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Lifestyle modification programs

An Evidence Check rapid review brokered by the Sax Institute
for the NSW Ministry of Health—June 2020

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This report was prepared by: Yvonne Zurynski, K-lynn Smith, Joyce Siette, Brona Nic Giolla Easpaig, Mary Simons, Gilbert Knaggs. NHMRC Partnership Centre for Health System Sustainability, Australian Institute for Health Innovation, Macquarie University.

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Executive summary

Background

Chronic conditions are the leading cause of illness, disability and death in Australia. The Australian Institute of Health and Welfare (AIHW) reports that approximately 50% of Australian adults have at least one chronic condition.[1] Modifying lifestyle factors contributes significantly to primary and secondary prevention of chronic diseases and improves health outcomes for people with diabetes, cancer, heart disease, respiratory disease and other chronic conditions.[2]

Successful lifestyle interventions require behaviour change – health professionals need to be supported to advise and refer patients to programs, patients need to be supported to engage with lifestyle programs, and policymakers need to ensure that overarching policy and program content meets the needs of both patients and health professionals. Behaviour changes are often challenging as they occur in complex contexts where influences, barriers and enablers are at play for different people at different times.[3]

The Get Healthy Service, offered by the NSW Ministry for Health, offers a six-month lifestyle and coaching intervention program, with delivery via a series of telephone calls. The program is free and accessible to patients and health professionals via several internet platforms.

This Evidence Check review explored factors contributing to effective referral by health professionals, patient engagement, uptake and completion of lifestyle programs. We identified and analysed the barriers and enablers for referral to and acceptance of lifestyle modification programs by health professionals for patients with chronic disease for secondary or tertiary prevention services.

Review questions

This review aimed to address the following questions:

Question 1: What factors influence whether a health practitioner will refer chronic disease patients to a population-based lifestyle intervention program?

Question 2: What elements of the referral process make a health practitioner refer their patients to a lifestyle modification program in a way that increases patient uptake and engagement with the program?

Question 3: What factors determine if a chronic disease patient referred to a lifestyle modification program will enrol and complete the program?

Summary of methods

A rapid literature review of the peer-reviewed and grey literature was conducted. The search was limited to works published between January 2010 and April 2020 in English and to lifestyle programs from Australia, United States of America, United Kingdom, and western European and Scandinavian countries. Five databases were searched: Medline, Embase, Scopus, PsycINFO and CINAHL. Grey literature was identified by searching targeted websites of government and leading non-government health organisations, such as departments of health, The King's Fund and The Commonwealth Fund. Snowball searching and manual searching were employed as complementary methods for both peer-reviewed and grey literature.

Evidence grading

We used the Hierarchy of Evidence based on publications by the National Health and Medical Research Council (NHMRC)[4], the Oxford Centre for Evidence-based Medicine Levels of Evidence[5], and Melnyk and Fineout-Overholt.[6] We used the Hawker tool to evaluate the quality of the selected peer-reviewed papers.[7] The Authority, Accuracy, Coverage, Objectivity, Date and Significance (AACODS)[8] checklist was used to appraise the quality of the grey literature.

Key findings

Twenty-nine papers—15 peer-reviewed, including 11 primary studies and four systematic reviews, and 14 grey literature documents—met the inclusion criteria and underwent data extraction. The strength of evidence was generally low, with most papers graded level IV or below (cohort studies or literature reviews). Based on the appraisal using the Hawker tool, the quality of the peer-reviewed literature was rated as good. Using the AACODS checklist, the grey literature was of adequate quality. Most papers described studies conducted in Australia (12/29; 41%) and the UK (11/29; 38%). Programs described in the literature included mainly exercise, self-management and chronic disease education programs for patients, care planning and case management interventions, and education interventions for healthcare professionals. Forty-four percent of the interventions were delivered remotely (telephone, internet, or distribution of hard-copy materials). In 69% of the included documents, health professionals, particularly general practioners, were the primary point of referral to lifestyle modification programs.

Question 1: What factors influence whether a health practitioner will refer chronic disease patients to a population-based lifestyle intervention program?

Key barriers hindering health practitioner capacity or willingness to refer patients to lifestyle modification programs included lack of familiarity with non-medical secondary prevention or social prescribing strategies. Health practitioners often lacked knowledge and resources about lifestyle modification programs. The following strategies to increase willingness and capacity to refer patients to lifestyle modification programs were identified:

- Increase exposure to and training in referring patients to lifestyle modification programs. Educational activities should target changing healthcare professionals' beliefs about the effectiveness and patient health outcomes of programs
- Give direct feedback to health practitioners on patient outcomes for patients engaging in lifestyle programs
- Provide clear inter-disciplinary channels of communication and clarity on roles, responsibilities and boundaries for those involved in delivering the program
- Offer monetary reimbursement to health practitioners who refer appropriately to lifestyle modification programs
- Recruit healthcare professional champions trained to advocate for the program
- Ensure that health practitioners have the tools and infrastructure needed to easily refer patients to programs in multiple settings (e.g. hospital, community, practice)
- Introduce secondary prevention key performance indicators for health professionals
- Use a single point of access framework for program case management.

Question 2: What elements of the referral process make a health practitioner refer their patients to a lifestyle modification program in a way that increases patient uptake and engagement with the program?

The way health practitioners refer their patients was found to influence patient uptake and engagement. Features of patient-health professional interaction thought to increase the likelihood of patient engagement with lifestyle programs included health professionals:

- adopting 'user-friendly language' and motivational interviewing techniques
- using active recruiting and multiple channels of communication with patients
- tailoring advice to individual needs by addressing health and social needs as well as health beliefs and/or culture
- providing advice appropriate to the different disease stages
- reassuring patients about the relevance and effectiveness of programs
- fostering patient feelings of agency and autonomy
- providing detailed information to patients about programs to reduce fear and anxiety around enrolment.

Question 3: What factors determine if a chronic disease patient referred to a lifestyle modification program will enrol and complete the program?

Program enrolment

A combination of patient and program attributes determined if a patient would enrol. The most frequently cited barriers were related to social and environmental factors, whereas enablers were related to strengthening patient support networks. Program attributes included:

- proximity and accessibility
- neighbourhood safety
- content, including cultural appropriateness, and
- availability in multiple formats (e.g. telephone and/or home-based programs).

Patient and support network attributes included:

- having strong support and assistance from the patient's family and support networks
- having a trusted health professional who provided detailed information about the program and program effectiveness, motivated patients, and answered questions
- having available resources (time and money) to attend the program
- initiating conversations with health professionals about programs
- having been exposed to multiple ongoing recruitment techniques.

Program completion

Patients who lacked time, were in poorer health (mental and/or physical) at the start of the program, or perceived minimal or no health benefits of lifestyle intervention were less likely to complete a lifestyle modification program. Lack of sustained patient interest and motivation was another major contributor.

Strong connections between the patient and the program increased the likelihood of completion. Factors that created strong connections included:

- building positive, trusting relationships with program leaders, facilitators and co-participants with ongoing communication
- use of motivational and cognitive behavioural techniques throughout by program facilitators to support positive relationships
- involving the patient's family and support networks in educational activities
- including peer-to-peer educators to increase patient optimism in the program's capacity to produce positive change.

Gaps in the evidence

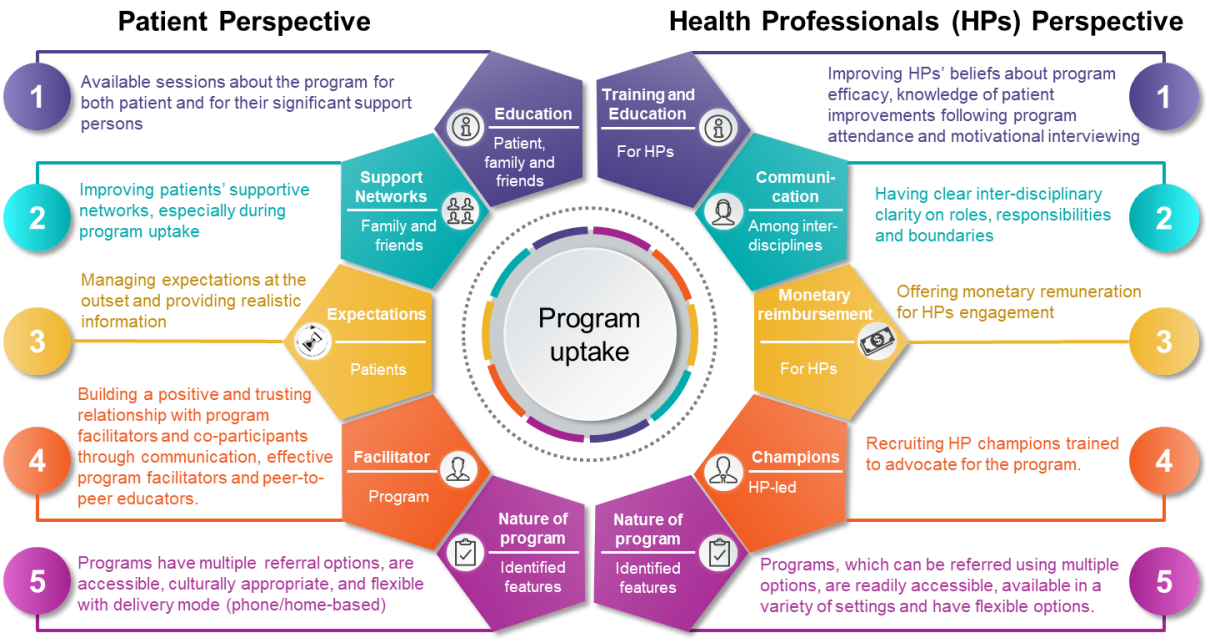
The literature is limited in terms of the number of articles identified, the intervention types described, and the breadth and depth of barriers and enablers attributed to engagement with lifestyle programs by the referring health professionals and patients. The literature was also limited mostly to cohort studies and evaluations were mainly short-term. Targeted patient groups were limited to obesity, diabetes, chronic respiratory disease or cardiovascular disease. Factors influencing *health*

professionals' referral behaviour were not explored in detail. The effectiveness of different recruitment strategies was poorly described in the literature and it is not clear which strategies are most effective and under which circumstances. Only five studies reported barriers to *patient* adherence and completion of lifestyle modification programs. Although emerging literature suggests directly involving health practitioners and patients in program development and implementation through co-design and co-production approaches, this was not explored in detail.

Conclusions

Our review identified key factors that have been associated with health professional referral to and patient uptake of lifestyle modification programs (**Figure 1**). Some of the main barriers to referral by health professionals were their lack of knowledge about programs, doubts about the effectiveness of programs, and perceptions that referring to lifestyle programs was not part of their clinical role. Research suggests that these barriers can be addressed by involving health professionals in the design and production of programs, including them in ongoing educational activities addressing effective referral behaviours, and by recruiting practitioners who will advocate for the lifestyle programs. Receiving regular feedback about the programs, especially on how the programs have helped their patients, is also likely to improve engagement and change referral behaviour among health professionals.

Figure 1—Summary of enabling factors of patient uptake of lifestyle modification programs.



The way health professionals engaged with patients about lifestyle modification programs was also found to be important to referral success. Adequately explaining lifestyle modification programs, facilitating questions from patients, appropriately managing patient expectations about outcomes, and reassuring patients of the benefits of lifestyle modification programs all contributed to greater program uptake and completion. Using motivational interviewing techniques and ensuring that the patient was

part of the decision-making process, and that the patient's individual health, social and financial circumstances and needs were considered, were important for patient engagement with programs.

A combination of patient and program attributes also determined whether a patient would enrol in and complete a program. From the patient's perspective, environmental and social factors, such as program proximity, the availability of culturally safe programs, and ability to safely access the program or to access them via different methods (e.g. face-to-face, online or via telephone), were primary factors affecting engagement. Involvement of family or personal networks and having needed resources (e.g. time, money, appropriate clothing) were identified as key enablers. Programs that developed supportive relationships with patients through approachable leaders and peer educators also had higher completion rates.

The literature on factors that help or hinder health practitioner and patient engagement in lifestyle modification programs for secondary prevention is currently limited due to the paucity of well-designed long-term evaluations. Barriers and enablers that influence health professionals' referral behaviours, and patients' capacity to engage with and complete lifestyle programs should be explored in depth using mixed methods research.

Background

Chronic conditions are the leading cause of illness, disability and death in Australia. The AIHW reports that almost 50% of Australian adults and 43% of Australian children have at least one chronic condition.[1] There is clear evidence that lifestyle factors, including smoking, alcohol consumption, low levels of exercise and eating a poor diet contribute significantly to the development and exacerbation of chronic conditions[9, 10] We know that augmenting lifestyle factors through lifestyle interventions contributes significantly to primary and secondary prevention of chronic diseases and improves health outcomes for people with conditions such as diabetes, cancer, heart disease, respiratory disease and other chronic conditions.[11] Despite this, there are significant challenges for the effective referral to, and engagement with, lifestyle modification programs.[12]

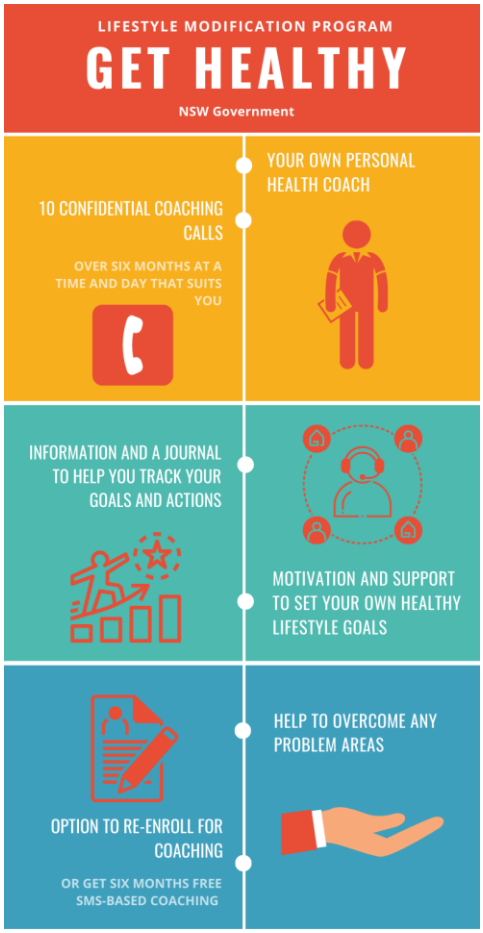
Referring patients to secondary prevention and lifestyle modification programs is rarely viewed by general practitioners (GPs) and specialist doctors as a core part of their work.[13] With GP consultation times at less than 15 minutes on average, doctors tend to focus on the clinical problems at hand, leaving little time to consider referral to non-medical lifestyle modification programs.[14] Furthermore, doctors often lack knowledge about the availability and effectiveness of lifestyle interventions for their patients and are unsure about which interventions might be suitable for their patients' specific needs and personal circumstances. Some doctors have expressed concerns about their clinical and legal obligations when referring patients to lifestyle programs. Allied health practitioners, on the other hand, see referral to lifestyle programs as an integral part of their practice and are more likely to refer patients to such programs.[14]

Even when referrals are made, patient engagement rates and program completion rates are low.[15,16] This has been reported across many settings, including in Australia.[17] For example, while cardiac rehabilitation reduces deaths and illness and increases quality of life, only an estimated 30 per cent of eligible patients complete a recommended rehabilitation program in NSW.[18]

Successful interventions require key stakeholders—whether they be patients, health professionals, policy makers or managers—to change behaviour, and interventions to translate evidence into practice require behaviour change approaches.[3,19] People need to be actively supported through the change process, while the health professionals need to recognise the complex contexts, influences, barriers and enablers that might be at play for different people at different times.[3] Such approaches have been used in successful social prescribing programs, for example in the United Kingdom and in Canada, where care navigators work closely with GPs and patients to tailor interventions to needs, readiness, capability and context through a patient-centred approach.[20]

The Get Healthy Service (**Figure 2**), developed and implemented by NSW Health, offers a lifestyle and coaching intervention program with regular phone support provided over six months (up to 10 phone calls) to support primary and secondary prevention. The program is freely available to anyone, including for people with chronic health conditions, and accessible via several internet platforms, including the national platform HealthDirect.

Figure 2—Key attributes of the Get Healthy Service.



The Get Healthy Service is currently looking to optimise:

1. The number of health professional referrals to the Service
2. The number of participants who graduate.

NSW Health has commissioned this rapid literature review to develop a better understanding of the current evidence about drivers and potential solutions to these two challenges. Specifically, the Get Healthy Service seeks evidence-based information to support decision-making to improve referral rates by health professionals, and engagement and retention of patients in the program by identifying patients who are likely to benefit and are able and likely to participate.

Methods

Rapid reviews aim to discover actionable evidence in a timely manner. This rapid review was conducted over a two-month period. Methods recommended for rapid reviews were adopted.[21] We limited our inclusion and exclusion criteria by date range, language, selected countries and by searching fewer databases. These restrictions limit comprehensiveness of the search while allowing for the timely identification of key evidence about the topic of interest.

Peer-reviewed literature

We conducted a rapid review of literature reporting on factors associated with health practitioner referral to, and patient uptake of, lifestyle modification programs targeting people living with chronic disease, thereby targeting literature on lifestyle modification for secondary prevention. Our search strategy for peer-reviewed studies (**Table 1**) was developed by a medical librarian. It covered the years 2010–2020 and targeted five databases: Medline, Embase, Scopus, PsycINFO and CINAHL. Inclusion/exclusion criteria and the search strategy adopted are described in **Table 1**.

We used the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) to guide the methods. A flow chart of the literature selection process is included as **Appendix 1**.

Grey literature

The inclusion of grey literature sources enhances the comprehensiveness of the rapid review by capturing a range of non-peer-reviewed outputs such as program evaluation reports relevant to the aims of this review. We were guided by our published protocol for a similar systematic review of grey literature.[22] Government and leading non-government health organisation websites were targeted for manual searching, including health departments, international health authorities, public policy institutes and universities. This technique was combined with keyword searches of the entire website using differing combinations of search terms and adjusting as needed for local/institutional vernacular.

Snowball searching and manual searching were employed as complementary methods for both peer-reviewed and grey literature. Where potentially relevant projects or literature were cited in pertinent texts, these were searched for via Google Advanced Search or URLs within a reference list.

A full list of websites from which grey literature full-text documents were sourced to assess eligibility for inclusion is in **Appendix 2**.

Table 1—Search strategies for the peer-reviewed and grey literature.

	Peer-reviewed studies	Non-peer-reviewed (grey) literature
Date	2010–2020	2010–2020
Language	English	English
Targeted databases/websites	Medline, Embase, Scopus, PsycINFO and CINAHL	Government and leading non-government health organisation websites
Text type	Peer-reviewed, empirical research or evaluation studies and reports	Non-peer-reviewed literature
Study methods	Qualitative, quantitative methods; opinion and descriptive studies; and conference presentations published in the past two years	N/A
Study details relevant to research question.	Relevant to lifestyle modification programs or social prescribing programs	
	Program used by people living with physical chronic disease	
	Intervention for adults over 18 years	
	Secondary and tertiary prevention programs with referral by a health professional	
	Study from Australia, New Zealand, Canada, USA, UK, Western Europe and Scandinavia	
	Sufficient details provided in the document to address research questions	

Evidence grading

We used the Hierarchy of Evidence (**Table 2**), which includes seven levels based on publications by the National Health and Medical Research Council (NHMRC)[4], the Oxford Centre for Evidence-based Medicine Levels of Evidence[5], and Melnyk and Fineout-Overholt.[6]

This hierarchy was chosen because it includes additional levels that better described the types of studies identified in the literature search. Few randomised controlled trials were expected in this search, while more literature reviews, interrupted time-series and descriptive studies (quantitative and qualitative) were anticipated.

Table 2—Hierarchy of Evidence Levels derived from NHMRC.

Hierarchy of evidence level	Description
I	Evidence obtained from a systematic review of all relevant randomised control trials
II	Evidence obtained from at least one well designed randomised control trial
III	Evidence obtained from well-designed controlled trials without randomisation
IV	Evidence obtained from well-designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case- series
V	Evidence obtained from systematic reviews of descriptive and qualitative studies
VI	Evidence obtained from single descriptive and qualitative studies
VII	Expert opinion from clinicians, authorities and/or reports of expert committees or based on physiology

In addition, the Hawker tool[7] for scoring methodological rigor was used to appraise the quality of the evidence. The following elements of texts were assessed in relation to specified standards: abstract and title, introduction and aims, method and data, sampling, data analysis, ethics and bias, findings/results, transferability/generalisability, and implications and usefulness. For every document, each of these elements were appraised as either: good (40 points), fair (30 points), poor (20 points) or very poor (10 points). A document could receive a maximum of 360, if ‘good’ was awarded for each element. The final score was averaged to create a score out of 40.

The Authority, Accuracy, Coverage, Objectivity, Date and Significance (AACODS)[8] checklist was used to assess the quality of the grey literature texts. The AACODS was chosen because it was designed specifically to evaluate the quality of non-peer-reviewed literature.[8]

All assessments were conducted by two independent reviewers. A summary table of the appraisal process is attached in **Appendix 3**.

Findings

Search results

Overview

The search identified 424 articles after exclusion of duplicates. Twenty-nine documents met the inclusion and exclusion criteria – 11 peer-reviewed primary studies, four systematic reviews and 14 grey literature documents (**Tables 3a and 3b**).

Articles were usually excluded because they did not address lifestyle modification programs. Most included studies were conducted in Australia (12/29; 41%) and the UK (11/29; 38%) (**Table 3a**).

Peer-reviewed studies

Among the peer-reviewed studies, exercise was the most commonly prescribed lifestyle modification program for secondary prevention (6/15; 40%), followed by self-management and/or educational programs (3/15; 20%) for patients managing their diseases[2,23] and for healthcare professionals directing patients to programs.[24] One included study detailed an initiative that allowed paramedics to refer patients with various chronic diseases to community programs.[25] An evaluation of a specific program (NSW Get Healthy), which is aimed at primary prevention, was also included.[26]

Six studies (40%) focused solely on the patient aspect of lifestyle modification interventions or educational programs (e.g. experience, engagement, uptake, acceptability). These explored patient experience, engagement and acceptability. Four other papers (27%) included information on both patients and health professionals and their engagement within the programs (e.g. interventions with educational programs for health professionals and patients). The most common chronic conditions included in the papers was cardiovascular disease (8/15; 53%) and diabetes (4/15; 27%). Six of the programs were from Australia, three from the UK with one each from the USA, England, Canada and the Netherlands (**Table 3a**).

Evidence grading of peer-reviewed literature

Only one paper was graded as level II on the Hierarchy of Evidence. All other peer-reviewed papers were graded as level IV or below, with two studies at level IV, four at level V, and eight at level VI. The included peer-reviewed literature was of good quality, based on the Hawker tool. Scores ranged from 25.55 to 40 points. The average score of the peer-reviewed literature was 35.77.

Table 3a—Characteristics of included peer-review studies reporting primary data.

Authors	Year	Location of program(s)	Study type[a]	Type of lifestyle program[b]	Reported perspectives	Target chronic condition
Newton et al.[24]	2011	Australia	QL	Educational program for healthcare professionals on prescribing osteoarthritis self-management	Healthcare professionals	Osteoarthritis
Murray et al.[27]	2012	International	R	Various	Patients	Cardiovascular disease
Walters et al.[28]	2012	Australia	QL	Self-management	Patients	Chronic obstructive pulmonary disease (COPD)
Clark et al.[2]	2013	International		Rehabilitation	Patients and healthcare professionals	Cardiovascular disease
Dennis et al.[29]	2013	International	R	Various	Patients	N/A
Geense et al.[30]	2013	The Netherlands	QL	Various	Healthcare professionals	Diabetes, cardiovascular disease, chronic respiratory disease, obesity
Brydges et al.[25]	2015	Canada	QL	N/A	Healthcare professionals	N/A
O'Hara et al.[26]	2015	Australia	QT	Exercise	Patients	Obesity

Authors	Year	Location of program(s)	Study type[a]	Type of lifestyle program[b]	Reported perspectives	Target chronic condition
McNamara et al.[31]	2016	Australia	MM	Exercise	Patients	Chronic respiratory and/or cardiac disease
Whelan et al.[32]	2016	Australia	QL	Exercise	Healthcare professionals	Obesity
James et al.[33]	2017	Australia	QT	Exercise	Patients	Chronic respiratory and/or cardiac disease, diabetes, arthritis, depression, cancer
Matthews et al.[34]	2017	UK	QL	Exercise	Patients and healthcare professionals	Diabetes
Davisson et al.[23]	2018	US	QL	Education for patients, self-management	Patients	Heart failure, COPD, diabetes
Bird et al.[35]	2019	UK	MM	Exercise	Patients[c]	Diabetes, hypertension, obesity, overweight, pre-diabetes
Husk[36]	2020	International	R (Realist review)	Various[b]	Patients	Multiple chronic conditions

[a] *R=Review; QL=Qualitative methods; QT=Quantitative methods; MM=Mixed methods.*

[b] *Various includes a combination of programs targeting alcohol reduction, smoking cessation, weight loss, healthy diet and exercise uptake.*

[c] *Multiple patient groups and more than one lifestyle modification reviewed. Patients often had chronic conditions, such as cardiovascular, diabetes, arthritis, depression, respiratory disease and cancer.*

Grey literature

Grey literature sources were mostly in reports (8/14; 57%) with some guideline resources (3/14; 21%). There was one case study, one evidence synthesis and one shared learning resource. The grey literature contained information about services in the UK (8/14), Australia (4/14), the US (4/14) and Germany (1/14) (**Table 3b**). Two sources synthesised information about programs in multiple countries.[37,38]

These documents described programs for people with multiple chronic conditions (9/14; 64%) as well as programs tailored to specific conditions (e.g. diabetes) (5/14; 36%). Rehabilitation and self-management programs were found to be the most common program type (9/14; 64%) followed by care coordination models (4/14; 28%). Secondary rehabilitation programs[39–41] addressed cardiovascular conditions. The programs were typically multidisciplinary, integrated approaches delivering care for lifestyle risk factor management coupled with optimal use of protective therapies. Care coordination models for chronic conditions included allied health professionals embedding the promotion of healthy lifestyles into routine interactions by signposting patients to further services[42] or having a link-worker service enabling GP referral of vulnerable patients with long-term illnesses to non-medical community programs.[26,43] For further information on the interventions, please refer to **Appendix 4**.

Evidence grading of grey literature

The grey literature appraisal according to the AACODS checklist indicated adequate quality.

Table 3b—Characteristics of included grey literature sources.

Source	Year	Location of program	Format	Type of lifestyle program	Reported perspectives*	Targeted chronic condition
NHS[44]	2011	UK	Report	Care planning	Patients	Diabetes
The King's Fund[37]	2011	UK and US	Report	Care planning	Patients	Multiple, long-term conditions
Secondary Prevention Alliance[39]	2011	Australia	Report	Rehabilitation and self-management	Patients	Acute Coronary Syndromes (ACS)
The George Institute[45]	2012	Australia	Report	Various	Patients	Coronary disease

Source	Year	Location of program	Format	Type of lifestyle program	Reported perspectives*	Targeted chronic condition
Newcastle Social Prescribing Project[43]	2013	UK	Report	Link-worker service	Patients	Multiple long-term conditions
NICE[46]	2013	UK	Shared Learning Resource	Exercise	Patients	Multiple long-term conditions
King's Fund[38]	2014	Australia, Canada, the Netherlands, New Zealand, Sweden, UK and US	Report	Various	Patients	Multiple long-term conditions in patients aged 65+
NICE[40]	2014	UK	Guideline	Rehabilitation program and self-management	Patients	Myocardial infarction
Department of Health, Western Australia[47]	2014	Australia	Guideline	Various	Patients	Cardio-vascular disease
The Commonwealth Fund[41]	2015	US	Evidence Synthesis	Clinical care models or care management programs	Patients	Multiple conditions with complex needs
Royal Society for Public Health UK[42]	2015	UK	Report	Healthy conversations	Patients	Multiple long-term chronic conditions

Source	Year	Location of program	Format	Type of lifestyle program	Reported perspectives*	Targeted chronic condition
EU[48]	2016	Germany	Report	Education and coaching on self-management	Patients aged 65+	Multiple long-term chronic conditions
The Commonwealth Fund[49]	2017	US	Case Study	Various	Patients	Multiple long-term chronic conditions
Scottish Intercollegiate Guidelines Network[50]	2017	UK	Guideline	Various	Patients	Cardio-vascular disease

Characteristics of the Lifestyle modification programs

A summary of the characteristics of lifestyle programs is presented in **Tables 4** and **5**. Due to the nature, purpose and aims of the grey literature sources, reporting on the program format, frequency of patient contact and duration of intervention was not possible.

Programs were mostly delivered in a combination of individual and group settings (5/15; 33%) although individual-only settings were also popular (4/15; 27%). Most programs were conducted remotely (6/15; 40%) or face-to-face (4/15; 27%); however, a third of the studies had a mixed mode of delivery, with face-to-face options supplemented by phone consultations and flyers/manuals (5/15; 33%). Programs were delivered across a wide range of frequencies, with exercise programs having a range of 5–16 sessions over varying program durations (ranging from eight weeks to indefinite). Educational programs and self-management programs differed in delivery mode based on the target population. For those targeting patients, the mode of delivery was weekly for a short period of time, and for healthcare professionals it was usually a one-off session. There was insufficient information on the frequency and duration of other types of lifestyle programs.

Table 4—Detailed description of the four types of lifestyle modification programs.

Program description	Mode of delivery (# of programs) and frequency of program (# contacts and duration)
Program type: Exercise interventions	
Exercise programs were the most frequently reported on interventions.[26, 31–35,46] These commonly targeted patients with obesity[26,32,35], diabetes[33–35] and cardiac diseases.[31,33] The *"Get Healthy"* program, which was reported on by two different sources[26,32], is a state-funded telephone-based exercise service for Australians living with or at risk of chronic disease. Phone-based coaching was also offered in the NewCOACH[33] program, an Australian intervention for primary care patients living with chronic respiratory and/or cardiac disease. Other interventions were centre-based, consisting of group-based classes hosted by an exercise specialist; some centre-based interventions also included distance components. Two exercise interventions, *"My Best Moves"*[46] and *"Generation Games"*[34] additionally consisted of health professional training in lifestyle modification and referral techniques. Exercise interventions were informed by social cognitive[33] and motivational interviewing theories.[34,35]	Mode of delivery: *Remote:* 2 *Mix:* 2 *In-person:* 1 Frequency (range): 1 session per week–flexible Duration (range): 2 months–indefinite
Program type: Self-management and chronic disease education for patients	
Self-management programs provide support and education around strategies and recommended behaviours and lifestyles for managing and minimising the symptoms of chronic disease. Self-management programs were addressed by five sources.[23,28,39,42,48] One study addressed self-management strategies in general.[39] Programs reported on were the *"Sustainable Integrated Chronic Care Models for Multi-morbidity"*[48], "*Healthy Conversations"*,[42] *"Living Well"* and a fourth intervention for an academic study.[28] All reported on interventions consisted of health professional educational components, aimed at increasing awareness about and referral to self-management interventions. The most frequently addressed conditions were COPD[23,28], diabetes[23], heart failure[23] and acute coronary syndromes.[39] Interventions for patients were delivered via phone[23,28,48], in group settings[23] and via information communication technologies.[39] One intervention was	Mode of Delivery: *Remote*: 1 *Mix*: 2 *In Person*: 1 Frequency (range): weekly–weekly Duration (range): 6 weeks–12 months

Program description	Mode of delivery (# of programs) and frequency of program (# contacts and duration)
informed by behavioural psychology and motivational interviewing theories.[28] Two grey literature studies reported on rehabilitation methods relevant to lifestyle modification,[39,40] however, in both sources, definition and descriptions of lifestyle-based rehabilitation practices closely resembled definitions used in descriptions of self-management. These addressed lifestyle modification practices for the secondary treatment of acute coronary syndrome[39] and myocardial infarction.[40] One peer-reviewed study systematically reviewed factors associated with health practitioners' referral to and patient uptake of cardiac secondary prevention programs.[2]	
Program type: Care planning and case management	
Case management and care planning interventions refer to the way health professionals deliver and organise patient care. Three articles reported on care planning strategies that were relevant to lifestyle modification[37,41,44], although only one specific intervention, the *"Year of Care"* program[44], was reported on; this program was a policy-based initiative. Diabetes was the only chronic disease specifically reported on.[44]	Information not reported on
Program type: Education intervention for healthcare professionals	
Many interventions for patients also featured an educational component for healthcare practitioners, however, one study—*"Better knowledge, better health"*—focused on an intervention aimed exclusively at healthcare professionals.[24] This intervention was an online education program about osteoarthritis self-management for general practice registrars. Motivational interviewing theories partly informed program content. Referrals processes and health professional–patient interactions were not examined.	Mode of delivery: *Remote: 1* Duration: approx. 1 hour Frequency: One off

Further details of lifestyle programs from peer-review and grey literature sources as organised by type of lifestyle program are in **Appendix 4**.

Healthcare professionals initiating program referral

Health professionals initiated lifestyle modification referrals most often (20/29; 69%) (**Table 5**). The literature reported a wide range of health professionals making referrals, including allied health staff, GPs, healthcare assistants, case managers and General Practice Nurses (GPNs). Only one publication in the grey literature specifically focused on the experiences of allied health professionals.[42]

Table 5—Person who refers chronic disease patients to a population-based lifestyle intervention program.

Person initiating program	Reviews	Empirical studies	Grey literature	Total
Health professional	2	8	10	20
Either health professional or elf-referral	0	3	3	6
Not specified	2	0	1	3

Question 1: What factors influence whether a health practitioner will refer chronic disease patients to a population-based lifestyle intervention program?

Barriers

Barriers were discussed in many sources and are summarised in **Table 6**. The most common factor raised was the lack of exposure to and training in referring patients to lifestyle modification programs for health professionals. Health professionals placed low importance on such programs and did not prioritise these as a prevention or treatment strategy.[30,35] GPs and GPNs are focused on clinical treatment and often lack exposure to chronic disease self-management techniques/programs and this was thought to contribute to a lack of referrals.[2,23,24,30,40] Health system barriers to facilitating referral processes included inadequate training for health professionals[34,41], insufficient inter-disciplinary communication, and 'siloing'[23,32,40,46] and confusion around roles, responsibilities and boundaries for those involved in implementing and executing the program.[37,40] In addition, inadequate identification, measurement and feedback of outcomes resulting from the lifestyle programs to health professional teams were also considered as major barriers.[25,44]

The next most common barrier type was insufficient resources. This included monetary barriers, such as difficulty accessing program reimbursement or having ongoing reimbursement issues due to lack of program funding[2,28,30,34,35,40], cultural barriers, such as a lack of interpreters to engage people from non-English speaking backgrounds (NESB), and staffing issues (e.g. limited staff time for each patient, few allied health professionals such as physiotherapists, dieticians, clinical psychologists available).[2,40]

Other barriers cited as preventing referral to programs included:

- *program efficacy and acceptability:* health professionals disagreed with the content[30] and were sceptical of the therapeutic value of health promotion programs.[44] There was also a failure to recognise the importance of tailoring the program to a person's individual needs[40]
- *perceptions about patients:* health professionals were reluctant to refer patients to specific programs as they believed patients "may see little 'perceived benefits' in the adoption of exercise",[34] assumed patients did not have the will power to complete exercise programs,[2] and did not think that patients would benefit[34]
- *previous referral experience:* health professionals' prior experience led to negative attitudes about the referral process and therefore they did not invest time in their practice in delivering care planning that involved referral to lifestyle programs.[25] Often, practitioners were frustrated by patients who failed to follow advice that was designed to improve outcomes. They felt referral was futile when people returned to their clinic with no changes in their behaviour or biomedical outcomes[44]
- *normative beliefs related to medicalisation:* this relates to *"beliefs about whether 'important others' would approve or disapprove of the desired behaviour".*[34] The perceived desired behaviour of health professionals is not to prescribe lifestyle modification programs.[28,34] Some health professionals may be concerned about further fragmenting primary care services. Others are hesitant to cede control of their patients to lower-level clinicians or non-clinicians.[49]
- *locality:* physicians reported that having no appropriate local programs to refer their patients to was a barrier. However, whether this was because there were no such programs or whether they were not aware of existing programs was not clear. It was further suggested that a rural setting may negatively affect referral rates but reasons for this were unclear.[23]

Table 6—Summary of barriers to referral by health professionals.

Type of Barriers	Reference(s)*
Inadequate training, communication and feedback	Eight sources[23,25,34,37,40,41,44,46]
Lack of resources	Six sources[24,25,30,34,35,40]
Lack of evidence of program efficacy and acceptability	Five sources[28,30,34,35,44]
Perceptions about patients	Two sources[2,34]
Previous referral experience	Two sources[25,44]
Normative beliefs related to medical clinical roles	Three sources[28,34,49]
Availability and access of program	Two sources[23,39]

* Sources may include more than one barrier type

Enablers

Identified enablers are summarised in **Table 7**. An almost universally agreed enabler was having available and easily accessible, systematic and ongoing educational and training components to influence behaviour change of health professionals in terms of referrals.[2,24,34,42,43,47] Effective educational training programs included high GP engagement with training program content, a presentation style that was digestible and capable of challenging GP/medical cultural resistance and preference for medicalisation, and enabled health professionals to feel in control.[24,25,34] This enabled clarity on the role of health professionals, the staff, and where lifestyle interventions could fit in the local pathway/model of care.[44]

Having GPs, GP organisations or a staff member involved in the program development – targeting interdisciplinary integration – was highly regarded[46,30], particularly if the individual had worked with or was familiar with the targeted chronic condition[35] or was partnered with a local provider.[46] This could aid patient uptake and adherence to programs.[40] Furthermore, having available primary care nurses in general practices would assist with referral procedures.[30] Champions (i.e. health professionals specifically trained to advocate for the program) were effective in increasing referrals.[35]

Other enablers identified include:

- *monetary reimbursements:* health professionals received payment for assessing and referring patients[2,30]
- *available program and choice:* having the ability to directly refer to existing services[30,47], offering a choice between hospital and community location, and having readily available information about the program[43] were considered facilitators to health professionals' promotion of rehabilitation programs.[40] It was considered desirable that lifestyle modification programs for patients were

nearby and accessible (such as within the practice).[30] One study identified the availability of phone and distance-based programs enabled HP referral to secondary cardiac rehabilitation programs[2]

- *implementing secondary prevention key performance indicators in general practice:* for example, making quality indicators and quality improvement modules around secondary prevention available through RACGP was considered important[38]
- *single point of access/single assessment:* a case management program with a single point of access—organisationally rather than geographically—can ensure that each individual is offered a systematic assessment and ensures that where clinician referral is the main form of admission to the program, the clinician can be assured of a straightforward route into the service in an otherwise complex system. Additional methods to reduce time constraints (such as using electronic records to identify eligible patients and the management of their risk factors) was considered valuable.[38]

Identified suggestions to simplify the referral and communication process include:

- Activity-Based Funding (ABF) link referral/attendance of funding to provide incentives[38]
- when discharged from hospital after an event, GPs need an evidence-based care plan[38]
- automated referrals that ideally reach the GP prior to the patient so that the GP has access to background information before they physically see the patient.[38]

Table 7—Summary of enablers to referral by health professionals.

Type of Enabler	Reference(s)
Appropriate training/educational programs	Seven sources[24,25,34,42–44,47]
Health professionals involved in program development	Four sources[30,35,40,46]
Monetary reimbursement	Two sources[30,38]
Availability and choice	Five sources[2,30,40,45,47]
Key performance indicators	One source[38]
Single point of access	One source[38]

A successful case study is presented in **Box 1.** (next page)

Box 1. Case study: My Best Move, NHS London, UK

The *"My Best Move"* project was designed to promote the prescription of physical activity, by GPs, for patients living with long-term conditions. Training was provided in the project to enhance GPs' knowledge and confidence to prescribe physical activity. In 2012, this training was delivered to 314 health professionals across 67 GP practices in London. While most attendees were GPs, healthcare assistants, nurses, health promotion staff and administration staff also participated in these sessions. Encouraging outcomes were reported:

"The project did monitor the impact of the training on GPs' knowledge and confidence in recommending activity to their patients and showed a significant improvement in both the importance that GPs and healthcare staff attached to the role of physical activity and also to their confidence in speaking to their patients about becoming more active."

"My Best Move" was guided by the NHS London Long Term Conditions Steering Group and informed by findings arising from the implementation of previous physical activity initiatives. The training included the presentation of evidence about the benefits of exercise for a diverse range of conditions and emphasised the positive effects 'everyday activities', such as walking, can have. As noted:

"By shifting the focus of training to how physical activity can help treat many conditions, GPs could appreciate how recommending physical activity could lead to better patient outcomes and is relevant to their role. Physical inactivity has suffered from being synonymous with obesity and many staff felt uncomfortable discussing weight with patients or felt that patients lost motivation for exercise as, without dietary changes, it did not lead to significant loss of weight."

This focus may have helped to anticipate and mitigate the barriers arising from health professionals' lack of exposure to and training in lifestyle modification programs, as well as any concerns they may have about the evidence for therapeutic benefit.

As part of the training, health professionals were introduced to motivational interviewing techniques, which were feasible to deliver within the brief consult timeframe – an important consideration where time is a limited resource. Further, the training outlined a clear role that GPs can play in initiating and facilitating patient behaviour change.

Several lessons were learned in the implementation of *"My Best Move".* GP practices were found to lack knowledge of and/or links with local service providers of physical activities (e.g. local cycling initiatives), and attempts were made to address this by inviting the involvement from these providers in the training. A high level of engagement from GPs, service providers and other health professionals was recommended to support successful program development and delivery.

The study also acknowledged that further research of barriers and enablers to health professionals' referral to lifestyle programs, particularly related to program uptake, should be conducted.[23]

Question 2: What elements of the referral process make a health practitioner refer their patients to a lifestyle modification program in a way that increases patient uptake and engagement with the program?

Five sources from the peer-reviewed literature and two sources from grey literature reported on aspects of the referral process that increased uptake.[34-36, 39, 40]

Identified elements included:

1. *Method of referral:*

    - *'active recruiting' strategies*, such as mail-based referral: Encouraging health professionals to proactively seek out program participants increased patient uptake. *"Recruitment figures were seen to increase following GP mail-outs, adding to the evidence base in support of using active recruitment strategies."*[35]
    - *concurrent use of multiple referral techniques*: For example, GPs conducting both in-person and targeted mail-out referrals was cited as a strategy to increase patient uptake.[35]

2. *Key elements of the referral process*

    During the referral process, health professionals should:

    - *tailor their advice to patients' needs and preferences:* health professionals tailoring advice to individuals by addressing health and social needs as well as health beliefs and/or culture had the potential to improve patient uptake.[40] Advice should also be appropriate to the different disease stages (acute, subacute and ongoing care) and be readily accessible at all levels of the health system for health professionals making referrals[39]
    - *assure patients of program relevance and effectiveness*: patients may harbour concerns and/or have doubts about the effectiveness of lifestyle modification programs recommended by health professionals.[35] Discerning and addressing patient reservations regarding participation was a cited strategy to overcome individual-level barriers to uptake. Program relevance to the patient's medical conditions and specific needs should also be explained clearly: *"Participants should feel that their condition or symptoms will be addressed by accepting"* the referral[36]
    - *foster patient agency and autonomy*: patient concerns and preferences should inform health professionals' decision-making about referral throughout the referral process, in a shared decision-making approach[34,36]
    - *ensure that patients understand details of the programs:* programs should be explained to patients and patients should have the opportunity to ask questions to reduce fear and anxiety around enrolment or fear of the unknown[36]
    - *employ 'user-friendly' language techniques and use motivational interviewing techniques:* HPs use of these behavioural techniques was found to be beneficial in increasing rates of program uptake by patients. Furthermore, encouraging GPs[2] to use positive and encouraging language was valued.[34]

Question 3: What factors determine if a chronic disease patient referred to a lifestyle modification program will enrol and complete the program?

Barriers to patient enrolment

Numerous patient barriers to enrolment to referred lifestyle intervention were identified. Environmental barriers, such as proximity, access to private and public transport and patient perceptions about program accessibility, were frequently reported as inhibiters of patient uptake[27,30,31,35,36,39,40,47], as were patient concerns about neighbourhood safety.[35, 36] Social barriers included lack of support and assistance from friends and family[27,35,40] and the local community.[35,39] Disjunctions between the cultural beliefs of patients and program requirements (i.e. clothing, dietary requirements) were also cited as barriers requiring consideration by health professionals.[36,40]

Individual context and psychological barriers were also frequently cited in the literature. Some patients were unmotivated and believed they could not change their current lifestyles.[27,30,34,35,39,48] Some did not perceive the need to address their illness by changing their lifestyle[30,34,47], or doubted the effectiveness of the prescribed lifestyle interventions.[27,36] Younger individuals, in particular, were less likely to believe lifestyle-related factors contributed to their chronic conditions.[40] For some patients, the prospect of program engagement was a source of fear which prevented enrolment.[35] Other pre-existing conditions, such as depression,[39, 40] anxiety[39] and other physical morbidities (e.g. cardiovascular disease preventing engagement in exercise intervention targeting diabetes)[27,33,34] were also cited as factors.

Other barriers identified include:

- *culturally and linguistically diverse (CALD) populations* may face unique difficulties accessing lifestyle services. Barriers identified include linguistic and translation issues during referral,[40] as well as misalignment between program characteristics and requirements, and cultural norms, especially around gender[40]
- *socio-economic factors* such as patient inability to pay[30] and make time for[39,40] lifestyle modification
- *health system-related barriers:* obstacles to patient enrolment arose because of the way healthcare professionals engaged with and referred patients to lifestyle modification programs. These included: patients not receiving enough information about the lifestyle modification programs[2,40], patients detecting discrimination from health care professionals related to their socioeconomic status,[40] and a lack of GP encouragement or willingness to refer patients to relevant LMPs.[2]

Enablers to patient enrolment

The most frequently cited enablers related to increasing patient support networks.[36,41,43,50,45] Steps should be taken by the referrers to ensure patients feel supported to engage with lifestyle modification programs.[2,34] Programs that established transitional support and channels of communication with referred patients prior to the lifestyle modification program commencement[36,41,43,45,50] and engaging

and educating family members about chronic disease and lifestyle modification[27,35,41,45] were widely cited and supported enablers of patient uptake.

Health professionals were thought to play a significant role in encouraging patients to engage in lifestyle modification programs. Some patients reported they were *"convinced by the conversation with their GP"* to engage with lifestyle modification programs.[43] Referral elements that effectively enhanced rates of patient recruitment included: health professional usage of and training in motivational interviewing and similar methods[50], relationships of trust between health professionals and patients,[34] health professionals' ability to discern and address patient needs and reservations[41] and clearly explain relevant lifestyle modification programs[2], and the health professionals' awareness of the availability of person-centred and population-specific programs for ethnic and cultural minorities[40,45,50] and older people.[50]

Rurality and negative patient perceptions about program accessibility were primary barriers to program enrolment. To increase enrolment of rural and minority groups, telephone and/or home-based programs specifically marketed to individuals who may struggle or find it inconvenient to access centre-based programs were used.[31,38,43,29]

Other identified enablers include:

- *stage of patient journey:* there was some evidence suggesting patients with a longstanding illness or those who sought information from their GPs about their illness were more receptive to lifestyle modification program referrals[36,43] compared with other patient groups. In line with the first two studies, a third study cited evidence suggesting that exercise programs were less likely to be effective in the early stages of a diabetes diagnosis, as some patients are largely asymptomatic during this time and therefore did not see the value of addressing their condition[34]
- *patients' positive perception of health practitioner authority*: one peer-reviewed study reported that *"there was a sense of [patients] being ready to be 'told what to do'"* by general practitioners[34]
- *the use of multiple ongoing recruitment techniques*: combining referrals during general practice consultations as well as mail-out referrals was found to more effective than adopting a single recruitment method.[35]

Barriers to patient completion of program

Only five sources examined barriers associated with patient completion of and adherence to lifestyle modification programs. The most frequently cited barriers were lack of time to continue or complete a lifestyle modification program[28,33] and diagnosis of depression or anxiety.[27,39] Other barriers were related to patient morbidity. Patients with more symptoms,[27] those who perceived minimal changes or benefits from program involvement,[36] and who had a higher expectation of program capacity to address morbidities[36] were identified as more likely to discontinue involvement before completion.

Other barriers to completion were:

- *patient ill health,* forcing early withdrawal because of capacity to complete[33]
- *lack of sustained patient interest in program*[33]
- *patient perceptions of unsupportive program leaders*: patients who felt program leaders lacked empathy and concern for their needs were less likely to return to prescribed interventions.[36]

Enablers to patient completion of program

Enablers of program adherence and patient retention were addressed in seven studies. Most enablers identified were linked to social components of the lifestyle intervention program. Positive and trusting relationships with program facilitators[23,29,35,36] and co-participants[23,31], education sessions for friends and family[23], and ongoing communication between health professionals, program staff and patients[34,35] were all associated with increased patient satisfaction and completion likelihood. Program facilitator expertise[31,36], the use of motivational and cognitive behavioural techniques[36] and facilitator provision of tailored advice[29] were also associated with greater patient retention.

Other identified enablers of patient completion were:

- *peer-to-peer educators:* opportunities for patients to meet and mutually support one another were associated with increased patient satisfaction, mutual feeling of patient comradery and increased likelihood of program adherence[45]
- *patient optimism* in program capacity to bring about positive change[27]
- *patient perception of positive change due to involvement*.[36]

Gaps in the evidence

The literature included mainly descriptive cohort studies. There were no pragmatic or randomised controlled trials with well-described contemporaneous control groups. We found few in-depth, long-term evaluation studies of lifestyle interventions in the recent literature. This is a significant gap in the literature which limits program adaptation, improvement, scaling up or de-implementation of programs. Systems theory suggests that health programs that are built for purpose at one time point may not be relevant at another time point as contexts, policies, patient populations and health practitioner populations change. Therefore, programs need to be continually evaluated and adapted to ensure that they remain fit for purpose in changing circumstances.[14] Furthermore, feedback of program outcomes was identified as an important factor facilitating health professional engagement and referral practices. Without ongoing robust evaluations, this needed feedback to health professionals is not possible.

The bulk of the literature focused on patient perspectives, including patient benefits, factors leading to patient engagement, and enablers and supports needed for completion of programs. Although significant patient factors were identified that posed barriers to engagement, detailed solutions and practical strategies about overcoming these barriers were limited.

Factors that helped health professionals refer to lifestyle programs were mostly limited to providing education to health professionals about programs and their benefits. This is a passive approach to behaviour change among health professionals and has been shown to have limited effect in practice.[51] Few articles explored more active approaches, such as program co-design and co-production with health professionals and patients, which ensures relevance and a feeling of ownership, both of which are related to positive behaviour change and ongoing engagement with new programs. The use of champions and advocates for lifestyle programs within the health professions (e.g. GP champions to support GP behaviour change among GP colleagues) was rarely discussed.

Although the patient-centred approach to identifying individual needs was suggested as important, the literature was not clear to what extent this approach is actually implemented in health settings when

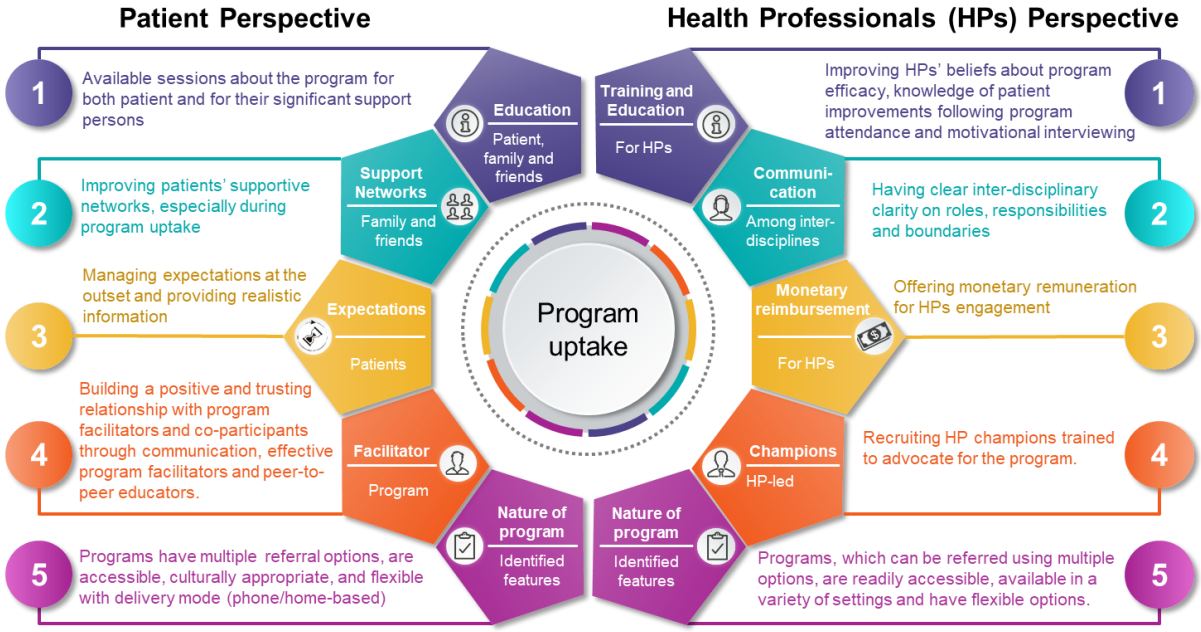
health professionals and patients make decisions about treatment and prevention options in the context of referral to lifestyle prevention programs.

Well-designed, methodologically robust, long-term evaluations of lifestyle programs are needed and should be prioritised to improve the evidence base. Such evaluations need to be comprehensive and timely. Evaluations should be underpinned by the Quadruple Aim[52] and should include studies to gauge multiple perspectives: patients, referring health professionals, organisations and staff delivering lifestyle programs, and policy makers and managers who commission and fund these programs.

Discussion

Current literature on improving patient referral and completion of lifestyle modification programs is relatively well described, however, there are very few robust, well-designed long-term evaluations of these factors contributing to better patient referral, uptake and completion of lifestyle modification programs, from both the GP and patient perspective. On balance, there are some promising reports providing detailed descriptions of the barriers and enablers to patient uptake of the prescribed program (**Figure 1**).

Figure 1—Summary of enabling factors of patient uptake of lifestyle modification programs.



Our rapid literature review identified factors relating to four program types only (i.e. exercise, self-management and education for patients, education for clinicians and care planning).

Significant barriers affecting GPs' decisions to refer patients to lifestyle modification programs were identified and need to be addressed when planning future lifestyle programs. These include barriers among GPs and other health professionals, including lack of awareness and training around such programs[2,23,24,30,40], perception that program referrals are not a component of their role[28,35], and lack of capacity and time to refer.[32] Some health professionals perceived that such programs had little value and efficacy for patients' outcomes and care pathways[2,35], either because of previous experience or general beliefs. Methodologically robust studies should be undertaken to further clarify the specific factors identified here.

Important enablers were identified. These include increasing exposure to and training in referring patients to lifestyle modification programs with resources targeting change in health professionals'

beliefs about program efficacy and patient improvements following program attendance. Providing clear inter-disciplinary communication and clarity on roles, responsibilities and boundaries for those involved in arranging the program will further assist in health professionals' patient referral.[34] Having monetary reimbursement to health professionals was a clear enabler[2,30], as well as having health professionals champions who were trained and could advocate for the program.[35,46] Health professionals valued if programs themselves were readily accessible and available in a variety of settings.[30,47] Future lifestyle modification projects could benefit from co-design and co-production approaches with meaningful involvement of patients, health professionals and policy stakeholders.

The type of referral processes had an effect on health professionals' referral decisions. Having active recruitment strategies and multiple referral techniques (e.g. mail-based referral, face-to-face clinic referral) were considered positive elements.[38,47] Programs that had flexible secondary service options and were perceived as suitable for improving patients' conditions were seen as favourable by health professionals.[38] Health professionals' ability to assess patient preferences and motivations and to apply shared decision-making when referring patients to lifestyle programs was seen as important, however, it was not clear whether health professionals have the capability to apply these approaches in practice. Building capacity among health professionals for motivational interviewing and shared decision-making within their routine practice should be a priority.

Factors related to patient enrolment and ongoing engagement with lifestyle modification programs were identified. These included having multiple recruitment strategies[35], providing accessible and culturally appropriate programs[33], and with the flexibility to be carried out via the telephone or at home.[29,33] Improving the support and assistance of patients' supportive networks of family and friends[36,41,43,45,50], especially during transitions during the program uptake phase when the behaviour changes and new habits are being built, were seen as critical for ongoing engagement. Education sessions on the program for the patient and for their significant support persons boosted patients' completion rates.[35] Patients who lacked sustained interest in the program as well as not experiencing any perceived health benefits of the lifestyle intervention were unlikely to complete the program.[34]

Managing patient expectations at the outset and providing realistic information about the program (e.g. what it involves and what benefits to expect within flexible timeframes) are also important for ongoing engagement.[40] Patients who have unrealistic expectations of large changes within short timeframes are less likely to engage and continue to participate to complete the programs.[40]

Program facilitators played a big role in patient adherence and completion of the program.[41,43,50] Patients building a positive and trusting relationship with program leaders, facilitators and co-participants by establishing ongoing communication[23,35], having an effective program facilitator who used motivational and cognitive behavioural techniques,[47] and having peer-to-peer educators[45] were helpful. Future programs should ensure that the staff who deliver the intervention have been appropriately trained and have capacity to work with people of different ethnicities, ages, socio-economic and educational backgrounds, and who have the skills to recognise different abilities and to adapt programs accordingly to ensure engagement.

Applicability and implications

The quality and relevance of existing evidence varied. However, our findings provide a minimum base of evidence supporting the implementation of policies and procedures to increase patient usage of the Get Healthy service. Based on our findings, the following factors could be taken into account when considering improvements for better engagement from health professionals and patients:

- *Increasing the impact of educational resources for general practitioners.* It was widely acknowledged that health professionals lacked the skills and knowledge required to address lifestyle-related treatments and refer patients to relevant services. Furthermore, health practitioners were often not interested in, had reservations about or doubted the effectiveness of lifestyle modification programs. Health practitioner training was identified as an effective way to improve referral rates to (exercise-based) lifestyle modification programs.

  Evidence suggests educational resources should:
  - Provide clear information about how the program works, including potential benefits for patients, and
  - Where applicable, challenge normative beliefs about the strictly clinical role of GPs.

  Offering training in motivational interviewing techniques and other effective referral strategies, which highlight the importance of discerning and addressing patient concerns and reservations about enrolment, could overcome GP reticence to engage with the program.

  Providing GP compensation or incentives to attend or use training resources, has been shown to be effective in several other programs and may also be effective for the Get Healthy program.

- *Reviewing how communication about the program fits with the routine GP workflow.* Poor communication between health practitioners and lifestyle modification program facilitators can reduce health practitioner willingness to engage with programs. Additionally, health professionals are often time and resource poor, and therefore unable to engage with modification programs. Creating a seamless referral process that embeds the initial GP referrals, patient hand-over, and information relevant to patient safety in existing general practice workflows could increase referral success. Linking Get Healthy program facilitators into the secure messaging delivery software used by GPs in NSW could enhance feedback to GPs and improve communication. Taking the opportunity to partner with Primary Health Networks may be another potential avenue to engage GPs in educational activities about lifestyle programs.

- *Developing a means of transitional support for patients shortly after referral.* Patient follow-up post referral and prior to enrolment was the most widely acknowledged method of increasing patient uptake. In the absence of link workers, effective, point-to-point channels of communication between GPs and the Get Healthy service would help establish timely phone-based patient follow-up.

- *Creating educational resources to engage and educate the patient and their family and friends.* Patients considering enrolment in lifestyle modification programs benefit from additional support within their personal networks. This could be achieved by educating patients' support networks (friends and families) about patient morbidities and the benefits of relevant lifestyle intervention programs. The commissioning agency may therefore wish to consider developing educational materials specifically for patients' support networks. Health professional training resources could also include information regarding the effectiveness of education being provided to families and friends who support the patient to engage with the lifestyle intervention program.

- *Marketing the accessibility of the Get Healthy program specifically to populations who may have difficulty accessing centre-based exercise programs*. Phone-based exercise and other lifestyle interventions were particularly suited to rural-dwelling patients. Patients who require culturally safe intervention settings may also prefer distance-based lifestyle modification programs.

- *Educating GPs about which patients may be more likely to attend and benefit from referral.* Available evidence indicates that patients with longstanding illnesses who seek advice from and trust their GPs were more likely to be receptive to referrals to exercise programs. There was also evidence suggesting patients with diagnoses of depression and/or anxiety were less likely to enrol and complete lifestyle modification programs recommended by health professionals. Referral to the Get Healthy service may be inappropriate for such populations without additional intensive support and integration of the lifestyle modification program with other treatment modalities.

Conclusion

The main identified barriers to referral for lifestyle modification programs were health practitioners' lack of knowledge about programs, doubts about the effectiveness of programs, and perceptions that referring to lifestyle programs was not part of their clinical role. To increase referral rates, health practitioners need to be engaged with lifestyle modification programs through co-design and co-production of the programs, through ongoing educational activities about the programs and by recruiting practitioners who will advocate for and champion the programs among their colleagues. Receiving regular feedback about the programs, especially how the programs have helped individual patients, is also likely to improve engagement and change referral behaviour.

Health practitioners who engage with patients when referring for lifestyle modification programs, by explaining the program adequately, facilitating questions from patients, reassuring the patient of the benefits of the program while managing realistic expectations, contribute to patient engagement with the program and completion. Using motivational interviewing techniques and ensuring that the patient is part of the decision-making process and that the patient's individual health, social and financial circumstances and needs are considered are essential to patient engagement with programs.

In addition to health practitioner factors, a combination of patient and program attributes also determines whether a patient will enrol in and complete a program. For patients, program proximity and ability to safely access the program, or to access via different modalities (e.g. online or via telephone), increase likelihood of engagement. Furthermore, patients expect program content that is relevant, appropriate to their level of ability and culturally appropriate. Involvement of family or personal networks and having needed resources (e.g. time, money, appropriate clothing) were all enablers. Programs that used approachable leaders and peer educators were more likely to retain patients to program completion because of the potential to develop supportive positive relationships with patients.

The literature on factors that help or hinder health practitioner and patient engagement in lifestyle modification programs for secondary prevention is currently limited due to the paucity of well-designed long-term evaluations. Methodologically robust long-term studies should be undertaken to clarify the factors influencing lifestyle modification referral from both healthcare professionals' and patients' perspectives. Barriers and enablers that influence health professionals' referral behaviours and patients' capacity to engage with and complete lifestyle programs should be explored in depth using mixed methods research.

References

1. Australian Institute of Health and Welfare (AIHW). Chronic disease. Canberra, Australia: AIHW; 2019.
2. Clark AM, King-Shier KM, Duncan A, Spaling M, Stone JA, Jaglal S, et al. Factors influencing referral to cardiac rehabilitation and secondary prevention programs: a systematic review. European Journal of Preventive Cardiology. 2013;20(4):692-700.
3. French SD, Green SE, O'Connor DA, McKenzie JE, Francis JJ, Michie S, et al. Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. Implementation Science. 2012;7(1):38.
4. National Health Medical Research Council (NHMRC). NHMRC additional levels of evidence and grades for recommendations for developers of guidelines. Canberra, Australia: NHMRC; 2009.
5. Phillips B, Ball C, Sackett D, Badenoch D, Straus S, Haynes B, et al. Oxford centre for evidence-based medicine-levels of evidence (March 2009). Oxford, UK: Centre for Evidence-Based Medicine; 2009.
6. Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & healthcare: A guide to best practice: Lippincott Williams & Wilkins; 2011.
7. Hawker S, Payne S, Kerr C, Hardey M, Powell J. Appraising the evidence: reviewing disparate data systematically. Qualitative health research. 2002;12(9):1284-99.
8. Tyndall J. The AACODS Checklist: Flinders University; 2010 [cited 2020 June 18]. Available from: https://dspace.flinders.edu.au/dspace/.
9. Australian Institute of Health and Welfare. Evidence for chronic disease risk factors Canberra2016 [Available from: https://www.aihw.gov.au/reports/chronic-disease/evidence-for-chronic-disease-risk-factors.
10. Willett WC, Koplan JP, Nugent R, Dusenbury C, Puska P, Gaziano TA. Prevention of chronic disease by means of diet and lifestyle changes. Disease Control Priorities in Developing Countries 2nd edition: The International Bank for Reconstruction and Development/The World Bank; 2006.
11. Carnes D, Sohanpal R, Frostick C, Hull S, Mathur R, Netuveli G, et al. The impact of a social prescribing service on patients in primary care: a mixed methods evaluation. BMC health services research. 2017;17(1):835.
12. Williams NH, Hendry M, France B, Lewis R, Wilkinson C. Effectiveness of exercise-referral schemes to promote physical activity in adults: systematic review. Br J Gen Pract. 2007;57(545):979-86.
13. Ju I, Banks E, Calabria B, Ju A, Agostino J, Korda RJ, et al. General practitioners' perspectives on the prevention of cardiovascular disease: systematic review and thematic synthesis of qualitative studies. BMJ open. 2018;8(11):e021137.
14. Pescheny JV, Pappas Y, Randhawa G. Facilitators and barriers of implementing and delivering social prescribing services: a systematic review. BMC health services research. 2018;18(1):86.
15. Mutsaerts M, Kuchenbecker W, Mol B, Land J, Hoek A. Dropout is a problem in lifestyle intervention programs for overweight and obese infertile women: a systematic review. Human reproduction. 2013;28(4):979-86.
16. Pagoto S. The current state of lifestyle intervention implementation research: where do we go next? Translational behavioral medicine. 2011;1(3):401.
17. McGill B, O'Hara B, Phongsavan P. Participant perspectives of a 6-month telephone-based lifestyle coaching program. Public health research & practice. 2018;28(2).
18. Thomas E, Astley C, Gallagher R, Foreman R, Mitchell JA, Grace SL, et al. Improving the Monitoring of Cardiac Rehabilitation Delivery and Quality: A Call to Action for Australia. Heart, Lung and Circulation. 2020;29(1):1-4.
19. Hrisos S, Eccles M, Johnston M, Francis J, Kaner EF, Steen N, et al. An intervention modelling experiment to change GPs' intentions to implement evidence-based practice: using theory-

based interventions to promote GP management of upper respiratory tract infection without prescribing antibiotics# 2. BMC Health Services Research. 2008;8(1):10.
20. Zurynski Y, Vedovi A, Smith K-l, editors. Social prescribing: A rapid literature review to inform primary care policy in Australia2020: Consumers' Health Forum of Australia.
21. Tricco AC, Langlois EV, Straus SE, editors. Rapid reviews to strengthen health policy and systems: a practical guide. Geneva, Switzerland: World Health Organization; 2017.
22. Braithwaite J, Zurynski Y, Ludlow K, Holt J, Augustsson H, Campbell M. Towards sustainable healthcare system performance in the 21st century in high-income countries: a protocol for a systematic review of the grey literature. BMJ Open. 2019;9(1).
23. Davisson EA, Swanson EA. Patient and Nurse Experiences in a Rural Chronic Disease Management Program. Professional case management. 2018;23(1):10-8.
24. Newton JM, Falkingham L, Clearihan L. Better knowledge, better health: piloting an education intervention in chronic condition self-management support. Australian Journal of Primary Health. 2011;17(1):4-9.
25. Brydges M, Spearen C, Birze A, Tavares W. A culture in transition: paramedic experiences with community referral programs. Canadian Journal of Emergency Medicine. 2015;17(6):631-8.
26. O'Hara BJ, Phongsavan P, Rissel C, Hardy LL, Zander A, Greenaway M, et al. Role of general practice in the utilisation of the NSW Get Healthy Information and Coaching Service. Australian Journal of Primary Health. 2014;21(2):182-8.
27. Murray J, Craigs C, Hill K, Honey S, House A. A systematic review of patient reported factors associated with uptake and completion of cardiovascular lifestyle behaviour change. 2012.
28. Walters JAE, Courtney-Pratt H, Cameron-Tucker H, Nelson M, Robinson A, Scott J, et al. Engaging general practice nurses in chronic disease self-management support in Australia: insights from a controlled trial in chronic obstructive pulmonary disease. Australian Journal of Primary Health. 2012;18(1):74-9.
29. Dennis SM, Harris M, Lloyd J, Powell Davies G, Faruqi N, Zwar N. Do people with existing chronic conditions benefit from telephone coaching? A rapid review. Aust Health Review. 2013;37(3):381-8.
30. Geense WW, Van De Glind IM, Visscher TL, Van Achterberg T. Barriers, facilitators and attitudes influencing health promotion activities in general practice: an explorative pilot study. BMC family practice. 2013;14(1):20.
31. McNamara RJ, McKeough ZJ, Mo LR, Dallimore JT, Dennis SM. Community-based exercise training for people with chronic respiratory and chronic cardiac disease: a mixed-methods evaluation. International journal of chronic obstructive pulmonary disease. 2016;11:2839.
32. Whelan ME, Goode AD, Hickman IJ, Eakin EG, Reeves MM. Telephone-delivered weight management services in the hospital outpatient setting: Decision-makers' perceptions of their use in routine practice. Nutrition & dietetics: the journal of the Dietitians Association of Australia. 2017;74(3):261-7.
33. James EL, Ewald BD, Johnson NA, Stacey FG, Brown WJ, Holliday EG, et al. Referral for Expert Physical Activity Counseling: A Pragmatic RCT. American Journal of Preventive Medicine. 2017;53(4):490-9.
34. Matthews A, Jones N, Thomas A, Foster C. An education programme influencing health professionals to recommend exercise to their type 2 diabetes patients - understanding the processes: a case study from Oxfordshire, UK. BMC Health Services Research. 2017;17(1).
35. Bird EL, Biddle MSY, Powell JE. General practice referral of 'at risk' populations to community leisure services: applying the RE-AIM framework to evaluate the impact of a community-based physical activity programme for inactive adults with long-term conditions. BMC Public Health. 2019;19(1).
36. Husk K, Blockley K, Lovell R, Bethel A, Lang I, Byng R, et al. What approaches to social prescribing work, for whom, and in what circumstances? A realist review. Health Soc Care Community. 2020;28(2):309-24.
37. Ross S, Curry N, Goodwin N. Case management: What it is and how it can best be implemented. London, UK: The King's Fund; 2011.
38. Goodwin N, Dixon A, Anderson G, Wodchis W. Providing integrated care for older people with complex needs: Lessons from seven International case studies. London, UK: The King's Fund; 2014.
39. Deloitte Access Economics. ACS in Perspective: The importance of secondary prevention. Sydney, Australia: Deloitte Access Economics; 2011.

40. National Clinical Guideline Centre (NICE). Secondary prevention in primary and secondary care for patients following a myocardial infarction. Partial update of NICE CG48 Methods, evidence and recommendations. London, UK.: Royal College of Physicians; Nov, 2014.
41. McCarthy D, Ryan J, Klein S. Models of Care for High-Need, High-Cost Patients: An Evidence Synthesis. New York, NY,: The Commonwealth Fund; 2015.
42. Royal Society for Public Health UK. Healthy Conversations and the Allied Health Professionals. London, UK: Royal Society for Public Health; 2015.
43. ERS Research and Consultancy. Newcastle social prescribing project. Final report. Newcastle upon Tyne, UK: ERS Research and Consultancy; 2013.
44. National Health Service (NHS). Year of Care: Report of findings from the pilot programme. London, UK: NHS; June, 2011.
45. The George Institute. National Secondary Prevention of Coronary Disease Summit-Technical Report. Sydney, Australia: The George Institute; 2012.
46. National Health Service London (NHS). My Best Move - GP training for physical activity for patients with Long Term Conditions. UK, London: NHS Shared Learning Database; January, 2013.
47. Department of Health Western Australia. Cardiovascular rehabilitation and secondary prevention pathway principles for Western Australia. Perth, Australia: Health Strategy and Networks, Department of Health Western Australia; 2014.
48. Struckmann V, Spranger A, Fuchs S, van Ginneken E. Work Package 2 Report: Germany. Brussels, Belgium: European Observatory on Health Systems and Policies, EU 2016.
49. Hostetter M, Klein S, McCarthy D. CareMore: Improving Outcomes and Controlling Health Care Spending for High-Needs Patients. . New York, NY,: The Commonwealth Fund; 2017.
50. Scottish Intercollegiate Guidelines Network (SIGN). Guideline 150: Cardiac rehabilitation - Full guideline. Edinburgh, UK.: SIGN; 2017.
51. Bickerdike L, Booth A, Wilson PM, Farley K, Wright K. Social prescribing: less rhetoric and more reality. A systematic review of the evidence. BMJ open. 2017;7(4):e013384.
52. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. The Annals of Family Medicine. 2014;12(6):573-6.

Appendices

Appendix 1. PRISMA diagrams

Figure 1—PRISMA flowchart for peer-reviewed literature.

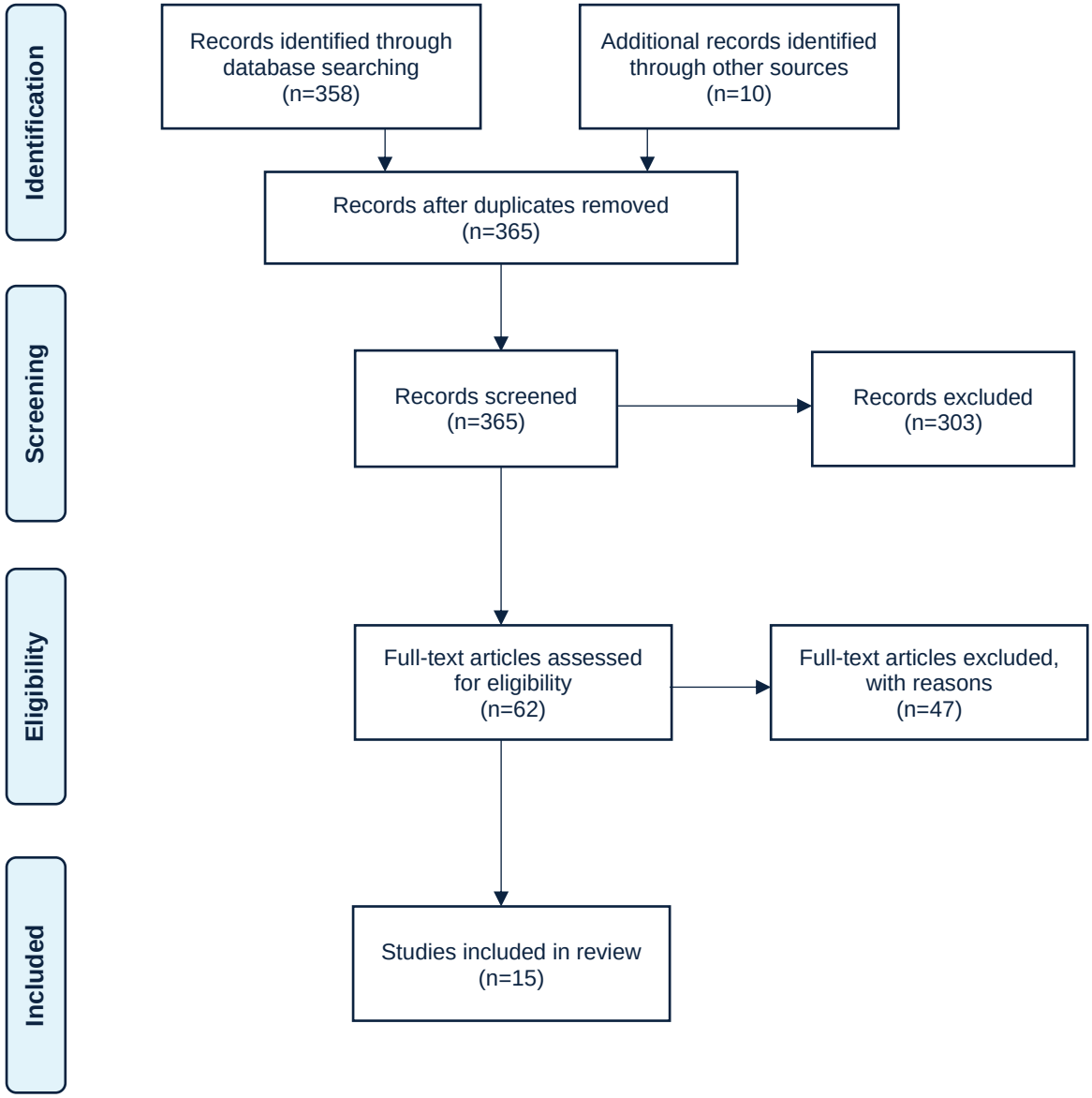
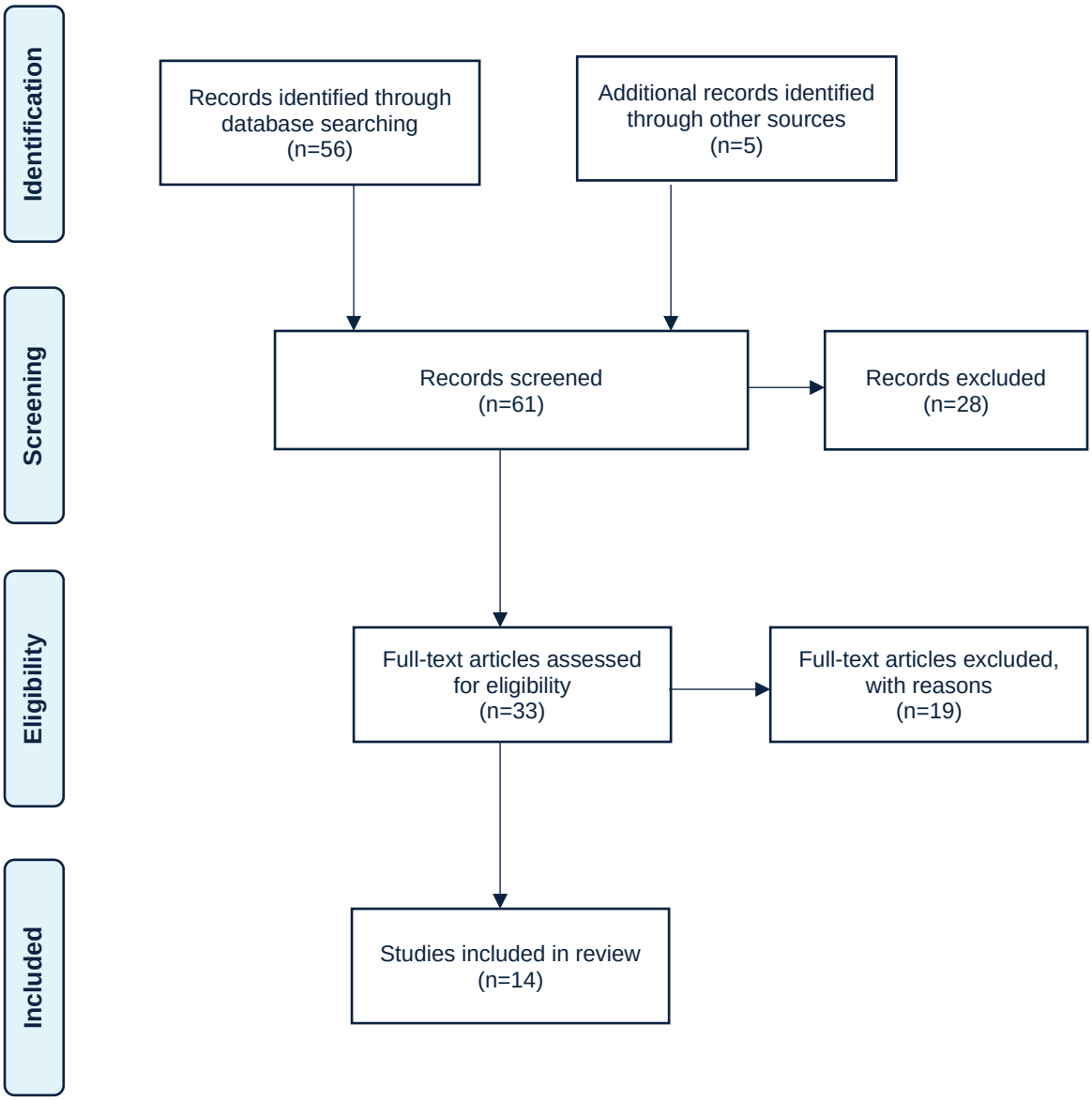


Figure 2—PRISMA flowchart for grey publications.



Appendix 2. Search strategy

Sources for grey literature

Websites from which full texts were sourced to assess eligibility for inclusion:

1. The National Institute for Health and Care Excellence (NICE)
2. The King's Fund
3. World Health Organisation (WHO)
4. Organisation for Economic Cooperation and Development (OECD)
5. The Commonwealth Fund
6. Public Health Agency of Canada
7. The Royal Society for Public Health (RSPH)
8. The Scottish Intercollegiate Guidelines Network (SIGN)
9. The National Health Service
10. Alliance for Healthier Communities
11. The George Institute
12. Secondary Prevention Alliance
13. Australian Secondary Prevention Alliance
14. Diabetes Australia
15. Department of Health, Western Australia
16. European Observatory on Health Systems and Policies
17. University of Westminster
18. ERS Research and Consultancy

Appendix 3. Evidence grading

Table 1—Quality assessment for peer-reviewed literature using the Hawker tool[7] scoring for methodological rigor.

Source	Abstract and title	Introduction and aims	Method and data	Sampling	Data analysis	Ethics and bias	Findings / results	Transferability / generalisability	Implications and usefulness	Average score
Newton et al.[24]	Fair	Fair	Poor	Poor	Poor	Poor	Poor	Fair	Good	25.55
Murray et al.[27]	Good	Good	Good	Good	Good	N/A (Good)	Good	Good	Good	40
Walters et al.[28]	Good	Fair	Fair	Good	Good	Poor	Fair	Fair	Good	33.33
Clark et al.[2]	Good	Good	Good	Good	Fair	N/A (Good)	Good	Good	Good	38.88
Dennis et al.[29]	Good	Good	Good	Good	Good	N/A (Good)	Good	Good	Good	40
Geense et al.[30]	Good	Fair	Good	Good	Good	Fair	Good	Good	Good	37.77
Brydges et al.[25]	Good	Fair	Fair	Fair	Good	Poor	Good	Fair	Good	33.3
O'Hara et al.[26]	Good	Fair	Fair	Good	Good	Poor	Good	Good	Fair	34.44

Source	Abstract and title	Introduction and aims	Method and data	Sampling	Data analysis	Ethics and bias	Findings / results	Transferability / generalisability	Implications and usefulness	Average score
McNamara et al.[31]	Good	Fair	Good	Good	Good	Fair	Good	Good	Good	37.77
Whelan et al.[32]	Good	Fair	Good	Fair	Good	Fair	Fair	Good	Good	35.55
James et al.[33]	Good	Fair	Good	Good	Good	Poor	Good	Good	Good	36.66
Matthews et al.[34]	Good	Fair	Fair	Fair	Good	Good	Fair	Good	Good	35.55
Davisson et al.[23]	Good	Good	Fair	Poor	Good	Poor	Fair	Poor	Good	31.11
Bird et al.[35]	Good	Fair	Good	Good	Good	Fair	Good	Good	Good	37.77
Husk[36]	Good	Fair	Good	Good	Good	N/A (Good)	Good	Good	Good	38.88

Table 2—Quality assessment for grey literature using the AACODS tool scoring for methodological rigor.

Source	Authority	Accuracy	Coverage	Objectivity	Date	Significance
NHS[44]	Yes	Yes	Yes	Yes	Yes	Yes
The King's Fund[37]	Yes	Yes	Yes	Yes	Yes	Yes
Secondary Prevention Alliance[39]	Yes	Yes	Yes	Yes	Yes	Yes
The George Institute[45]	Yes	Yes	Yes	Yes	Yes	Yes
Newcastle Social Prescribing Project[43]	Yes	Yes	Yes	Yes	Yes	Yes
NICE[46]	Yes	Yes	No	No	Yes	Yes
King's Fund[38]	Yes	Yes	Yes	Yes	Yes	Yes
NICE[40]	Yes	Yes	Yes	Yes	Yes	Yes
Department of Health, Western Australia[47]	Yes	No	Yes	Yes	Yes	Yes
The Commonwealth Fund [41]	Yes	Yes	Yes	Yes	Yes	Yes
Royal Society for Public Health UK[42]	Yes	Yes	Yes	Yes	Yes	Yes
EU[48]	Yes	Yes	Yes	Yes	Yes	Yes
The Commonwealth Fund[49]	Yes	Yes	Yes	Yes	Yes	Yes
Scottish Intercollegiate Guidelines Network[50]	Yes	Yes	Yes	Yes	Yes	Yes

Appendix 4. Intervention characteristics

Table 1—Intervention characteristics.

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
Newton et al.[24]	Better Knowledge, Better Health	S	Australia	Developed to improve general practice registrars' understanding and competence around self-management for patients with osteoarthritis. Delivered via online learning module comprised of educational, interactive workshop, and self-assessment quizzes	HP	Osteoarthritis
Murray et al.[27]	Systematic review of interventions	G	UK	Information not available; multiple programs reviewed	Mix	Cardiovascular disease
Walters et al.[28]	Intervention for academic study: COPD-specific clinical management module	S	Australia	Initiative to train general practice nurses to provide ongoing health coaching to identified chronic obstructive pulmonary disease (COPD) patients. After taking part in education and training session, general practice nurses mentored up	Mix	COPD

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
				to five patients for 12 months. Mentorship was patient-centred and aimed to help patients reach personal goals and manage symptoms of COPD		
Clark et al.[2]	Systematic review of interventions	-	Canada	Information not available; multiple programs reviewed	Mix	Cardiovascular disease
Dennis et al[29]	Systematic review of interventions	-	Australia	Information not available; multiple programs reviewed	Mix	Multiple
Geense et al.[30]	-	G	The Netherlands	Information not available; multiple programs reviewed.	P	Diabetes, cardiovascular disease, chronic respiratory disease, obesity
Brydges et al.[25]	CREMS (Community referrals by Emergency Medical Services) initiative	S	Canada	Referral initiative that aims to involve paramedics in initiating patient referral to lifestyle intervention and other community programs. Paramedics are trained and educated around referral criteria and techniques. Various programs are available to patients, although patients are most often	HP	Multiple

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
				referred to chronic disease management options		
O'Hara et al.[26]	Get Healthy Information and Coaching Service	S	Australia	State-funded telephone-based exercise service. Provides an information kit on healthy eating, physical activity recommendations and achieving or maintaining a healthy weight, and a telephone-based health coaching service that aims to help participants reach personal health goals	P	Obesity
McNamara et al.[31]	One-off intervention for academic study	S	Australia	Supervised exercise program for people living with chronic respiratory and/or cardiac disease. Offered to patients instead of hospital-based rehabilitation. Exercise therapy hosted by physiotherapist	P	Chronic respiratory and/or cardiac disease
Whelan et al.[32]	Get Healthy program	S	Australia	State-funded telephone-based exercise service. Provides an information kit on healthy eating, physical activity recommendations and achieving or maintaining a healthy weight, and a telephone-based health coaching service that	HP	Obesity

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
				aims to help participants reach personal health goals		
James et al.[33]	Newcastle Comparison Of Activity Coaching for Health (NewCOACH)	S	Australia	Exercise counselling program for inactive patients with or without chronic disease. Program established to determine the feasibility and efficacy of primary care referrals pathways to lifestyle modification programs, and to compare results of face-to-face and phone-based delivery of program	P	Chronic respiratory and/or cardiac disease, diabetes, arthritis, depression, cancer
Matthews et al.[34]	Generation Games	S	UK	Offers multiple exercise programs for different population groups, seeks to facilitate healthy lifestyle across age groups. Also facilitates health practice education programs and referral pathways for chronically ill patients, such as people living with diabetes. Health practitioners are trained to identity and refer patients who may benefit from physical therapy coaching	Mix	Diabetes

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
Davisson et al.[23]	*"Living Well"* chronic disease management program	S	US	Chronic disease self-management program for rural Americans. Program elements are facilitated by a nurse coordinator. Elements include in-person and telephone coaching on disease self-management, as well as peer-support and group educational sessions	P	Heart failure, COPD, diabetes
Bird et al.[35]	CLICK into activity referral scheme	S	UK	General practice referral scheme designed for inactive patients living with, or at risk of developing, one or more morbidities. Program consists of exercise program held in local leisure centres, which are led by exercise specialists	Mix	Diabetes, hypertension, obesity, overweight, pre-diabetes
Husk[36]	Systematic review of interventions	G	UK	Information not available; multiple programs reviewed	Mix	Multiple
NHS[44]	Year of care programme	S	UK	Policy initiative targeting the patient uptake of and health professional care management of diabetes	P	Diabetes
The King's Fund[37]	Case management	G	UK and US	Case management approach is discussed. Case management refers	P	Multiple, long-term conditions

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
	(analysed as generic approach)			to tailored interventions, usually lifestyle interventions, for patients suffering illness or chronic disease		
Secondary Prevention Alliance[39]	Rehabilitation and self-management programs	G	Australia	Discusses a range of cardiac rehabilitation programs	P	Acute Coronary Syndromes (ACS)
The George Institute[45]	-	G	Australia	Secondary prevention for coronary disease discussed generally	P	Coronary disease
Newcastle Social Prescribing Project[43]	Newcastle Social Prescribing Project	S	UK	Link-worker program developed within existing voluntary organisations. Designed to assist health care professionals to refer patients with long-term illnesses to community secondary support. Other goals were to raise awareness of program and social prescribing among health care professionals	P	Multiple
NICE[46]	My Best Move	S	UK	Educational intervention for GPs. Project aims to assess the feasibility of educating and encouraging GP referrals to physical activity interventions	P	Multiple

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
King's Fund[38]	-	G	US	Information not available; multiple programs reviewed	P	Multiple
NICE[40]	Cardiac Rehabilitation	G	UK	Discusses a range of cardiac rehabilitation programs	P	Myocardial infarction
Department of Health, Western Australia[47]	Cardiovascular rehabilitation		Australia	Discusses a range of cardiac rehabilitation programs	P	Cardiovascular disease
The Commonwealth Fund [41]	-	G	US	Examines a range of community resources for patients with complex needs	P	Multiple
Royal Society for Public Health UK[42]	*"Healthy Conversations"* or *"Making Every Contact Count"* initiative	S	UK	*"Healthy Conversations"* refers to an initiative encouraging health practitioners to embed discussion of lifestyle, including lifestyle modification program referral options, into everyday discussions with patients	P	Multiple
EU[48]	Sustainable integrated chronic care models for	S	Germany	An initiative to prevent hospital (re)admissions of older patients using	P	Multiple

Ref	Intervention name	Type	Country of origin	Lifestyle intervention description	Targeted population[b]	Chronic condition(s) targeted
	multi-morbidity (SELFIE)			targeted lifestyle modification and self-management programs		
The Commonwealth Fund[49]	-		US	Discusses a range of lifestyle modification interventions	P	Multiple
Scottish Intercollegiate Guidelines Network[50]	-		UK	Discusses a range of cardiac rehabilitation programs.	P	Cardiovascular disease

Table 2—General characteristics of the lifestyle program including format, mode of delivery and frequency of intervention.

Type [a]	Ref	Year	Location	Type of lifestyle program	Format of program[b]	Method of delivery[c]	Frequency/ Duration[d]
PR	Newton et al.[24]	2011	Australia	Education for healthcare professionals	Not reported	D	One-off online training module
PR	Murray et al.[27]	2012	UK	Various	-	Multiple[f]	-
PR	Walters et al.[28]	2012	Australia	Self-management	Individual	F2F	Weekly, then less frequently / 12 months
PR	Clark et al.[2]	2013	Canada	Various	-	Multiple	-
PR	Dennis et al.[29]	2013	Australia	Various	-	Multiple	-
PR	Geense et al.[30]	2013	The Netherlands	Various	-	Multiple	-
PR	Brydges et al.[25]	2015	Canada	-	-	-	-
PR	O'Hara et al.[26]	2016	Australia	Exercise	Group	F2F	Twice a week / 8 weeks
PR	McNamara et al.[31]	2015	Australia	Exercise	Individual	D(PC)	10 calls / 6 months

Type [a]	Ref	Year	Location	Type of lifestyle program	Format of program[b]	Method of delivery[c]	Frequency/ Duration[d]
PR	Whelan et al.[32]	2016	Australia	Exercise	Individual	D(PC)	10 calls / 6 months
PR	James et al.[33]	2017	Australia	Exercise	Individual	Mixed (F2F, D[PC])	5 / 13 weeks
PR	Matthews et al.[34]	2017	UK	Exercise	Both	Mixed (F2F, [PC, IV,ICT])	Flexible and ongoing participation
PR	Davisson et al.[23]	2018	US	Education for patients, self-management	Both	Mixed (F2F, D[PC])	Once every week / minimum 6 weeks
PR	Bird et al.[35]	2019	UK	Exercise	Group	F2F	1 session per week / 12 weeks
PR	Husk[36]	2020	England	Various	-	Multiple	-
GL	NHS[44]	2011	UK	Care planning	-	-	-
GL	The King's Fund[37]	2011	UK and US	Care planning	-	D (PC/TH)	-
GL	Secondary Prevention Alliance[39]	2011	Australia	Rehabilitation programmes and self-management	-	ICT	-

Type [a]	Ref	Year	Location	Type of lifestyle program	Format of program[b]	Method of delivery[c]	Frequency/ Duration[d]
GL	The George Institute[45]	2012	Australia	Various	-	Mixed (F2F, D[PC], B, other)[e]	-
GL	Newcastle Social Prescribing Project[43]	2013	UK	Link-worker service	-	-	-
GL	NICE[46]	2013	UK	Exercise	-	-	-
GL	King's Fund[38]	2014	UK and US	Various	-	-	-
GL	NICE[40]	2014	UK	Cardiac rehabilitation programme	-	D (PC/TH)	-
GL	Department of Health, Western Australia[47]	2014	Australia	Various	-	-	-
GL	The Commonwealth Fund[41]	2015	US	Clinical care models or care management programs	-	-	-

Type [a]	Ref	Year	Location	Type of lifestyle program	Format of program[b]	Method of delivery[c]	Frequency/ Duration[d]
GL	Royal Society for Public Health UK[42]	2015	UK	Healthy conversations	-	-	-
GL	EU[48]	2016	Germany	Education and coaching on self-management	-	Mixed (D[PC]; B)	-
GL	The Commonwealth Fund[49]	2017	US	Various	-	F2F	-
GL	Scottish Intercollegiate Guidelines Network[50]	2017	UK	Various	-	D (PC/TH)	-

[a] PR=peer-review article; GL=grey literature.
[b] Delivery of the program could be in a group setting or individual intervention (e.g., self-education) or both group and individual.
[c] F2F=Face-to-face; D=distance, PC=phone consultation; TH=telehealth; B=brochures; IV=Instructional video; ICT=information communications technologies
[d] Frequency and duration of program.
[e] Other also included internet or web-based systems, provided video, DVD or written manuals
[f] Multiple programs evaluated; program details not.s