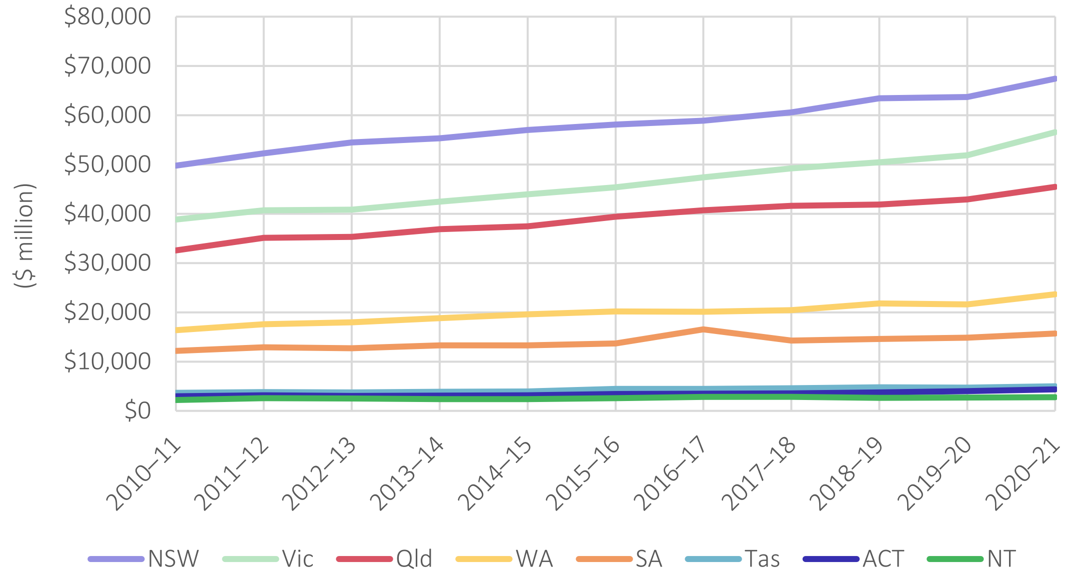
Australia’s health system is complex, and so are its funding arrangements. Health care in Australia is funded by all levels of government, non-government organisations, private health insurers and individuals when they pay out-of-pocket costs for products and services that aren’t fully subsidised or reimbursed.

Figure 7 shows the total health expenditure from all government and non-government sources from 2010-2021. Victoria has remained the second largest spender on health since 2010, and since the pandemic, Victoria has seen the most considerable increase in spending. Figure 8 shows the Australian

State and Territory Government spending growth rates in health between 2010 and 2021. Unsurprisingly, State and Territory Governments invested significantly in health research during the COVID-19 pandemic.

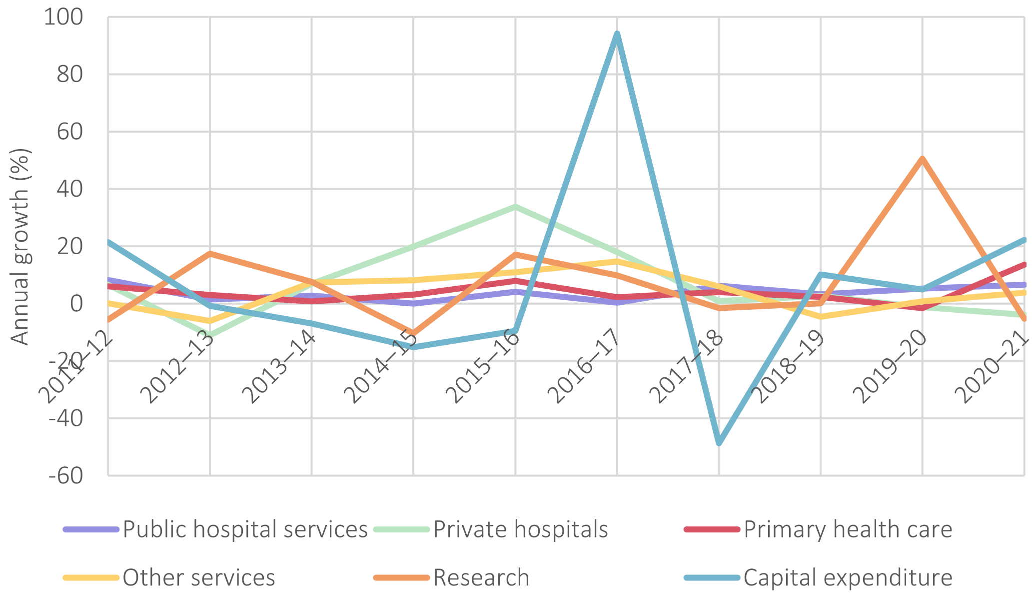
Figure 9 shows the flow of funds for health care, from their source to the area of expenditure.

FIGURE 7: HEALTH EXPENDITURE BY ALL SOURCES BY STATE, 2010 TO 2021



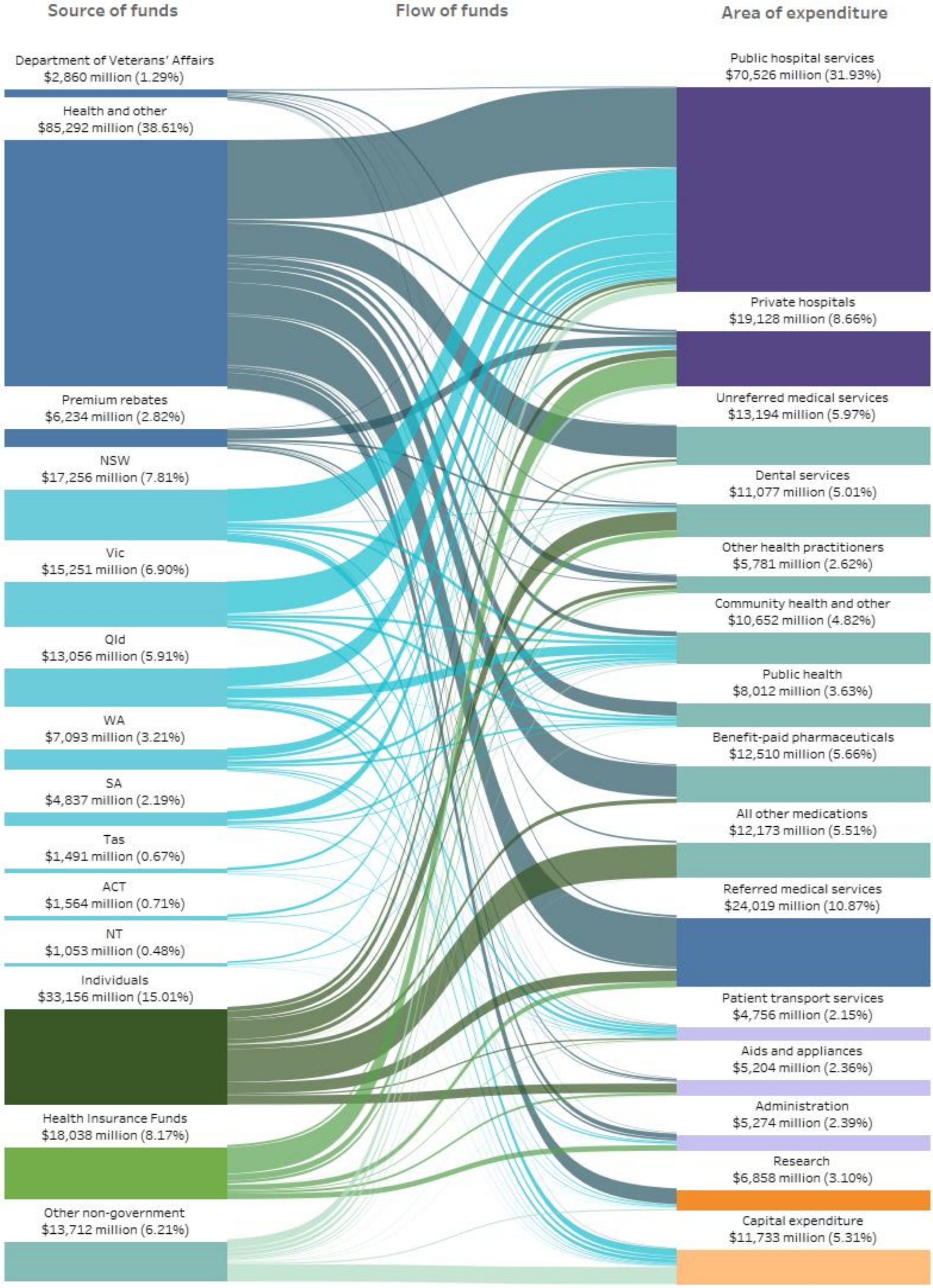
Source: SGS Economics & Planning using Australian Institute of Health and Welfare, Health Expenditure Australia, 2020-21

FIGURE 8: AUSTRALIAN STATE AND TERRITORY GOVERNMENT TOTAL HEALTH SPENDING BY AREA OF SPENDING ANNUAL GROWTH RATES, 2010-2021



Source: SGS Economics & Planning using Australian Institute of Health and Welfare, Health Expenditure Australia, 2020-21

FIGURE 9: NATIONAL HEALTH SPENDING FLOWS, 2020-21



Source: Australian Institute of Health and Welfare, Health Expenditure Australia, 2020-21 (www.aihw.gov.au)

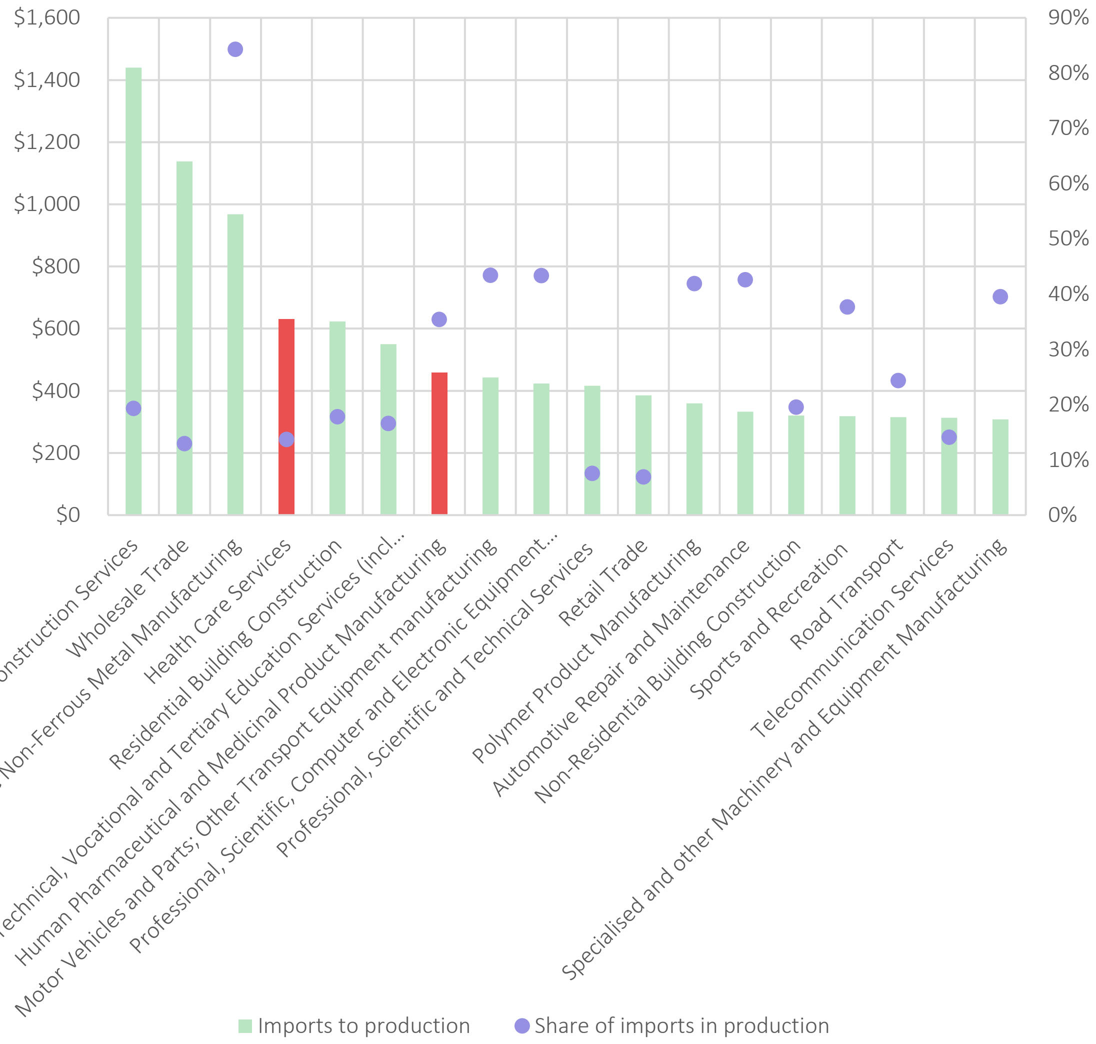
4.3 Leakages

Economic performance is reduced as income leaks out of the region as local firms import inputs to production. These leakages dilute the multiplier effect from export sales, public and private investment and other injections. Another leakage occurs when the local economy is dominated by firms owned elsewhere, which sees the wealth generated (as profits and dividends) flowing to shareholders and investors outside the local economy.

Imports

Imports by industry are sales of goods and services from industries located outside the Eastern Region to resident businesses and institutions. Figure 10 shows the top 18 (out of 114) sub-industries in the Eastern Region regarding the value of goods and services imported. All these sub-industries import more than $300 million of goods and services from outside the Eastern Region each year in their production processes. The value of imports as a share of total output is also shown.

FIGURE 10: GOODS AND SERVICES IMPORTED BY INDUSTRY IN THE PRODUCTION PROCESS (2019/20)



The industries that import the most in absolute terms are construction, wholesale trade and non-ferrous metal manufacturing.

The fourth largest importer comes from the HI&C economy, being health care services, which imports $630 million of goods and services into the region (14% of the output value). Medical equipment manufacturing is the seventh highest importer, importing $442 million of goods and services (43% of the output value).

Regions often require imports to fill local capability and resource gaps. However, there are also opportunities to consider what imports can be provided locally, a process known as import substitution. Health care services and medical manufacturing import $1.08 billion annually from outside the region. Therefore, a 10 per cent reduction in leakages would trap an additional $108 million in the local economy, which can flow to local businesses in the health innovation and care economy.

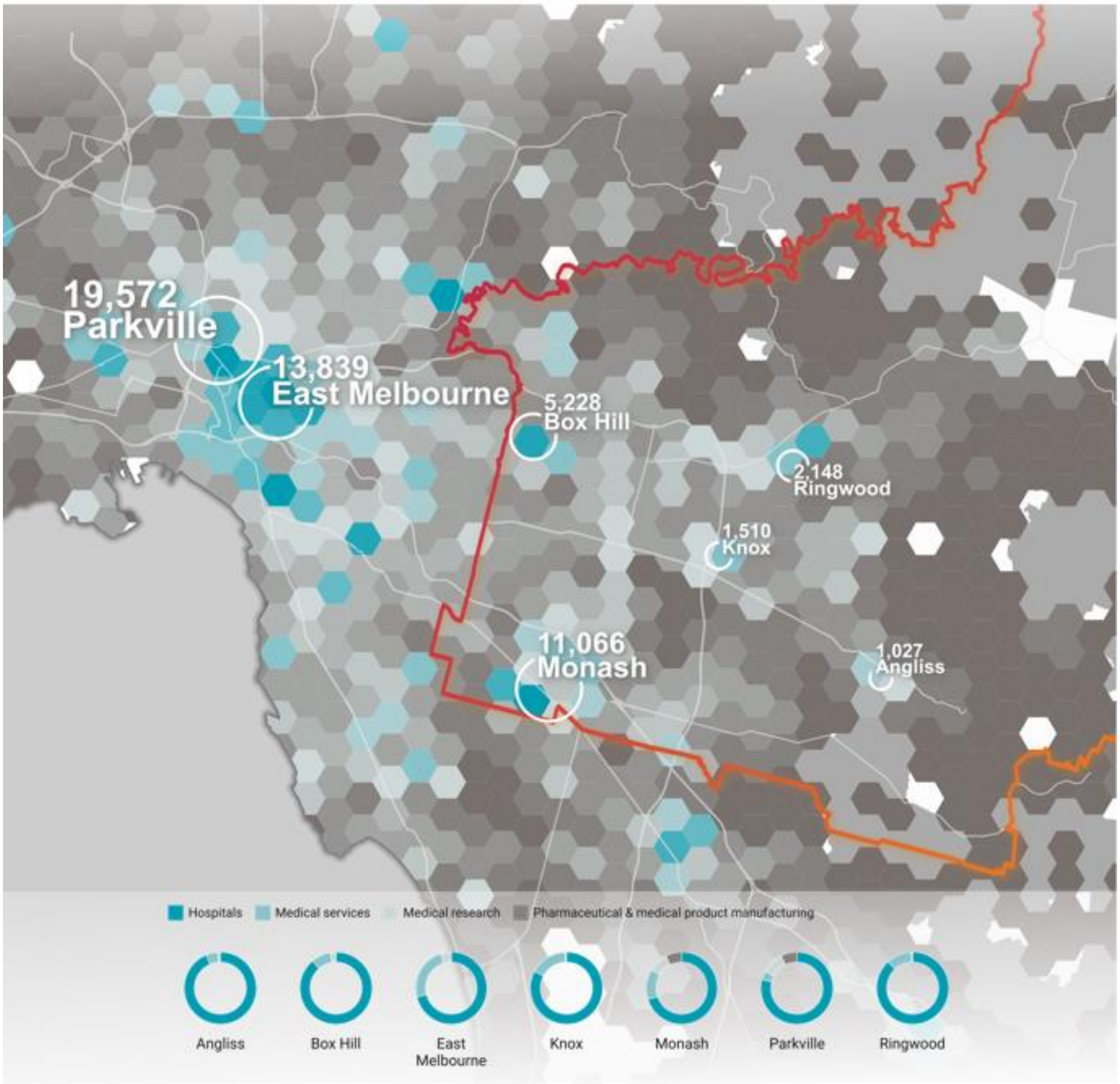
5. Ecosystem map

This section examines the significant clusters of HI&C economic activity in the Eastern Region.

5.1 Ecosystem map

Employment estimates from the 2021 ABS census were used for the four-health innovation and care economy sub-sectors (hospitals, medical services, medical research and pharmaceutical & medical product manufacturing) to determine the key clusters of activity across the Eastern Region (Figure 11).

FIGURE 11: ERG ECOSYSTEM MAP



Source: SGS Economics & Planning

Based on this analysis, the five largest HI&C economy clusters in the Eastern Region are:

1. **Monash**, which has over 11,000 jobs, including 7,700 in hospitals, 1,500 in medical services, 1,000 in medical research and 800 in medical product manufacturing.
2. **Box Hill**, which has over 5,200 jobs, including 4,600 in hospitals, 460 in medical services, and 130 in medical research. There are no jobs in medical product manufacturing in Box Hill.
3. **Ringwood**, which has over 2,100 jobs, including 1,900 in hospitals, 240 in medical services, and 15 in medical research. There are no jobs in medical product manufacturing in Ringwood.
4. **Knox,** which has over 1,500 jobs, including 1,250 in hospitals, 250 in medical services, and 11 in medical research. There are no jobs in medical product manufacturing in Knox**.**
5. **Angliss/Upper Ferntree Gully,** which has over 1,000 jobs, including 950 in hospitals, 50 in medical services, and 12 in medical research. There are no jobs in medical product manufacturing in the Upper Ferntree Gully.

The clusters of HI&C economy activity are explored in more depth in the rest of this section.

Parkville and East Melbourne are also included on the map in Figure 11 to compare the Eastern Region and Melbourne's largest HI&C economy clusters.

Monash cluster

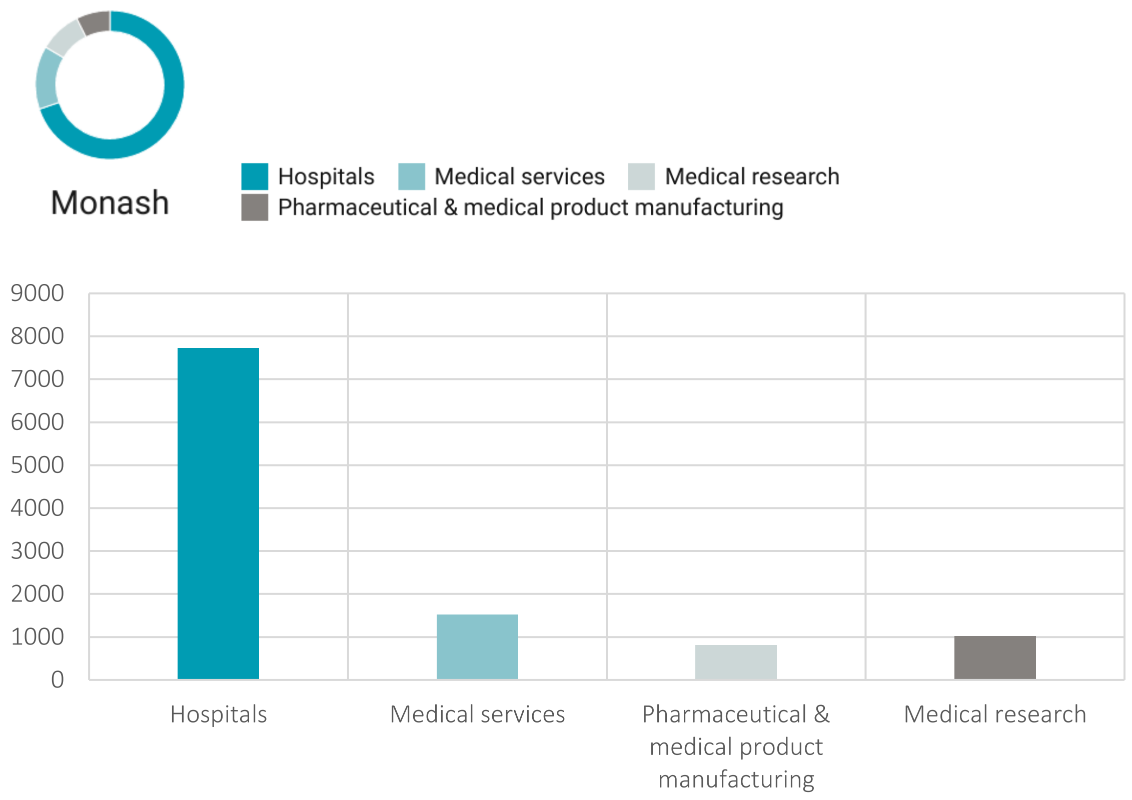
The Monash cluster is the largest cluster of activity in the Eastern Region's health innovation and care economy and the third largest in Greater Melbourne. The cluster employs over 11,000 people across the four sectors of hospitals, health services, health science and research and medical manufacturing (Figure 12). A strength of the cluster is that there is a higher share of people employed in pharmaceutical and medical product manufacturing and medical research compared to the other clusters in the Eastern Region, but also Parkville and East Melbourne.

The Monash precinct is a designated National Employment and Innovation Cluster (NEIC) in Plan Melbourne, Melbourne's overarching planning policy document. NEICs are designated concentrations of employment distinguished by a strong core of nationally significant knowledge sector businesses and institutions that make a major contribution to the national economy and Melbourne's positioning in the global economy. These areas are to be developed as places with a concentration of linked businesses and institutions providing a major contribution to the Victorian economy, with excellent transport links and the potential to accommodate significant future growth in jobs and, in some instances, housing.

The Monash Medical Centre is also designated as a Health precinct by Plan Melbourne, showing that the health sector has, and will continue to play, played a pivotal role in the Monash NEICs growth and development as a precinct.

Monash has already established itself as a hub for the HI&C economy at both State and National levels, and globally. The following hospitals, organisations, institutions and businesses are located in the Monash cluster (Table 1).

FIGURE 12: NUMBER OF JOBS IN THE MONASH HI&C ECONOMY CLUSTER BY SUB-SECTOR, 2021



Source: SGS Economics and Planning using ABS census data, 2021

TABLE 1: KEY HEALTH INNOVATION AND CARE INSTITUTIONS AND BUSINESSES IN MONASH

Institution/Business Type	Institution/Business in the Monash activity cluster
Hospitals	Monash Medical Centre, Jessie McPherson Private Hospital, Victorian Heart Hospital, Monash Children's Hospital, Sir John Monash Private Hospital, Monash Surgical Private Hospital, Monash House Private Hospital
Universities & TAFEs	Monash University Clayton
Major allied health services	McCulloch House, Monash IVF Clayton, Monash Ultrasound for Women, Mediclinic Clayton, Melbourne Pathology, Monash Breast Clinic, Melbourne Endoscopy, Stepping Stones Medical Centre, Monash Doctors Surgery, Monash Specialist Centre, St John Ambulance Victoria, ITL Biomedical
Manufacturing firms	Osteon Medical, GAMA Health care, Kaseem Health Pty Ltd, Aesthetic Bureau, Ingeneus, Essity Medical Solution (BSN Medical), DePuy Synthes, Avecho, Grifols Australia Pty Ltd, Ensign Laboratories, Formulytica
Research and clinical trial institutions	CSIRO Clayton, Australian Regenerative Medicine Institute, Australian Synchotron, Melbourne Centre for Nanofabrication, Monash Biomedical Imaging, Monash Health Translation Precinct, Monash Medicines Manufacturing Innovation Centre, Brecton Dickinson Pty Ltd, Bristol Myers Squibb

COVID-19 saw a boost in research funding, with the Monash cluster being a significant beneficiary. Monash continues to see growth in mRNA research and manufacturing. Moderna will build its first mRNA production facility in the Southern Hemisphere in Clayton, also the world's first mRNA production facility located on a university campus. In addition, Monash University and the Victorian Government are partnering to establish the Monash Centre for Advanced mRNA Medicines Manufacturing and Workforce Training.

Significant future investment in the Monash cluster includes the development of the Suburban Rail Loop Stage 1 (SRL East). The SRL East project proposes a new train station at both Clayton and Monash. The project will add to the existing interchange station at Clayton, creating a new transport super hub. The project will be significant in connecting the Eastern Region, making these areas of employment more accessible. Trains are expected to be operating as part of the SRL East project by 2035.

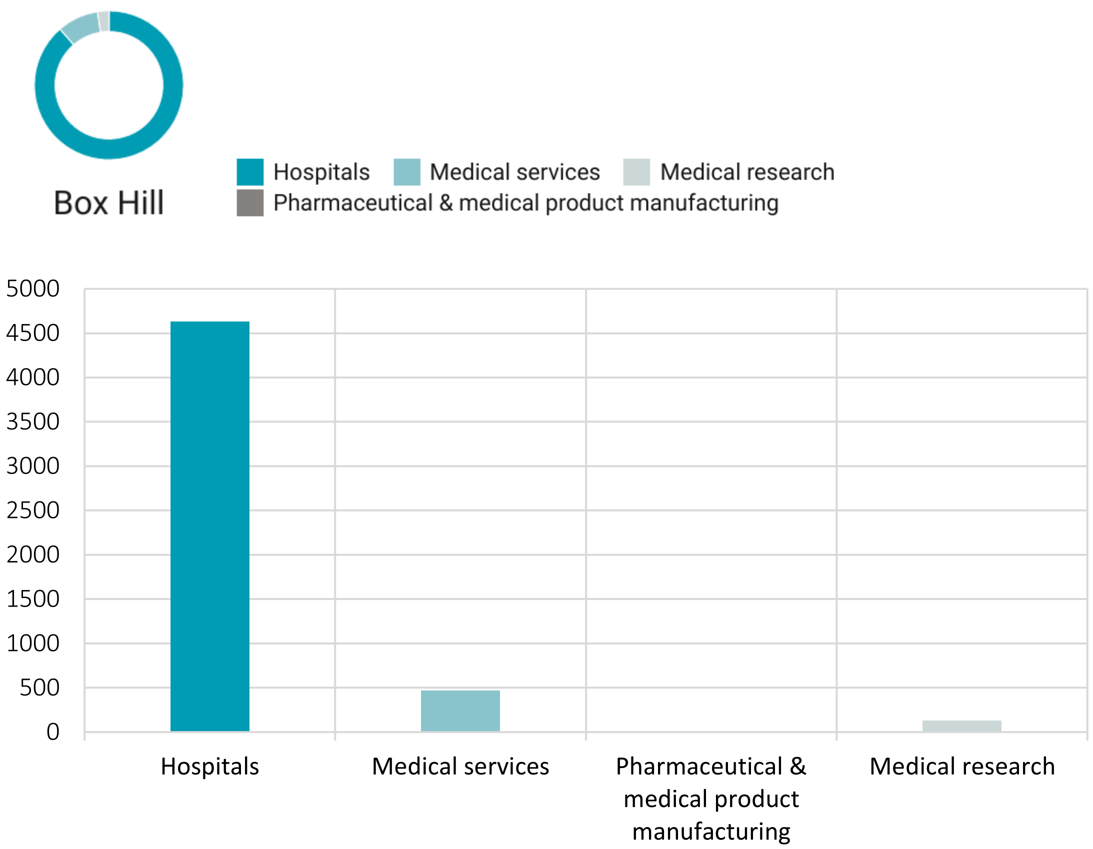
Box Hill cluster

The Box Hill cluster is in Whitehorse, just 14 kilometres from Melbourne’s CBD. The Box Hill precinct employs over 5,200 people across the four HI&C economy sub-sectors. Compared to the other smaller clusters identified, Box Hill has a higher proportion of employment in medical services and medical research, pointing to an ecosystem of activity around and in the Box Hill Hospital. Box Hill is designated a Metropolitan Activity Centre (MAC) in Plan Melbourne. MACs are higher-order centres with diverse employment options, services and housing stock, supported by good transport connections. These centres play a service delivery role, including government, health, justice and education services, retail and commercial opportunities.

Box Hill Hospital is one of the most prominent health care providers in the area, serving a large catchment area in Melbourne's eastern suburbs. It is a major teaching hospital and research centre that provides a broad range of services. The Box Hill Hospital, Epworth Eastern Hospital and Eastern Health Clinical School are all significant institutions for research and clinical trials and contribute to the high proportion of medical research employment in the area. The following hospitals, organisations, institutions and businesses are located in the Box Hill cluster (Table 2).

The Box Hill precinct has transformed significantly over recent years and has some of the highest-density residential areas outside Melbourne’s CBD. The Box Hill precinct will be another beneficiary of the SRL East project. The station will be central to the Box Hill activity centre and provide an interchange with the existing station on the Belgrave/Lilydale line, integrated with the local tram and bus network. This transport infrastructure will create better connections to Box Hill’s health facilities, such as Box Hill Hospital and Box Hill Institute. Along with the SRL East project, new structure plans are being developed for each new station area to guide the development of the Box Hill precinct.

FIGURE 13: NUMBER OF JOBS IN THE BOX HILL HI&C ECONOMY CLUSTER BY SUB-SECTOR, 2021



Source: SGS Economics and Planning using ABS census data, 2021

TABLE 2: KEY HEALTH INNOVATION AND CARE INSTITUTIONS AND BUSINESSES IN BOX HILL

Institution/Business Type	Institution/Business in the Box Hill activity cluster
Hospitals	Box Hill Hospital, Epworth Eastern Hospital, Glen Iris Private Hospital, Delmont Private Hospital
Universities & TAFEs	Box Hill Institute, Deakin University
Major allied health services	Eastern Health Community and Allied Health Services, Epworth Easter Rehabilitation, Head to Health, Box Hill Dental, Box Hill CYMHS, Dorevitch Pathology, Upton House, Express-Cardio services, Wellways
Other major anchor institutions	Department of Health and Human Services
Manufacturing firms	Lumos Diagnostics, TeArai BioFarma, Planet Innovation
Research and clinical trial institutions	Box Hill Hospital, Eastern Health Clinical School, Epworth Eastern, Melbourne Stem Cell Centre Research

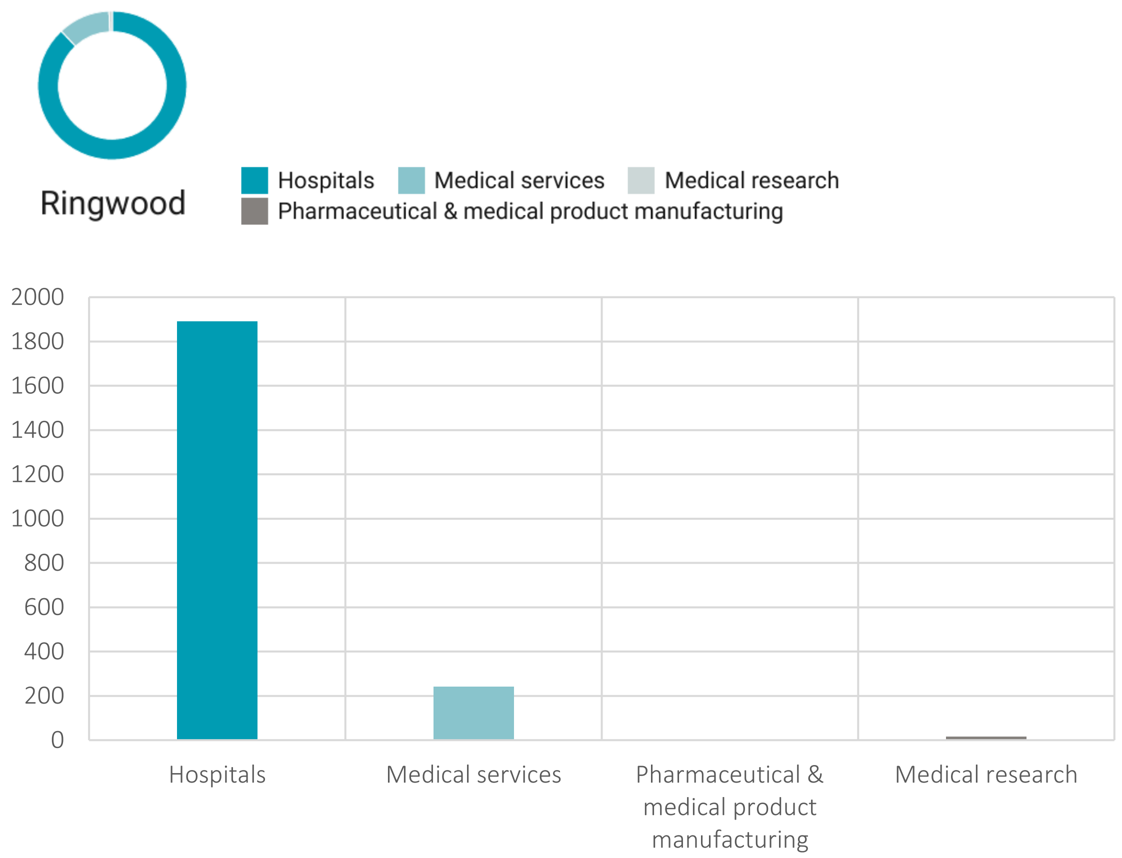
Ringwood cluster

The Ringwood HI&C economy cluster lies in the City of Maroondah. Ringwood's HI&C economy cluster supports over 2,100 jobs across associated sectors, the third largest in the Eastern Region. Three significant hospitals are located in the area, including Melbourne Eastern Private Hospital, Mitcham Private Hospital and Maroondah Hospital.

These hospitals and the many allied health services co-located in the area lead to a high share of jobs in hospitals and medical services (Figure 14). Of the 2,148 HI&C economy jobs located in Ringwood, 99 per cent are in hospitals and medical services.

Ringwood is designated a MAC in Plan Melbourne, playing a higher-order role in its suburban locality. The Ringwood MAC is situated along Maroondah Highway and acts as a sub-regional goods and services hub, and is serviced by the metropolitan Ringwood and Lilydale train lines, supported by a bus network.

FIGURE 14: NUMBER OF JOBS IN THE RINGWOOD HI&C ECONOMY CLUSTER BY SUB-SECTOR, 2021



Source: SGS Economics and Planning using ABS census data, 2021

The following hospitals, organisations, institutions and businesses are located in the Ringwood cluster (Table 3).

TABLE 3: KEY HEALTH INNOVATION AND CARE INSTITUTIONS AND BUSINESSES IN RINGWOOD

Institution/Business Type	Institution/Business in Ringwood activity cluster
Hospitals	Melbourne Eastern Private Hospital, Mitcham Private Hospital, Maroondah Hospital
Major allied health services	Eastern Health Rehabilitation Services, Eastern Health Mental Health Services, Eastern Health Child Mental Health Services, EACH, Wellways Maroondah PARC, Siles Health, Horizon Doctors, Access Health and Community
Manufacturing firms	Trajan Scientific and Medical, Mcfarland Medical Equipment Holdings Pty Ltd., Cockatoo Blue Medical Products
Research and clinical trial institutions	Monash University Research Unit

Knox cluster

The Knox HI&C economy cluster is the fourth largest in the Eastern Region. The Knox cluster contains 1,510 jobs in the HI&C economy, of which 1,248 are within the hospital sector, and 251 are within medical services. As shown in

Figure 15, these numbers represent the significant presence of hospitals and allied health services in the Knox area. While not in the Knox cluster, many health-related medical manufacturing firms are in the Knox LGA.

Table 4 sets out a comprehensive list of institutions and businesses in the Knox activity cluster.

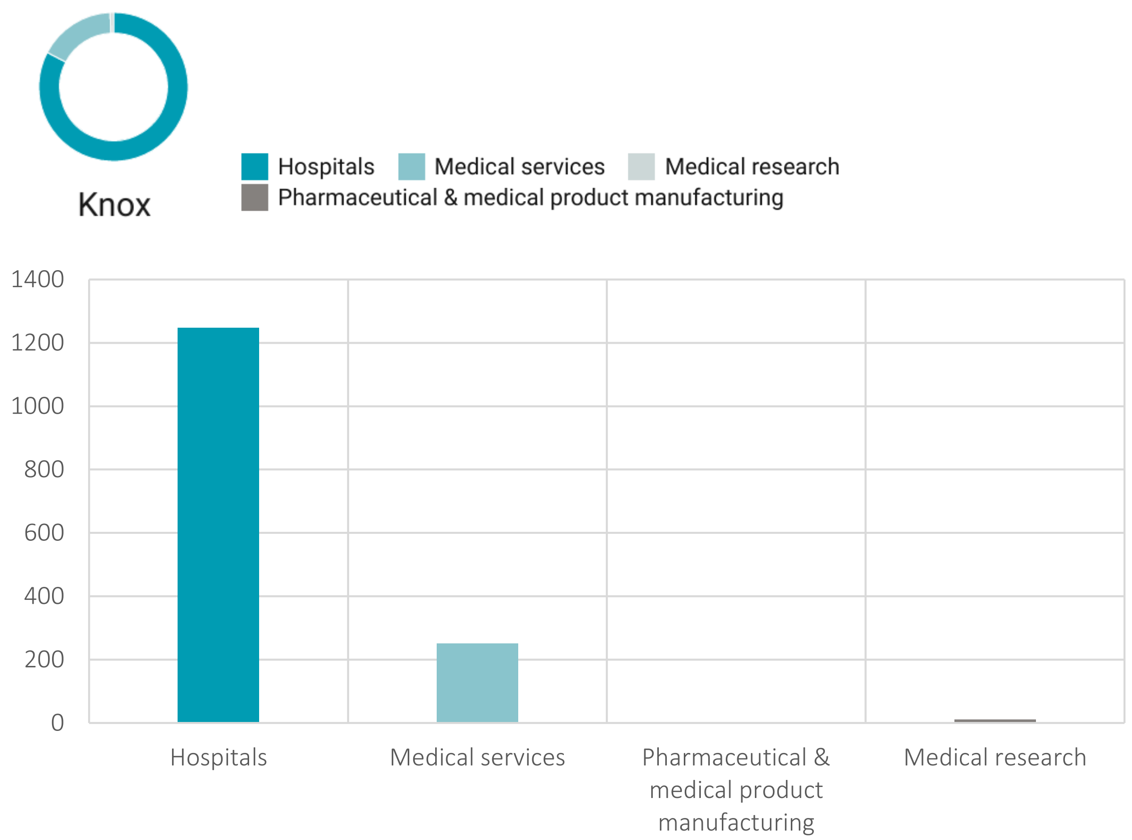
Angliss/Upper Ferntree Gully cluster

The Angliss activity cluster is the smallest of the five identified HI&C economy clusters in the Eastern Region. The Angliss cluster has 1,027 jobs in the HI&C economy (Figure 16). The most predominant sector within Angliss is the hospital sector, accounting for 94 per cent of the HI&C economy jobs in the cluster.

Angliss Hospital is located just south of the Upper Ferntree Gully activity centre, a small suburban activity centre in the foothills of the Dandenong Ranges National Park on the Burwood Highway. Upper Ferntree Gulley is served by the Belgrave train line and a small bus network that connects the hospital to the train station and activity centre.

Table 5 sets out a comprehensive list of institutions and businesses in the Angliss activity cluster.

FIGURE 15: NUMBER OF JOBS IN THE KNOX HI&C ECONOMY CLUSTER BY SUB-SECTOR, 2021

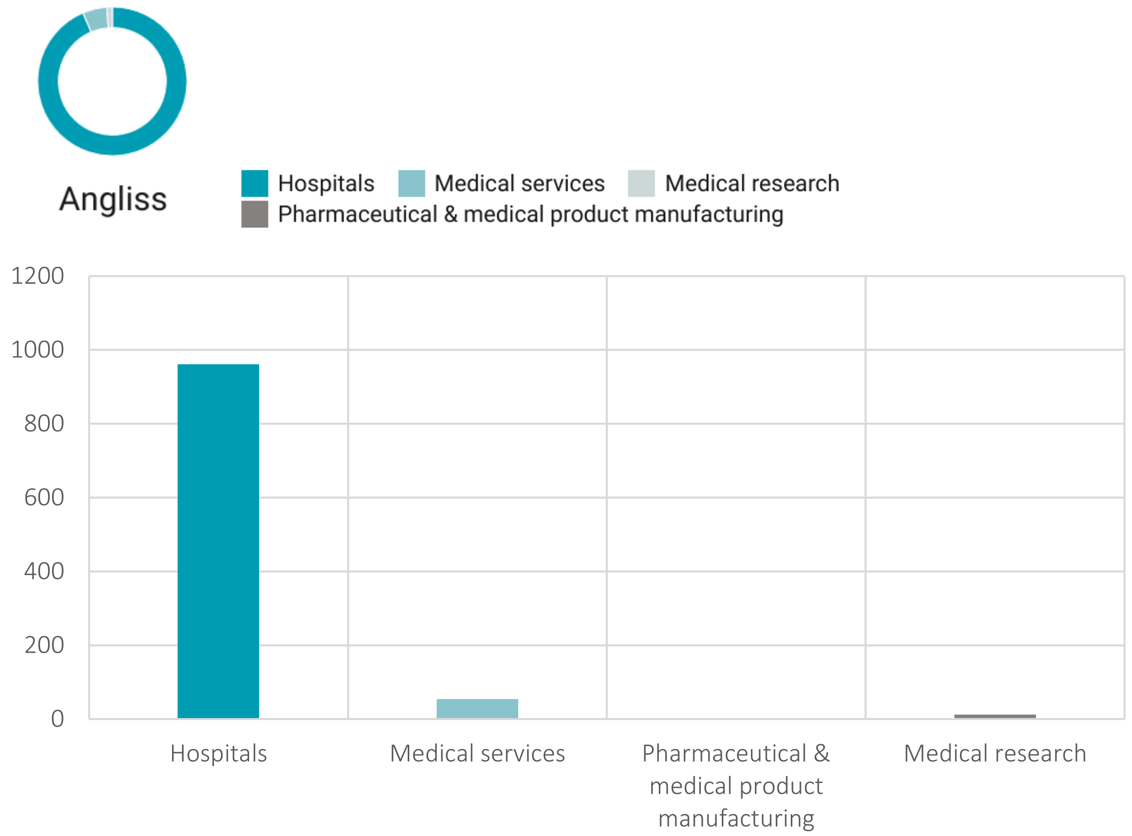


Source: SGS Economics and Planning using ABS census data, 2021

TABLE 4: KEY HEALTH INNOVATION AND CARE INSTITUTIONS AND BUSINESSES IN KNOX

Institution/Business Type	Institution/Business in the Knox activity cluster
Hospitals	Wantirna Health, Knox Private Hospital, The Melbourne Eastern Private Hospital
Universities or TAFEs	Swinburne University of Technology
Major allied health services	Wantirna South Medical Centre, Knox Garden Medical Centre, Headspace, Eastern Health Continuing Care and Support Services
Manufacturing firms	Medical Concepts Australia Pty Ltd, Taylor Surgical Instruments, Indigo Care, Siqura, Fibertech Medical Australia, Cockatoo Blue Medical Products Pty Ltd, Fairmont Medical Products, Baldwin Medical, Advanced Molecular Technologies
Research and clinical trial institutions	Systematic Medicine, Herbal Research Laboratories, Ovulation Method Research & Reference Centre of Australia

FIGURE 16: NUMBER OF JOBS IN THE ANGLISS/UPPER FERNTREE GULLY HI&C ECONOMY CLUSTER BY SUB-SECTOR, 2021



Source: SGS Economics and Planning using ABS census data, 2021

TABLE 5: KEY HEALTH INNOVATION AND CARE INSTITUTIONS AND BUSINESSES IN THE ANGLISS ACTIVITY CLUSTER

Institution/Business Type	Institution/Business in the Angliss activity cluster
Hospitals	Angliss Hospital
Major allied health services	Chandler House, Vital Heart Care, Belgrave Medical Clinic

Metropolitan context

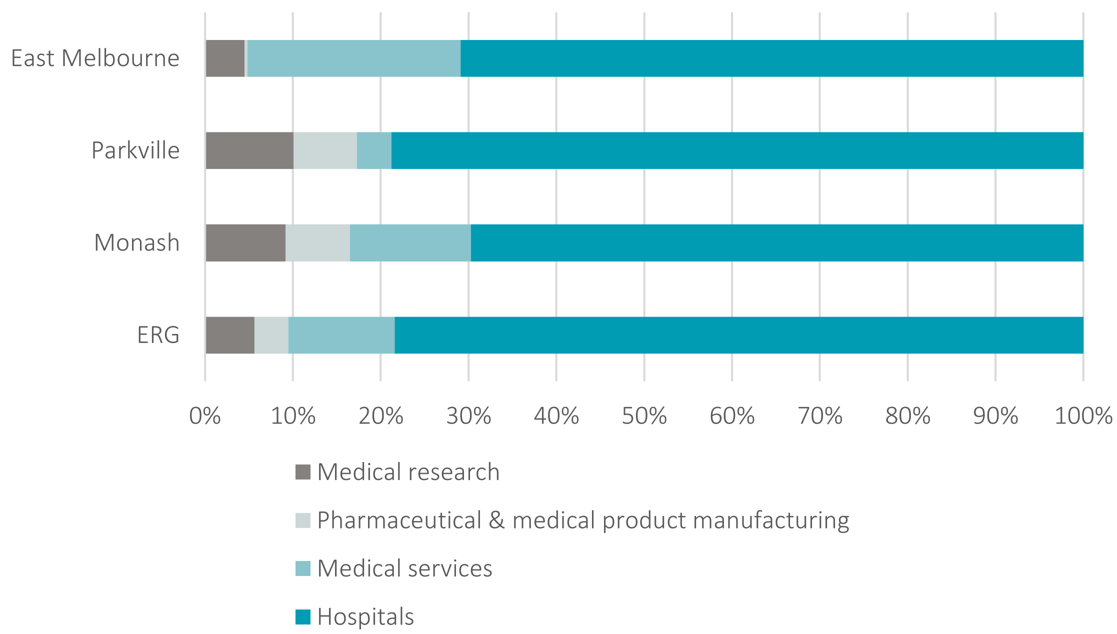
Regarding Melbourne's health and education precincts and the HI&C economy, Parkville, East Melbourne, and Monash are leading clusters integral to Melbourne's overall health innovation and care economy. The major anchors for Monash and the Eastern Region are the Monash Medical Centre, Monash University and Eastern Health. However, these institutional anchors, like those in Parkville and East Melbourne, rely on the broader Eastern Region for their success.

Strong partnerships exist between medical research facilities and institutions across Melbourne's established HI&C precincts. For example, Monash University and the University of Melbourne have partnered to create BioCurate. BioCurate is a collaboration vital to all of Melbourne's health precincts in growing the sector by commercialising research. The Eastern Region has broad pharmaceutical and medical manufacturing capabilities and room for expansion, meaning that research and manufacturing can occur in the Region.

Monash distinguishes itself from the other key Melbourne precincts through its diversity in the share of jobs across the four HI&C sectors, as shown in Figure 17. East Melbourne splits its share of workers between hospitals, medical services and medical research. Parkville has a broader share across medical research and manufacturing, with a smaller medical services sector. Monash has a similar share of employment in both medical research and pharmaceutical and medical product manufacturing compared to Parkville while maintaining a significant share in medical services and hospitals.

The Eastern Region's HI&C economy has a strength in that it services a large suburban population whilst also specialising in research and manufacturing.

FIGURE 17: SHARE OF HI&C EMPLOYMENT ACROSS MELBOURNE'S MAIN ACTIVITY CLUSTERS AND THE EASTERN REGION, 2021



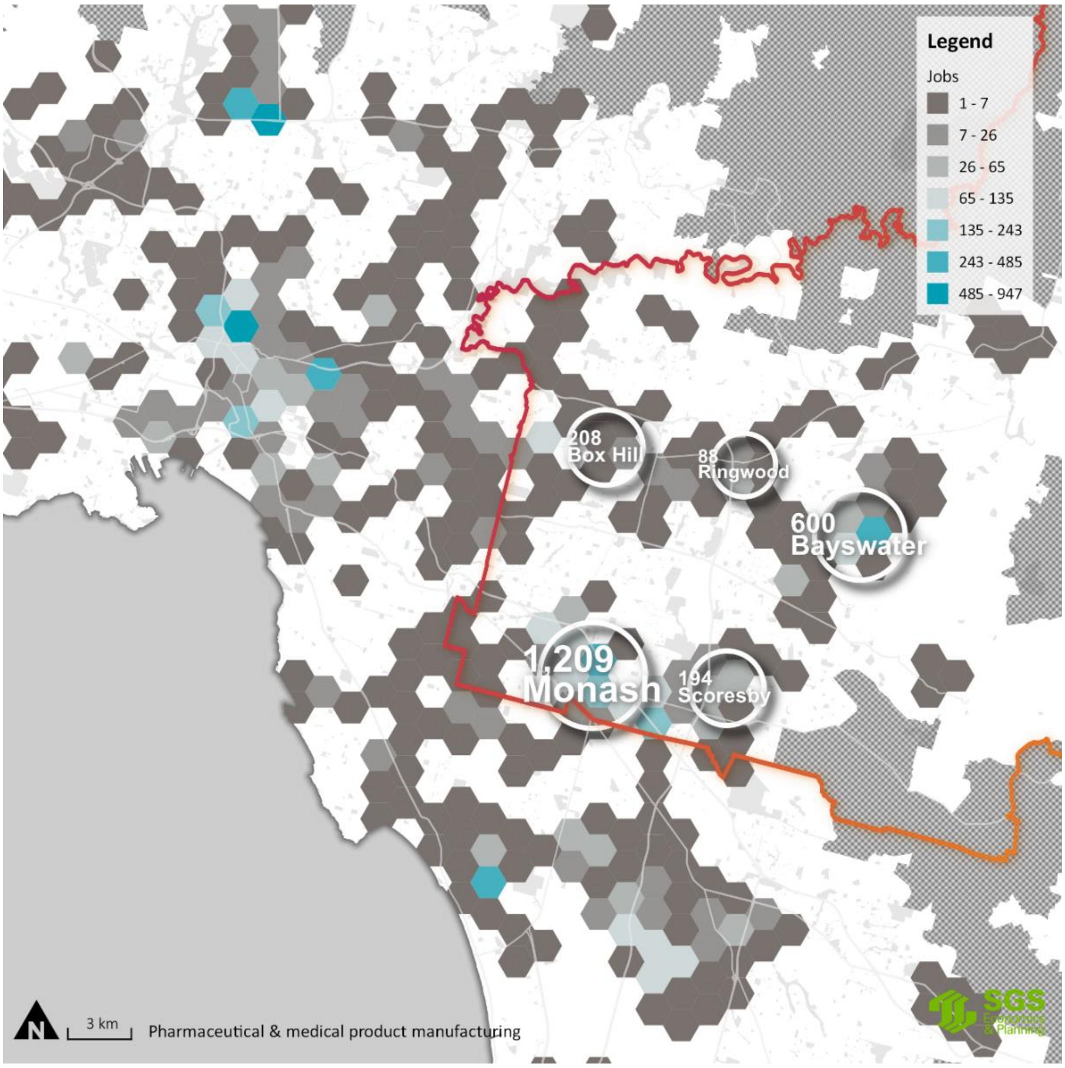
Source: SGS Economics and Planning using ABS census data, 2021

Pharmaceutical and medical manufacturing

While the Ecosystem map in in section 5.1 provides a thorough overview of the ERG HI&C economy ecosystem, the large number of jobs in the hospitals and medical services overshadows the pharmaceutical and medical product manufacturing sector when the sectors are combined. Also, because pharmaceutical and medical product manufacturing is often located in industrial land on the periphery of centres, the geographies used to define clusters in the ecosystem map in Figure 11 did not cover many of the areas that pharmaceutical and medical product manufacturing is situated.

Figure 19 shows the distribution of jobs in medical product manufacturing only, and larger geographical areas for cluster identification. The ERG supports clusters of this activity throughout the region. The Monash cluster (including Clayton and Mulgrave) supports the highest number of jobs in the sector within the ERG with 1,209 jobs. Other clusters are Bayswater (including Boronia), Box Hill (including Blackburn and Nanawading), Scoresby (including Rowville) and Ringwood (including Mitcham). The industrial and commercial precincts is these areas is critical to the development of the HI&C economy.

FIGURE 18: PHARMACEUTICAL AND MEDICAL PRODUCT MANUFACTURING ECOSYSTEM



Source: SGS Economics & Planning

Supporting and ancillary sectors

Important to the growth of specialized industries is the co-location of supporting businesses and industries that enable growth and development in the HI&C economy sector. These include specialized advisory firms such as venture capital firms, lawyers, and finance and professional services. These sectors are necessary to enable business and innovation in the sector. The co-location of these firms can also be important as face to face contact is valuable across the business sector.

There are several law firms that specialize in corporate and commercial law located throughout the Eastern Region. There are a higher number of corporate and commercial law firms located around the Monash/Clayton area and particularly in Box Hill, where there are firms such as Merton Lawyers who specialise in health as a key area of business.

There are few dedicated venture capital firms located in the Eastern Region. Most venture capital firms are located within central Melbourne, Richmond and Hawthorn.

5.2 Supply chains

The nature of employment ecosystems such as the HI&C economy is that there are naturally business-to-business relationships as businesses source materials and services from each other. While it is difficult to understand these supply chain linkages at a locally-specific level without engaging directly with businesses, analysis of input-output modelling leads to some clear connections emerging.

Figure 19 shows the value of inputs into health care services derived from other sub-industries in the Eastern Region, with employment, travel agency and other administrative services[1]; professional, scientific and technical services; and wholesale trade all receiving over $80 million for their inputs into the region's health care services.

There are over 25 sub-industries that contribute more than $5 million. In total, as shown in Figure 6, $866 million flows to other businesses in the region for inputs to production (intermediate uses), and $630 million leaks out of the region through importing goods and services for production.

Figure 20 captures the outflows from the health care services industry, showing where the goods and services go in the region. The largest amount ($2.5 billion) is consumed by government (through the provision of public health), followed by consumption by households (through private health). In addition, there are some small industry connections, including other health care services (i.e. the industry trading amongst itself) and insurance and superannuation funds. In addition to the outflows captured in the region, $1.2 billion of output is used outside of the region, likely people travelling into the Eastern Region to use its hospitals and health care services.

Moving to medical product manufacturing, Figure 21 shows the value of inputs derived from other sub-industries in the Eastern Region. The largest value of inputs by far comes from professional, scientific and technical services, pointing to the strong connection between knowledge industries and modern manufacturing. Other key intraregional industry links include wholesale trade; transport support services and storage; employment, travel agency & other administrative services; and road transport.

[1] Other administrative services includes office administrative services, document preparation services, credit reporting and debt collection services and call centre operation.

There are also links with other manufacturing sub-industries, notably polymer product, basic chemicals, paper/cardboard and glass manufacturing.

There are over 20 sub-industries that contribute more than $5 million. In total, as shown in Figure 6, $312 million flows to other businesses in the region for inputs to production (intermediate uses), and $1.3 billion leaks out of the region through importing goods and services for production.

Figure 22 captures the outflows from the medial product manufacturing sub-industry, showing where the goods and services go in the region. The largest amount ($163 million) is consumed by government, followed by consumption by households ($68 million). In addition, there are some small industry connections, including health care services. In addition to the outflows captured in the region, $1 billion of output is exported outside of the region. The scale of exports points to the position of the medical product manufacturing sector as a national and even global player.

FIGURE 19: INPUT FLOWS FROM EASTERN REGION INDUSTRIES INTO HEALTH CARE SERVICES

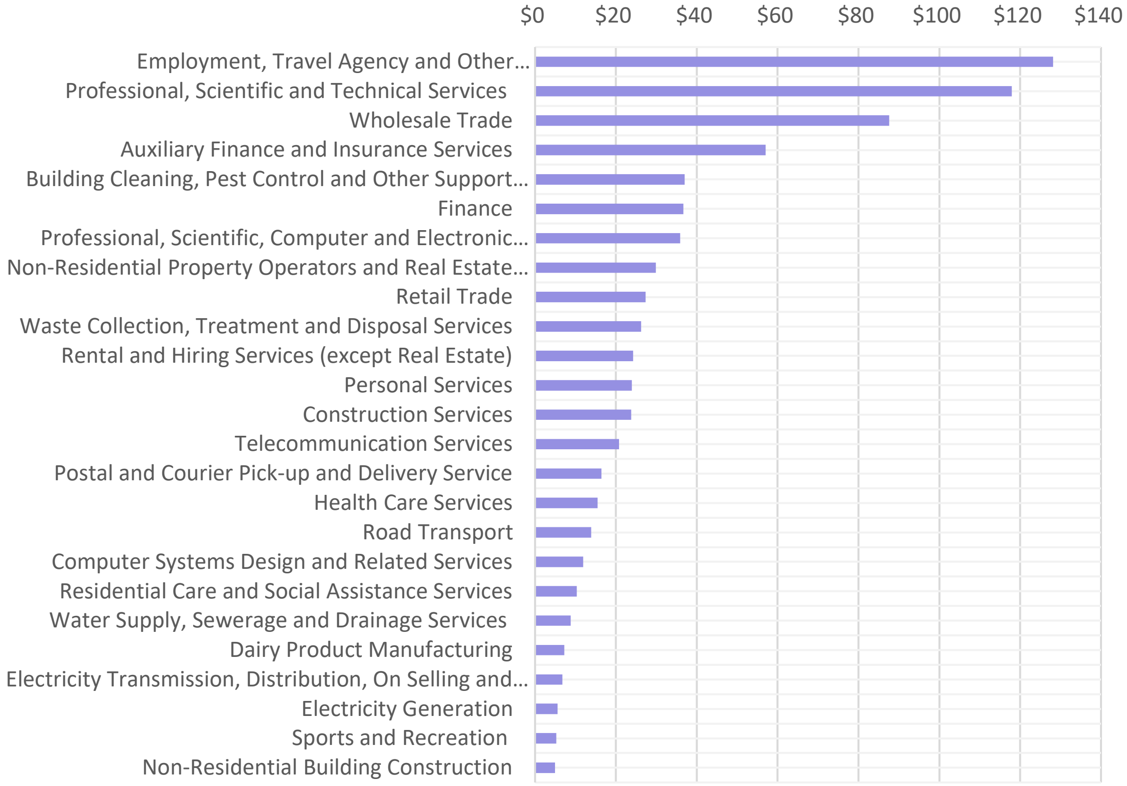
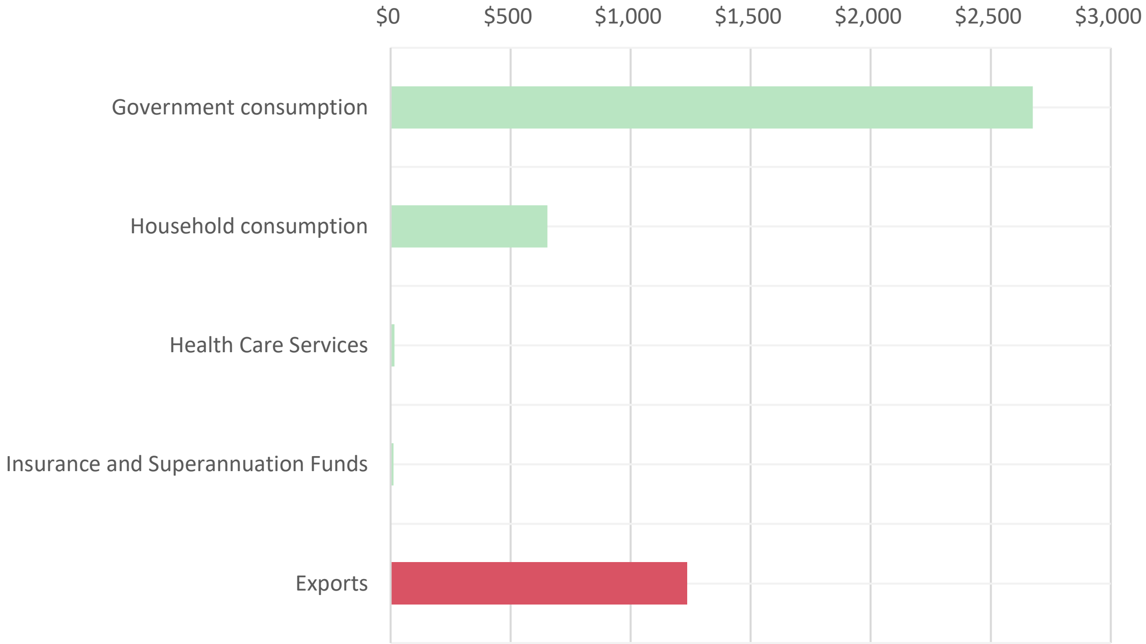


FIGURE 20: OUTPUT FLOWS FROM HEALTH CARE SERVICES TO THE EASTERN REGION



Source: SGS Economics and Planning (2023) using an internal input-output model of the Eastern Region economy

FIGURE 21: INPUT FLOWS FROM EASTERN REGION INDUSTRIES INTO MEDICAL PRODUCT MANUFACTURING

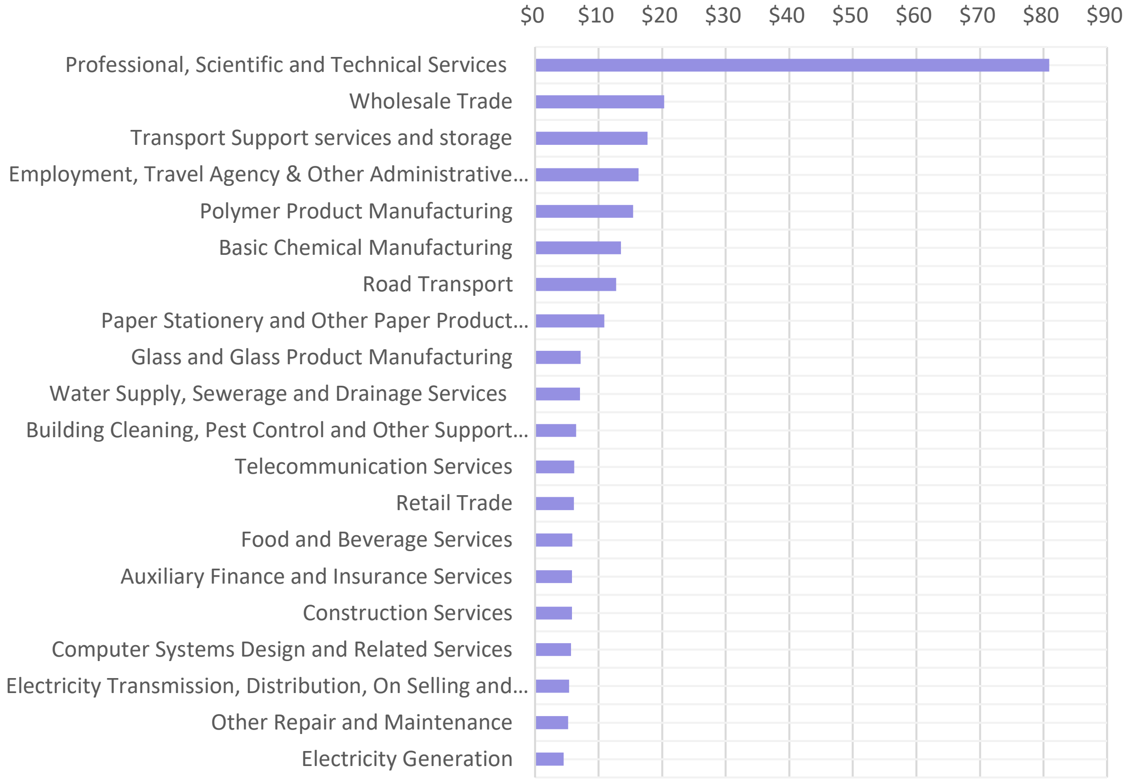
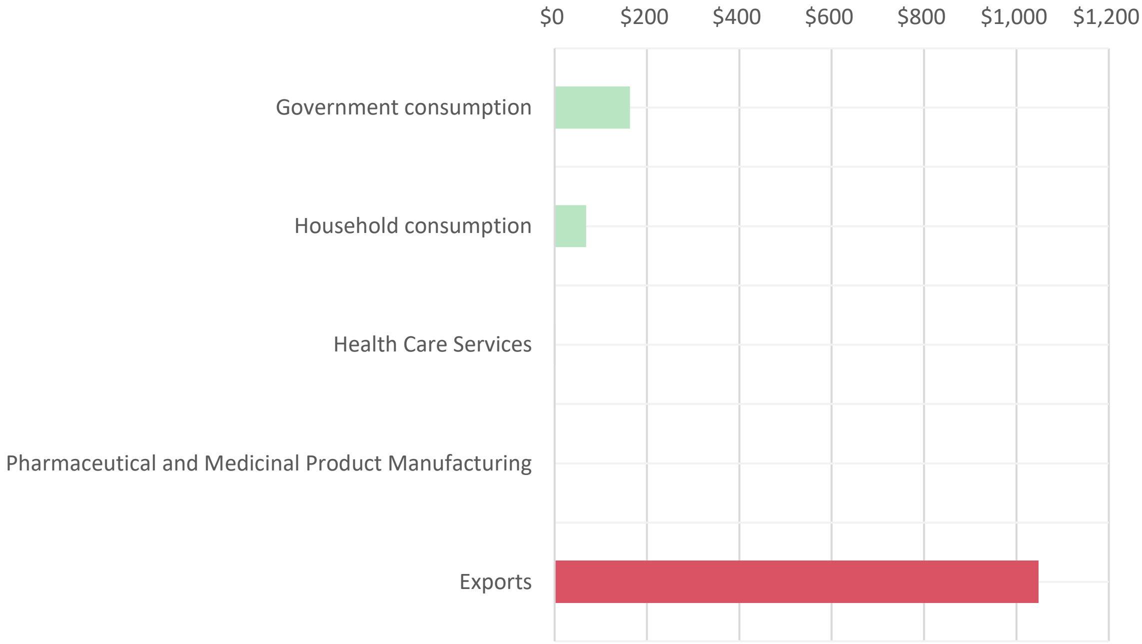


FIGURE 22: OUTPUT FLOWS FROM MEDICAL PRODUCT MANUFACTURING TO THE EASTERN REGION



Source: SGS Economics and Planning (2023) using an internal input-output model of the Eastern Region economy

5.3 Economic connectivity

Understanding the relative connectivity of the Eastern Region from an economic perspective sheds further light on the opportunities and challenges. Effective Job Density (EJD) is a measure of agglomeration that indicates the accessibility to workers for businesses in a given area. Accessibility is based on how long it takes workers to get to jobs , the transport mode of those trips and the employment levels of those locations. EJD is therefore strongly linked to accessibility to large clusters of jobs and the provision of public transport and road networks.

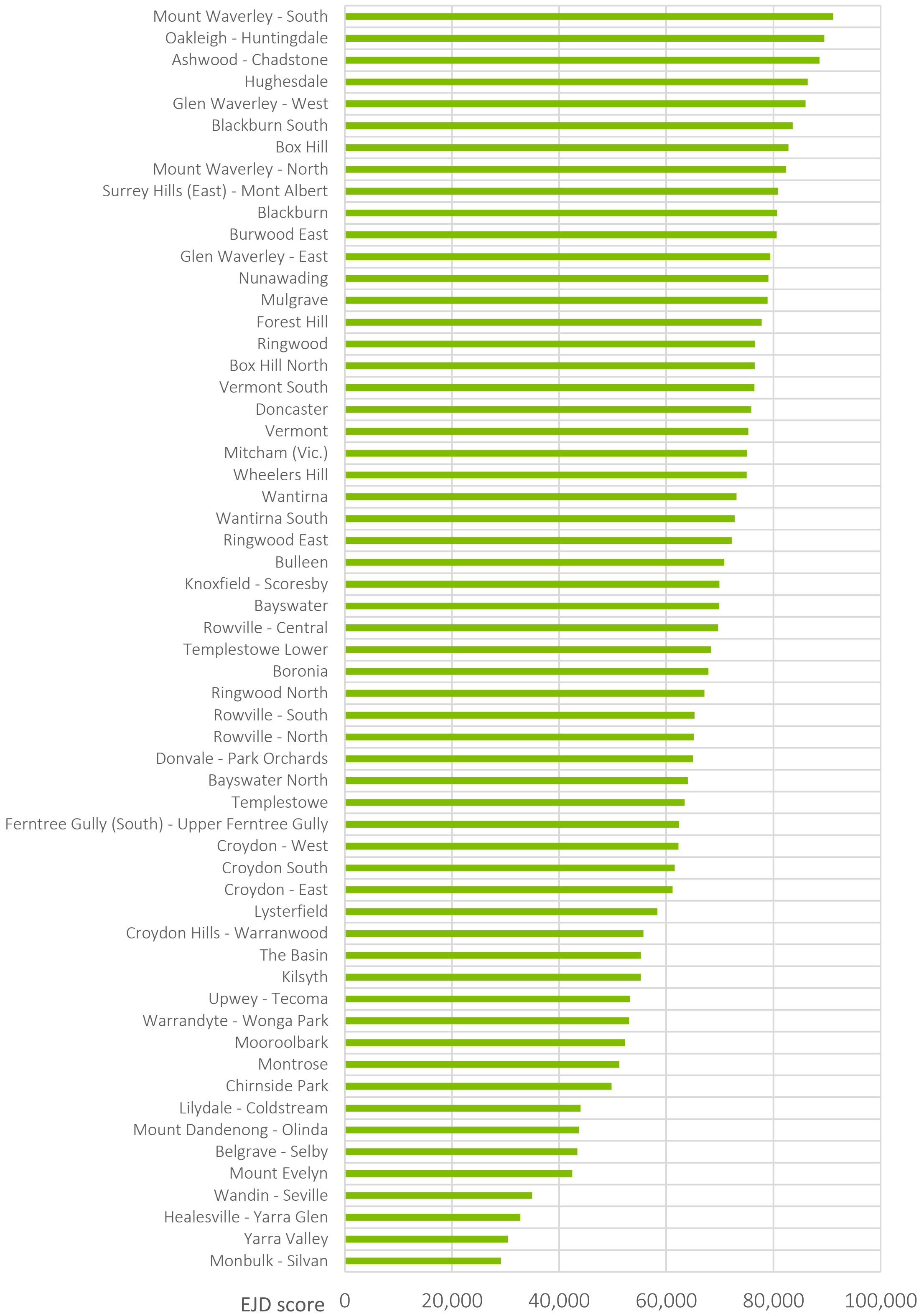
From a business perspective, higher levels of connectivity mean that businesses enjoy scale and productivity advantages through better access to skills, suppliers and complementary enterprises. It is this access – referred to as 'agglomeration' - that drives new knowledge and innovation in modern economies.

Some parts of the region, notably Box Hill and Monash/Clayton, have good EJD scores, pointing to good accessibility. Other parts of the region (Knox, Ringwood and Ferntree Gully), however, have a relatively peripheral location which means that, compared to other places in Melbourne, they are less connected and therefore have a lower Effective Job Density (Figure 23).

This is a pattern observed in cities generally; EJD – and agglomeration – favour highly connected precincts with high job densities and the broadest access to a large labour market. For the locations in outer Melbourne, a low EJD score is not a sign of failure, but it is a measure that should help to inform what type of industries and jobs a precinct is likely to attract.

Building a strategic directions framework through this lens means that industry attraction can be more appropriately targeted to key opportunity areas rather than driven by unrealistic and uninformed ambition.

FIGURE 23: EFFECTIVE JOB DENSITY BY SA2 IN EASTERN REGION



Source: SGS Economics and Planning, 2021

5.4 Skills profile

The stock of knowledge, experience and skills in the economy is critical to economic performance. This stock is referred to as 'human capital'. Without a stock of knowledgeable and skilled people, businesses cannot function. An undersupply of skilled labour will impede HI&C economy growth and development.

A Location Quotient (LQ) methodology has been used to compare occupations within the Eastern Region to Australia to understand the concentration of specific occupations in the region. LQs are calculated by dividing the regional concentration of an occupation by the national concentration of that same occupation. When an occupation has an LQ score above 1.0, there is a higher-than-average concentration of that occupation in the region. An LQ less than 1.0 means that the occupation is less concentrated in the region than in Australia, indicating a potential comparative disadvantage in that occupation for the region.

High LQ occupations are essential because they tend to be export-oriented and form most of a region's economic base. A diverse set of high LQ occupations can also create a more robust and adaptable economy less vulnerable to economic shocks.

Figure 24 shows the LQ scores for occupations at the 3-digit ANZSCO level in the Eastern Region, compared to Australia. The figure shows scores greater than 1.1, representing occupations in the region with a significant concentration compared to the national average. The highest-ranking occupations in the Eastern Region include printing and trade workers (2.4), factory process workers (2.1), tertiary education teachers (1.7), packers and product assemblers (1.7), education professionals (1.5) and sales workers (1.5).

The highest scores for occupations directly within the health and care industries include agriculture, medical and science technicians (1.3), health therapy professionals (1.2), medical professionals (1.2), natural and physical sciences professionals (1.2), midwifery and nursing professionals (1.2) and health diagnostic and promotion professionals (1.1).

The Eastern Region has diverse occupations, including many health-related occupations, which show higher concentrations than the national average. This diversity in specialisation positions the region's workforce well to capitalise on further growth in the HI&C economy. Also prevalent across the Eastern Region are manufacturing and factory-process related occupations.

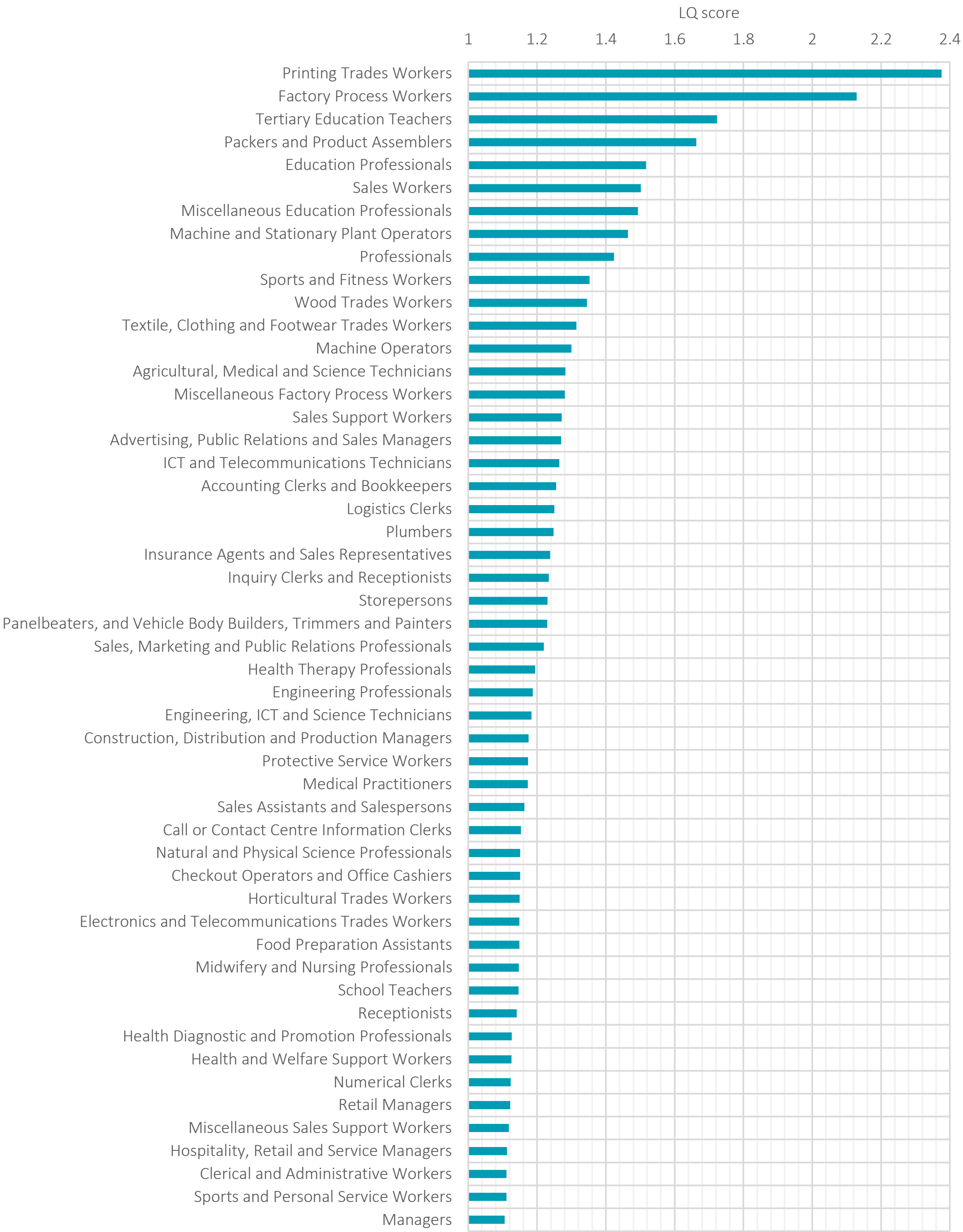
The ABS categories also allow for the analysis of occupation types to be undertaken at a finer level, this case at a 6-digit occupation level, which is the finest grain available. Figure 25 shows the LQ scores for health professionals, and Figure 26 shows the LQ scores for natural and physical science professionals.

For health professionals, occupations with the highest competitive advantage within the Eastern Region include dental practitioners (4.3), specialist physicians (2.4), industrial pharmacists (2.4), osteopaths (2.3), clinical haematologists (2.2), traditional Chinese medical practitioners (1.9), complementary health therapists (1.9), orthotics or prosthetists (1.9) renal medicine specialists (1.8), and neurologists (1.7). While these are the top ten occupations with a competitive advantage, there are around 40 per cent of all health professional occupations with LQ scores indicating competitive advantage when compared to Australia.

Within natural and physical science professionals, occupations with the highest competitive advantage include other natural and physical science professionals (3.09), biochemists (2.8), microbiologists (2.8), life scientists (general) (2.3), chemists (2.3), natural and physical science professionals (2.1), food technologists (1.8), medical laboratory scientists (1.6) and biotechnologists (1.4).

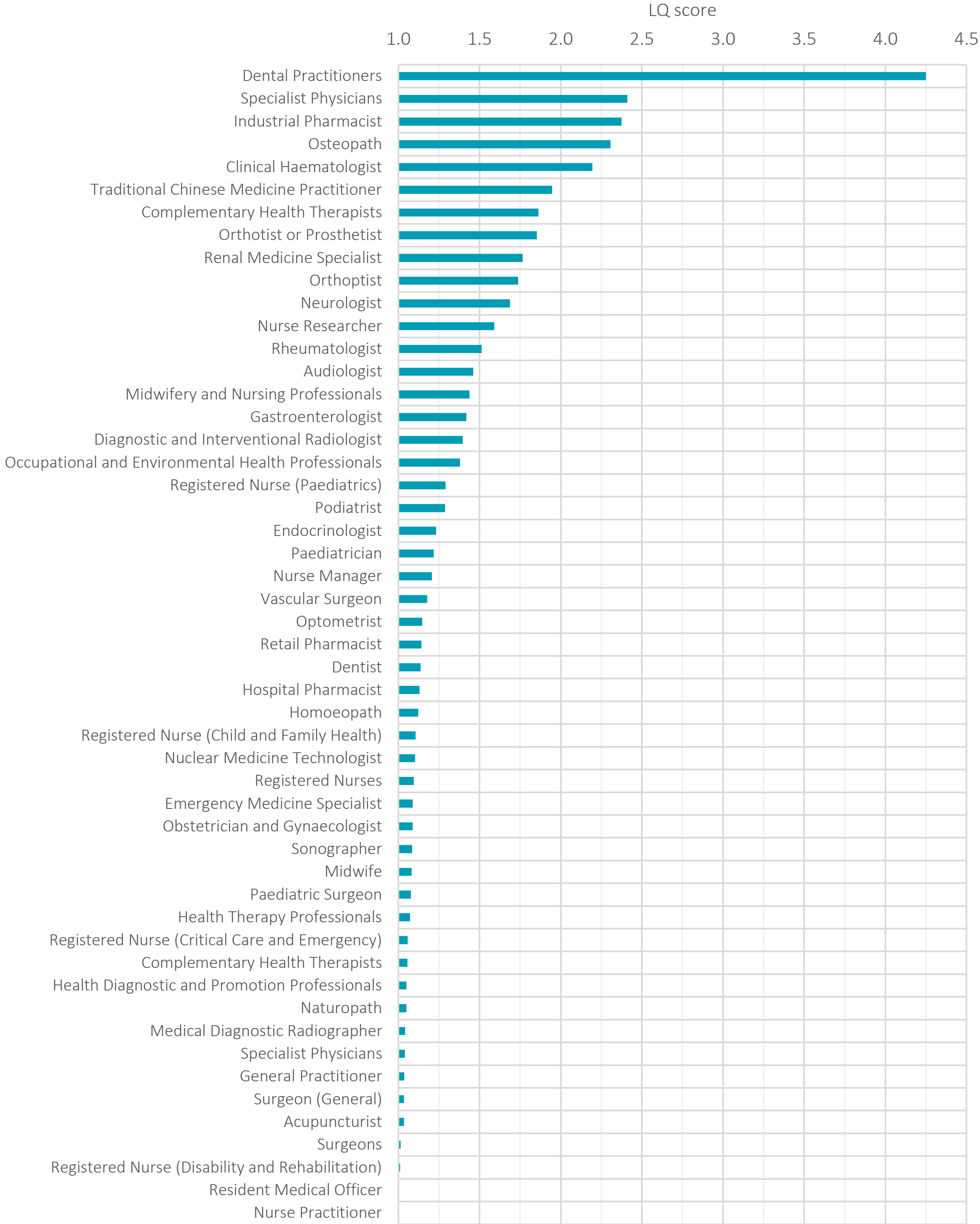
When comparing the ERG's occupational skill level to Australia, the Eastern Region follows a similar pattern in the percentage of the workforce across all skill levels, however, the Eastern Region does have a slightly higher percentage of workers in higher skill levels (categories 3 & 4) and a marginally lower share of workers in low skill levels (category 1) when compared to Australia in Figure 27.

FIGURE 24: LQ FOR THE EASTERN REGION COMPARED TO AUSTRALIA AT THE 3-DIGIT LEVEL, 2021 (SHOWING OCCUPATIONS WITH LQ SCORES ABOVE 1.1)



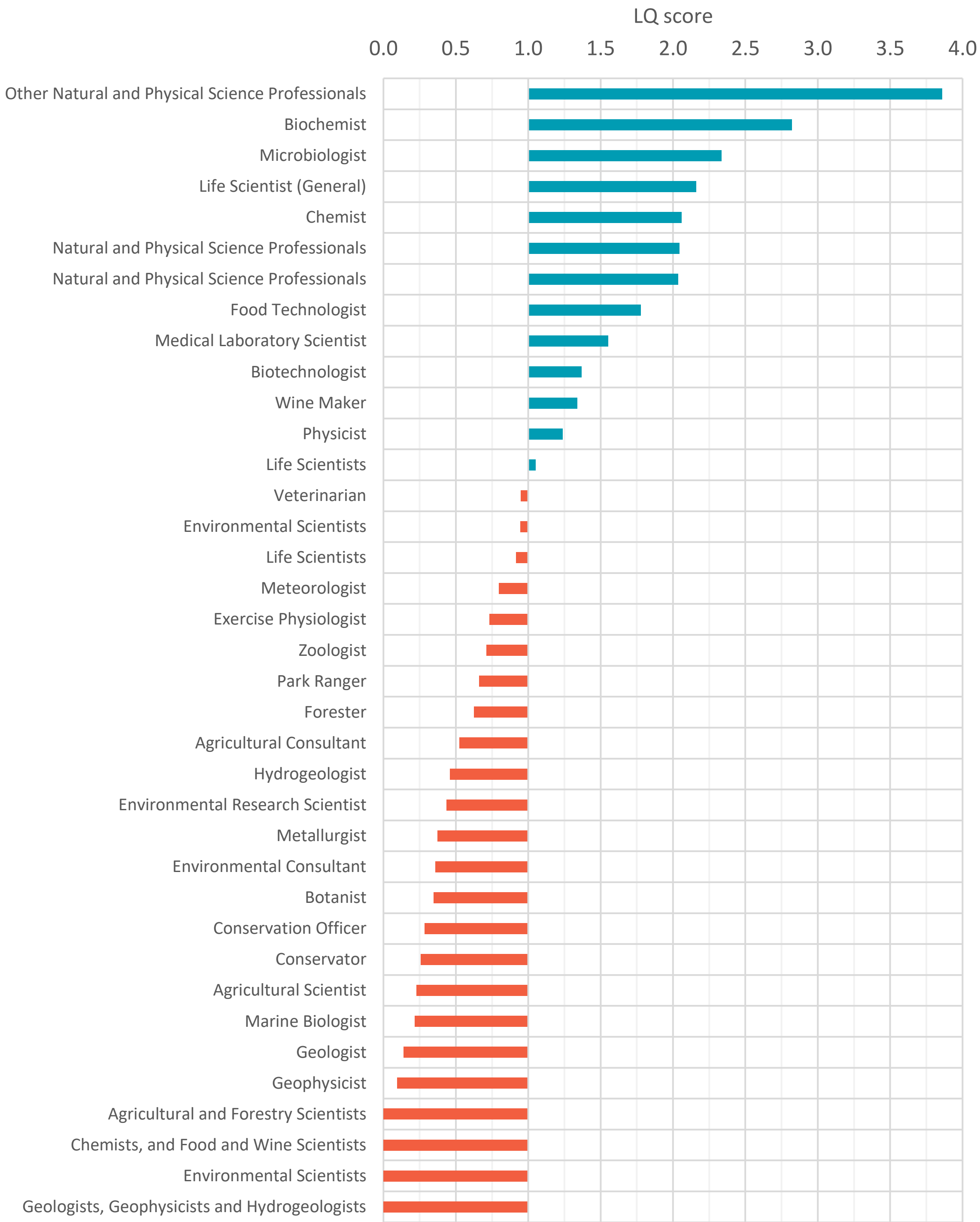
Source: SGS Economics and Planning using ABS census data, 2021

FIGURE 25: LQ FOR HEALTH PROFESSIONALS IN THE ERG COMPARED TO AUS AT THE 6 DIGIT LEVEL, 2021 (SHOWING SCORES GREATER THAN 1.0)



Source: SGS Economics and Planning using ABS census data, 2021

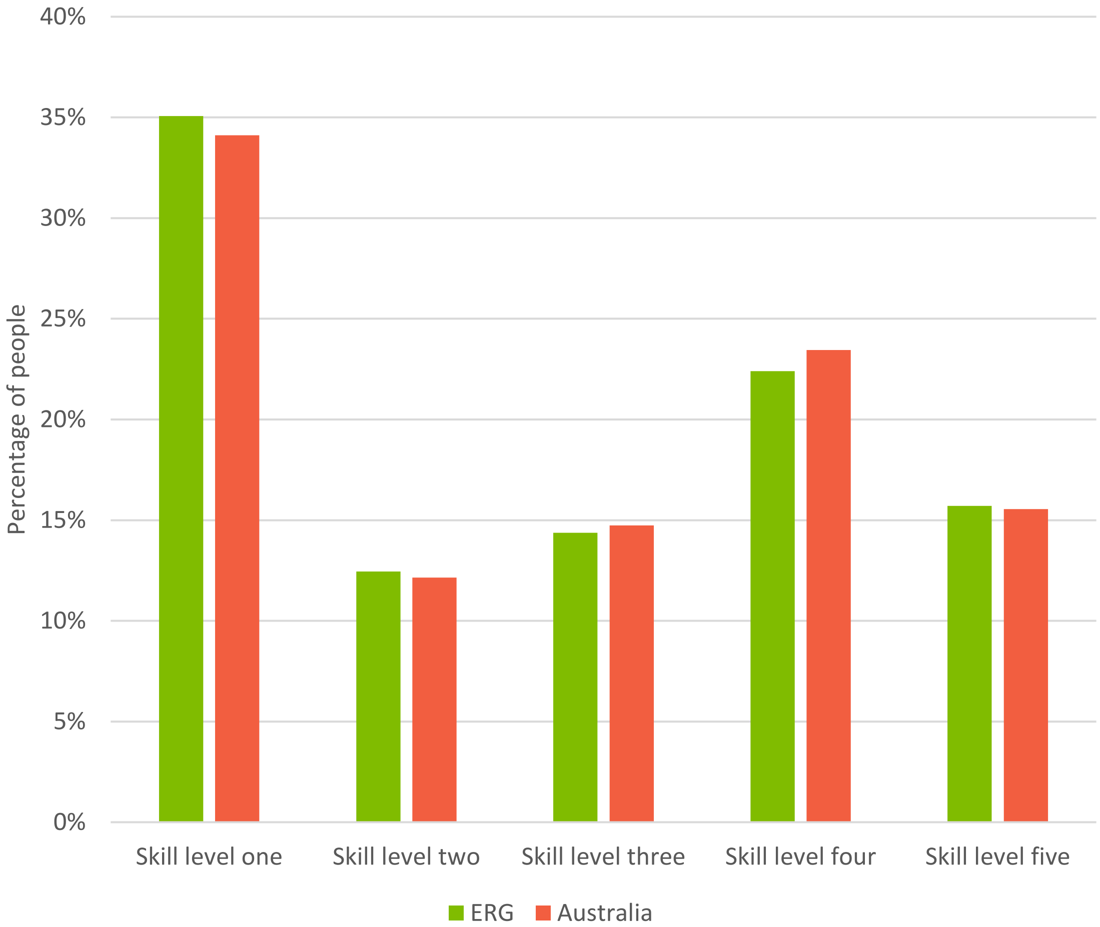
FIGURE 26: LQ FOR NATURAL AND PHYSICAL SCIENCE PROFESSIONALS OCCUPATIONS IN THE ERG COMPARED TO AUS AT THE 6-DIGIT LEVEL, 2021



Source: SGS Economics and Planning using ABS census data, 2021

Regarding skill levels, the Eastern Region has a similar level across all skill levels compared to Australia (Figure 27). However, the Eastern Region does have a slightly higher percentage of workers in the highest skill level (skill levels 1 and 2). Occupations at Skill Level 1 have a level of skill commensurate with a bachelor degree or higher qualification. Skill level 5 is commensurate with finishing compulsory secondary schooling.

FIGURE 27: OCCUPATION SKILL LEVELS IN THE ERG COMPARED TO AUS, 2021



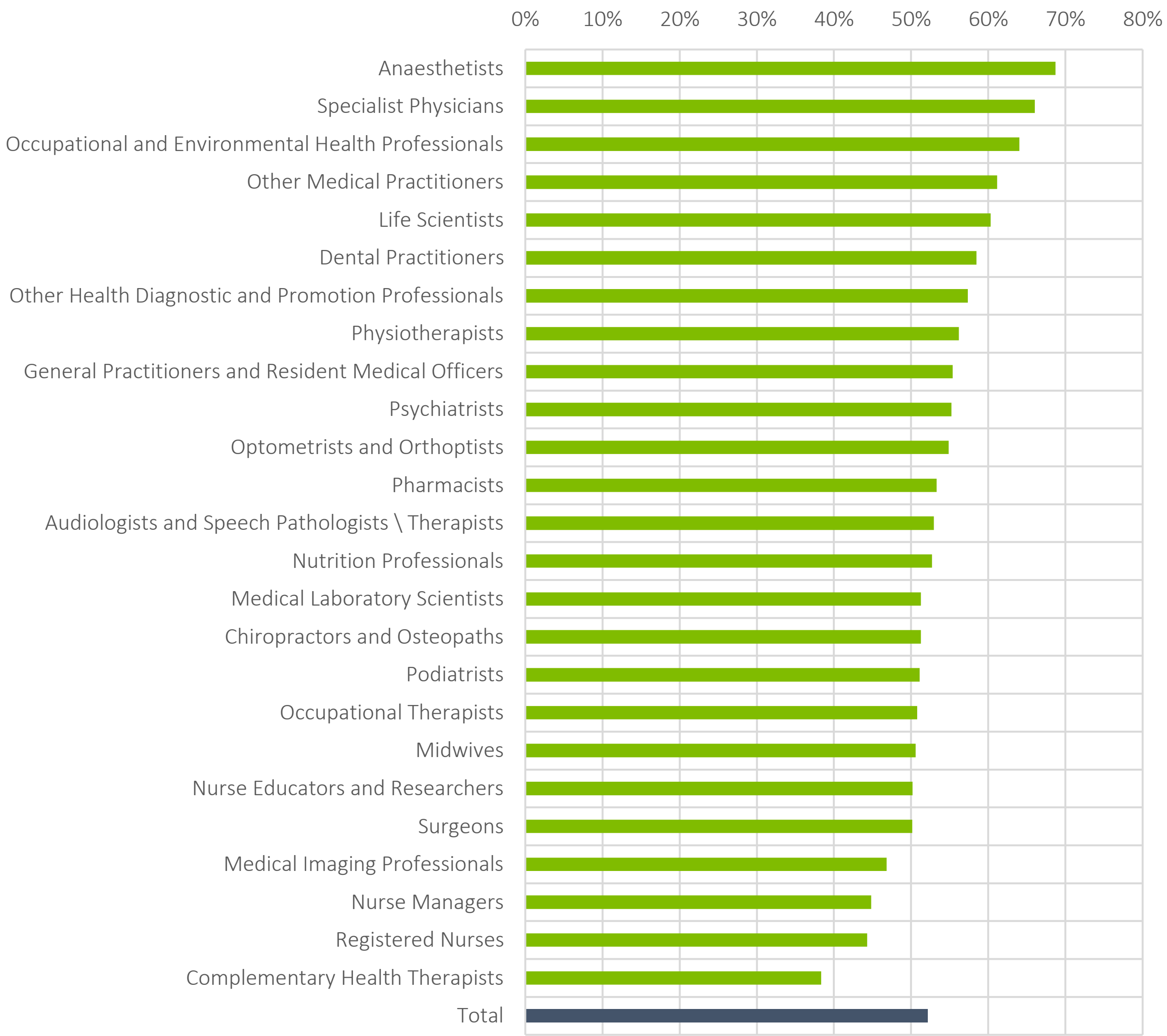
Source: SGS Economics and Planning using ABS census data, 2021

Local worker containment

While there are a high number of health jobs within the ERG, many other health workers leave the region each day for to work in areas outside of the ERG. In total, 52 per cent of health care professionals and natural and physical science professionals living in the region leave the ERG for work. More specifically, 16 per cent of health professionals leaving the region work within the Melbourne LGA, at sites like Parkville.

Figure 28 shows occupations across of health care and natural and physical science occupations and the percentage of people leaving the ERG in each occupation for work. The health occupations of anaesthetists and specialised physicians have the highest rates of working outside the region, and in the research space 60 per cent of local life scientists work outside the Eastern Region.

FIGURE 28: PERCENTAGE OF HEALTH PROFESSIONALS LEAVING THE ERG FOR WORK



Source: SGS Economics and Planning using ABS census data, 2021

6. Summary of strengths and gaps

6.1 Strengths of the Eastern Region HI&C economy

Strengths of the current regional HI&C economy, as revealed in the working paper, are:

- **A skilled workforce:** The Eastern Region has a highly skilled and educated workforce, making it an attractive location for businesses looking to recruit top talent. The Eastern Region shows higher concentrations than the national average in HI&C economy occupations, including health care workers, but also scientists, research and manufacturing technicians. This diversity in specialisation positions the region's workforce well to capitalise on further growth in the HI&C economy and points to a level of existing comparative advantage.
- **Strategic location**: The inner parts of the Eastern Region are strategically located in close proximity to Melbourne's central business district while not having the same land and development costs.
- **Export earners:** The HI&C economy is already a leading export earner, through products and services for Melbourne, but also globally.
- **Infrastructure and transportation**: The region has a well-developed infrastructure and transportation network for two of its main clusters, Monah and Box Hill, making it easy for businesses to connect with suppliers, customers, and employees in the locations. Accessibility will improve in the coming decades as the Suburban Rail Loop is developed. Other areas of the region, like Ringwood and Knox/Bayswater, have lower accessibility, which may impact the type of business attracted to those locations.
- **Local supply chains:** Local supply chains see the money injected into the economy flowing to related businesses in the Region. Almost $1.2 billion with of money is recirculated around the economy from the health care services and medical product manufacturing sub-industries.
- The Eastern Region's **workforce supports health care across Melbourne**. In total, 52 per cent of health care professionals and natural and physical science professionals living in the region leave the ERG for work. More specifically, 16 per cent work within the Melbourne LGA, at sites like Parkville.
- **A growing population**: The region has a growing population, providing a large market for businesses and increasing demand for goods and services. The region also has an attractive lifestyle, which attracts a large number of residents and businesses (including those from overseas).
- **International recognition:** The existing Monash NEIC and Health precinct is recognised on a state, national and international level for its research and innovation activities. This reputation is a major attractor for businesses and organisations.

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