


Clinical Obesity Services in Public Hospitals in Australia: a position statement based on expert consensus

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What is already known about this subject

- Approximately 1 million Australians with clinically severe obesity (defined as body mass index [BMI] ≥ 40 kg/m² or BMI ≥ 35 kg/m² with at least one complication) could benefit from specialist obesity services (i.e. specialist hospital-based multidisciplinary team [MDT] services for the management of weight and obesity-related complications).
- Due to complex healthcare issues, patients suitable for specialist obesity services are unlikely to be adequately managed in primary care alone.
- Specialist obesity services including non-surgical MDT care, weight loss pharmacotherapies, and bariatric surgery have been shown to effectively improve a range of health outcomes in patients with clinically severe obesity.

What this study adds

- This is the first description of specialist obesity services in public hospitals in Australia, and the first national expert consensus position statement on such services.
- The composition of services varied substantially between hospitals. Patient access to services and treatments was limited by strict entry criteria (e.g. BMI 40 kg/m² or higher with specific complication/s), prolonged wait times, geographical location (major cities only), as well as out-of-pocket costs.
- There was consensus on the need for significant improvements in: (i) staff and physical infrastructure resources required for providing effective evidence based treatments for clinically severe obesity; (ii) access to services (e.g. establishing new services in areas of need and expanding the capacity of existing services including education and training resources) and (iii) targeted research funding for improving specialist obesity services.

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Summary

We aimed to describe the current state of specialist obesity services for adults with clinically severe obesity in public hospitals in Australia, and to analyse the gap in resources based on expert consensus. We conducted two surveys to collect information about current and required specialist obesity services and resources using open-ended questionnaires. Organizational level data were sought from clinician expert representatives of specialist obesity services across Australia in 2017. Fifteen of 16 representatives of current services in New South Wales ($n = 8$), Queensland ($n = 1$), Victoria ($n = 2$), South Australia ($n = 3$), and the Australian Capital Territory ($n = 1$) provided data. The composition of services varied substantially between hospitals, and patient access to services and effective treatments were limited by strict entry criteria (e.g. body mass index 40 kg/m² or higher with specific complication/s), prolonged wait times, geographical location (major cities only) and out-of-pocket costs. Of these services, 47% had a multidisciplinary team (MDT), 53% had an exercise physiologist/physiotherapist, 53% had a bariatric surgeon and 33% had pharmacotherapy resources. Key gaps included staffing components of the MDT (psychologist, exercise physiologist/physiotherapist) and access to publicly funded weight loss pharmacotherapy and bariatric surgery. There was consensus on the need for significant improvements in staff, physical infrastructure, access to services, education/training in obesity medicine and targeted research funding. Based on the small number of existing, often under-resourced specialist obesity services that are located only in a few major cities, the

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vast majority of Australians with clinically severe obesity cannot access the specialist evidence based treatments needed.

Keywords: Obesity, hospital Outpatient Clinics, specialist weight management, weight loss.

Introduction

The international epidemic of severe obesity (defined using a body mass index [BMI] of ≥ 35 kg/m²) requires immediate intervention with effective management strategies for appropriate obesity service access and delivery for people suffering from this disease and its complications (1, 2). Primary care frequently provides first line services for obesity, and general practitioners (GPs) play an important role in identifying individuals with obesity and implementing strategies to promote weight loss and/or prevent weight

regain as well as treating associated complications (3–5). Patients with severe obesity often have multiple health conditions, and consequently, complex health needs that cannot be met within the constraints of most primary care settings (6). Their health needs may be more appropriately addressed in specialized obesity services with a multidisciplinary team (MDT) approach that can provide more intensive interventions where appropriate (i.e. specialist hospital-based obesity support services including bariatric surgery) (3–5). Specialist obesity services including non-surgical MDT care, weight loss pharmacotherapies, and

bariatric surgery have been shown to effectively improve a range of health outcomes in patients with clinically severe obesity (7–10).

There are approximately 1 million adults in Australia with ‘clinically severe obesity’ (defined using a BMI ≥ 40 or ≥ 35 kg/m² with at least one complication), potentially eligible for bariatric surgery (11), whom would be candidates for referral to specialist obesity services but few have access to the range of recommended treatments and services needed (3, 4). Patients referred for specialist obesity services often have been unable to maintain prior weight loss and have complex care needs requiring the evaluation and treatment of multiple conditions. These include metabolic diseases such as type 2 diabetes, cardiopulmonary diseases (e.g. hypertension, ischaemic heart disease or severe heart failure, obstructive sleep apnoea, obesity hypoventilation syndrome), severe joint disease limiting mobility, as well as depression and anxiety (5). Given that the high and rising prevalence of severe obesity is likely to persist (1) the provision of specialist obesity services to address the health needs of people suffering with clinically severe obesity will challenge health systems in countries like Australia, where there is publicly-funded universal health care. Despite most Australians relying on the public health system, the majority (approximately 88%) of bariatric surgery is performed in private hospitals (12).

While comprehensive recommendations on evidence based treatments are available (3, 4), there is limited guidance on the organizational structure and resource composition of specialist obesity services. Few are available from the United Kingdom (13, 14), which as with Australia, has publicly funded universal health care (although with reportedly far greater fiscal constraints). Locally, a report containing recommendations on the composition and operation of specialist obesity services was prepared by the Greater Metropolitan Clinical Taskforce for the New South Wales Ministry of Health in 2009, and these have been updated in 2017 (unpublished reports). There is no description to date of obesity services in public hospitals in Australia. The collaborators in the Clinical Obesity Services in Public Hospitals (COSiPH) project sought to describe the current state of public specialist obesity services for adults in Australia, and to develop recommendations based on consensus of expert opinion.

A gap analysis and formulation of recommendations was undertaken by a working group with representatives from COSiPH, an expert chair (JD), and stakeholders including the Australian and New Zealand Obesity Society (ANZOS) and the Australian and New Zealand Metabolic and Obesity Surgery Society. Membership of the working group is shown in Appendix S1 (Supporting information).

The aims of the COSiPH project were to

1. Describe the current state of public specialist obesity services for adults in Australia.

2. Develop recommendations to address the current resource gaps and future needs based on consensus of expert opinion.

Material and methods

We conducted two surveys to collect information about current and required specialist obesity services and resources. Organizational level data were sought from clinician expert representatives of specialist obesity services across Australia in 2017, identified by exhaustive internet searches (i.e. approximately one full day searching Google using a range of keywords) and through professional referrals from the core group of COSiPH representatives, as with snowball sampling (or chain referral). Representatives completed two rounds of open-ended questionnaires designed to solicit opinions about the current (survey 1, Appendix S2) and required (survey 2, Appendix S3) resources of existing specialist obesity services. After the first round, representatives discussed the preliminary results and the need for a position statement at the 2017 Australian & New Zealand Obesity Society and Obesity Surgery Society of Australia & New Zealand and Asia Oceania Association for the Study of Obesity (ANZOS–OSSANZ–AOCO) Joint Scientific Meeting, and exchanged views and commentary via email regularly thereafter. Members of the COSiPH working group were asked to disclose any conflicts of interest information before deliberations. We sought and obtained confirmation from the Research and Ethics Office, South Western Sydney Local Health District, New South Wales that ethics review of the project was not required given that respondents would be providing organizational level data.

In both rounds, representatives were provided tabulated data summarized for the entire group, asked to check the accuracy and completeness of their responses, and had the opportunity to revise their judgments, consistent with features of the Delphi technique (15). Responses to the questions on ‘...current list of clinic staff...?’ (question 2, survey 1) and ‘minimum clinic staff?’ (question 1, survey 2) were coded into seven staff categories such as physician, bariatric surgeon, nurse, etc. Responses to the question on ‘...key features of the obesity services...’ (question 3, survey 1) or ‘minimum services...?’ (question 2, survey 2) were classified into four key services: bariatric surgery; MDT; weight loss pharmacotherapy; and lifestyle/diet intervention). Responses to the question on ‘minimum infrastructure...?’ (question 3, survey 2) were classified into five categories such as adequate room/space, adequate chair size, etc. Data extraction and synthesis were conducted by one author (EA). Responses were coded 0 (for ‘absent’) and 1 (for ‘present’) for each component resource. Quantitative characteristics of each service (such as year of commencement, treatment period, number of clinics per week)

were recorded as reported. Responses to questions 9–11 were not classified into categories.

We describe this population of obesity service providers using percentages for categorical variables and number above specified thresholds for the numeric variables. To assist gap analysis, a graph was created to plot the percentage of each staff and service type currently available against the percentage of times they were identified as a required part of the service. While the reference lines on this graph are arbitrary, they aid discussion of gaps in services. As a rough indication of the adequacy of current services, we compared the total number of resource categories available against the total number of resource categories required. The linear correspondence between available and required resource categories was summarized using Pearson's correlation coefficient. Analyses were conducted using SPSS (Armonk, New York, USA) software.

Results

Sixteen public hospital obesity services in major cities were identified. Fifteen of the 16 representatives contacted agreed to participate in the COSiPH project and provided survey data. In the first round (survey 1), 15 representatives from New South Wales ($n = 8$), Queensland ($n = 1$), Victoria ($n = 2$), South Australia ($n = 3$) and the Australian Capital Territory ($n = 1$) provided data. This geographical area covers approximately 86% of the Australian population (16). In the hospitals represented, the obesity services were established between 1983 and 2017 (with three new services established since 2014). Patient treatment periods were: 2 years or more ($n = 11$), 6–12 months ($n = 2$), up to 6 months ($n = 1$) and unclear ($n = 1$). The number of visits to services per week varied widely across sites, but typically, there were two or fewer. Only 7 of 15 services reported currently managing more than 100 patients and most ($n = 14$) reported managing less than 10 new patients weekly. Many services had more than 300 patients on a waitlist ($n = 6$) resulting in protracted waiting times that ranged from months to years. Specific referral/intake criteria varied across the sites, but most reported features of 'clinically severe obesity' defined using specific BMI thresholds with a range of obesity-related complications. Three services were specifically for patients with severe obesity and type 2 diabetes, fatty liver or obesity hypoventilation syndrome. In most services, patients paid for very low energy diet meal replacements (typically AU\$2–3 per meal replacement) and weight loss pharmacotherapy. Discharge criteria included: failure to lose weight/attend scheduled clinics ($n = 3$); referral back to GP in agreement with the patient ($n = 5$); achieved successful weight-loss goals ($n = 2$); declined surgery ($n = 2$) and none specified ($n = 3$).

Table 1 presents the current and required specialist obesity management clinic staff/service composition reported

Table 1 Summary of current (survey 1 data) and required (survey 2 data) resources of specialist obesity services in Australian public hospitals

Responses by category	Current (%) ($N = 15$)	Recommended (%) ($N = 13$)
Staff		
Physician	93	100
Bariatric surgeon	53	77
Clerical/administration	60	62
Nurse	73	46
Dietitian	87	100
Psychologist	67	92
Exercise physiologist or physiotherapist	53	77
Services		
Bariatric surgery	87	92
Multidisciplinary team	47	77
Weight loss pharmacotherapy	33	77
Lifestyle/diet interventions	80	77
Infrastructure		
Adequate rooms/space		85
Adequate size chairs		92
Adequate anthropometric measuring devices		62
Adequate physical access (doorways, parking, ramps)		69
Education/telehealth facilities		31
Other		
Research resources		31
Rapid access to allied and specialist services		46

Surveys used are available online (see Appendices S2 and S3).

by the representatives. Currently, 80% or more of services had a physician, a dietitian, access to bariatric surgery (a fixed number either onsite or affiliated), or lifestyle/diet intervention (including very-low-energy diet) resources. Only 60% of services had nursing, psychology or clerical staff resources. Multidisciplinary team care or exercise physiologist/physiotherapist resources were available in only about half of the services. Access to weight loss pharmacotherapies was provided by only one third of the services.

In the second round, 13 representatives from metropolitan areas in New South Wales ($n = 7$), Queensland ($n = 1$), Victoria ($n = 2$) and South Australia ($n = 3$) provided data for survey 2. Nearly all (92–100%) of the respondents agreed that effective obesity services require a physician, a bariatric surgeon, dietitian and psychology resources, and the majority (77%) recommended access to lifestyle interventions, pharmacotherapy and co-located exercise physiologist resources. Service providers reported having access to an average of 7.2 of the 11 staff and services categories but felt that 8.8 on average of these resources were required. This gap was largely in clinic staff composition (psychologist and exercise physiologist or physiotherapist), access to an MDT, weight loss pharmacotherapy and

bariatric surgery (Fig. 1). No linear relation was found ($r = 0.04$) between the two surveys for summed scores. The lack of correlation indicates that the number of resources available to the services does not correspond to the number of resources required by the services. Most of the experts agreed that there was a lack of adequate physical infrastructure.

Discussion

We present the first description of publicly funded specialist obesity services in Australia. Based on the results of survey 1, access to specialist obesity services is limited to only a very small fraction of people potentially eligible for specialist health care for clinically severe obesity (11). For instance, we estimate that less than 2000 patients have access to either specialist obesity services (survey 1 data) or publicly funded bariatric surgery (12) each year in Australia. Even if there was a 10-fold increase in services tomorrow, it would take more than 25 years to treat at least 1 million people potentially eligible for specialist obesity services including bariatric surgery, assuming the prevalence of clinically severe obesity remains unchanged during this period. The prolonged waiting lists reported for most services are undoubtedly causing distress among patients, especially those waiting for publicly funded bariatric surgery (17). Timely and equitable access is of concern. Very strict entry criteria (e.g. BMI 40 kg/m² or higher with complication/s, representing only 45% of the adult population with clinically severe obesity (11)) are often used by services to determine intake eligibility.

Individuals with socioeconomic disadvantage are least likely to afford the out-of-pocket expenses for some treatments. This is particularly important given the growing use of both weight loss pharmacotherapies (18) and bariatric surgery (19) in Australia. From the data collected, there is no clear policy justification (other than cost) for the apparent differences in the allocation of resources including weight loss pharmacotherapies and bariatric surgery in the Australian public health system. Furthermore, geographical location is a major obstacle for many patients, as approximately 35% of people with clinically severe obesity in Australia live in remote areas (11) and regular travel to specialist obesity services in major cities is usually prohibitive. Residential distance has been shown to be negatively associated with attendance and completion at specialist obesity services (20).

The COSiPH project has identified substantial heterogeneity in the composition of the obesity services, despite broad consensus from representatives regarding the resources that should be available to specialist obesity services. There was unanimous agreement that MDT care provided by physicians, surgeons, allied health including dietitians, exercise physiologists/physiotherapists and psychologists would improve the quality of services. This composition of a specialist obesity service is almost identical to that currently recommended for commissioning similar specialist obesity services in the United Kingdom (13, 14). The gaps in clinic staff and services between what is currently available and expert recommendations are related to limited budgets, resources, clinical capacity and access to effective therapies. The experts within the COSiPH working

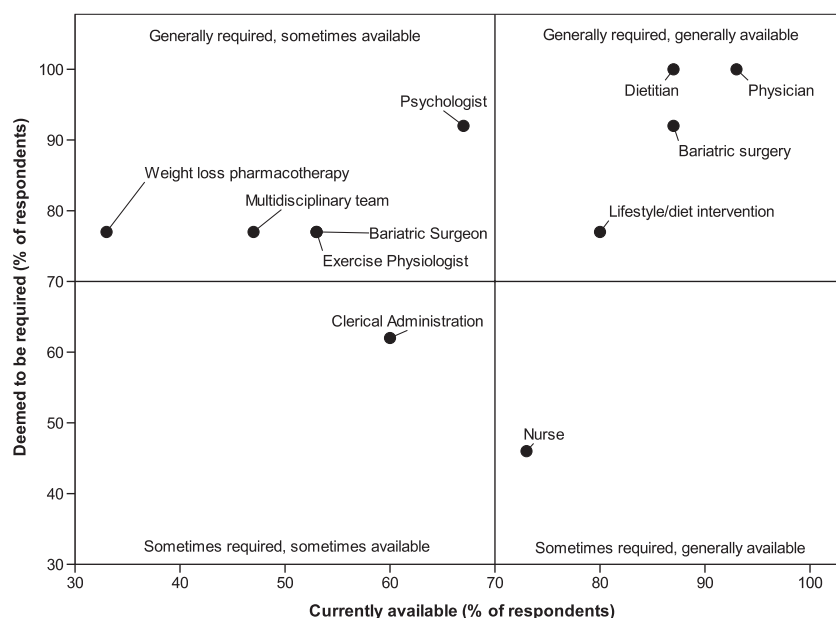


Figure 1 Visual analysis of gaps between current and required resources of specialist obesity services in Australian public hospitals.

group, representative of existing publicly funded specialist obesity services, agree that a national consensus regarding best practice for Clinical Obesity Services can be reached, but implementation will require a broad commitment across the health system from important stakeholders including the Federal Department of Health and the Departments' of Health in each state. The current national approach to assessing and managing clinically severe obesity would surely be unacceptable if it were applied to other complex chronic health conditions such as cancer, type 2 diabetes and cardiopulmonary diseases.

Despite the 1 000 000 adults with clinically severe obesity in Australia, very limited services are available and there is substantial variability in the structure, resourcing and capacity of current specialist obesity services. Current services have arisen on an *ad-hoc* basis, driven by dedicated groups of practitioners in conjunction with individual health services. Establishing new services is extremely challenging because of the fiscal constraints imposed by most local health districts. To date, a consistent national strategic plan for current services and how they link with other services, including to primary care has not been implemented. While the important role of GPs in this regard is acknowledged, effective obesity management in primary care requires further development and investment/training (6, 21). Attempts have been made to rationalize bariatric surgical services in some states, but this has often limited access to care without broader rationalization of the service structure or function (22–24).

Currently funded services, many of which are associated with major teaching hospitals, have an important role in leading and shaping the future of Australia's health system. Of course, a major expansion in national clinical capacity will require education, training and hands on experience with skilled health practitioners (25), and a substantial increase in allied health professional workforce resources (26). Clinical pathways need to be developed and assessed, common standards of care established, and criteria for escalating therapy evaluated. An effective team care approach is required for opportunities to determine efficiencies in managing chronic obesity-related conditions, including group patient education (27), self-management support, shared visits to health care practitioners, team approaches in decision-making, and other principles of the Chronic Care Model (28). Additive ways of interacting with health professionals and other relevant stakeholders for providing effective specialist obesity service including 'interdisciplinary' and 'transdisciplinary' approaches should be explored (29). Evidence comparing the effectiveness of physician led MDT with interdisciplinary and transdisciplinary team models of care for improving health outcomes in patients with clinically severe obesity is lacking. Targeted research funding for testing and evaluating such initiatives is required from local health district, state and federal government grant agencies.

Draft key recommendations

1. *Staff*: should include a physician led co-located MDT containing specialist dietitian, clinical psychologist, exercise physiologist or physiotherapist, bariatric surgeon, specialist nurse and administration personnel, as is feasible for the site.
2. *Physical infrastructure*: should include group rooms, adequately sized plinths/waiting room chairs/clinical rooms, drop off zones and/or easy access parking, use of ambulatory services and telehealth service delivery.
3. *Access*: there should be a national- and state-wide framework for incrementally scaling up specialist obesity services in public hospitals.
4. *Education and training*: there should be routine training of medical students and other healthcare professionals, including allied health professionals and primary care physicians, in specialist obesity management. This can include, but is not limited to, formal instruction using lectures and courses, as well as clinical exposure within services themselves. This is important for optimizing the effectiveness, scalability and sustainability of specialist obesity services in Australia.
5. *Electronic database*: each service should create an electronic database for systematically capturing minimum and standardized clinic data for the ongoing monitoring and evaluation of their service, and to promote collaboration *between* services such as information sharing for quality assurance as well as data linkage for future research purposes.
6. *Research funding*: there should be targeted calls for research on exploring ways of improving specialist obesity services using new and existing interventions from local health districts, state and federal grant agencies.

We acknowledge several study limitations and potential sources of bias. Most of the clinician expert representatives whom provided responses to the surveys (13 of 15) are physicians whom also formed the majority of the COSiPH working group membership and this position statement authorship. No specialist obesity service was identified in Western Australia; this was unexpected given that it had the highest rate (1.9 per 10 000 population) of publicly-funded weight loss surgery episodes of care (i.e. hospitalization admissions that include one or more procedures) in 2014–15 (12). While there are several public hospitals providing bariatric surgery only, we believe that our sampling procedure identified all of the existing comprehensive specialist obesity services in public hospitals across Australia. Study participation was limited to specialist obesity services predominately for adults. Thus the abovementioned draft key recommendations may not be universally endorsed by other relevant stakeholders. Further, the quality of the survey data which formed in part the basis for the position

statement is unknown. For instance, the two open-ended questionnaires (surveys 1 and 2) developed for this study were not tested for reliability and validity, and the accuracy and completeness of the responses were not repeatedly and systematically followed up with the respondents. Despite these limitations, the authors believe that these draft key recommendations and position statement are a necessary first step for scaling up specialist obesity services in Australia.

In summary, this is the first description of specialist obesity services in public hospitals in Australia, and the first national expert consensus position statement on such services. The composition of services varied substantially between hospitals. Patient access to services and treatments were limited by strict entry criteria, prolonged wait times, geographical location, as well as out-of-pocket costs. There was consensus on the need for significant improvements in: (i) staff and physical infrastructure resources to provide the recommended evidence based treatments; (ii) access to services (e.g. establishing new services in areas of need and expanding the capacity of existing services including education and training resources) and (iii) research funding for improving specialist obesity services in Australia. Based on the small number of existing, often under-resourced specialist obesity services that are located only in a few major cities, the vast majority of Australians with clinically severe obesity cannot access the specialist evidence based treatments needed.

Conflict of Interest Statement

EA received honoraria from Lilly Diabetes Australia in 2013. IC is the President of the World Obesity Federation. He has performed clinical trials of obesity treatment and prevention some of which have been funded by government, but others by the pharmaceutical industry. Current trials are funded by the NHMRC, NovoNordisk, Pfizer, BMS, Australian Eggs and SFI. He has given talks for NovoNordisk, Servier Laboratories, Ache and Pfizer in the last 3 years. JD has research support and grants from NHMRC, and has consulted for Bariatric Advantage, Nestle Health Science, I-Nova, Medtronic, Apollo Endosurgery, Novo Nordisk and Ethicon Endo Surgery. None of these companies had any role in this project. GW has research grants from the NH&MRC, ARC, NHF and Diabetes Australia. He is Editor in Chief of Obesity Research and Clinical Practice, and International Advisor for Clinical Key (Elsevier). He is independent Chair of the Weight Management Council of Australia. He has had research support from Weight Watchers, Bayer, and Eli Lilly and received honoraria from Novo Nordisk, I-Nova, Merck-Serono, Abbvie, Astra Zeneca, Roche, Bayer and Besins. PS has received payment from Novo Nordisk for a talk unrelated to this project. TM has received research support and performed clinical trials of obesity treatment and

prevention, some of which have been funded by government, but others by the pharmaceutical industry. Current trials are funded by the NHMRC, NovoNordisk, Eli Lilly, Pfizer, Zafgen, Australian Eggs and SFI. She has given talks for NovoNordisk and Astra Zeneca. She has consulted for Australian Eggs, Nestle Health Science and NovoNordisk. No conflict of interest was declared for NK, KS, KW, SG, PF, KF, RB, LD, VC and PD.

Author contributions

EA conceived and led the project. NK, KS, PS, SG, GW, KF, RB, TM, LD, KW, VC and PD provided the data. PF analysed the data. All authors were involved in writing the paper and had final approval of the submitted and published versions.

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References

1. Collaboration NCDRF. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *Lancet* 2016; 387: 1377–1396.
2. Dietz WH, Baur LA, Hall K *et al.* Management of obesity: improvement of health-care training and systems for prevention and care. *Lancet* 2015; 385: 2521–2533.
3. Australian Diabetes Society, Australian and New Zealand Obesity Society, Obesity Surgery Society of Australian and New Zealand. The Australian Obesity Management Algorithm. The Australian Obesity Management Algorithm. Australia: Australian and New Zealand Obesity Society, 2017. URL <http://anzos.com/australian-obesity-management-algorithm> (accessed 31 July 2017).
4. National Health and Medical Research Council. *Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescents and Children in Australia*. NHMRC: Melbourne, 2013. URL <http://www.nhmrc.gov.au/guidelines/publications/n57> (accessed 23 March 2015).
5. Grima M, Dixon JB. Obesity – recommendations for management in general practice and beyond. *Aust Fam Physician* 2013; 42: 532–541.
6. Booth HP, Gulliford MC. Obesity management in primary care. *Lancet* 2017; 389: 1605–1606.
7. Lih A, Pereira L, Bishay RH *et al.* A novel multidisciplinary intervention for long-term weight loss and glycaemic control in obese patients with diabetes. *J Diabetes Res* 2015; 2015: 7.
8. Brown TJ, O'Malley C, Blackshaw J *et al.* Exploring the evidence base for tier 3 weight management interventions for adults: a systematic review. *Clin Obes* 2017; 7: 260–272.
9. Gloy VL, Briel M, Bhatt DL *et al.* Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. *BMJ* 2013; 347: f5934.

10. Khera R, Murad MH, Chandar AK *et al.* Association of pharmacological treatments for obesity with weight loss and adverse events: a systematic review and meta-analysis. *JAMA* 2016; **315**: 2424–2434.
11. Sharman MJ, Breslin MC, Kuzminov A *et al.* Population estimates and characteristics of Australians potentially eligible for bariatric surgery: findings from the 2011–13 Australian Health Survey. *Aust Health Rev* 2017. <https://doi.org/10.1071/AH16255>.
12. Australian Institute of Health and Welfare. *Weight Loss Surgery in Australia 2014–15: Australian Hospital Statistics*. Cat. no. HSE 186. Canberra: AIHW, 2017.
13. Welbourn R, Hopkins J, Dixon JB *et al.* Commissioning guidance for weight assessment and management in adults and children with severe complex obesity. *Obes Rev* 2017; **19**: 14–27.
14. Welbourn R, Dixon J, Barth JH *et al.* NICE-accredited commissioning guidance for weight assessment and management clinics: a model for a specialist multidisciplinary team approach for people with severe obesity. *Obes Surg* 2016; **26**: 649–659.
15. Hsu CC, Sandford BA. The Delphi Technique: Making Sense of Consensus. Practical Assessment, Research & Evaluation; 2007.
16. Australian Bureau of Statistics. 3101.0 – Australian Demographic Statistics, Jun 2017.
17. Sharman MJ, Venn AJ, Jose KA *et al.* The support needs of patients waiting for publicly funded bariatric surgery – implications for health service planners. *Clin Obes* 2017; **7**: 46–53.
18. Ching Lee P, Dixon J. Pharmacotherapy for obesity. *Aust Fam Physician* 2017; **46**: 472–477.
19. Korda RJ, Joshy G, Jorm LR, Butler JRG, Banks E. Inequalities in bariatric surgery in Australia: findings from 49,364 obese participants in a prospective cohort study. *Med J Aust* 2012; **197**: 631–636.
20. Blane DN, McLoone P, Morrison D, Macdonald S, O'Donnell CA. Patient and practice characteristics predicting attendance and completion at a specialist weight management service in the UK: a cross-sectional study. *BMJ Open* 2017; **7**: e018286.
21. Torti J, Luig T, Borowitz M *et al.* The 5As team patient study: patient perspectives on the role of primary care in obesity management. *BMC Fam Pract* 2017; **18**: 19.
22. Talbot ML, Jorgensen JO, Loi KW. Difficulties in provision of bariatric surgical services to the morbidly obese. *Med J Aust* 2005; **182**: 344–347.
23. Australian Institute of Health and Welfare. *Weight loss surgery in Australia 2014–15: Australian Hospital Statistics*. Cat. no. HSE 186. Canberra: AIHW, 2017.
24. Surgery for morbid obesity: Framework for bariatric surgery in Victoria's public hospitals. Victorian Government Department of Human Services; 2009.
25. Leiter LA, Astrup A, Andrews RC *et al.* Identification of educational needs in the management of overweight and obesity: results of an international survey of attitudes and practice. *Clin Obes* 2015; **5**: 245–255.
26. Begley A, Pollard CM. Workforce capacity to address obesity: a Western Australian cross-sectional study identifies the gap between health priority and human resources needed. *BMC Public Health* 2016; **16**: 881.
27. Paul-Ebhohimhen V, Avenell A. A systematic review of the effectiveness of group versus individual treatments for adult obesity. *Obes Facts* 2009; **2**: 17–24.
28. Coleman K, Austin BT, Brach C, Wagner EH. Evidence on the chronic care model in the new millennium. *Health Aff* 2009; **28**: 75–85.
29. Choi BC, Pak AW. Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1. Definitions, objectives, and evidence of effectiveness. *Clin Invest Med* 2006; **29**: 351–364.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix S1. Working group members.

Appendix S2. Survey 1.

Appendix S3. Survey 2.