Australian obesity research

Global leadership and local change



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OUR VISION: Research Australia envisions a world where Australia unlocks the full potential of its world-leading health and medical research sector to deliver the best possible healthcare and global leadership in health innovation.

OUR MISSION: To use our unique convening power to position health and medical research as a significant driver of a healthy population and contributor to a healthy economy.

OUR ROLE:

Engage
Australia in a conversation about the health benefits and economic value of its investment in health and medical research.

Connect
researchers, funders and consumers to increase investment in health and medical research from all sources.

Influence
government policies that support effective health and medical research and its routine translation into evidence-based practices and better health outcomes.

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Novo Nordisk Pharmaceuticals Pty Ltd (Novo Nordisk), is part of a leading global healthcare company, founded in 1923 and headquartered in Denmark.

Novo Nordisk's purpose is to drive change to defeat diabetes and other serious chronic diseases such as obesity and rare blood and endocrine disorders. It does this by pioneering scientific breakthroughs, expanding access to its medicines, and working to prevent and ultimately cure disease. Novo Nordisk employs about 50,800 people in 80 countries and markets its products in around 170 countries.

Novo Nordisk is committed to driving change and improving the lives of people living with obesity.

Novo Nordisk invests in research and innovation and collaborates with a number of stakeholders in an effort to drive change and support the wealth and healthcare of Australia.

Novo Nordisk is committed to continuing its contribution to the shared responsibilities in policy, education, awareness, and treatment to ensure overweight and obesity are both prevented and managed.

1.4M+

Around 1.4 million registered Australians are living with diabetes.[1]

12.5M+

More than 12.5 million adult Australians are over-weight or have obesity.[2]

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INVESTMENTS IN AUSTRALIA[3]

15 Novo Nordisk trials

423 Patients 2016-2020

18.2 M AUD Novo Nordisk R&D investments in 2016-2020

8 trials initiated in 2021

110 Clinical research sites will be established by 2022-2023

5% of all global Novo Nordisk clinical trials are conducted in Australia

Novo Nordisk performs the entire R&D value chain in-house, from pre-clinical to commercialisation & patient access

Glossary of Key Terms

Term	Acronym	Definition
Australian Institute of Health and Welfare	AIHW	The AIHW is an independent statutory Australian Government agency producing authoritative and accessible information and statistics to inform and support better policy and service delivery decisions, leading to better health and wellbeing for all Australians.
Australian Research Council	ARC	Commonwealth entity that advises the Australian Government on research matters, administers the National Competitive Grants Program (NCGP). The ARC is a significant component of Australia's investment in research and development, and has responsibility for Excellence in Research for Australia (ERA).
Burden of disease		Burden of disease measures the impact of living with illness and injury and dying prematurely.[4]
Comorbidity		Comorbidity is the condition of having two or more diseases at the same time.[5]
Health economics		Health economics applies the principles of economics to address problems of health and health care. It identifies the factors that contribute to the health of individuals and populations and identifies the most productive ways of using whatever resources are available for improving health.[6]
Health promotion		Process of enabling people to increase control over, and to improve their health. It covers a wide range of social and environmental interventions that are designed to benefit and protect individual people's health and quality of life by addressing and preventing the root causes of ill health, not just focusing on treatment and cure.[7]
Medical Research Future Fund	MRFF	Ongoing research fund established by the Australian Government in 2015. The MRFF aims to transform health and medical research and innovation to improve lives, build the economy and contribute to health system sustainability. In July 2020 it grew to $20 billion in capital. The net interest from the fund pays for important health and medical research projects. In 2021-22 it provided approximately $650 million of research and innovation.
National Health and Medical Research Council	NHMRC	An independent statutory agency within the portfolio of the Australian Government Minister for Health and Ageing. The NHMRC creates pathways to a healthier future through research funding, health guidelines and ethical standards. In 2021-22 it provided approximately $850 million in funding for health and medical research and research training.

Term	Acronym	Definition
National Obesity Strategy 2022-2032		The National Obesity Strategy was announced by the Australian Government in March 2022. It is a 10-year framework for action to prevent, reduce and treat overweight and obesity in Australia. The Strategy will guide all governments and their many partners to *"better embed prevention, early intervention and treatment into our health care system"*.[8]
Obesity		Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health.[9] Research Australia has followed best practice language guidelines when communicating about obesity in this report.
Obesity-related comorbidities or complications		Obesity is associated with over 200 complications affecting an individual's health and various organ systems.[10] These include hypertension, dyslipidaemia, heart failure, pre-diabetes, type 2 diabetes, osteoarthritis, polycystic ovary syndrome and infertility in women, obstructive sleep apnoea.[11]
Population health research		Population health research is an interdisciplinary field focused on factors that influence the health of population groups or whole populations. It addresses health outcomes, health determinants, and policies and interventions that link the two.[12]
Prevention		In this Report, obesity prevention ranges from: • Primary prevention: reducing risk factors (e.g. low physical activity) • Secondary prevention (e.g. early identification of unhealthy weight gain) • Tertiary prevention (e.g. support; treatment)
Primary care		Primary health care is the entry level to the health system and, as such, is usually a person's first encounter with the health system. It includes a broad range of activities and services, from health promotion and prevention to treatment and management of acute and chronic conditions.[13]
Research		The investigation into a topic that is unknown or requires further exploration. For example, many investigations have been completed by researchers (often PhD qualified people at universities) into the treatments for arthritis, but some might believe that more research is needed into specific treatments.
Telehealth		Telehealth is having a consultation with a healthcare provider by phone or video call.[14]

List of Tables and Graphs

Graphs 1 – 4	Results of Research Australia's Public Opinion Poll 2022	Pages 16-19
Network Map 1	Australian Obesity Research: Co-occurrence network based on topic domain index keywords occurring 50 or more times.	Page 20
Network Map 2	Australian Obesity Research: Co-occurrence network based on study type index keywords occurring 50 or more times.	Page 21
Table 1	Top obesity research funders by sector	Page 26
Table 2	Top individual obesity research funders	Page 26
Table 3	Australian Government funders of obesity publications	Page 27
Graph 5	Distribution of obesity research funding from Australian State and Territory Governments	Page 28
Table 4	Australian State and Territory Government departments or agencies funding obesity research	Page 29
Table 5	Top 10 Australian research institutions funding obesity research publications	Page 31
Table 6	Charities and not-for-profits funding obesity research publications	Page 32
Table 7	Private sector organisations funding obesity research publications	Page 33
Graph 6	Career stages of obesity researchers surveyed	Page 35
Table 8	Obesity research gaps reported by the health and medical researchers	Page 37
Table 9	Government strategies and resources related to obesity	Page 39
Diagram 1	Obesity policy distilled into key research themes	Page 40

Contents

Executive Summary 8

Introduction 12

How we got here 14

Obesity and Overweight: One of Australia's greatest health challenges 15

Australians' attitudes to the obesity epidemic 16

Current obesity research activity in Australia 20

Types of obesity research being conducted in Australia 20
Who is conducting obesity research in Australia 22

Who funds obesity research in Australia 26

Summary of key findings 26
Public sector – Australian Government 27
Public sector – Australian state and territory governments 28
International government funders 30
Australian universities and research institutions 31
Philanthropy – Australian charities and not-for-profits 32
Private sector – Pharmaceutical and/or commercial 33

Where we are now 34

What health and medical researchers need to manage the obesity epidemic 35

Australian obesity policy distilled into key research themes 38

Obesity research priorities Australia needs 40

Future research opportunities: The evidence Australia needs to tackle the obesity epidemic 42

Research priority 1: Impacts of obesity 44
Research priority 2: Obesity in high priority populations 46
Research priority 3: Preventing obesity – health care 50
Research priority 4: Managing obesity – health care 54
Research priority 5: Healthy living programs/interventions for obesity 58

Where we need to go 62

Key findings and recommendations 63

References 70

Appendices 74

Acknowledgements 77

Executive Summary

Research Australia, together with Novo Nordisk, is proud to celebrate Australian research talent in the field of obesity. This report presents a close examination of Australia's strengths in obesity research and priority areas for further research investment.

Approximately two thirds of Australian adults live with overweight or obesity[15], one of the highest in the world. There is a key role for research in developing effective interventions, evaluating existing treatments, and conducting comparative effectiveness studies and clincial trials.

Australia must prioritise key obesity research themes

Based on analysis of the National Obesity Strategy and other key obesity policies, there are 5 key research themes Australia must prioritise to accelerate progress for the millions of Australians living with overweight and obesity.



IMPACTS OF OBESITY

A clearer picture of the true social, economic and personal impacts of obesity must underpin future investment decisions. There is a strong social, economic and health case for investing more in obesity prevention to reduce individual/community impacts, improve use of healthcare resources, and boost economic productivity.

OBESITY IN HIGH PRIORITY POPULATIONS

Obesity disproportionately impacts Aboriginal and Torres Strait Islanders, people living in regional/remote communities, culturally and linguistically diverse communities and older adults. Intervention and prevention strategies should be developed in partnership with consumers from these diverse groups.

PREVENTING OBESITY – HEALTH CARE

People living with obesity need individual clinical support and services, informed by clinical practice guidelines, and access to evidence-based information on prevention, weight management and treatment options. Obesity prevention research should be deeply embedded into all obesity health care practice.

MANAGING OBESITY – HEALTH CARE

All Australians should have access to supportive obesity healthcare. To deliver on this ambition, research into cost-effective multidisciplinary obesity support and care services, appropriate funding models, patient care pathways and clinical support tools is essential. This includes embedding early intervention and treatment into the healthcare system.

HEALTHY LIVING PROGRAMS OR INTERVENTIONS

Equitable access to affordable and culturally appropriate, person centred obesity care systems is essential to reducing obesity prevalence. Lived experience should inform future interventions and incorporate the needs and preferences of people living with obesity.

Understanding Australian obesity research

Without a baseline understanding of Australia's existing research capability in obesity, we risk duplication and waste and potentially a missed opportunity to better harness the incredible research talent that exists in this field. The research priorities and recommendations for further research investment in this report are underpinned by a detailed understanding of Australia's world-leading obesity research. Research Australia, in partnership with Roy Morgan, has conducted multi year polling canvassing Australians' own views on obesity research. This important data on consumer attitudes has also informed the recommendations in this report. The National Obesity Strategy outlines four key approaches to address obesity and overweight in Australia and our analysis demonstrates that all approaches are well supported by Australians.

Australians' opinions

76% of Australians thought it was very/extremely important to keep people well and **prevent** unhealthy (and further) weight gain, by creating supportive environments.



75% of Australians thought it was very/extremely important to enable people living with obesity to access early and appropriate **support and treatment.**

Current Research Activity

The top 5 most published authors are responsible for 8% of publications in the last 5 years.

Obesity publications are dispersed across multiple authors (over 160 authors), multiple researcher areas and multiple disciplines.

The five most frequently conducted types of obesity research are:

1. Preventive health research
2. Health services research
3. Observational studies
4. Population/ epidemiological research
5. Research into the health impacts of obesity

Current Obesity Research Funding

Over 50% of obesity research funding comes from the Federal Government, this is followed by Australian universities and research institutions (24%) and the philanthropic sector (22%). Current funding from obesity research is also provided through the private sector, state and territory governments, and international governments.

Top funders:

1. National Health and Medical Research Council (32%)
2. Australian Government Department of Health (13%)
3. National Heart Foundation (7%)
4. National Institutes of Health, US (7%)
5. Australian Research Council (7%)
6. Victorian Government (5%)

Australia needs dedicated obesity research funding

The National Obesity Strategy and other obesity policies should be accompanied by dedicated research funding to deliver the vision of *"an Australia that encourages and enables healthy weight and healthy living for all".*

Dedicated funding will ensure Australia's world leading researchers are sufficiently supported to provide the evidence Australia needs to deliver real change for more than 12.5 million Australians living with overweight and obesity.

This report presents six key recommendations. Obesity is a complex condition and the recommendations are necessarily multi-part, designed to be implementable and tested by key experts in the field. The summarised recommendations presented below are expanded on in further detail in this report.

Key Recommendations

1. The Australian Government, as the major funder of health and medical research and obesity research, should develop targeted funding for obesity research into:
   - Impacts of obesity
   - Obesity in high priority populations
   - Preventing obesity
   - Managing obesity
   - Healthy living programs or interventions

2. Future Australian Government funding for obesity research must be guided by the research priorities of people living with overweight and obesity.

3. More research is needed into the experiences of rural and remote Australians and Aboriginal and Torres Strait Islander Peoples living with overweight and obesity. Obesity research must extend beyond prevention and treatment to look at obesogenic environments, food labelling and food reformulation. This research will be most effective when it is conducted by multi-sector collaborations.

4. Primary care is key to managing obesity. Research is needed into better ways to fund and support general practitioners (GPs) to manage obesity and utilise multidisciplinary treatment pathways.

5. Future research into preventing obesity should be focused on developing strategies aimed at all age groups – particularly those outside of 'school age'. Australia has a wealth of obesity prevention experts who will be key to addressing the obesity epidemic in Australia.

6. Dynamic international investment in Australian obesity research should be further leveraged through more international research collaborations. Philanthropy, industry and higher education must be enabled and incentivised to build the international collaborations that bring international research investment to Australia.

Introduction

More than two thirds of Australian adults are classified as living with overweight or obesity.[16] Australia ranks fifth in the OECD for obesity[17], representing a significant economic burden with overweight and obesity costing the Australian economy at least an estimated $11.8 billion.[18] This is made up of $5.4 billion in direct health costs and $6.4 in indirect costs.[19]

Obesity* is a serious, chronic, relapsing condition with substantial unmet medical need, and the condition is greatly misunderstood. People living with obesity are often subject to high levels of stigma, discrimination and negative impacts on both mental and health-related quality of life.[20] It is not widely understood that up to 70% of the causes of obesity can be linked to genetics and the physiology that our genetics determine. So too, the physiological, psychological, social and environmental factors that contribute to obesity are often overlooked.[21,22,23]

Australia has a wealth of incredible research talent in this field and the opportunity to expand on its world-leading research. The National Obesity Strategy 2022-2032 emphasises that the implementation of its vision – *an Australia that encourages and enables healthy weight and healthy living for all* – will be guided by three enablers, the use of evidence and data being one.[24]

Further research to understand obesity is critical, given obesity is a risk factor for many serious and chronic health conditions, including diabetes and cardiovascular disease, some cancers, musculoskeletal disease, and disability.[25]

As the national peak body for Australian health and medical research, Research Australia welcomed the ambitious ten-year framework set up by the Australian Government in March 2022 and is pleased research remains a key enabler. What is now required is a focused discussion on the need for dedicated and strategic funding for obesity research, not just from the Australian Government but from the multiple funding streams that underpin health and medical research, including philanthropy and the private sector.

It is Australia's world leading obesity research that will, in part, provide the novel therapies, preventive health measures and community-based interventions, that are vital to preventing and treating this global epidemic.

This report is structured to understand:

1. **How we got here,** including an analysis of the obesity research being funded and undertaken around Australia broken down across key research themes and Australians' attitudes to obesity research.
2. **Where we are now,** including a clear picture of the research needed to implement not only the Australian Government's National Obesity Strategy, but the range of Commonwealth, state and territory public policy initiatives, seeking to address Australia's obesity epidemic.
3. **Where we need to go,** a proud acknowledgment of Australia's incredible research talent and those areas where Australia's national strength in obesity research naturally lend themselves to opportunities for further research investment and collaboration.

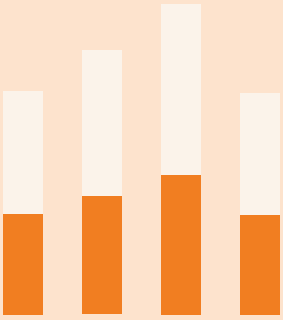
* In this report obesity is used as an umbrella term encompassing overweight research unless otherwise specified.



HOW WE GOT HERE

This section looks at crucial Australian obesity research in the last 5 years including:

1. Australians' attitudes to obesity research
2. Where it has been conducted
3. Australia's obesity research leaders
4. How obesity research is being funded in Australia



> *"Research needs to address weight stigma and discrimination in healthcare... stigma is not only a mental health issue for larger bodied people - it is created and sustained by discriminatory systems and healthcare providers and that is where research effort should be directed."*
>
> AUSTRALIAN OBESITY RESEARCHER



Obesity and Overweight: One of Australia's greatest health challenges

With approximately two thirds of Australian adults living with overweight and obesity – one of the highest rates of obesity in the world[26] – there is a key role for research moving forward including testing and developing interventions, undertaking evaluations of treatments and interventions, or comparative effectiveness studies and clinical trials.

The pressing issue of obesity – for both Australia's health and wealth – is well known:

- in 2017-18 an estimated 1.2 million children and adolescents were overweight or obese;
- in 2018, 8.4% of the total burden of disease in Australia was due to overweight and obesity and was the leading risk factor contributing to non-fatal burden; and
- Treating diseases caused by obesity will cost an average of 8.4% of OECD countries' total health care spending.[27]

Australians do not have to live with obesity. As the following pages will demonstrate, obesity is a tractable problem, where further research is making a real impact. Every $1 invested in obesity prevention has a return of up to $6.[28]

As the Australian Government set out when launching the National Obesity Strategy, no single action will be enough to prevent, treat and reduce obesity, instead a systems-based approach that tackles the environmental influences and empowers individuals will be critical.[29]

Now is the time to understand what future research is needed to "prevent and reduce overweight and obesity in Australia".[30] There are clear research priorities needed to ensure Australia's world leading obesity researchers – from a broad spectrum of disciplines – are supported by dedicated and strategic funding to deliver real change for the 12.5 million Australians living with overweight or obesity.[31]

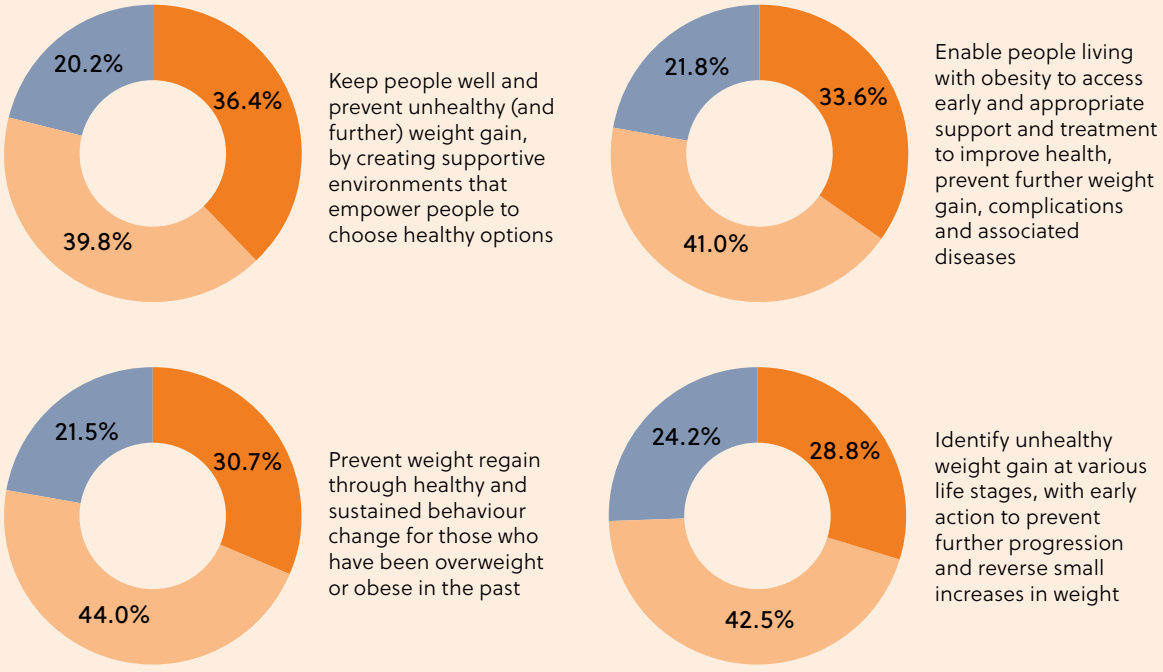
Australians' attitudes to the obesity epidemic

Following the launch of the National Obesity Strategy in March 2022, Research Australia explored the public's view of how best to tackle this epidemic.

In conjunction with Roy Morgan, Research Australia polled over a thousand Australians to understand their attitudes towards obesity research funding, priorities and its role in Australia's economy and society.

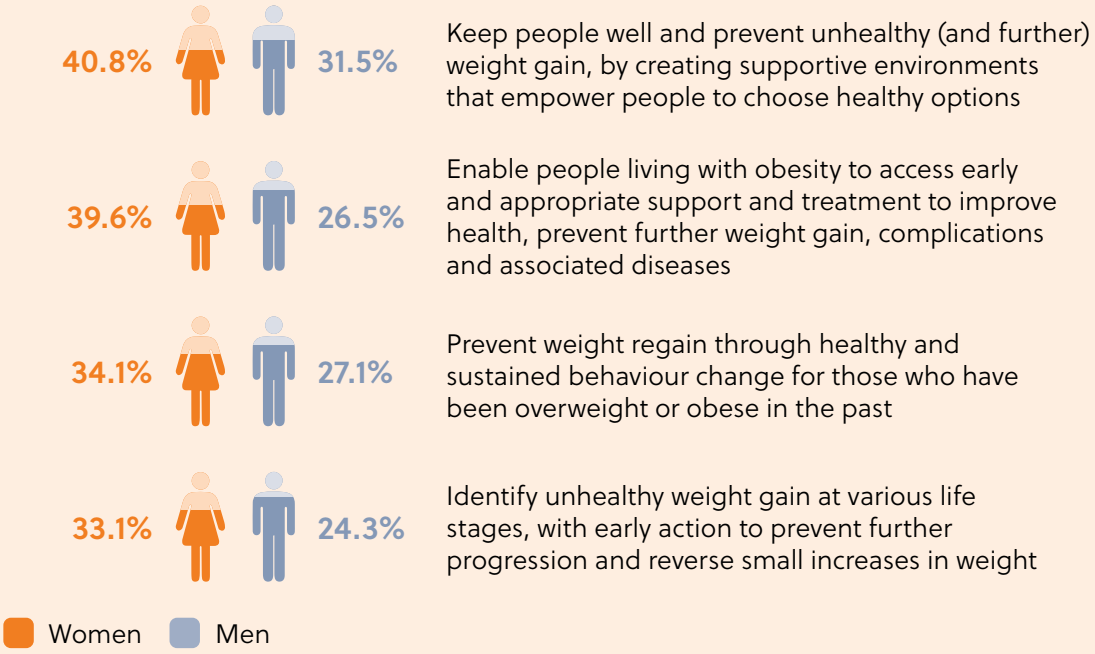
Encouragingly, there is broad support for both prevention and intervention strategies (as demonstrated in Graph 1 below). 76% of Australians thought that it was very or extremely important to keep people well and prevent unhealthy (and further) weight gain, by creating supportive environments that empower people to choose healthy options. Treatment options and access were also supported by Australians. Nearly three quarters of Australians (74.6%) thought it was very/extremely important to enable people living with obesity to access early and appropriate support and treatment to improve health, prevent further weight gain, complications and associated diseases.

Graph 1: Anti-obesity strategies



More women than men identified all of the strategies as extremely important.

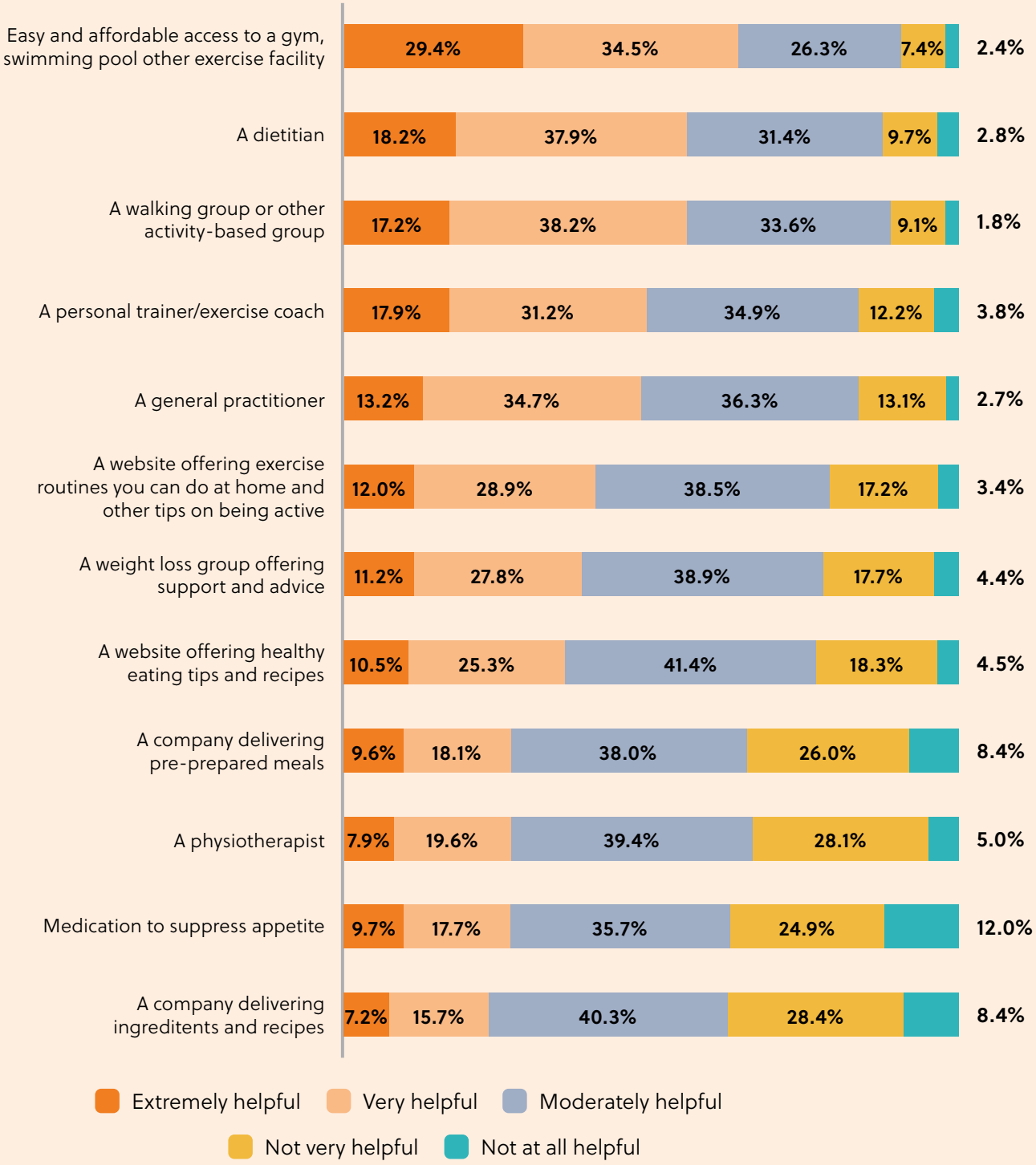
Graph 2: Extremely important-women and men



The above approaches are very high level and somewhat abstract, so Research Australia also asked people about the kinds of things they would find helpful if they were trying to lose weight. Apart from a dietitian, there is strongest support for physical activity rather than changing diet. For most options, more women than men rated them as extremely helpful.



Graph 3: Anti-obestity support



Research Australia also wanted to know if how people perceived their own weight influenced their response to questions. So, before we asked the previous two questions, we asked people to nominate the option that best describes them.

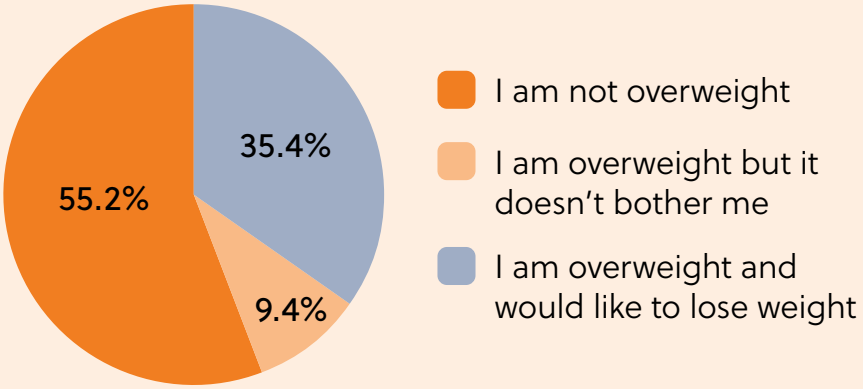
Perceptions of their own weight status influenced how people responded to the questions about the obesity strategy and the actions they could take if they wished to lose weight. People who identified as not overweight, or as wanting to lose weight, gave similar ratings to the importance of each of the four strategies. People who identified as 'overweight but it doesn't bother me' rated the importance of all the strategies as lower.

Similarly, when it came to the list of things that could help people lose weight, people who identified as not overweight and people wanting to lose weight generally gave similar ratings. People who identified as 'overweight but it doesn't bother me' generally gave lower ratings for how helpful the options would be. Perhaps they have tried options to lose weight before and not found them helpful?

A little more than a quarter overall thought medication to supress appetite would be extremely or very helpful (27.4%). When we asked the same question again to people who identify as wanting to lose weight the number rises quite significantly to nearly 40%.

The National Obesity Strategy reports around two thirds of adults live with overweight or obesity, whereas on the self-assessment in Research Australia's poll, fewer than half (44.8%) identified as a person who has obesity. This is consistent with the scientific literature, where under reporting of overweight and obesity is recognised as common in self-assessment.[32]

Graph 4: Which option best describes you?



Current obesity research activity in Australia

Types of obesity research being conducted in Australia

Research Australia's literature review of Australian obesity research since 2017 retrieved 1586 citations. Please see Appendix A for further details on Research Australia's methodology.

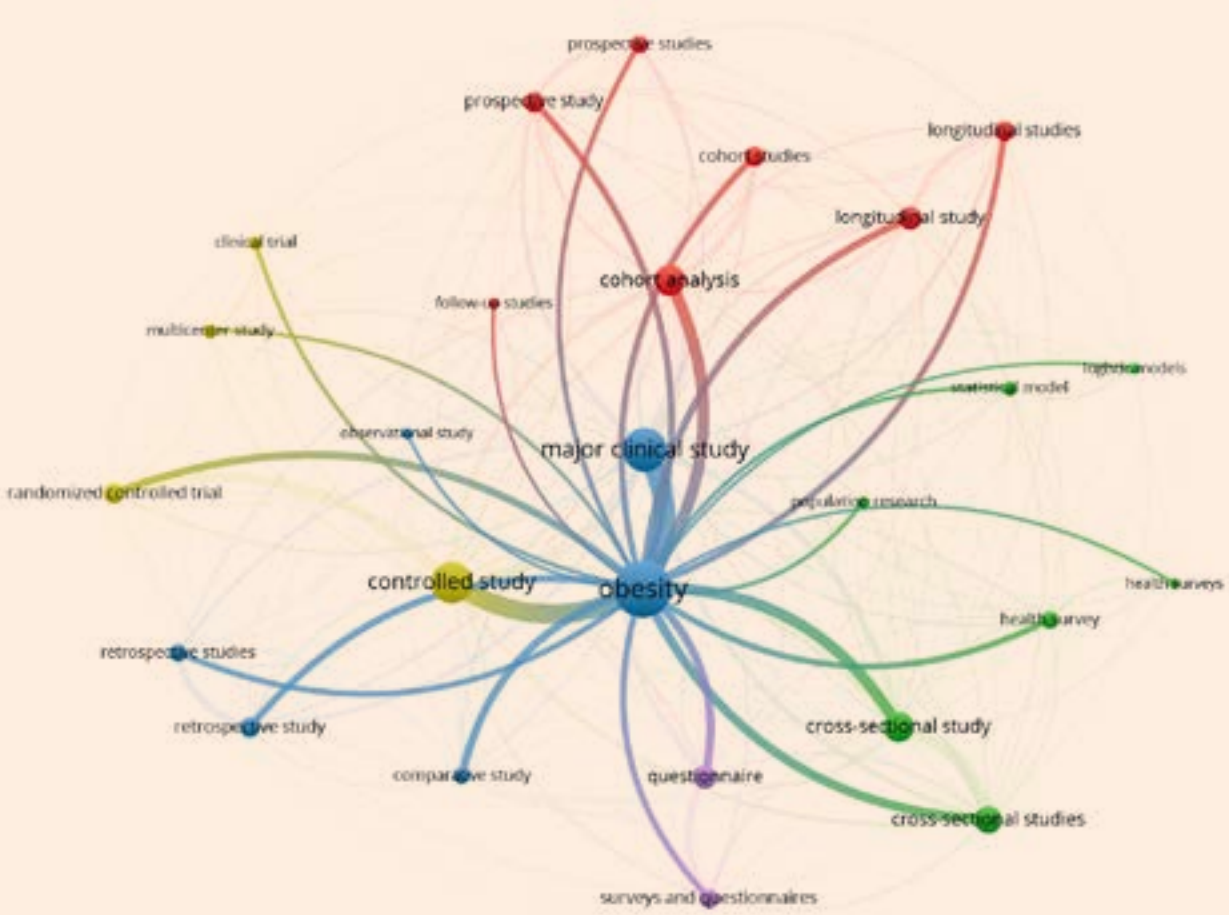
A network map was created based on all index keywords occurring 50 or more times. This resulted in 139 keywords which were filtered to create two maps. One map included keywords selected for relevance to the topic domains (Network Map 1), whereas the other included keywords indicating study type (Network Map 2). In these maps circle sizes illustrate the number of occurrences whereas line thickness indicates strength of co-occurrence.

Network Map 1: Australian Obesity Research: Co-occurrence network based on topic domain index keywords occurring 50 or more times



This graph indicates that studies investigating younger populations (childhood and adolescence), risk factors, and prevalence were most common amongst obesity publications in the last 5 years. There are also strong links between "obesity" and the keywords: "complications", "psychology", "procedures", and "health promotion" as indicated by the thickness of lines.

Network Map 2*:* Australian Obesity Research: Co-occurrence network based on study type index keywords occurring 50 or more times.



Network map 2 demonstrates that obesity research is dominated by "major clinical studies" and "controlled studies". There are also strong links to cross-sectional studies and cohort analyses.

Research Australia acknowledges that publications are not the only form of research. This includes clinical trials, qualitative research, clinical guidelines and other forms of research. Research Australia also undertook a search of the main international clinical trials registry (clinicaltrials.gov) which identified 106 Australian obesity-related clinical trials. These trials had an Australian site involved and were still running in 2017 or began after 2017.

Who is conducting obesity research in Australia

Australian obesity research is dispersed across the country, within a range of institutions, and stemming from broad research areas.

Across the literature search conducted by Research Australia the 5 institutions with the highest publication volumes were:

1. The University of Sydney
2. Monash University
3. The University of Melbourne
4. Deakin University
5. The University of Queensland

The most published authors were Professor Steven Allender from Deakin University; Professor Louise Baur AM, the University of Sydney; Professor Dianna Magliano, from Monash University and Baker Heart and Diabetes Institute; and Professor Gita Mishra from the University of Queensland. There is a wealth of obesity research that will not necessarily be reflected in publication rates taking place in Australia and regionally. For example the work being done by Professor Boyd Swinburn who leads the international network (INFORMAS) in over 60 countries to monitor and benchmark the healthiness of food environments and the implementation of food policies and actions to reduce obesity.

Although these institutions and researchers are top in Australia, they are not responsible for everything. The top 5 most prolific authors are responsible for 8% of publications (138 publications). Obesity publications in the past 5 years are dispersed across multiple authors (over 160 authors), multiple researcher areas and multiple disciplines.

Universities are an important source of obesity research talent but by no means the only centres of obesity research activity in Australia.

Health and medical research is part of an ecosystem sustained by many participants and multiple funding streams. The breadth of medical research undertaken in Australia makes it difficult to track progress in particular disease areas or conditions. This is especially true for obesity – a complex chronic condition that overlaps with research into other causes and/or comorbidities.

Research Australia recognises the excellent obesity research from our members across the pipeline, including medical research institutes, local health districts and philanthropy. The following case studies showcase some of this outstanding obesity research from some of Research Australia's members.

Research has a critical role in the 10-year National Obesity Strategy which calls for a focus on prevention, scaling up or leveraging current efforts, innovative and bold ideas, working together and filling gaps. However, Australia cannot become a world leader in obesity research without a clearer picture of what research activity is underway around Australia.

NHMRC Centre of Research Excellence in Healthy Food, Healthy Planet, Healthy People[33]

Led by Professor Simone Pettigrew, The George Institute

The Healthy Food, Healthy Planet, Healthy People Centre for Research Excellence received $2.5 million in government funding in 2021 for over five years to deliver world-leading innovations to help transform the food system, improving the health of both people and the planet.

This unique initiative brings together investigators from 12 organisations, four Australian states and four countries into a Centre of Research Excellence designed to help address the combined health and environmental impacts of the food system.[34]

The project seeks to:

- Identify effective means of conveying combined nutrition and sustainability information.
- Use the developed algorithms, environmental indicators and user response data to model the impact of various policy options on human and planetary health outcomes.
- Develop evidence-based recommendations for government-led and market-based strategies to improve the nutritional quality and sustainability of the food supply.
- Work with consumers, industry and government to accelerate uptake of the research findings.

Addressing Overweight and Obesity Project[35]

Local initiative of NSW Regional Health Partners (NSWRHP) and funded by Hunter Medical Research Institute (HMRI)

The Overweight and Obesity (the Project) was commissioned in recognition that there are significant, often collaborative, healthy weight initiatives across the NSWRHP organisations, and there is value in collating and analysing information about them to assist the partners in future planning and decision-making.

Undertaken in 2019, the Project discovered:

- Rates 12% higher in NSWRHP than the national average for adult overweight and obesity.
- Over $486 million is spent each year on healthcare in NSWRHP due to overweight and obesity.
- At least 99 projects, projects and services targeting overweight and obesity were delivered over 10 years.

Play Active Program – physical activity policy and training for Early Childhood Education and Care[36]

Investigator, Associate Professor Hayley Christian, Telethon Kids Institute

Physical activity is critical during the early years of life for a child's health and development, providing many benefits including healthy body weight, improved bone health and cardiovascular fitness, and enhanced cognitive, emotional and psychosocial development. However only one in three Australian children aged two to five get the recommended level of three hours of physical activity per day.

Early childhood education and care (ECEC) services play an important role in encouraging young children to be physically activity, and an ECEC-specific physical activity policy can support educators to do so. The Physical Activity Policy fills this gap in the sector. The Physical Activity Policy provides clear guidance on the amount of physical activity and sedentary time (including screen time) young children should have whilst attending ECEC, and outlines procedures which services should undertake to ensure successful implementation.

The main goals in the creation of this policy include:

- National uptake and monitoring of the Physical Activity policy including 'Movement Guidelines' specific for early childhood education and care settings developed by this study.
- Training and development of ECEC staff in the use and implementation of the policy.
- Improved parent engagement with ECEC staff around encouraging and enabling children to be more physically active.

Program partners include the Department of Health WA, NaturePlay Australia, Department of Local Government, Sport and Cultural Industries WA, Cancer Council Western Australia, Minderoo Foundation, Australian Childcare Alliance, Goodstart Australia.

Australian Red Cross Lifeblood: Faecal Microbiota for Transplant

In 2021, Australian Red Cross Lifeblood (Lifeblood) became Australia's first licensed faecal microbiota for transplant manufacturer (FMT). Their goal is to transfer good healthy microbiota from a donor into someone whose current gut microbiota may be making them sick.

FMT is an emergent technology employed to improve clinical outcomes of various pathological conditions through modifications in the gut microbiota composition.[37]

Lifeblood's FMT program is currently being used to research and treat recurrent C. difficile which is a serious bacterial infection within the gut and has shown to successfully treat 70-90% of people.[38]

Research has shown that there could be potential usage of FMT in other microbiota-associated conditions such as obesity. There is an opportunity to expand the use of Lifeblood's FMT for research projects evaluating its impact on obesity-associated metabolic disorders.

Evaluation of an online weight loss program (the CSIRO Total Wellbeing Diet Online)[39]

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

This study evaluated the CSIRO's Total Wellbeing Diet Online program to determine the reach and the weight loss results of its first five years (October 2014 – September 2019).

Data were available from nearly 60,000 members for analysis. Members were divided into 2 groups for analysis: "stayers" were members who signed up for at least 12 weeks of the program and recorded a weight entry at baseline and at the end of the program, while "starters" began the program but did not record a weight after 12 weeks.

Members were predominately female (82.06%) with an average age of 50 years. The average weight loss for all members was 2.8 kg or 3.1% of their starting body weight. Stayers lost 4.9 kg (5.3% of starting body weight) compared to starters, who lost 1.6 kg (1.7% of starting body weight).

Almost half (48.91%) of the members who stayed on the program lost 5% or more of their starting body weight, and 15.48% achieved a weight loss of 10% or more.

This comprehensive evaluation of a commercial, online weight loss program showed that it was effective for weight loss, particularly for members who finished the program and were active in using the platform and tools provided. If the results demonstrated here can be achieved at an even greater scale, the potential social and economic benefits will be extremely significant.

Who funds obesity research in Australia

Health and medical research is funded and administered by at least five separate federal portfolios (Health, Education, Industry/Innovation, Defence and Foreign Affairs). State and territory governments are also providing varying levels of funding, so too are non-government organisations across philanthropy, private healthcare and industry.

Nowhere is this more evident than in obesity research, where funding comes from a range of sources. Research Australia has analysed Australian obesity research publications conducted since 2017 from the perspective of its funding sources.*

Summary of key findings

Table 1: Top obesity research funders by sector

Funders by sector	Percentage (and number) of obesity publications funded
Public sector – Australian Government	52% (n=832)
Australian universities and research institutions	24% (n=381)
Philanthropy – Australian charities and not-for-profits	22% (n=352)
Private sector – Pharmaceutical and/or commercial	18% (n=292)
Public sector – state and territory governments	13% (n=200)
International governments	13% (n=199)

Table 2: Top individual obesity research funders

Notable individual funders	Percentage (and number) of obesity publications funded
National Health and Medical Research Council (NHMRC)	32% (n=513)
Department of Health, Australian Government (including Medical Research Future Fund)	13% (n=202)
National Heart Foundation	7% (n=116)
US-based National Institutes of Health (NIH)	7% (n=108)
Australian Research Council (ARC)	7% (n=107)
State of Victoria	5% (n=82)

* 644 publications have undefined funding sources. Please note most individual obesity publications receive funding from multiple sources. Research Australia is unable to comment on the amount of funding provided by each funding source.

Public sector – Australian Government

Total proportion of obesity publications funded: 52% (832 publications)

Approximately $7.9 billion is spent on health and medical research in Australia each year.[40] While only a small proportion of research is undertaken directly by the Australian Government, it is responsible for providing funding for a much larger proportion.

Australian Government funding for obesity research is predominantly allocated through three funding bodies: The National Health and Medical Research Council (NHMRC), the Medical Research Future Fund (MRFF) and the Australian Research Council (ARC).

Three of the top funders by volume of papers are Australian Government health and medical research funding bodies.

Table 3: Australian Government funders of obesity publications

Funding organisation	Percentage of obesity research funded (volume of papers)
NHMRC	32% (513)
Department of Health, Australian Government (including MRFF)	13% (202)
ARC	7% (107)

While the ARC does not fund medical research, it is a major funder of research into obesity.[41] This recognises that obesity has broader societal causes and impacts, and it is not just a medical issue.

Some recent important findings from ARC funded obesity research include:

- All neighbourhood environmental attributes, including air pollution, were directly and/or indirectly related to cognitive functions via other environmental attributes and/or physical activity but not sedentary behaviours.[42]
- Children living in Perth, WA experience a high level of exposure to unhealthy outdoor food advertisements during the school commute. Policies which restrict the placement and content of outdoor advertising, could be a useful strategy in the fight against childhood obesity.[43]
- Built-environment factors have direct effects on physical activity but indirect effects on general health and obesity. Among these factors, greater green space exposure plays a key role in enhancing general health and reducing obesity. Low-density and car-dependent neighbourhoods can be activity-friendly and mitigate obesity if these neighbourhoods are also equipped with easy access to green space.[44]

The Australian Government, as the major funder of health and medical research and obesity research, has a clear role to play in any conversation about future sustainable funding for obesity research. Given the magnitude of obesity and the Government's National Obesity Strategy there is an opportunity to accompany the 10-year framework with a focused discussion on the need for dedicated and strategic funding for obesity research.

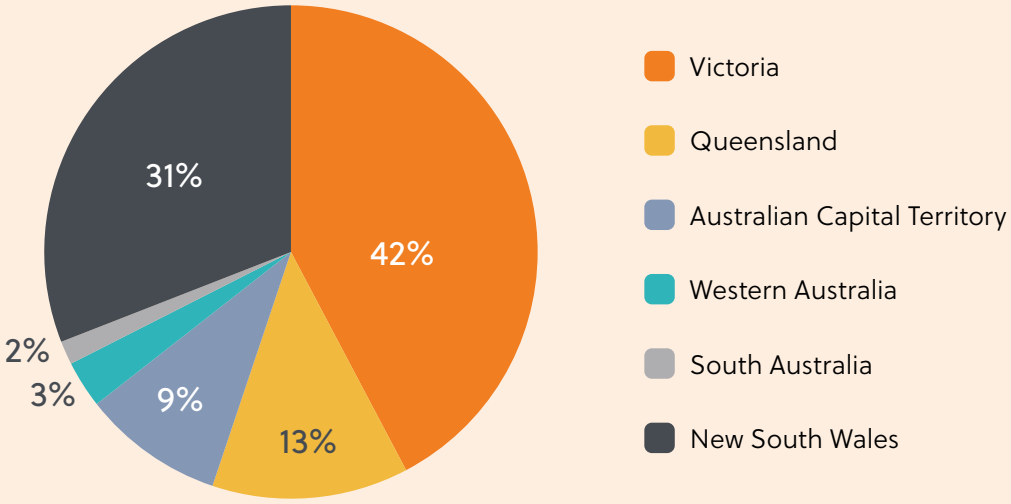
Public sector – Australian state and territory governments

Total proportion of obesity publications funded: 13% (200 publications)

State and territory governments are responsible for funding research undertaken within the state and territory hospital systems; providing support to medical research institutes (MRIs) for the indirect costs of research; and other programs to support research and development, a portion of which funds health and medical research. State and territory governments also provide capital funding for stand-alone research institutions (e.g. the South Australian Health and Medical Research Institute) and for organisations that combine research with health care delivery (e.g. the Victorian Comprehensive Cancer Centre).

The state of Victoria has funded 82 obesity publications and are the largest state and territory government funder of obesity research (5%). Graph 5 below details the proportion of obesity research funded by Australian state and territory governments.

Graph 5: Distribution of obesity research funding from australian state and territory governments



The primary state and territory government funders of obesity research are Victoria and New South Wales. This is expected when compared against their share of the national population. Funding from state and territory governments has been provided through particular department and agencies within each government. This is detailed in Table 4 below.*

* Whilst the results of the literature scan reported here are comprehensive and representative of obesity research in Australia, Research Australia acknowledges that other relevant publications, government programs, interventions and initiatives may not have been picked up by our search strategy.

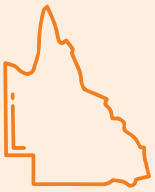
Table 4: Australian State and Territory Government departments or agencies funding obesity research

Australian State or Territory	Department or Agency (number of publications)*
Victoria (82)	State Government of Victoria (48) VicHealth (24) Victoria Cancer Agency (6) Victoria Health Promotion Foundation (4)
New South Wales (66)	NSW Ministry of Health (50) NSW Health (10) Cancer Institute NSW (6)
Queensland (25)	QLD Health (22) Department of Health (3)
Australian Capital Territory (18)	ACT Health (18)
Western Australia (6)	Healthway (6)
South Australia (3)	Government of South Australia (3)

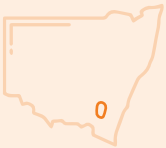
Research Australia acknowledges that state and territory governments may be funding more obesity research that does not result in publication. For example:



NSW: Healthy Children Initiative Is a multistrategy, settings-based approach to prevent childhood obesity that has become embedded into the policies and practices of primary schools and early childhood services in NSW. It currently comprises three flagship primary prevention programs that have been scaled up for delivery across NSW.[45]



QLD: The Queensland Health Good Start program aimed to improve knowledge, attitudes and practises related to healthy eating and physical activity amongst Māori and Pacific Islander communities living in Qld as these communities have higher rates of obesity and chronic disease than the wider Australian population. There were significant increases in knowledge of correct servings of fruit and vegetables, knowledge of sugar content of common sugar-sweetened drinks, recognition of the consequences of marketing and upsizing, and the importance of controlling portion size. There were also increases in knowledge of physical activity recommendations and the importance of physical activity for preventing heart disease and improving self-esteem. The evaluation contributes valuable information about components and impacts of this type of intervention, and considerations relevant to this population in order to successfully change behaviours and reduce the burden of chronic disease.[46]



ACT: It's Your Move" Is a 3-year (2012-2014) systems intervention to prevent obesity in 656 adolescents aged 12-16 years attending 3 intervention and 3 comparison schools. The intervention consisted of multiple initiatives at individual, community, and school policy level to support healthier nutrition and physical activity including increasing active transport, time spent physically active at school, and supporting mental wellbeing. There was some evidence of effectiveness of the systems approach to preventing obesity among adolescents. Implications for public health: The incorporation of systems thinking has been touted as the next stage in obesity prevention and public health more broadly. These findings demonstrate that the use of systems methods can be effective on a small scale.[47]

Although involved as funders, state and territory governments are not the major funders of recent obesity publications (with the exception of New South Wales and Victoria). State and territory hospitals and Australia's public health system are a significant untapped resource and should be provided with resources to develop formal evaluation of state funded programs (including state clinics).

* The departments and agencies have been listed as they are named in Research Australia's literature review. We recognise that some of these departments and agencies have changed over the years.

International government funders

Total proportion of obesity publications funded: 13% (199 publications)

Obesity is a global problem, and Australian researchers regularly collaborate with researchers around the world. Australian researchers also undertake research which is supported by overseas government funding agencies.

Of the government funding bodies internationally, the US-based National Institutes of Health (NIH) was the most frequent non-Australian funder by publication volume (7%, 108 publications). Interestingly the international NIH is on par with one of Australia's biggest research funding agencies, the ARC in terms of overall Australian research investment.

Other international government funders of obesity research include:

- Medical Research Council, UK (30)
- National Institute for Health and Care Research, UK (10)
- Canadian Institutes of Health Research (18)
- Health Research Council of New Zealand (11)
- European Commission (11)
- Department of Health and Human Services, US (11)

Research Australia recognises that this funding may be due to international researchers involved in the publications. However, this foreign investment highlights how connected Australian obesity researchers are to global obesity efforts. This is a true testament to how Australia's obesity researchers are seen on the national stage – world leading.

Australian universities and research institutions

Total proportion of obesity publications funded: 24% (381 publications)

Australia's universities and research institutions not only conduct world leading obesity research but were also identified as funders of this research from Research Australia's literature review. Even where funding is provided by an external funding agency such as the NHMRC or a philanthropic fund, the university or research institute at which the research is conducted will typically provide additional funding, including contributing to the indirect costs of research not covered by grants.

Table 5: Top 10 Australian research institutions funding obesity research

1. University of Newcastle (37)
2. Deakin University (36)
3. University of Sydney (34)
4. University of Melbourne (28)
5. University of Queensland (28)
6. Monash University (25)
7. University of Western Australia (21)
8. Curtin University of Technology (19)
9. University of Adelaide (18)
10. University of Western Sydney (16)

Please see Appendix B for a full list of institutions funding obesity research.

Nearly half of all Australian health and medical research is undertaken in the higher education sector.[48] In obesity research too they have a very key role with the top ten institutions conducting obesity research by obesity research publications all being universities.

Six of the top 10 universities funding obesity research are Group of Eight (Go8). While rural populations experience higher rates of obesity, there is not a proliferation of obesity research across regionally-based universities. There is a need going forward to conduct research closer to those rural and regional communities where obesity is most prevalent.

There is an opportunity for Go8 universities to provide dedicated support in rural and remote areas rather than building a foundation for research activity from scratch. For example, this could be through collaborations with Western NSW Local Health District (WNSWLHD) or Murrumbidgee Local Health District (MLHD) in NSW.

These organisations provided funding to a similar, if not greater, proportion of obesity research when measured by publications to state and territory governments, and philanthropic sources. While universities and other research institutions do have their own income from philanthropy, teaching etc, they are generally not the major funder of this research. Being a funder and conductor of obesity research places inevitable pressures on these universities and this must be considered if Australia, as a nation, want to increase obesity research.

Philanthropy – Australian charities and not-for-profits

Total proportion of obesity publications funded: 22% (352 publications)

Charities and not-for-profits both fund and undertake health and medical research. Many hospitals and health providers that participate in and support research are also charities. There are also many independent charities that raise money specifically for health and medical research or fund health and medical research as one of their purposes.

The National Heart Foundation of Australia is ranked the third top funder of all obesity research by volume of papers in the past 5 years (7% = 116 publications).

Table 6: Charities and not-for-profits funding obesity research publications (in the past 5 years by number of publications)

- National Heart Foundation of Australia (116)
- Cancer Council Australia (15)
    - Cancer Council NSW (23)
    - Cancer Council VIC (22)
    - Cancer Council TAS (8)
    - Cancer Council WA (8)
    - Cancer Council QLD (5)
- Jack Brockhoff Foundation (19)
- HCF Research Foundation (17)
- Kidney Health Australia (17)
- Pratt Foundation (17)
- Raine Medical Research Foundation (13)
- Diabetes Australia, including Diabetes Australia Research Trust (13)
- Financial Markets Foundation for Children (10)
- National Breast Cancer Foundation (7)
- Royal Children's Hospital Foundation (7)
- Women and Infant Research Foundation (WA) (5)
- Arthritis Australia (5)
- Rebecca Cooper Foundation (4)
- Australian Dental Association (3)
    - Australian Dental Research Foundation (3)
- Australian Orthopaedic Association (3)
- Ian Potter Foundation (3)
- Juvenile Diabetes Research Foundation (3)
- Multiple Sclerosis Research Australia (3)

In much the same way that governments invite applications for grants subject to specific eligibility criteria, many charitable organisations do the same. Many 'mission driven' charities invite applications for funding for specific purposes related to their own objectives. These range from small grants for individual students and researchers (e.g. funding travel to conferences, scholarships and fellowships) to long term funding for a whole team or institute.

The list above reflects the nature of obesity. Currently there is no charity with a mission to address obesity explicitly funding obesity publications. It is being tackled by charities with more general remits (e.g. Jack Brockhoff Foundation), or disease specific charities where obesity is implicated on the condition. Is this holding back obesity research? Although not represented as funders of obesity research there are a number of charities and organisations contributing to community outreach, services and advocacy within the obesity philanthropic ecosystem in Australia.

Given the number of charities and not-for-profit organisations funding obesity research and the broader related health areas and disciplines, the philanthropic sector is key to ensuring impactful and sustainable funding for obesity research in Australia.

Private sector – Pharmaceutical and/or commercial

Total proportion of obesity publications funded: 18% (292 publications)

About 25% of all health and medical research expenditure is in the private sector.[49] While it is difficult to estimate the amount of money spent by these private companies on obesity research, the potential importance of this sector for obesity research cannot be overestimated.

Table 7: Private sector organisations funding obesity research (in the past 5 years where it led to publication)

- Merck Sharp and Dohme (28)
- GlaxoSmithKline (27)
- Roche (23)
- Cilag (21)
- Eli Lilly and Company (20)
- Novartis Pharmaceuticals Corporation (17)
- Novo Nordisk (17)
- AstraZeneca (19)
- Bristol-Myers Squibb (12)
- Pfizer (16)
- Merck (10)
- Amgen (9)
- AbbVie (8)
- Boehringer Ingelheim (8)
- Novartis (7)
- Sanofi (11)
- Servier (7)
- Gilead Sciences (6)
- Johnson and Johnson (6)
- Medtronic (6)
- Shire (6)
- Abbott Laboratories (4)
- Janssen Pharmaceuticals (4)

Research Australia recognises that many of these companies conduct and fund obesity research that does not lead to publication (e.g. clinical trials). However, our analysis has shown that they fund more obesity publications than Australian state and territory governments (funded 5% of publications) and only slightly fewer than the philanthropic sector (funded 20% of publications).

WHERE WE ARE NOW

This section provides a clear picture of what research is needed to address Australia's obesity epidemic, including:

1. Australian obesity researchers' own views of the research questions yet to be explored;
2. Potential research priorities identified from not only the Australian Government's National Obesity Strategy, but the range of Commonwealth, state and territory public obesity policy initiatives; and
3. Analysis of public policy priorities against current research activities to highlight where there are areas of national strength, gaps and opportunities for further research and investment.

> *"Almost no obesity prevention or treatment research actively involves people with lived experience as co-researchers."*
>
> AUSTRALIAN OBESITY RESEARCHER



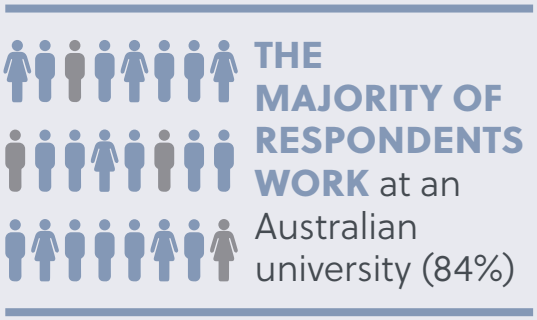
What health and medical researchers need to manage the obesity epidemic

As the national peak body for health and medical research, Research Australia is uniquely able to access health and medical researchers across a range of disciplines, working at various stages of research from basic, fundamental science to clinical research and health policy change.

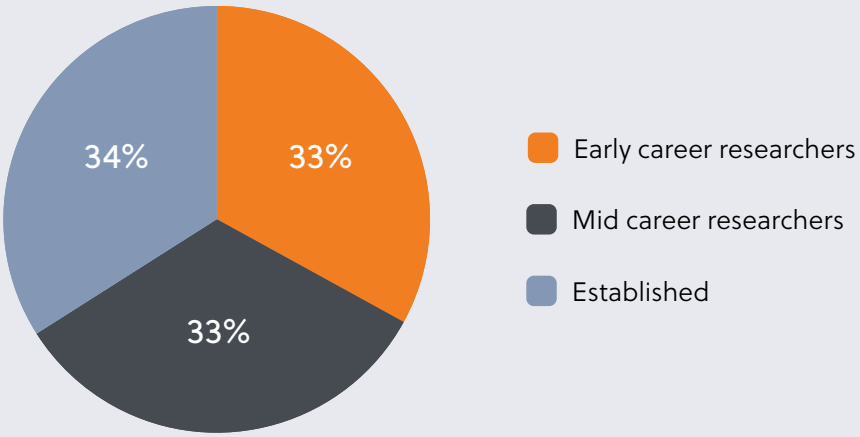
Research Australia sought the views of nearly 100 key experts in obesity research to understand where obesity research is being conducted in Australia and where the health and medical research sector should be advocating for more research investment. For more details on Research Australia's survey please see Appendix C.

The majority of respondents work at an Australian university (84%). Only 8% stated that they work at a medical research organisation and 6% at a health care institution (e.g. public or private hospital). Research Australia recognises that the significant skew to universities may be due to asking respondents to select their main affiliation if they hold dual appointments.

33% of respondents identified as early career researchers; 33% identified as mid career; and 34% as established.



Graph 6: Career stage of obesity researchers



52% of obesity researchers surveyed are responsible for a research team or lab and the number of staff and students responsible for ranges from 2 to 500. The most provided responses were 6 and 10.

The most common source of funding for obesity researchers surveyed was the Federal Government (e.g. MRFF, NHMRC or ARC grant) (69%). 40% of respondents received research funding from the philanthropic sector and 35% received funding from an Australian state or territory government. Universities were the most reported 'other' form of funding for this obesity research. This is consistent with Research Australia's analysis of obesity publications which was explored in further detail previously.



THE MOST COMMON SOURCE OF FUNDING FOR OBESITY RESEARCHERS SURVEYED WAS THE FEDERAL GOVERNMENT

Survey respondents were asked to nominate the types of obesity research they have conducted, with many nominating multiple areas. The top five types of research nominated were:

1. Preventive health research (49%);
2. Health services research (33%);
3. Observational study (32%);
4. Population/epidemiological research (30%) ; and
5. Health impacts of obesity (29%)

Survey respondents were also asked to nominate their top three priorities for obesity research investment, they were:

1. Preventive health research (38%);
2. Systems change (29%); and
3. Food systems research (24%) AND Translation science (24%).

Please see Appendix C for how survey respondents ranked the other 24 priorities for research investment.

Research Australia also sought to understand obesity researchers' perspectives on the most important research questions for reducing the impact of obesity in the next 5-10 years. Table 8 on the next page provides examples of responses provided.

Table 8: Obesity research gaps reported by the health and medical researchers

Research theme	Areas where obesity experts report more research is needed
Food systems research	What are the most effective ways of creating a healthier food environment at scale (e.g. evidence required for government regulation, ways of encouraging industry to change etc.)?
	What can we do to improve food access, affordability and security?
Health economics of obesity treatment	How to provide long-term sustainable free/low-cost services that are fit-for-purpose to support the 71% of the population who are already living with obesity?
	How can the global and national disease burden associated with diseases such as cardiovascular disease and dementia be addressed by focusing on obesity?
	Health economic and clinical benefits of newly available (or soon to be available) medications for weight management, as well as bariatric surgery, compared to the upfront cost of paying for these.
	Can we focus interventions on reducing health stigma associated with obesity... and does this impact on outcomes?
Health services research	How to improve access to size appropriate healthcare equipment, e.g. ensuring access to large enough gowns, equipment such as MRI machines, beds and chairs?
	Changing the medical and allied health curriculum to ensure particularly medical professionals are able to safely and effectively treat individuals at higher BMI's (without weight loss).
	How can be implement one system of care, perhaps supported by integration and virtual care strategies? How can we reduce silos, stop thinking acute vs non acute and focus on outcomes and impact for the medium and longterm not just shorterm output measures?
Health technology	How can we halt the rise of obesity? How can we use new technologies and medical advancements to help people manage their weight?
Population health research	How can population policies be adopted and implemented to support healthy food and physical activity behaviours?
	Modelling of the obesogenic environment, not just behavioural, physical activity or nutritional program. But questions that address and can provide evidence to demonstrate the impact of the obesogenic environment relative to the standard 'healthy eating/health promotion campaigns and programs.
Preventive health research	How can we establish a primary through to tertiary prevention system to support a reduction of obesity-related lifestyle behaviours through to effective and sustainable treatment options?
Regulation and Education	How do we identify, prioritise and address consumer/community led-research questions?
	Tighter control of junk food marketing.
	Availability of junk food in public and government institutions, including schools and childcare.
	Education about healthy eating should be legislated in childcare and schools.
	To what extent is government willing to make significant policy decisions that may be unprofitable to companies but which have demonstrated success in reducing the impact of obesity?

Australian obesity policy distilled into key research themes

The National Obesity Strategy 2022-2032 outlines a vision for an Australia that encourages and enables healthy weight and healthy living for all, through achieving two targets:

- halting the rise and reversing the trend in the prevalence of obesity in adults by 2030; and
- reducing overweight and obesity in children and adolescents aged 2-17 years by at least 5% by 2030.

To achieve this vision, we must rely on and utilise our world leading obesity research in Australia. Research Australia sought to understand the research needed to implement not only the National Obesity Strategy, but the range of federal, state and territory public policy seeking to address Australia's obesity epidemic.

The questions that Research Australia set out to answer were:

1. To what extent does current Australian obesity research activity and related outputs align with the strategic priorities generated by the National Obesity Strategy and other public obesity policies?
2. Are there gaps in obesity research that should be funded and prioritised to support the delivery of the National Obesity Strategy and other public obesity policies?

To address these questions, the National Obesity Strategy, and other relevant and related resources including the National Preventive Health Strategy, and state and territory obesity strategies were analysed to identify the focus areas of the strategy, and to determine the related obesity research priorities that are needed to deliver on the government's vision.

Table 9: Government strategies and resources related to obesity

Government Strategies
Australian Government National Obesity Strategy
Australian Government National Preventive Health Strategy
Australian Government National Diabetes Strategy
NSW Healthy Eating and Active Living Strategy: Preventing overweight and obesity in New South Wales 2013-2018. and NSW Healthy Eating and Active Living Strategy 2022 – 2032*
Policies for tackling obesity and creating healthier food environments. *Scorecard and priority recommendations for the Northern Territory government.*
A Healthier Start for Victorians: *A consensus statement on obesity prevention.*
WA Healthy Weight Action Plan 2019-2024. *Taking action on early intervention and management for people at risk of or with overweight and obesity.*
Resources
Adult overweight and obesity, snapshot (NSW Government 2018)
Childhood overweight and obesity, snapshot (NSW Government 2018)
Victorian public health and wellbeing plan 2019–2023. (Department of Human and Health Services, Victorian Government)
Healthy Tasmania Five-Year Strategic Plan 2022-2026. (Department of Health, Government of Tasmania)
Policies for tackling obesity and creating healthier food environments, 2019 progress update on Australian Governments

* The latest NSW Government Healthy Eating and Active Living Strategy was announced during Research Australia's analysis of government obesity strategies.

Obesity research priori

Research Australia has analysed the National Obesity Strategy and a number of other federal, state and territory obesity strategies and distilled these into key research themes. The question we were seeking to answer was, what research is needed to ensure fewer Australians health is impacted by overweight and obesity. Diagram 1 presents the key research themes Australia needs to meet this national health challenge.

Diagram 1: Priority obesity research themes



ities Australia needs

IMPACTS OF OBESITY

A clearer picture of the true social, economic and personal impacts of obesity must underpin future investment decisions. There is a strong social, economic and health case for investing more in obesity prevention to reduce individual/community impacts, improve use of healthcare resources, and boost economic productivity.

OBESITY IN HIGH PRIORITY POPULATIONS

Obesity disproportionately impacts Aboriginal and Torres Strait Islanders, people living in regional/remote communities, culturally and linguistically diverse communities and older adults. Intervention and prevention strategies should be developed in partnership with consumers from these diverse groups.

PREVENTING OBESITY – HEALTH CARE

People living with obesity need individual clinical support and services, informed by clinical practice guidelines, and access to evidence-based information on prevention, weight management and treatment options. Obesity prevention research should be deeply embedded into all obesity health care practice.

MANAGING OBESITY – HEALTH CARE

All Australians should have access to supportive obesity healthcare. To deliver on this ambition, research into cost-effective multidisciplinary obesity support and care services, appropriate funding models, patient care pathways and clinical support tools is essential. This includes embedding early intervention and treatment into the healthcare system.

HEALTHY LIVING PROGRAMS OR INTERVENTIONS

Equitable access to affordable and culturally appropriate, person centred obesity care systems is essential to reducing obesity prevalence. Lived experience should inform future interventions and incorporate the needs and preferences of people living with obesity.

Future research opportunities: The evidence Australia needs to tackle the obesity epidemic

Research Australia has looked at the National Obesity Strategy and other public obesity policies and mapped the potential research priorities identified above against current research activity to identify gaps and opportunities for future research and investment.

It is critical that the ambitious vision set out by the National Obesity Strategy is accompanied by impactful and sustainable investment in obesity research that can improve and sustain Australians' health and wealth in the future.

While health and medical research that focuses on improving our health system can deliver returns in a short time frame, research to develop new medical products is necessarily a 'long game'- the benefits of research undertaken now may not be realised for many years, or even decades. In this way, health and medical research is an investment for future generations; a tangible way we can act now to improve future generations' health and prosperity.

Research Australia's review of published obesity research has enabled an assessment of some of the areas where there has been most active obesity research since 2017, and more importantly areas where there are gaps in research activity, to enable appropriate investment in these areas of obesity research are effective in preventing, treating and managing obesity.

Some published research mentioning obesity that has been identified may not be primarily obesity research. For example, research into diabetes may include obesity as an outcome. Where possible such studies have been manually evaluated and excluded.

The results of this gap analysis for each potential research priority are presented below.



I believe that the reasons leading to obesity are still not well understood...”

AUSTRALIAN OBESITY RESEARCHER

Research priority 1
Impacts of obesity

A clearer picture of the true social, economic and personal impacts of obesity must underpin future investment decisions. There is a strong social, economic and health case for investing more in obesity prevention to reduce individual/community impacts, improve use of healthcare resources, and boost economic productivity.

Where more research is needed:

- Qualitative studies in consumers to understand the impact of obesity on body image, and the stigma of living with obesity to ensure appropriate support.
- Burden on carers of people living with obesity to understand how to support carers appropriately.
- Obesity and links with eating disorders (e.g. food addiction) – these are usually considered and researched separately, but are often intrinsically linked and to improve obesity management and treatment.
- Assessing the expenditure on obesity-related health care in public hospitals to understand the true economic impact of obesity to ensure adequate funding/funding models for care.
- Heterogeneity of obesity - why is there such a difference in experience and health impacts across people?

SUB-CATEGORIES
Impacts on consumers/patients (e.g. comorbidities; mental wellbeing; quality of life; disability; life expectancy)
Impacts on carers
Impacts on health systems (e.g. obesity-related costs of care; hospitalisation; healthcare utilisation)
Impacts on communities
Impacts on welfare systems (e.g. disability/disutility)
Impacts on the economy (e.g. healthcare costs)

Topics identified in studies published since 2017 included but are not limited to obesity and impact on:

- Mental health and quality of life in adults and children living with obesity
- Obesity-related health conditions and disability/disutility due to obesity
- Economy/socioeconomic factors related to obesity, including obesity-related healthcare costs

Understanding the association between obesity and health-related quality of life[50]

Led by Dr Syed Afroz Keramat, University of Queensland

A study analysing data for more than 19,000 people (2009-2017) examined the association between obesity, multiple long-term conditions (MLTC) and health-related quality of life (HRQoL).

The study found that people living with morbid obesity and MLTCs had reduced HRQoL compared with people of healthy weight, as measured using validated assessment tools.

The findings of this study will be useful for cost-effectiveness analyses and measuring the burden of diseases since it provides information on the disutility associated with morbid obesity and MLTCs.

Research priority 2
Obesity in high priority populations

Obesity disproportionately impacts Aboriginal and Torres Strait Islanders, people living in regional/remote communities, culturally and linguistically diverse communities and older adults. Intervention and prevention strategies should be developed in partnership with consumers from these diverse groups.

Where more research is needed:

Obesity disproportionately impacts Aboriginal and Torres Strait Islander peoples compared with non-Indigenous people, as well as older people, people from culturally and linguistically, diverse backgrounds, and communities living in regional or remote areas.

Overall, there was a small proportion of published studies in people from any of these priority groups relative to the prevalence of obesity and its impact on them. The research is needed to ensure that effective and appropriate prevention/intervention strategies are developed with involvement from people from these groups.

SUB-CATEGORIES
Pregnant and breastfeeding women
Children, adolescents (not just as a risk for weight gain but as a real management challenge), young adults
People with a disability due to obesity
Aboriginal and Torres Strait Islander Peoples/Indigenous communities
People living in regional and remote areas
Culturally and linguistically diverse (CALD) communities

Research Australia's analysis found publications on obesity research related to the following high priority populations:

- Children and adolescents
- Aboriginal and/or Torres Strait Islander peoples
- People living in regional/remote areas and CALD communities
- Older adults
- Pregnant and breastfeeding women

Transforming Obesity Prevention for CHILDren (TOPCHILD) global study[51]

Led by The University of Sydney

TOPCHILD encompasses 49 studies with about 40,000 participants from many countries around the world and assesses whether interventions work better for different population groups for the prevention of obesity.

Early interventions to prevent childhood obesity are usually extensive and complex, cover multiple lifestyle behaviours and use a range of strategies. The aims of TOPCHILD are:

1. To deconstruct childhood obesity interventions into their components (i.e. delivery features and behaviour change techniques) using a systematic, internationally recognised framework.
2. To assess each discrete intervention component, establishing their relative impact on child obesity outcomes.
3. To assess which intervention components are particularly effective for specific populations (e.g. by socioeconomic position).

Growing up in Australia: paradox of overweight/obesity in children of immigrants from low-and-middle-income countries[52]

Dr Tehzeeb Zulfiqar, Australian National University

Children of immigrants from low-and-middle-income countries show excess overweight/obesity risk relative to host populations, possibly due to socioeconomic disadvantage. The aim of the study was to estimate overweight/obesity prevalence and its association with the family socioeconomic-position in 2–11-year-old Australian-born children of immigrants and Australian-mothers.

Dr Zulfiqar's study, using repeated cross-sectional analysis of a large population-based cohort (data from the Longitudinal Study of Australian Children), observed that children of mothers from low-and-middle-income countries in Australia have an excess overweight/obesity risk compared with the children of Australian-mothers. This excess risk increased as children grew older. This trend was consistently observed among sons, but not among daughters.

The positive associations between maternal immigrant status and overweight/obesity among children from 4-11 years persisted after adjustment for family SEP and neighbourhood liveability. These effects were only evidence if mothers had a low-and-middle-income country background and did not apply to mothers from high-income countries, suggesting it is not immigrant status per se that is the cause of excess overweight/obesity.

The study results challenge a simple socioeconomic or genetic explanation, instead, they point to a likely interplay between cultures of food, weight, gender and health and the experience of immigrant status in a developed, western country.

Individual, social and environmental factors and their association with weight in rural-dwelling women[53]

Led by Dr Cheryce Harrison, Monash University

Obesity is a major public health concern and women living in rural settings present a high-risk group. With contributing factors poorly explored, this study involved 649 rural Australian women aged 18-50 years from 42 rural towns.

This study found that overall, 65% of women participating were living with obesity, with only 20% of women reporting health professional engagement for weight management.

Initiatives to prevent weight gain in these communities require a multifaceted approach, with self-management strategies, and social and environmental support.



Translation is important, but translation is not possible without a solid foundation in fundamental biology.”

AUSTRALIAN OBESITY RESEARCHER

Research priority 3
Preventing obesity – health care

People living with obesity need individual clinical support and services, informed by clinical practice guidelines, and access to evidence-based information on prevention, weight management and treatment options. Obesity prevention research should be deeply embedded into all obesity health care practice.

Where more research is needed:

A large proportion of all the studies retrieved focused on obesity programs and interventions in school-age children (5-17 years old). Far fewer studies identified addressed preventing obesity in other age groups including:

- Older people (65-74 years old) – 41% of people aged 65-74[54] are living with obesity, yet proportionally we found very few studies reporting obesity prevention interventions in this age group.
- Young people (18-24 years old) and later adulthood – increasing prevalence of obesity is correlated with increasing age, but interventions in people aged 30-65 are lacking.
- Young children (pre-school children, 2-4 years old) – only about 1/100 studies involving children addressed this age group.
- Effectiveness/cost-effectiveness studies of interventions/treatments other than surgery are needed to invest in those that are most cost efficient in reducing obesity.
- Assessments of the health literacy of people living with obesity, and their confidence in their ability to find reliable information about healthy living and eating is required to assess any information gaps, and support people appropriately with their health information needs.
- Qualitative studies addressing influences/attitudes regarding food/drink choices, healthy living, physical activity to ensure health promotion activities and programs address these attitudes/influences.
- Views on cultural and linguistic appropriateness of marketing/health promotion messages relating to obesity to ensure effective communication.

SUB-CATEGORIES
Primary prevention: reducing risk factors (e.g. low physical activity levels)
Secondary prevention: early identification of unhealthy weight gain, and weight management
Tertiary prevention: support and care/treatment for people living with obesity
Health promotion interventions/awareness raising (community, policymakers and/or health professionals; organisations active in obesity prevention)
Primary and other medical or clinical research into obesity risk factors/treatments (eg. genetic and molecular research)
Workforce building (e.g. obesity specialists; dietitians; upskilled exercise practitioners)

Subcategories of published studies identified since 2017 included but are not limited to obesity prevention programs/interventions addressing:

- Childhood obesity (5-17 years old) (majority of studies)
- Adolescents
- Young people (18-24 years old)
- Later adulthood (30-64 years)
- Health promotion/health literacy

WHO STOPS[55]

Led by Professor Steven Allender, Global Centre for Nutrition and Preventive Health, Deakin University

The Whole of Systems Trial of Prevention Strategies for Childhood Obesity (WHOSTOPS Childhood Obesity) was a stepped wedge, cluster randomized trial of a whole of community systems-based approach to preventing childhood obesity in the Great South Coast region of Victoria, Australia.[56] The intervention helped community leaders and members identify and take actions to prevent childhood obesity in children aged 5 to 12 years (primary school age).

WHOSTOPS created a 4% reduction in obesity in the first two years and sustained behaviour change. The reversal in obesity reduction occurred due to the reduction in support and effort and alternate priorities for the community.

This has been used as a case study for the Lancet Obesity Commission and has led to multiple follow on trials in Australia and around the world.

NHMRC Centre of Research Excellence in the Early Prevention of Obesity in Childhood – Translate (EPOCH-Translate)

Professor Louise Baur AM, University of Sydney; and the Sydney Children's Hospital Network.

EPOCH-Translate, led by Professor Baur AM, is a multi-state collaboration to address the overarching question of "How do we embed effective, scalable, cost-effective interventions to transform obesity prevention in early childhood?".[57]

The Centre brings together not just trialists but also health economists, health promotion specialists, big data analysts, modellers, dietitians, physical activity experts, primary care clinicians, health services leaders and implementation scientists from across Australia and New Zealand. This range of disciplines is needed in order to tackle the complex issue of childhood obesity.

Factors influencing sweet drink consumption among preschool-age children[58]

Led by Dr Alexandra Chung, Monash University

Consuming high sugar foods and drinks are key risk factors for childhood obesity. Sweet drinks are the single greatest contributor to the free sugars consumed by Australian children. Little is known about the factors influencing consumption of sweet drinks, particularly among preschool-age children. This study conducted focus groups and semi-structured interviews with parents and grandparents (n = 25) living in different socio-economic areas across metropolitan and regional Victoria.

Sweet drink consumption among preschool-age children is influenced by multiple factors. At an individual level, health knowledge, health beliefs, and parenting skills and confidence influenced drink choices. At the social level, peer and family influence, and social and cultural norms emerged as influential. At the environmental level, availability of sweet drinks, targeted marketing, drink prices and settings-based policies influenced drink choices.

Strategies identified by participants to support healthier drink choices included health education at the individual level; positive role modelling at the social level; and restricting unhealthy marketing, improved access to water decreased availability of sweet drinks and price modification at the environmental level.

Parents and grandparents are calling for education, healthy environments and supportive policies. Children's sweet drink consumption is often influenced by factors beyond parental control. A multi-component strategy is required to support parents and grandparents in their efforts to make healthy choices for their children.



Multidisciplinary management is the key to better management of obesity. Many individuals present with a wide range of issues and conditions that need to be managed."

AUSTRALIAN OBESITY RESEARCHER

Research priority 4
Managing obesity – health care

All Australians should have access to supportive obesity healthcare. To deliver on this ambition, research into cost-effective multidisciplinary obesity support and care services, appropriate funding models, patient care pathways and clinical support tools is essential. This includes embedding early intervention and treatment into the healthcare system.

Where more research is needed:

Strategies for improving obesity diagnosis and management in general practice, including obesity-focused training for healthcare professionals, and investigating gaps in obesity health care delivery, including the availability and effectiveness of community obesity clinics and outreach care, and equity of access across Australia to obesity prevention/management programs/interventions.

- Research into best practice obesity management, including shared decision-making, and acceptability with patients.
- Consumer knowledge of obesity-related support and health care services available to them.
- Alternative funding models specific to obesity healthcare, similar to the condition-specific funded care for people with diabetes.
- Studies on pre-habilitation interventions and obesity management programs in people awaiting obesity treatment/elective surgery, to enable more effective use of health system resources, and the effectiveness of these strategies to avoid/reduce unnecessary obesity treatment and elective surgery.
- Information about the effectiveness of obesity support technologies in broader settings.
- Criteria for appropriately selecting people for bariatric and related obesity surgery to ensure cost-effective use of health system resources.
- Obesity and outcomes related to Covid-19 – an important and emerging field of research.

SUB-CATEGORIES

Embedding early intervention, and treatment into the healthcare system
Access to early healthy eating/active living interventions as part of routine health care and health service delivery
Models of care; patient care pathways
Patient access to telehealth services/digital patient support
Clinical support tools (e.g. clinical information systems, care pathways, GP toolkits, template management plans, shared-decision aids)
Obesity care funding models (e.g. public and private reimbursement models)
Patient education programs (e.g. online guides, fact sheets, other information resources to support informed, healthy choices)
Community-based interdisciplinary obesity clinics, clinical networks and outreach and social services
Workforce building (e.g. obesity specialists; dietitians)

Research Australia's analysis identified published studies relating to managing obesity that included but were not limited to:

- Primary care research into obesity management interventions, and obesity-related complications
- Various models of obesity care including technology enabled care using telehealth/health coaching, mobile phone, digital and other applications
- Clinical obesity-related databases of information to inform obesity-specific health service use and costs
- Covid-19 outcomes in people with obesity

Impact of specialised obesity management services on the reduction in the use of acute hospital services

Dr Kathryn Williams, Family Metabolic Health Service, Nepean Hospital, Kingswood, NSW and Charles Perkins Centre and Gabrielle Maston, Dr Francisco J Schneuer and Prof Natasha Nassar from the Epidemiology Unit, Charles Perkins Centre, The University of Sydney, NSW

Severe obesity affects 4% of Australians and is associated with significant morbidity resulting in increased use of healthcare services and higher healthcare costs. A record-linkage study of people aged ≥16 years with severe obesity who attended the Nepean Blue Mountains Family Metabolic Health Service (FMHS), between January 2017 and September 2021 was conducted to evaluate the impact of attending a public tertiary obesity service on acute hospital use. Emergency department (ED) presentations and acute hospital admissions and respective costs in the 1-year and 3-years pre-and-post first FMHS attendance were compared, overall and for adequate attendance (≥ 5 visits).

A total of 640 patients (74% female, 50% <45years) attended the FMHS, totalling 15,303 occasions of service and average 24 visits per person. There was a 31.0% and 17.6% reduction in acute admissions and ED presentations, respectively, translating into 34.0% and 23.4% decrease in hospital costs. Adequate engagement was associated with a 48% decreased risk of acute admission (Odds Ratio 0.52; 95%CI 0.29-0.94). Over 3-years, there was a 19.8% and 20.7% reduction in acute hospital admissions and ED presentations, respectively. Most significant change was seen in the reduction of cardiac and respiratory-related admissions. For all admissions to hospital, we found the diagnosis of obesity to be recorded in 30.8% of all acute hospital admissions. This proportion increased from 17.2% in 2015 to 46.6% in 2021.

Improved access to specialised obesity management may reduce the burden on hospitals and decrease acute healthcare costs . Inadequacies in coding for obesity in clinical data sets should be proactively addressed as a matter of urgency to enable a full appreciation of the cost of obesity to our healthcare services.

The ACTION IO Australian study[59]

The Awareness, Care and Treatment In Obesity maNagement- International Observation (ACTION-IO) study was conducted in 2018 to assess perceptions, attitudes and behaviours towards obesity management in people with obesity and healthcare professionals.

The study is a true demonstration of broad sector collaboration with researchers from St George Private Hospital and Nepean Hospital in New South Wales, the Boden Collaborative at the Charles Perkins Centre at the University of Sydney, the University of Melbourne, Monash University and funded by Novo Nordisk.

The study found a mean delay of 8.9 years from when a person with obesity first started to struggle with their weight, and the initial discussion with a healthcare professional about this. Healthcare professionals acknowledged weight loss efforts in only 39% of their patients, although 74.6% of people with obesity had attempted weight loss. Healthcare professionals identified short appointment times (61%) and the cost of obesity mediation, programmes, and services (59%) as barriers to weight management conversations and weight loss respectively.

Compared with global results, the study highlighted that people with obesity in Australia took 3 years longer to seek medical care about their weight and recommended that better recognition of obesity's impact and targeting barriers to care are needed.

A Community Jury on initiating weight management conversations in primary care[60]

An international collaboration between University of Leeds, Centre for Research in Evidence-Based Practice, Bond University, and Gold Coast Hospital.

Current guidelines recommend that people attending general practice should be screened for excess weight, and provided with weight management advice.

This study sought the views of people living with overweight and obesity about the role of GPs in initiating conversations about weight management.

People with a body mass index (BMI) >25 were recruited to take part in a Community Jury. Participants (n = 11) deliberated on two interconnected questions: "Should GPs initiate discussions about weight management? And if so, when? (a) opportunistically, (b) in the context of disease prevention, (c) in the context of disease management or (d) other?" The jury deliberations were analysed qualitatively to understand their views and recommendations.

The study found that people living with overweight and obesity believe GPs should discuss weight management with their patients. GPs should feel reassured that discussions are likely to be welcomed by patients, particularly if embedded within a more holistic focus on person-centred care.



Pre-clinical research is vital for better understanding the mechanisms driving poorer health outcomes in people with obesity.”

AUSTRALIAN OBESITY RESEARCHER

Research priority 5
Healthy living programs/interventions for obesity

Equitable access to affordable and culturally appropriate, person centred obesity care systems is essential to reducing obesity prevalence. Lived experience should inform future interventions and incorporate the needs and preferences of people living with obesity.

Where more research is needed:

- Research addressing the cost-effectiveness and outcomes of the large number of state and territory government led and funded programs and interventions is essential to ensure only cost-effective interventions are rolled out more widely (as appropriate) and invested in.
- More qualitative investigation into consumer and health professional attitudes to – and experience of – healthy living programs and interventions is needed, to ensure that they are meeting the needs of the people accessing the interventions, and to optimise them if not.
- Investigating people's barriers to healthy eating, and doing physical activity, and relevant person-centred incentives to increase uptake of program/interventions to inform future interventions and strategies to remove barriers and provide appropriate incentives if relevant.
- Workplace interventions and support including availability of/access to/effectiveness of the interventions (e.g. health assessments).

SUB-CATEGORIES
Government-initiated and funded healthy living programs
Cost effectiveness of interventions
The person-centredness, cultural appropriateness, comprehensiveness of the interventions
Workplace programs/interventions/support/information
Programs/interventions for physical activity in children, adolescents and adults
Programs/interventions to increase access to/consumption of healthy food and drink options/recommended energy intake/reduced intake of free sugars
Strategies for creating/improving environments and conditions to support people to live active, healthier lives (e.g. cycle paths; food labelling; greater access to healthy food; food marketing)
Industry, including food producers/retailers, pharmaceutical industry, digital product developers
Educational institutions
Digital applications or tracking tools for research or with potential research use
Clinical/administrative/other datasets for research or with potential research use
Surveys (e.g. national surveys)

A large number of studies published since 2017 related to obesity programs or interventions. Topics included but are not limited to:

- Diet/nutrition/healthy eating
- Physical activity (including reducing sedentary behaviour; active transport initiatives etc.)
- Food/junk food/unhealthy food
- Cost-effectiveness of interventions
- Lifestyle
- Education

Specific obesity-prevention interventions designed were found specifically for:

- Parents and parents-to-be
- Men
- Pregnant and breastfeeding women
- School-age children
- Adolescents
- Young people

Costing recommended (healthy) and current (unhealthy) diets in urban and inner regional areas of Australia[61]

Professor Anna Peeters & Associate Professor Kathryn Backholer, Global Obesity Centre, Institute for Health Transformation, Deakin University

This 2022 study sought to compare the cost and affordability of two fortnightly diets (representing the national guidelines and current consumption) across areas containing Australia's major supermarkets.

Healthy diets were consistently less expensive than current (unhealthy) diets. Nonetheless, healthy diets would cost 25-26 % of the disposable income for low-income households and 30-31 % of the poverty line.

Differences in gross incomes (the most available income metric which overrepresents disposable income) drove national variations in diet affordability (from 14 % of the median gross household incomes in the Australian Capital Territory and Northern Territory to 25 % of the median gross household income in Tasmania).

In Australian cities and regional areas with major supermarkets, access to affordable diets remains problematic for families receiving low incomes. These findings are likely to be exacerbated in outer regional and remote areas (not included in this study). To make healthy diets economically appealing, the study recommends policies that reduce the (absolute and relative) costs of healthy diets and increase the incomes of Australians living in poverty are required.

Efficacy of a gender-tailored intervention to prevent weight regain in men over 3 years[62]

Laureate Professor Clare Collins, University of Newcastle; and the Hunter Medical Research Institute

This 2017 study investigated whether a gender-tailored, self-administered weight loss management intervention could reduce weight regain in a sample of men who had lost weight with a linked gender-tailored weight loss program. At 6 months, a significant difference in weight regain was detected between groups, which favoured the group receiving the weight loss management program, but this effect did not persist once the program had concluded.

At 3 years, the group receiving no resources (WL-only) and the weight loss management (WL + WLM) groups had maintained 59% and 51% of their initial 7.3 kg weight loss, respectively, which was notable as both programs were self-administered and neither group received any face-to-face or individualized support during the study.

This study demonstrated that a gender tailored, self-administered weight loss management program could provide a short-term, protective effect against weight regain among men who had recently lost weight. However, this initial benefit was not evident at 3 years post-randomization.

Given the substantial challenges associated with long-term weight loss management this suggests that future programs may require more support or a greater frequency and/or duration of contact during weight loss management to encourage men to engage with all program components.

Food Policy Index[63]

Associate Professor Gary Sacks, Global Obesity Centre, Deakin University (supported by the Australian Prevention Partnership Centre and the Obesity Policy Coalition)

The Food Policy Index was developed in 2017 for Australia to assess food- and diet-related government policies that are currently in place, and to identify areas for improvement. This was based on the Healthy Food Environment Policy Index (Food-EPI) that was developed by INFORMAS, an international network of experts in food policy. The Food-EPI has been applied in several countries globally, including New Zealand, the United Kingdom, Canada, South Africa and Malaysia.

The Food Policy Index covers key policy areas, including specific aspects of food environments (such as food composition, labelling, promotion, prices and provision) that have been shown to have an important impact on population diets and obesity, as well as infrastructure support (including leadership, governance, monitoring and funding) that helps facilitate effective policy implementation.

The latest Food Policy Index progress update in 2019 found that while each jurisdiction has made some progress in relation to the recommended policies, there is large variation in the actions taken by each jurisdiction, and there continues to be varying levels of implementation across Australia of internationally recommended policies. The report recommended a national co-ordinated approach to address unhealthy diets and obesity.[64]

Prevalence of obesity in train drivers[65]

Associate Professor Anjum Naweed, Central Queensland University

Australian train drivers undergo health assessments as part of a nationally standardised approach to reducing sudden incapacitation risk, given the potential for occupational and public harm. Assessments occur pre-placement, then every 5 years to age 50, then every 2 years to age 60, and then every year thereafter.

The prevalence of obesity in drivers is higher than in the general population and continues to increase suggesting the assessments are not operating as effectively as they might. This study examined train drivers' perceptions and experiences of the assessments, to understand how these experiences shape their engagement with the process, and to generate recommendations for improvement from a systems thinking perspective.

Semi-structured qualitative interviews were conducted within five focus groups of train drivers (n = 29) held across four Australian rail organisations. Questions assessed drivers' understanding and experiences of and attitudes to health assessments, lifestyle risk factors, and personal approach to health and wellbeing.

Five factors were identified: unmet information needs, perceived low reliability and validity of assessment, need for psychological wellbeing assessment and support, and focus on short-term outcomes and compliance. Findings suggest that driver engagement with health assessment can be improved by proactively addressing the identified factors in occupational health initiatives and preventive interventions to tackle the problem of train driver health impairment.

WHERE WE NEED TO GO

This final section is a proud acknowledgement of Australia's obesity research talent. This includes a closer look at those areas where Australia's national strength in obesity research naturally lend themselves to opportunities for further research investment and collaboration.



> *"We know what needs to be done. The research required is understanding why evidence based policies are not implemented."*
>
> AUSTRALIAN OBESITY RESEARCHER



Key findings and recommendations

RECOMMENDATION 1

The Australian Government, as the major funder of health and medical research and obesity research, should develop targeted funding for obesity research into the five key research priority areas Research Australia has identified in this report.

Research Australia's analysis found that the Australian Government funded 52% of obesity publications in the past 5 years. However, there is no dedicated stream of funding for research into obesity as a condition in its own right.

Given the magnitude of obesity and the Government's National Obesity Strategy there is an opportunity to accompany the 10-year framework with a focused discussion on a dedicated agenda for obesity research that targets funding at the five key research priority areas Research Australia has identified in this report:

1. The impacts of obesity
2. Obesity in high priority populations
3. Managing obesity
4. Preventing obesity
5. Healthy living programs and interventions for obesity

RECOMMENDATION 2

Future Australian Government funding for obesity research must be guided by the research priorities of people living with overweight and obesity.

There is a lack of research into not only how people living with overweight and obesity live and their views on what current interventions would best support them.

For research to have its greatest potential impact, consumers need to be an integral part of health innovation as co-designers and co-developers. Public involvement right at the beginning of a project helps researchers to identify new research topics and to modify their research questions.[66] Consumer co-design can also influence what research outcomes are measured as well as how they are measured, helping make the research findings more relevant and valuable to the people who want to use them.[67]

Australian charities have a key role to play in bringing consumers together with researchers. The philanthropic sector has funded 22% of obesity publications since 2017 with 7% of publications funded by the National Heart Foundation of Australia alone. Obesity research is supported by charities with more general remits (e.g. Jack Brockhoff Foundation), or disease specific charities where obesity is implicated on the condition (e.g. Arthritis Australia, Diabetes Australia).

It is important that the philanthropic sector, those who represent some of the 12.5 million Australians[68] living with overweight and obesity and who fund over 20% of obesity publications*, are involved in these conversations.



THE PHILANTHROPIC SECTOR HAS FUNDED 22% OF OBESITY PUBLICATIONS since 2017 with 7% of publications funded by the National Heart Foundation of Australia alone.

* Proportion of funding sourced from Research Australia's analysis of obesity research published in the past 5 years.

RECOMMENDATION 3

More research is needed into the experiences of rural and remote Australians and Aboriginal and Torres Strait Islander Peoples living with overweight and obesity.

Rural communities experience higher rates of obesity and reduced food security compared with urban communities.[69] Research shows that obesity disproportionately impacts Aboriginal and Torres Strait Islander peoples compared with non-Indigenous Australians, as well as people from culturally and linguistically, diverse backgrounds.[70]

The five institutions with the highest publication volumes are all metropolitan universities (the University of Sydney, Monash University, the University of Melbourne, Deakin University, the University of Queensland). While rural populations experience higher rates of obesity, there is not a proliferation of obesity research across regionally based universities.

There is an opportunity for government, philanthropy, higher education and the private sector to fund research that is designed in collaboration with rural and regional Australians, where the impacts of obesity are keenly felt.

Overweight and obesity contribute **7.2% OF THE HEALTH GAP BETWEEN ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES** and non-Indigenous Australians.[74]

RECOMMENDATION 4

Primary care is key to managing obesity. Research is needed into better ways to fund general practitioners to manage obesity and utilise multidisciplinary treatment pathways.

The National Obesity Strategy states that for every 1,000 GP visits by adults in Australia, only 8 receive weight management support, despite a 31% prevalence of adult obesity.[72] In addition, for every 200 Australian children who visit their family doctor, 60 are living with obesity, but only one is offered weight management support.[73]

Research is needed into how to best support and upskill GPs and other health to more consistently and effectively diagnose, manage and treat obesity. There are undoubtedly pockets of excellent research exploring this issue which could be built upon. For example, clinician and healthcare managers' (HCMs) views on weight management service delivery are imperative for informing the nature of future services to treat children with obesity.[74]

Almost 60% of Australians living with overweight and obesity who have spoken to their GP have found it helpful and 40% have felt more informed.[75]

Integrated, collaborative, multidisciplinary models of care are key to managing obesity. Clinicians, health professionals and research should be working together to optimise effective interventions and shared care plans tailored to individuals or groups of people to improve outcomes. This approach also makes better use of limited resources.



ALMOST 60% OF AUSTRALIANS LIVING WITH OVERWEIGHT AND OBESITY who have spoken to their GP have found it helpful and 40% have felt more informed.

Research Australia's analysis also found a lack of research activity in all aspects of patient care and obesity. This includes all levels of care (primary, secondary and tertiary), health care funding models specific to obesity, and gaps in obesity-specific healthcare delivery (e.g. availability; effectiveness of outreach).

Currently MBS funding is directed to obesity interventions (e.g. bariatric surgery) rather than obesity management. There is an MBS funded model used in diabetes to support people living with diabetes to have the necessary medical checks and tests to manage their condition (i.e. the Diabetes Annual Cycle of Care, MBS item number 2517), which could be adapted for obesity-specific healthcare measures, including screening, and MBS rebated sessions with dietitians, psychologists and exercise physiologists etc.

RECOMMENDATION 5

Future research into preventing obesity should be focused on developing strategies aimed at all age groups – particularly those outside of 'school age'. Australia has a wealth of obesity prevention experts who will be key to addressing the obesity epidemic in Australia.

The dynamic Australian research activity in obesity prevention is currently, largely focused on school aged children (5-18 years). Different prevention strategies and interventions are needed for different age groups.

In Research Australia's survey, preventive health research was ranked as the most conducted form of obesity research conducted by respondents (49.21%) and researchers' top priority for obesity research investment (38.10%).

Research shows the prevalence of obesity increases with age – for both men and women, however there are complexities within a statement such as this that must be considered (for example, weight loss in elderly Australians).

Preventive health research was the **most frequently conducted and top priority for investment** by Australian obesity researchers

The biggest increase in excess weight gain is from childhood to early adulthood.[76] The National Obesity Strategy highlights that targeted prevention actions at critical points in life – such as during pregnancy, the early years, adolescence, or when leaving school or home as a young adult – can help to reduce the risk of childhood and subsequent adult obesity.[77]

Addressing obesogenic environments is key to meaningful and sustainable obesity prevention. Obesogenic environments (including food labelling and food reformulation) are considered one of the driving factors behind the higher burden of obesity and chronic disease observed in low socio-economic status groups. There are important multi-sector collaborations and partnerships (e.g. employers/workplaces; food manufacturers; local government areas; sports clubs) that could be capitalised upon for co-designed prevention programs and interventions to address obesity across lifespan.

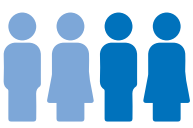
While there is a wealth of research activity and expertise in preventive health research, Australia must ensure this research is generating much needed evidence to prevent obesity at all stages of life.



1 in 4
young children
2-4 years old



1 in 4
children
5-17 years old



1 in 2
young people
18-24 years old



4 in 5
older people
65-74 years old

RECOMMENDATION 6

There is dynamic international investment in Australian obesity research that could be further leveraged through more international research collaborations.

Of the government funding bodies internationally, the US-based National Institutes of Health (NIH) was the most frequent non-Australian funder by publication volume (7%, 108 publications).* Interestingly the international NIH is on par with one of Australia's biggest research funding agencies, the ARC in terms of overall Australian research investment.

Australian researchers' ability to attract international funding, is a reflection of Australia's international standing in obesity research.

Philanthropy, industry and higher education must be enabled and incentivised to build the international collaborations that bring international research investment to Australia. Whether this be at a state, federal or institute level, this collaboration should be led depending on where the research is taking place.

7% of Australian obesity publications in the past 5 years have been **funded by US-based National Institutes of Health**

* Research Australia recognises that this funding may be due to international researchers involved in the publications.



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Appendix A Methodology

Literature Review: Australian Obesity Research

Research Australia conducted a rapid literature and clinical trial registry scan to identify Australian obesity-related research published from 2017 onwards. Whilst the results of the literature scan reported here are comprehensive and representative of obesity research in Australia, we acknowledge that other relevant publications, government programs, interventions and initiatives may not have been picked up by our search strategy. We also recognise that industry funded research generally does not lead to publication in the scientific literature. It was not feasible to manually verify every publication identified in detail by screening titles and abstracts. Some published research mentioning obesity that have been identified may not be primarily obesity research. For example, research into diabetes may include obesity as an outcome. Where possible such studies have been manually evaluated and excluded.

Publication references were exported to the VosViewer open-source platform [https://www.vosviewer.com/] to render maps representing the most frequent co-occurring words by article topic across the included documents. Specifically, the co-occurrence network was rendered by uploading all citations to the VosViewer platform with the map based upon selection of index keywords occurring 50 or more times. Index keywords are keywords used by bibliographic databases to organise data, and are therefore more consistent and standardised than author generated keywords.

Clinicaltrials.gov was searched for all obesity-related studies conducted in Australia. This was further limited to all studies that were either not completed by, or had begun after, 2017.

Gap analysis

The abstracts of all search results were filtered by keywords for each category (obesity prevention; management etc), appraised and assigned a subcategory according to area of research activity. The abstracts were then assessed to ensure relevance, and to further categorise the focus of the research.

Any studies appraised that were not carried out in – or relevant to – the Australian population, or that did not have obesity as a primary focus of the research were also excluded. An appraisal of the methodological validity or quality of the publications was out of scope for this review.

The types of publications identified included randomised controlled trials; clinical trial registrations; systematic reviews; surveys; primary/clinical research; cohort studies; longitudinal studies; database analyses; conferences papers.

Studies included in the body of the report as case studies or examples for the various research areas were chosen by relevance to illustrate particular aspects of obesity research and are representative and not exhaustive.

Appendix B Australian institutions funding obesity research

The list below identifies Australian research institutions funding obesity research in the past 5 years (ranked by number of research publications identified).

Deakin University (36)
University of Sydney (34)
University of Melbourne (28)
University of Queensland (28)
Monash University (25)
University of Newcastle (37)
University of Western Australia (21)
Curtin University of Technology (19)
University of Adelaide (18)
University of Western Sydney (16)
Hunter Medical Research Institute (13)
Murdoch Children's Research Institute (11)
Edith Cowan University (9)
Queensland University of Technology (9)
University of New South Wales (9)
University of Tasmania (8)
Melbourne Institute,
University of Melbourne (7)
Baker IDI Heart and Diabetes Institute (6)
University of Notre Dame Australia (6)
Victoria University (6)
Australian Catholic University (5)
University of Technology Sydney (5)
Australian National University (4)
RMIT University (4)
University of South Australia (4)
Western Alliance Health Research (4)
Bond University (3)
Griffith University (3)
Macquarie University (3)

Appendix C
Survey respondents' priorities for research investment

Research Australia's survey of obesity researchers was conducted in September 2022.

The aim of the survey was to understand where obesity research is being conducted in Australia and where the health and medical research community should be advocating for more research ivnestment.

Research Australia received responses from 97 individual researchers.

Survey respondents were asked to nominate their top three priorities for obesity research investment. The following table lists how respondents ranked the other 24 priorities provided.

1. Preventive health research
2. Systems change
3. Food system research
4. Translation science
5. Health economic evaluation
6. Pre-clinical research
7. Clinical trials testing obesity treatments
8. Health services research
9. Population/epidemiological research
10. Health impacts of obesity
11. Other
12. Multidisciplinary team management approach
13. Stigma and mental health
14. Built environments
15. Core biology
16. Physical activity
17. Weight regain
18. Behavioural research
19. Observational study
20. Primary care management
21. Eating disorders
22. Other drivers (e.g. sleep, pollutants, microbiome etc.)
23. Technology and apps
24. Life cycle changes

Acknowledgements

Research Australia and Novo Nordisk are pleased to acknowledge the contributions of the following members and individuals:

Dr Kathryn Williams, Clinical Lead and Manager, Nepean Family Metabolic Health Service and HOD Endocrinology, Nepean Hospital, NBMLHD; and Senior Lecturer (conjoint), Charles Perkins Centre - Nepean, Faculty of Medicine and Health, The University of Sydney

Ms Tiffany Petre, Director, the Collective for Action on Obesity

Professor Alexandra McManus, Former Research Australia Director; Director, McManus R&D Consulting; Adj Professor, School of Population Health, Curtin University; and Adj Professor, School of Medicine, University of Notre Dame

Ms Carol Kilkenny

Dr Narcyz Ghinea, Research Fellow, Department of Philosophy, Macquarie University

Professor Peter Bragge, Veronica Delafosse and Diki Tsering at BehaviourWorks Australia, Monash University

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Date approved: November 2022