

Development of an individualised primary care program for acute low back pain using a hybrid co-design framework

Malene Ahern^{A,*} , Catherine M. Dean^B, Blake F. Dear^C, Simon M. Willcock^D and Julia M. Hush^B

For full list of author affiliations and declarations see end of paper

*Correspondence to:

Malene Ahern
Department of Psychology, Faculty of
Medicine, Health and Human Sciences,
Australian Hearing Hub, Level 2 and Level
3, 16 University Avenue, Macquarie
University, Sydney, NSW 2109, Australia
Email: malene.ahern@mq.edu.au

Received: 23 August 2021

Accepted: 8 March 2022

Published: 5 September 2022

Cite this:

Ahern M *et al.* (2022)
Australian Journal of Primary Health
28(5), 428–443. doi:[10.1071/PY21206](https://doi.org/10.1071/PY21206)

© 2022 The Author(s) (or their
employer(s)). Published by
CSIRO Publishing on behalf of
La Trobe University.

This is an open access article distributed
under the Creative Commons Attribution-
NonCommercial-NoDerivatives 4.0
International License ([CC BY-NC-ND](https://creativecommons.org/licenses/by-nc-nd/4.0/))

OPEN ACCESS

ABSTRACT

Background. Low back pain is the leading worldwide cause of years lost to disability and the problem is worsening. This paper describes and demonstrates the scholarly development and contextual refinement of a primary care program for acute low back pain in Sydney, Australia.

Methods. Hybrid theoretical frameworks were applied, and co-design was used to contextualise the program to the local healthcare setting. **Results.** The program was developed in four stages. In stage 1, the scientific evidence about management of acute low back pain in primary care was examined. In stage 2, stakeholders (patients and clinicians) were consulted in nationwide surveys. Data from stages 1 and 2 were used to design an initial version of the program, called My Back My Plan. Stage 3 involved the contextual refinement of the program to the local setting, MQ Health Primary Care. This was achieved by co-design with primary care clinicians and patients who had sought care for low back pain at MQ Health Primary Care clinics. In stage 4, a panel of Australian experts on clinical care for low back pain reviewed the contextualised version of My Back My Plan and final amendments were made. **Conclusion.** My Back My Plan has been developed using an innovative scholarly approach to intervention development.

Keywords: general practitioners, intervention development, matched care, My Back My Plan, patient education, person-centred, physiotherapists.

Introduction

Low back pain (LBP) affects 70–90% of Australians at some time in their lives ([Australian Institute of Health and Welfare 2019](#)), and although many episodes are transient, at least one-third develop chronic pain after seeking primary care for an acute episode ([Henschke *et al.* 2008](#); [Chou and Shekelle 2010](#)). The 2017–18 Australian Bureau of Statistics National Health Survey reveals that about 4 million Australians currently suffer from long-term disability due to LBP ([Australian Bureau of Statistics 2018](#)). In fact, LBP is one of the most burdensome non-fatal conditions in Australia and globally ([Vos *et al.* 2020](#)), and the disability burden is steadily rising ([March *et al.* 2014](#)). Recent research has indicated that up to two-thirds of individuals experienced recurrence of LBP within 12 months after recovery from the acute LBP episode ([Machado *et al.* 2017](#); [da Silva *et al.* 2019](#)). These reported rates of symptom persistence and recurrence suggest that initial LBP episodes may be better described as episodes of a relapsing and remitting disorder with an ‘acute phase’. Furthermore, the high burden of disease from LBP causes great individual suffering and socioeconomic inequality in Australia ([Schofield *et al.* 2012](#)), indicating current primary care management of acute LBP may be inadequate in preventing progression to chronic LBP. Indeed, there is Level 1 evidence ([Maher *et al.* 2017](#)) that common treatments for acute LBP tested in randomised controlled trials fail to achieve clinically worthwhile outcomes.

One explanation for this may be that the complex, multidimensional nature of LBP has been largely neglected in clinical trials, which are commonly designed to evaluate only unimodal treatments (e.g. heat, massage or analgesics); another may be that researchers have rarely designed novel treatments for LBP using scholarly intervention development

methodologies, rather selecting treatments from those in current clinical use (Hush 2020). Furthermore, recent research efforts have aimed at overcoming the ‘one size fits all’ treatment approach by investigating outcomes from stepped care, stratification and matched care approaches within clinical trials (Linton *et al.* 2018). These approaches aim to provide more efficient and cost-effective health care for people with LBP, by providing a level of care that aligns with the clinical profile of the patient, based on assessment findings. These considerations indicate that novel treatment approaches that embrace the complexity of LBP and are designed using appropriate intervention development methods, are needed.

This paper describes and demonstrates the process of developing a scholarly informed and contextually refined primary care program for acute LBP in Sydney, Australia. In this study, an episode of acute LBP was defined as a period of pain of <12 weeks’ duration, not caused by specific or serious pathology, lasting for >24 h and for which health care is sought (de Vet *et al.* 2002). The development of this program, My Back My Plan, utilised a mixed qualitative and quantitative methodological approach to understand gaps in current research evidence, stakeholder needs, local context needs and using co-design/iterative feedback to develop an intervention. An essential first step when developing a complex health intervention is to review relevant theoretical frameworks and identify empirical evidence (Craig *et al.* 2008). Theoretical frameworks aim to assist clinicians and researchers when developing a new intervention by clearly defining the relevant barriers and enablers in the design of implementation strategies (Hodder *et al.* 2016). Common frameworks include intervention mapping (Eldredge *et al.* 2016), complex intervention development (Craig *et al.* 2008) and behaviour change wheel (Michie *et al.* 2011). A systematic mapping review examining how health interventions have been developed in a range of contexts, found

that a common practice is to create a hybrid approach adapted to the local context, which can result in more acceptable, feasible and effective outcomes (Croot *et al.* 2019). Such hybrid approaches may also be more adaptive to dynamic local health-care systems (O’Cathain *et al.* 2019). Another important feature in the development of interventions is co-design with relevant stakeholders (such as patients, clinicians, community, researchers), so that local contextual factors are given appropriate consideration, and thereby facilitate tailored solutions for that local healthcare system (Skivington *et al.* 2018) and improve person-centred care (Viney and Sides 2017).

Therefore, in this study, we used a hybrid development process and user co-design with patients and clinicians to contextualise the program to the healthcare system that was the test site for this project: Macquarie University (MQ) Health Primary Care. This site includes a co-located general practice (GP) service and outpatient physiotherapy (PT) clinic, facilitating interdisciplinary care for LBP patients. Note that in Australia, physiotherapists (PTs) are registered primary healthcare professionals and first contact practitioners. The resultant program was developed specifically for acute LBP and is called My Back My Plan (MBMP). The present paper outlines the development of MBMP, and the accompanying paper (Ahern *et al.* 2022) describes the feasibility and acceptability trial of MBMP at MQ Health Primary Care.

Methods

The development of MBMP was conducted in four stages (Fig. 1).

Stage 1

The initial stage aimed to explore the evidence about management of acute LBP treatment in primary care, and

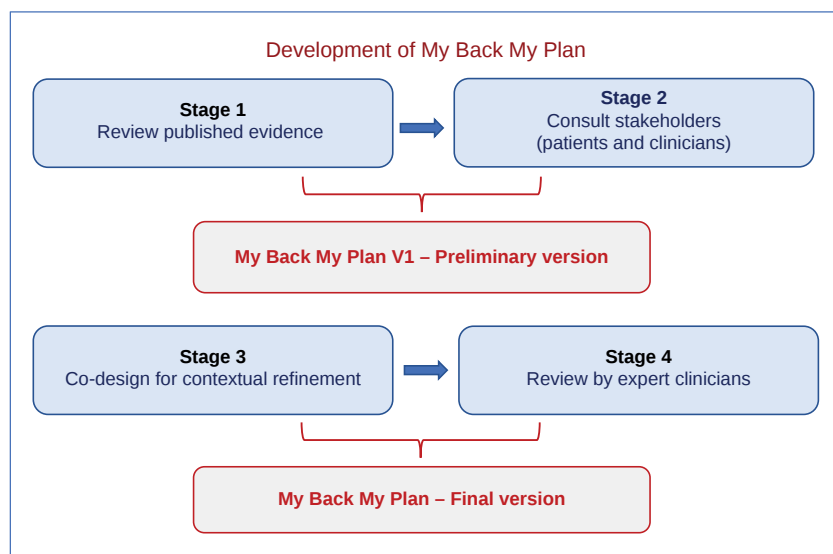


Fig. 1. Four stages of the development of My Back My Plan (MBMP) for MQ Health Primary Care. V1, Version 1.

relevant scientific literature on the following aspects of acute LBP care was evaluated: (1) evidence of effectiveness of primary care treatments; (2) stepped, stratified, and matched care approaches; (3) relevant clinical practice guidelines; and (4) person-centred care. Note that evidence examined was available at the time the review was conducted at the start of this project, in 2016. Secondary pre-appraised research (e.g. systematic reviews) where available, was evaluated prior to primary original research.

Stage 2

In this stage, stakeholder consultation was conducted in two studies. The first was a cross-sectional nationwide internet survey of patients who had sought primary care for LBP. The aim of this study was to understand the experiences and needs of Australians who had received treatment for LBP in primary care. The methods of this study are outlined elsewhere (Ahern *et al.* 2019). The second study was also a cross-sectional nationwide internet survey, but of primary care clinicians. The aim of this study was to identify the practices and perspectives of general practitioners (GPs) and PTs in their management of acute LBP. The methods of this study are also outlined elsewhere (Ahern *et al.* 2020). Macquarie University Human Research Ethics Committee (Refs: 520170078, 5201800026) approved these studies.

My Back My Plan version 1

A preliminary prototype of MBMP was designed using data from Stages 1 and 2. This included the composition of the healthcare team, the clinical pathway to be employed, the assessment methods to be used, how the treatment streams would be matched to patient needs, and a Patient Booklet.

Stage 3

In this stage of the project, My Back My Plan Version 1 (MBMP Version 1) was contextually refined to the MQ Health Primary Care setting, optimising content and process. This was achieved by co-design with: (1) MQ Health Primary Care clinicians (GPs and PTs); and (2) MQ Health Primary Care LBP patients. Focus groups were held with each of these cohorts in 2018–19 using semi-structured interviews and framework analysis research methodology (Gale *et al.* 2013). This research was approved by Macquarie University Human Research Ethics Committee (Ref: 5201800370).

MQ Health Primary Care clinicians

Primary care practitioners were eligible for this study if they: (1) were MQ Health Primary Care General GPs or PTs registered by the Australian Health Practitioner Regulation Agency; and (2) had treated patients presenting with acute LBP at least once in the past 12 months; (3) had adequate proficiency in written English; and (4) were an Australian resident. One week prior to each focus group, background

material (information about MBMP Version 1) was sent to study participants to review. Three focus groups of 1.5-h duration were conducted at Macquarie University and were audio recorded. After a brief overview of MBMP Version 1, an interview topic guide was used to investigate clinicians' views about the program and to obtain their feedback to optimise the program. Audio files were transcribed verbatim. Transcripts were checked against audio files for accuracy and were analysed by two members (MA, JMH) of the research team. Framework analysis was used to identify emergent themes related to clinicians' opinions about MBMP Version 1.

MQ Health Primary Care LBP patients

Patients were eligible for this study if they: (1) received treatment at MQ Health Primary Care for LBP within first 12 weeks of an episode; (2) were able to read, write and speak English; and (3) were aged ≥ 18 years. Participants were excluded if they had experienced LBP due to serious or specific pathology requiring specialised treatment. Three focus groups of 1.5-h duration were conducted at Macquarie University and were audio recorded. The participants first completed a brief questionnaire to evaluate their experiences of treatment for LBP at MQ Health Primary Care. MBMP Version 1 was explained to the participants and an interview topic guide was used to investigate their views about the program and obtain their feedback to optimise the program, as well as previous care received at MQ Health. Audio files were transcribed verbatim. Transcripts were checked against audio files for accuracy and were analysed by two members (MA, JMH) of the research team. Framework analysis was used to identify emergent themes related to patients' perceptions of treatment for acute LBP at MQ Health, and opinions about the proposed MBMP program. Data obtained from the questionnaire were analysed using descriptive statistics.

Stage 4

In the final stage, feedback from interdisciplinary primary care clinicians who had specific expertise in LBP was sought about MBMP. This study was an online internet survey conducted in 2019, hosted by Qualtrics (Provo, UT, USA), licensed to Macquarie University. This study was approved by Macquarie University Human Research Ethics Committee (Ref: 5201836676466). Experts were selected based on the following criteria: (1) they had a national or international profile in the field of LBP; (2) they had a significant background of clinical experience in LBP care; and (3) they were a medical practitioner, physiotherapist, psychologist, or pharmacist registered to practice in Australia. The survey was designed to take approximately 15–20 min to complete, and consisted of questions about clinician demographics, their opinions on aspects of the MBMP program (principles, content, personalised care, potential benefits) and overall comments. Single item questions were analysed using descriptive

statistics and qualitative responses were analysed by two members (MA, JMH) of the research team. Data were de-identified to ensure confidentiality.

My Back My Plan

The contextualised MQ Health Primary Care version of the MBMP program was finalised using data from Stages 3 and 4.

Results

Stage I

Effectiveness of primary care treatments

Evidence synthesis of treatment effectiveness for acute LBP (Maher *et al.* 2017) revealed that: (1) treatments evaluated in clinical trials were predominantly unimodal; (2) a low proportion of the evidence was high quality (based on the Grading of Recommendations Assessment, Development and Evaluation (GRADE) rating (Guyatt *et al.* 2008)); and (3) of the treatment comparisons evaluated, including pharmacological therapies, bed rest, manual therapies, massage, exercise and acupuncture, the only treatment with evidence for a clinically worthwhile pain reduction was heat therapy; however, this was based on very low-quality evidence. Of treatments for which there was high-quality evidence, most (NSAIDs, paracetamol, and exercise) had very small treatment effects, which are unlikely to be worthwhile to patients (Ferreira *et al.* 2009).

Stepped, stratified, and matched care

These approaches, summarised in Table 1, aim to achieve more cost-effective health care by providing care that aligns with the patient's clinical profile, rather than a one-size-fits-all treatment. A benefit of all three approaches in the context of acute LBP is that overtreatment is avoided for low-risk patients; however, additional benefit is gained from stratified and matched care with early screening to specifically identify those at higher risk who would benefit from more comprehensive treatment (Linton *et al.* 2018). Commonly recommended screening tools for risk stratification include the STarT Back screening tool (SBST) (Hill *et al.* 2008) and Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ – Short Form) (Linton *et al.* 2011). There is good evidence of beneficial outcomes in Australian workers with LBP injuries, using the ÖMPSQ for early identification of delayed recovery or return to work (Nicholas *et al.* 2020). A review of both the ÖMPSQ and SBST for acute LBP in primary care (Karran *et al.* 2017) found that both instruments have good accuracy at identifying risk of high disability or prolonged absenteeism, although do not perform as well at identifying those at risk of developing chronic pain. This review recommended assessment of additional contextual or prognostic factors, in addition to scores of screening tools, to provide a more comprehensive assessment of patient risk. Although the large body of literature on LBP prognosis is characterised by variable methods and results (Hayden *et al.* 2008), there are some biological, psychological and social factors that are consistently associated with poor outcome. These include: presence of a compensable injury,

Table 1. Stepped, stratified, and matched approaches to primary care treatment of LBP.

	Stepped care	Stratified care	Matched care
Approach	Initially treat all patients with simple first-line care and only step care up to more complex interventions if this fails, at a designated time point (e.g. 6 weeks)	Provide different treatment type to each patient based on identified risk of poor outcome, based on questionnaire assessment	Tailor treatment to the risk factors identified for each individual patient
Benefits	Easy to implement	Early screening identifies level of risk	Early screening identifies level of risk
	No increased costs initially	Overtreatment avoided for low-risk patients	Low-risk patients receive conservative treatment
	Overtreatment avoided for low-risk patients	Comprehensive treatment provided for higher-risk patients	Patients' profiles can be used to individualise treatment Overtreatment avoided for low-risk patients Promotes patient engagement
Limitations	Yellow flags can be missed in the early stage, which may delay recovery, and contribute to chronicity and recurrence	May not fully address individual factors	Evidence to identify risk profiles and match treatment is unclear
	Can cause entrenchment of unhelpful behaviours (e.g. activity avoidance)	More complicated to implement compared with stepped care	More complicated to implement than other approaches
	Fails to address complexity	May not address workplace, social, and other contextual factors	

Adapted from Linton *et al.* (2018), with permission.

negative cognitive beliefs (such as catastrophising), poor general health and co-morbidities as well as other factors such as presence of sciatica, reduced mobility and functional dependence (10 m walk test) and poor relationships with colleagues (Hayden *et al.* 2008; Middleton *et al.* 2015). This evidence informed the selection of additional clinical features for clinicians to consider as contextual factors in their patient assessment and identifying the level of risk for developing chronic pain.

Clinical practice guidelines

Three guidelines most relevant to primary care management in Australia for non-specific acute LBP were examined: the 2016 New South Wales Agency of Clinician Innovation *Model of Care: Management of People with Acute Low Back Pain* (ACI MoC (Australia); NSW Agency for Clinical Innovation 2016), the 2016 National Institute of Health and Care Excellence *Low Back Pain and Sciatica in over 16s: Assessment and Management* (NICE (UK); National Institute for Health and Care Excellence (NICE) 2016), and the 2017 American College of Physicians *Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians* (ACP (USA); Qaseem *et al.* 2017). Recommendations for primary care of acute LBP in these guidelines are summarised in Table 2. Elements of assessment consistently recommended were: diagnostic triage (or identification of serious pathology); psychosocial risk assessment; and avoidance of routine radiological imaging. Regarding treatment, advice to remain active, education about LBP, prognosis, and self-management were commonly recommended; however, guidelines varied in the extent, mode, and content of education. Some recommendations about short-term use of simple analgesics were consistent. Recommendations varied across the guidelines regarding inter-disciplinary care, exercise and adjunct treatments such as spinal manual therapy. Although individualised treatments were recommended, stratification and psychological approaches were only recommended in the ACI MoC and the NICE (UK) guidelines. Pre-determined review times were only recommended in the ACI MoC (Australia). These elements of first-line care for acute LBP were supported in a 2018 review (Almeida *et al.* 2018) of current international clinical guidelines for LBP.

Several barriers have been reported to the implementation of LBP guidelines from the perspective of clinicians. These include beliefs regarding the role of guidelines (e.g. that they are highly prescriptive), time constraints, knowledge limitations and perceptions that guidelines can restrict clinical judgment and challenge professional autonomy (Slade *et al.* 2016).

Person-centred care

A systematic review of clinical practice guidelines recommends that best practice care for musculoskeletal pain is person-centred or patient-centred, defined as 'care that responds to the individual context of the patient, employs

effective communication and uses shared decision-making processes' (Lin *et al.* 2020). To achieve a person-centred approach in primary care for LBP, multimodal treatment strategies, selected with the patient using shared decision-making, have been recommended; such individualised treatments may include patient education and reassurance, self-care, pharmacologic and non-pharmacologic therapies, and timely follow up (Shah 2017).

Stage 2

Survey of patients

The full results of this survey have been published previously (Ahern *et al.* 2019). A total of 426 Australians completed the survey with a response rate of survey completion of 50%. Participants reported seeking primary care for LBP not only for pain relief, but to help with activities and participating in social roles, as well as to improve quality of life and mood. Participants consulted multiple healthcare practitioners for health care, with more than one-quarter of participants consulting four to eight different types of practitioners; the clinicians most commonly consulted were general practitioners and physiotherapists; and used numerous treatment modalities. Only half reported they received education and a very low proportion reported receiving care consistent with guideline-based advice. The level of satisfaction with care was below moderate for 42% of respondents. Participants reported that they want LBP care to be more person-centred and better tailored to their needs; they also reported wanting more education, particularly about prevention of future episodes and self-management (Ahern *et al.* 2019).

Survey of clinicians

The full results of this survey have been published previously (Ahern *et al.* 2020). Two hundred primary care practitioners (72% PTs and 28% GPs) from all States and Territories of Australia completed the survey. Most primary care practitioners were familiar with clinical guidelines for acute LBP management and reported they typically delivered many core components of guideline-based care, including education, advice about favourable prognosis, encouraging activity and self-management and discouraging prolonged bed rest. Deviations from guideline-based care were common, including providing some medications, passive therapies and referring for radiological imaging. Overall, most Australian primary care clinicians in this sample were aware of LBP guidelines and typically implement care that is consistent with guideline-based recommendations. Divergences from these guidelines may indicate that primary care practitioners were delivering evidence-based and person-centred care that integrates clinicians' judgement with patients' preferences and guideline-based evidence.

My Back My Plan version 1

The first version of the MBMP program (MBMP Version 1) was designed by integrating evidence about primary care management of acute LBP (Table 3) and the outcomes from

Table 2. Summary of the recommendations from three clinical practice guidelines for primary care management of acute LBP.

Aspect of care	ACI MoC (Australia) ^A	NICE (UK) ^B	ACP (USA) ^C
Assessment			
Diagnostic triage	Triage into non-specific LBP, LBP with leg pain or suspected serious pathology	Consider alternative diagnoses at initial contact or if new/changed symptoms excluding specific causes of LBP	Does not include assessment
Psychosocial and risk assessment	Assess yellow flags (using SBST, or ÖMPSQ) at initial consultation if significant yellow flags are apparent, or at 2-week review if no improvement, at which time stratify into low, medium, or high risk	Consider using risk stratification (e.g. SBST) at first point of contact for each new episode of LBP with or without sciatica to inform shared decision-making about stratified management based on low or high risk	
Spinal imaging and investigations	Radiological imaging is not appropriate for acute non-specific LBP; only image those with suspected serious pathology	Do not routinely image patients with or without sciatica	
Treatment			
Self- management and education	Encourage to self-manage from first visit; provide information packs to facilitate self-management	Provide tailored advice to continue with normal activities and information on self-management, and the nature of LBP	Provide information about effective self-care options
	At first visit, provide advice to remain active and reassurance of favourable prognosis; provide education (DVD or website such as painHEALTH or Pain Toolkit)	Educational resources not specified	Provide advice to remain active as tolerated and information regarding expected course of recovery Educational resources not specified
Interdisciplinary care	Primary team members are the patient and their family, their GP, practice nurse and physiotherapist	Consider adding psychological therapies in conjunction with treatment package	Consider spinal manipulation, acupuncture, and massage as non-pharmacological treatment options. Insufficient evidence reported on psychological therapies and multi-disciplinary rehabilitation approaches
Physical activity	Encourage resumption of normal activities; structured exercise program not recommended in acute phase	Consider group exercise program; individualise exercise based on preference and capabilities	No specific recommendations in addition to advice to remain active as tolerated
Analgesic medications	Short-term use of simple analgesics (e.g. NSAIDs, paracetamol) using time-contingent regimen is recommended	Consider NSAIDs at lowest effective dose for shortest period; do not offer paracetamol alone; do not offer opioids for acute LBP	Individualise choice between NSAIDs and muscle relaxants based on patient's preferences and medication risk profile
Individualised care	Consider patients' preferences for treatment	Consider patients' specific needs, preferences, and capabilities to individualise exercises given in group program and tailor advice on self-management	Use shared decision- making to select appropriate treatment based on patients' preferences, availability, harms, and cost of treatment Individualise pharmacological therapy based on patients' preferences and individual risk profile
Stratification of treatment	Low risk: health education, review analgesia, encourage activity and self-management support	Low risk: simpler and less intensive support such as reassurance, advice to keep active and guidance on self-management	None
	Medium risk: as low risk plus evidence-based physiotherapy	High risk: more complex and intensive support such as exercise program, manual therapy, psychological approach	
	High risk: as medium risk plus more targeted management of psychosocial barriers to recovery using a CBT approach		

(Continued on next page)

Table 2. (Continued)

Aspect of care	ACI MoC (Australia) ^A	NICE (UK) ^B	ACP (USA) ^C
CBT	Principles of cognitive-behavioural therapy are applied to all treatments	Only recommended as an adjunct (i.e. part of a treatment package)	None
Follow up and referral			
Review	Pre-determined review times are 2, 6 and 12 weeks	No pre-determined times for review specified	No pre-determined times for review specified
Referral	If not recovered by 12 weeks refer to musculoskeletal specialist	Consider imaging in specialist settings or if surgical treatment options have not worked	No specific recommendations provided

^AACI MoC (Australia): New South Wales Agency for Clinical Innovation: *Model of Care: Management of People with Acute Low Back Pain* (NSW Agency for Clinical Innovation 2016).

^BNICE (UK): *Low Back Pain and Sciatica in over 16s: Assessment and Management* (National Institute for Health and Care Excellence (NICE) 2016).

^CACP (USA): *Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians* (Qaseem et al. 2017).

ACI, Agency for Clinical Innovation; ACP, American College of Physicians; CBT, cognitive behavioural therapy; LBP, low back pain; MoC, model of care; NSAIDs, non-steroidal anti-inflammatory drugs; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire; SBST, STarT Back Screening tool.

the stakeholder consultation studies (Table 4). The principles and core elements of MBMP Version 1 program are listed in Table 5, and the program is briefly outlined below.

Clinical pathway

Patients could access MBMP through initial consultation with a GP or PT.

Patient assessment

The initial assessment would include diagnostic triage to screen out patients with possible serious or specific causes of LBP, a comprehensive patient history to understand the biopsychosocial contributors to the presenting problem, identify the patient's goals and preferences for treatment; conduct a thorough physical examination (including a neurological exam if indicated) to assess lumbar mobility, physical function and fear avoidance behaviours; routine referral for radiological imaging was avoided.

Treatment streams

Three treatment streams were developed to provide stepped care for patients: MBMP *Standard*, MBMP *Plus*, and MBMP *Intensive* (Table 6). All streams were based on the principles of inter-professional patient management, delivery of recommended first-line care, and individualised, person-centred care. The optimal treatment stream would be identified by integrating findings from the patient assessment, evaluation of the ÖMPSQ score and additional contextual factors (co-morbidities, compensable injury, LBP recurrence, lumbar spine range of movement, gait speed, and unhelpful thoughts and beliefs). Each stream differed with respect to the number and type of health professionals involved, and the frequency and number of consultations and complexity of care required.

Patient Booklet

An A4 Patient Booklet was designed to: (1) facilitate communication between all members of the healthcare team; (2) serve as an interactive educational resource;

(3) facilitate shared decision-making about treatment; (4) assist the patient to set treatment goals; (5) prescribe activities; and (6) facilitate self-management, including prevention of future episodes of LBP and flare-up management. The Patient Booklet was to be given to the patient at the first assessment, and relevant sections explained regarding diagnosis and prognosis. The booklet consisted of four sections: *Understand my back pain*, *Reassure myself*, *Move well*, and *My Recovery plan*. An over-arching aspect of the booklet design was to enable content to be tailored to patients, and to support person-centred care. An educational graphic designer assisted with development of the booklet.

Stage 3

MQ Health Primary Care clinicians

Thirteen MQ Health Primary Care participants were recruited to the focus groups; eight GPs, four PTs and one practice manager. In a pre-focus group survey completed by clinicians, the majority (85%) agreed or strongly agreed that a new clinical treatment model for acute LBP was needed. Most clinicians (92%) agreed the MBMP program was feasible to implement in clinical practice. All clinicians agreed (58%) or strongly agreed (42%) that MBMP would be beneficial for LBP patients in primary care.

MQ Health LBP patients

Fourteen participants who had previously sought care at MQ Health Primary Care GP or PT clinics for treatment of acute LBP were recruited to the focus groups. Slightly more than half (57%) were female, and the mean age was 44 years. Participants had received LBP care from MQ Health GPs and PTs (79 and 50%, respectively). Almost half (42%) of participants reported they found treatment extremely or very beneficial for their recovery from LBP. Overall, half of the participants (50%) were extremely or very satisfied with their previous care at MQ Health. Feedback on the proposed MBMP Version 1 included consideration of costs of seeking care, benefits of having a patient booklet resource as an educational tool,

Table 3. Summary of how evidence from Stage I informed the design of MBMP Version I.

Key findings from the evidence	Source of information	Rationale	Evidence incorporated into MBMP Version I
Use an interdisciplinary team for patient care	Clinical practice guideline (NSW Agency for Clinical Innovation 2016; Bernstein <i>et al.</i> 2017; Qaseem <i>et al.</i> 2017)	Most relevant guideline to Australian context (ACI MoC) recommends primary team members are the patient and their family, their GP, practice nurse and physiotherapist Other guidelines recommend referral to allied health and psychological therapies as needed	Establish inter-professional teams for patient care in MBMP, including the patient, GP, physiotherapist, and as needed, psychologist. Encourage communication within the team aligned with contextual factors
Screen for possible specific or serious causes of LBP	Clinical practice guideline (NSW Agency for Clinical Innovation 2016; Bernstein <i>et al.</i> 2017; Qaseem <i>et al.</i> 2017) Inception cohort study (Henschke <i>et al.</i> 2008)	Although looking for specific and serious causes of acute LBP is discouraged in primary care in most guidelines, including the ACI MoC Guidelines, assessment of red flags is essential to identify possible cases	Perform diagnostic triage of patients at the initial assessment. Refer to specialist if suspected specific or serious pathology or recovery significantly delayed
Avoid routine imaging for non-specific acute LBP	Clinical practice guideline (NSW Agency for Clinical Innovation 2016; Bernstein <i>et al.</i> 2017)	Evidence indicates that imaging is only appropriate for those with suspected serious pathology (i.e. presence of red flags)	Discourage routine imaging of patients with acute non-specific LBP
Include early psychosocial evaluation in a comprehensive assessment	Clinical practice guidelines (NSW Agency for Clinical Innovation 2016; Bernstein <i>et al.</i> 2017)	Early screening of prognostic factors that can delay recovery is essential; the ÖMPSQ is a well-validated tool for screening; comprehensive assessment should include a biopsychosocial framework	Screen for psychosocial factors using the ÖMPSQ, at the initial assessment
Assess additional prognostic/contextual factors to facilitate treatment planning	Systematic reviews (Hayden <i>et al.</i> 2008, 2010; Slade <i>et al.</i> 2016)	Identification of contextual factors can guide selection of most appropriate treatment, facilitates person-centred care and promotes the role of clinicians' judgment	Include relevant contextual factors (e.g. lumbar spine ROM, unhelpful thoughts and beliefs, co-morbidities) for clinicians to evaluate in conjunction with ÖMPSQ screening to enable identification of the most appropriate treatment stream
Deliver recommended first line care for acute LBP	Clinical practice guidelines (NSW Agency for Clinical Innovation 2016; Bernstein <i>et al.</i> 2017) Systematic review (Lin <i>et al.</i> 2020) Clinical practice guidelines review (Almeida <i>et al.</i> 2018)	Although Level I reviews indicate high-quality evidence for clinically worthwhile treatments for acute LBP is limited, current clinical guideline recommendations for first-line care of acute LBP should be considered	Include the following elements of recommended first-line care for all patients in MBMP: Provide advice and reassurance about favourable prognosis Encourage physical activity Teach patients how to self-manage their LBP Address psychosocial barriers to recovery Review patients in appropriate timeframes
Provide individualised treatment for patients based on a comprehensive biopsychosocial assessment and their individual preferences	Clinical practice guideline (NSW Agency for Clinical Innovation 2016; Bernstein <i>et al.</i> 2017; Qaseem <i>et al.</i> 2017) Biopsychosocial model of pain (Fillingim 2017)	Patients' specific needs, preferences and capabilities need to be considered to select appropriate treatment together with the patient	Ensure a shared decision-making approach is used to individualise MBMP treatment stream. Design the patient assessment to help identify biopsychosocial contributors of each patient's LBP, and select a tailored treatment plan that is individualised, based on assessment findings and patients' goals
Ensure care is person-centred	Systematic review (Lin <i>et al.</i> 2020) Randomised controlled trial (Hill <i>et al.</i> 2011)	Patients' preferences and experiences need to be incorporated into evidenced-based and person-centred care for LBP	Set goals with patients and ensure treatment planning addresses specific patients' needs

(Continued on next page)

Table 3. (Continued)

Key findings from the evidence	Source of information	Rationale	Evidence incorporated into MBMP Version 1
	Clinical practice guidelines (NSW Agency for Clinical Innovation 2016; Bernstein et al. 2017)		
Deliver targeted early education to help patients understand and self-manage their LBP	Systematic review (Bodegård et al. 2019; Lin et al. 2020) Clinical practice guidelines (NSW Agency for Clinical Innovation 2016; Bernstein et al. 2017)	Educating patients about their LBP is important in primary care Although no guideline specifies the use of tailoring education and resources, the principle of person-centred care supports this approach	Ensure patient education is a core element of treatment, and that it is comprehensive and tailored to each patient. Develop a Patient Booklet as a resource to facilitate education, as well as self-management and team-based care
Consider multiple treatment modalities	Clinical practice guideline (NSW Agency for Clinical Innovation 2016) Biopsychosocial model of pain (Fillingim 2017)	Multimodal treatment (e.g. education, analgesic medication, self-management advice, and physical activity) aligns with a biopsychosocial understanding of LBP	Integrate multimodal care for patients to address identified biopsychosocial drivers of their LBP, and to target patients' needs and preferences
Schedule early follow up and review	Clinical practice guidelines (NSW Agency for Clinical Innovation 2016; Bernstein et al. 2017)	Monitoring of patients' progress with treatment plan following initial consultation is important, particularly to address psychosocial barriers to recovery	Embed appropriate early follow-up appointments and review times in MBMP

ACI, Agency for Clinical Innovation; GP, general practitioner; LBP, low back pain; MBMP, My Back My Plan; MoC, model of care; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire; ROM, range of movement.

Table 4. Summary of the primary themes from stakeholder consultation studies and how they informed MBMP Version 1.

Primary themes	Source of information	Rationale	Theme incorporated into MBMP Version 1
Ensure decision making is shared across the healthcare team	Patient and clinician surveys	Integrating clinical judgement and patients' values with evidence for treatment decision making will optimise evidence-based healthcare	Design a treatment planning protocol that enables application of evidence about psychosocial risk factors, together with clinician-identified contextual factors, and patients' values and preferences in a shared decision-making process
Promote a strong therapeutic alliance	Patient and clinician surveys	A good therapeutic alliance between members of the healthcare team will enhance compliance, patient outcomes and person-centred care	Facilitate all aspects of patient care to be person-centred, including, communication styles, identification of individual treatment needs, regular follow ups, and tailoring treatment
Develop a person-centred intervention	Patient survey	Tailoring treatment to identified biopsychosocial contributors of each patient's LBP will optimise person-centred care	Design the patient assessment to help identify biopsychosocial contributors of each patient's LBP, and select a tailored treatment plan that is individualised, based on assessment findings and patients' goals Develop an education resource (Patient Booklet) which can be used to provide individualised care
Facilitate self-management	Patient survey	Patient's value and seek information and clinical guidance on how to self-manage their condition. education in primary care for LBP	Ensure self-management is a central element of care for all MBMP streams. Include content about self-management in the Patient Booklet
Treat using a multimodal approach	Patient and clinician surveys	Treatments that include multiple modalities (e.g. education, analgesic medication, self-management advice, and exercise) are valued by patients and clinicians	Design treatment streams to integrate multiple modalities, as indicated by assessment findings, guided by integration of evidence, patients' preferences, and clinical judgement
Promote prevention and management of recurrences	Patient and clinician surveys	Both patients and clinicians considered education about prevention of LBP recurrences and flare-up management to be beneficial	Address strategies for prevention and flare-up management as part of MBMP and include sections about this in the Patient Booklet

LBP, low back pain; MBMP, My Back My Plan.

Table 5. The seven principles and seven core elements of My Back My Plan.

Principles	Core elements
(1) Early psychosocial evaluation: Relevant psychosocial factors to be evaluated for all patients in the initial assessments (GP and PT), by use of the ÖMPSQ questionnaire and patient history to identify additional prognostic or contextual factors	(1) Collaborative goal setting: Meaningful SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) goals to be established in collaboration with the patient and listed in the Patient Booklet for review by the healthcare team
(2) Interdisciplinary patient care: MBMP patients to have a GP and PT in their team with shared communication of information and education; psychological therapy to be added if indicated	(2) Imaging advice: The role of imaging for managing back pain to be discussed with the patient, based on the principle that most patients with common LBP will not require imaging
(3) A biopsychosocial understanding of LBP underpins patient care: Biological, psychological, and social contributors to the patient's LBP to be identified at initial assessment and are addressed in treatment	(3) Tailored education: Tailored, person-centred education regarding each patient's diagnosis, prognosis, and nature of their back pain to be provided early. Where indicated by psychosocial assessment, education to address unhelpful thoughts and beliefs to be included
(4) Personalised and stepped care: Initial treatment stream selection based on psychosocial screening (ÖMPSQ score) and clinician-identified contextual factors that have established prognostic value. Care can be stepped up to MBMP <i>Plus</i> or MBMP <i>Intensive</i> as required	(4) Analgesic medication advice: GPs to discuss the potential role of simple analgesics in the patients' recovery plan, with dosing and timeframes established if medications are recommended
(5) Person-centred treatment program: Clinicians and patients collaboratively develop a personalised treatment plan that addresses identified individual biopsychosocial contributors to their back pain, and targets patient's goals	(5) Advice about returning to daily activities and work: Patients to be encouraged to gradually return to usual daily activities and work following appropriate rest. Advice to be carefully tailored to the physical requirements of each patient's usual roles and activity levels
(6) Focus on self-management: Patients to be taught skills to help self-manage their LBP, prevent recurrences, and manage flare-ups	(6) Individualised physical activity program: Physical activity to be central to the MBMP program. The PT and GP will prescribe individualised activities and exercises (listed in the Patient Booklet) to improve function, reduce fear of movement/reinjury and achieve goals set in collaboration with the patient
(7) Early review times: Patients to be reviewed by GPs and PTs within 2–3 days of initial consult	(7) MBMP Patient Booklet: The Patient Booklet to be used as a shared-care resource to facilitate communication between the patient and the healthcare team, for goal setting, education and to support the patient to apply relevant aspects of their MBMP program

GP, general practitioner; LBP, low back pain; MBMP, My Back My Plan; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire; PT, physiotherapy.

Table 6. MBMP Version 1 treatment streams, based on clinical indications (ÖMPSQ score and the following contextual factors: comorbidities, compensable injury, LBP recurrence, lumbar spine range of movement, gait speed, and unhelpful thoughts and beliefs).

	MBMP <i>Standard</i>	MBMP <i>Plus</i>	MBMP <i>Intensive</i>
Indications	ÖMPSQ score <40 and few contextual factors	ÖMPSQ score 40–70 and some contextual factors	ÖMPSQ score >70 and many contextual factors
Healthcare team	Patient, GP, PT	Patient, GP, PT	Patient, GP, PT, psychologist
Program duration	Up to 4 consults 2–3 weeks	Up to 10 consults 6 weeks	>10 consults 6–12 weeks

GP, general practitioner; MBMP, My Back My Plan; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire (score 0–100); PT, physiotherapy.

and optimisation of the useability of the booklet by adding sections on long-term management and self-pacing.

Data analysis from the focus groups of both cohorts enabled contextual refinement of MBMP as summarised in Table 7. Each element of the program was either affirmed by the focus groups or enhanced following amendment.

Stage 4

Seventeen experts (89% of those invited) completed the survey and 94% were primary care clinicians, with a mean

(SD) of 22 (10) years clinical experience. Disciplines included physiotherapy (53%), medicine (24%), psychology (18%) and pharmacy (6%). Regarding the *principles* of MBMP, most participants (>85%) rated management based on identified biopsychosocial factors, person-centred treatment with individualised care, and the focus on self-management as very relevant. Approximately two-thirds rated personalised care and early psychosocial evaluation for all patients as very relevant. Interdisciplinary patient care for all patients was rated as somewhat or very relevant by 76% the participants. Regarding the *core elements* of MBMP, most participants

Table 7. Summary of contextual refinement of MBMP for MQ Health Primary Care following co-design with clinicians and patients.

Element of MBMP Version 1		Outcome of clinicians' focus groups		Outcome of patients' focus groups		Suggested amendments to MBMP Version 1
		Affirmed (✓)	Enhanced (✓+)	Affirmed (✓)	Enhanced (✓+)	
Process of care	Patient eligibility		✓+		✓+	Include people with previous episodes of LBP
	Patient recruitment		✓+		✓+	Clinicians to recruit patients rather than reception staff Explain to patients that MBMP is a new model of care
	Psychosocial screening		✓+			ÖMPSQ to be completed in the waiting room prior to first study consult
	Time management		✓+		✓+	Share components of care among disciplines to optimise time management
Assessment	Diagnostic triage at the initial assessment	✓			✓+	Communicate clearly with patients about likely contributors to their LBP; re-assure no serious cause
	Avoid routine imaging	✓			✓+	Educate patients about role of imaging and when referral is appropriate
	Comprehensive history and examination	✓		✓		No change recommended
	Early psychosocial evaluation		✓+			Clinicians will require additional training on psychosocial evaluation (e.g. training video on how to explore ÖMPSQ findings with patients)
	Assess contextual factors		✓+			Remove gait speed (10 MWT) as contextual factor
Treatment	Design individualised treatment based on assessment findings and individual preferences		✓+		✓+	Discuss findings of ÖMPSQ, biopsychosocial assessment and contextual factors to determine an agreed treatment stream with the patient Inform patients regarding all treatment costs Note treatment stream in Patient Booklet
	Use an interdisciplinary team and integrate care		✓+		✓+	Promote interdisciplinary care to all patients Consider methods to enhance interdisciplinary communication about care (e.g. phone calls, meetings, use of Patient Booklet) Consider free eCenterClinic online Pain Course when psychological input indicated Ensure patients have choice to consult external clinicians

(Continued on next page)

Table 7. (Continued)

Element of MBMP Version 1	Outcome of clinicians' focus groups		Outcome of patients' focus groups		Suggested amendments to MBMP Version 1
	Affirmed (✓)	Enhanced (✓+)	Affirmed (✓)	Enhanced (✓+)	
Deliver targeted early education to help patients understand their LBP and self-manage		✓+		✓+	Add sections on activity pacing and long-term self-management plan (<i>My Back Action Plan</i>) to Patient Booklet
Use a multimodal approach, with an emphasis on physical activity		✓+		✓+	Integrate multiple modalities to address patient needs, and preferences and enhance self-management Physiotherapist to have oversight of activity prescription Personalise and tailor activities and exercise Include ergonomic training if indicated
Use the Patient Booklet as an integrated resource		✓+		✓+	Promote interactive use among healthcare team Add section (<i>My Long-term Action Plan</i>) for prevention and management of recurrences, and when to seek further care Update <i>What's my diagnosis?</i> section with treatment stream selection information Expand section on lifestyle factors to include sleep and diet Add blank pages for notes and plastic sleeve for handouts Train clinicians to prioritise sections of Patient Booklet
Schedule early follow up and review		✓+		✓+	Follow-up patient after initial consult within 2–3 days Communicate plan for follow-up appointments with patient, including justification of PT/GP care Ongoing review by healthcare team

GP, general practitioner; LBP, low back pain; MBMP, My Back My Plan; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire; PT, Physiotherapist; 10 MWT, 10-m walk test.

Table 8. Summary of MBMP for MQ Health Primary Care after amendments following review by an expert panel.

Element of MBMP for MQ Health Primary Care		Outcome of experts' review		Suggested amendments to MBMP for MQ Health Primary Care or no change recommended (-)
		Affirmed ✓	Enhanced (✓+)	
Assessment	Diagnostic triage at initial assessment	✓		–
	Avoid routine imaging	✓		–
	Early psychosocial evaluation		✓+	Adjust ÖMPSQ scores for treatment streams to align with psychologically informed practice and current evidence (Nicholas and George 2011) • MBMP <i>Standard</i> < 40 • MBMP <i>Plus</i> 40–65 • MBMP <i>Intensive</i> > 65 Manage patients' expectations early (e.g. role of medications)
	Assess contextual factors		✓+	Consider including other psychosocial screening tools, work status and disability measures
Treatment	Design individualised treatment based on assessment findings and individual preferences	✓		Use matched care rather than stepped care –
	Use an interdisciplinary team and integrate care	✓		Justify costs of more complex care to patients
	Deliver best practice through recommended first-line care for acute LBP	✓		–
	Ensure patient care is person-centred		✓+	Ongoing review of plan by patient and clinicians and note changes in Patient Booklet Include partner/family/support network in program as much as possible – education about program aims and how to support the patient Promote skill-based learning for patients: active learning section of the Patient Booklet
	Deliver targeted early education to help patients understand their LBP and self-manage	✓		–
	Use a multimodal approach	✓		–
	Use the Patient Booklet	✓		–
	Schedule early follow up and review	✓		–

MBMP, My Back My Plan; LBP, low back pain; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire.

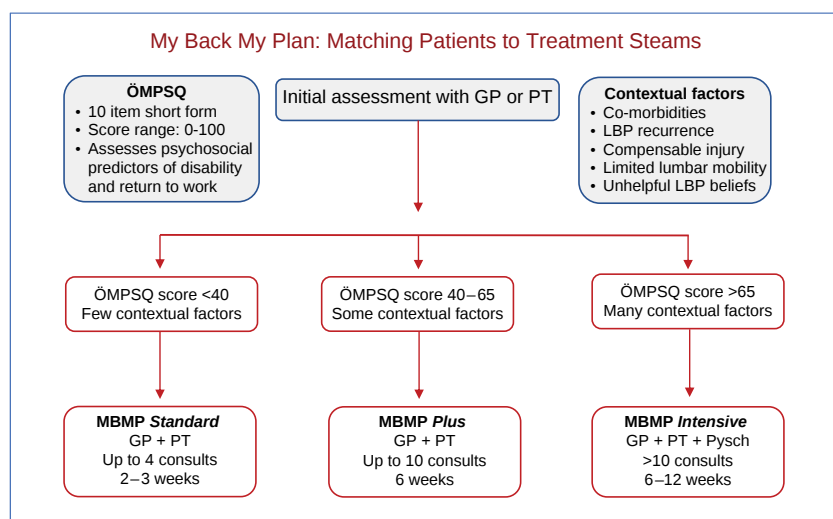


Fig. 2. Selection and content of treatment streams in MBMP for MQ Health Primary Care. GP, general practitioner; LBP, low back pain; MBMP, My Back My Plan; ÖMPSQ, Örebro Musculoskeletal Pain Screening Questionnaire; Psych, psychologist; PT, physiotherapy.

(>85%) rated tailored education, advice about returning to daily activities and work, individualised physical activity program and imaging advice as very relevant. More than half of the participants rated collaborative goal-setting and analgesic medication advice as very relevant.

Overall, the interdisciplinary experts surveyed in this study affirmed most of the key aspects of MBMP for MQ Health Primary Care (Table 8). Based on their feedback, the following changes were made to enhance the program.

1. Stepped care was replaced with matched care.
2. ÖMPSQ cut-off scores for the MBMP program streams were adjusted to: MBMP *Standard* < 40; MBMP *Plus* 40 – 65; and MBMP *Intensive* > 65.
3. A shared decision-making approach was implemented to select the most appropriate treatment stream.

MBMP final version I

Amendments to MBMP following Stages 3 and 4 resulted in the final version of MBMP contextualised for MQ Health Primary Care. The only adjustment to the principles and core elements (Table 5) was to change *Personalised and stepped care* (principle 4) to *Personalised and matched care*. The revised treatment streams, including updated ÖMPSQ scores, contextual factors, and matched care, are shown in Fig. 2. A brief training video was made available for clinicians on assessment of psychosocial factors, using the completed ÖMPSQ as a resource. Other amendments made are listed in Tables 7, 8. The final Patient Booklet is available in FigShare (<https://doi.org/10.25949/20488191.v1>).

Discussion

The purpose of this paper was to describe and demonstrate the scholarly co-design and contextual refinement of a

primary care program for people with acute LBP. The development of this program, My Back My Plan, was founded on empirical evidence and theory and included consultation with key stakeholders, namely primary care clinicians and people seeking care from GPs and PTs for LBP. Co-design methods were applied to contextualise My Back My Plan for MQ Health Primary Care, and the program was reviewed by a national panel of experts. A limitation of the development process is that the program was contextualised to a single primary care setting. Thus, there are other healthcare professionals (e.g. pharmacists) and factors that might need to be considered in other contexts if this and similar programs are to be used in different or across multiple settings. Nevertheless, the principles of scholarly development and contextual refinement of the program outlined in this paper may assist others to develop programs to suit their local contexts. The next stage of this project was to test the clinician-rated feasibility and patient-rated acceptability of My Back My Plan. This feasibility and acceptability trial is reported in an accompanying paper (Ahern *et al.* 2022).

References

- Ahern M, Dean CM, Dear BF, Willcock SM, Hush JM (2019) The experiences and needs of people seeking primary care for low-back pain in Australia. *Pain Reports* 4(4), e756. doi:10.1097/PR9.0000000000000756
- Ahern M, Dean CM, Dear BF, Willcock SM, Hush JM (2020) Management of acute low back pain: the practices and perspectives of primary care clinicians in Australia. *Australian Journal of Primary Health* 26(3), 256–264. doi:10.1071/PY19152
- Ahern M, Dean CM, Dear BF, Willcock SM, Hush JM (2022) My Back My Plan is a feasible and acceptable individualised program for acute low back pain in primary care. *Australian Journal of Primary Health*. doi:10.1071/PY21207
- Almeida M, Saragiotto B, Richards B, Maher CG (2018) Primary care management of non-specific low back pain: key messages from recent clinical guidelines. *Medical Journal of Australia* 208(6), 272–275. doi:10.5694/mja17.01152
- Australian Bureau of Statistics (2018) National Health Survey: First Results, 2017–18. Cat. no. 4364.0.55.001. (Commonwealth of Australia: Canberra, ACT, Australia) Available at <https://www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey-first-results/latest-release> [Verified 7 February 2021]

- Australian Institute of Health and Welfare (2019) Back problems. Cat. no. PHE231. (AIHW: Canberra, ACT, Australia) Available at <https://www.aihw.gov.au/reports/chronic-musculoskeletal-conditions/back-problems/contents/what-are-back-problems> [Verified 7 February 2021]
- Bernstein IA, Malik Q, Carville S, Ward S (2017) Low back pain and sciatica: summary of NICE guidance. *BMJ* **356**, i6748. doi:10.1136/bmj.i6748
- Bodegård H, Helgesson G, Juth N, Olsson D, Lynøe N (2019) Challenges to patient centredness – a comparison of patient and doctor experiences from primary care. *BMC Family Practice* **20**(1), 83. doi:10.1186/s12875-019-0959-y
- Chou R, Shekelle P (2010) Will this patient develop persistent disabling low back pain? *JAMA* **303**(13), 1295–1302. doi:10.1001/jama.2010.344
- Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M (2008) Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ* **337**, a1655. doi:10.1136/bmj.a1655
- Croot L, O'Cathain A, Sworn K, Yardley L, Turner K, Duncan E, Hoddinott P (2019) Developing interventions to improve health: a systematic mapping review of international practice between 2015 and 2016. *Pilot and Feasibility Studies* **5**(1), 127. doi:10.1186/s40814-019-0512-8
- da Silva T, Mills K, Brown BT, Pocovi N, de Campos T, Maher C, Hancock MJ (2019) Recurrence of low back pain is common: a prospective inception cohort study. *Journal of Physiotherapy* **65**(3), 159–165. doi:10.1016/j.jphys.2019.04.010
- de Vet HC, Heymans MW, Dunn KM, Pope DP, van der Beek AJ, Macfarlane GJ, Bouter LM, Croft PR (2002) Episodes of low back pain: a proposal for uniform definitions to be used in research. *Spine (Phila Pa 1976)* **27**(21), 2409–2416. doi:10.1097/01.BRS.0000030307.34002
- Eldredge LKB, Markham CM, Ruiter RA, Fernández ME, Kok G, Parcel GS (2016) 'Planning health promotion programs: an intervention mapping approach.' (Jossey-Bass Inc.: San Francisco)
- Ferreira ML, Ferreira PH, Herbert RD, Latimer J (2009) People with low back pain typically need to feel 'much better' to consider intervention worthwhile: an observational study. *Australian Journal of Physiotherapy* **55**(2), 123–127. doi:10.1016/S0004-9514(09)70042-X
- Fillingim RB (2017) Individual differences in pain: understanding the mosaic that makes pain personal. *Pain* **158**(Suppl 1), S11–S18. doi:10.1097/j.pain.0000000000000775
- Gale NK, Heath G, Cameron E, Rashid S, Redwood S (2013) Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology* **13**(1), 117. doi:10.1186/1471-2288-13-117
- Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, Schünemann HJ G. W. Group (2008) GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ (Clinical Research ed.)* **336**(7650), 924–926. doi:10.1136/bmj.39489.470347.AD
- Hayden JA, Côté P, Steenstra IA, Bombardier C, QUIPS-LBP Working Group (2008) Identifying phases of investigation helps planning, appraising, and applying the results of explanatory prognosis studies. *Journal of Clinical Epidemiology* **61**(6), 552–560. doi:10.1016/j.jclinepi.2007.08.005
- Hayden JA, Dunn KM, van der Windt DA, Shaw WS (2010) What is the prognosis of back pain? *Best Practice & Research Clinical Rheumatology* **24**(2), 167–179. doi:10.1016/j.berh.2009.12.005
- Henschke N, Maher CG, Refshauge KM, Herbert RD, Cumming RG, Bleasel J, York J, Das A, McAuley JH (2008) Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. *BMJ* **337**, a171. doi:10.1136/bmj.a171
- Hill JC, Dunn KM, Lewis M, Mullis R, Main CJ, Foster NE, Hay EM (2008) A primary care back pain screening tool: identifying patient subgroups for initial treatment. *Arthritis Care & Research: Official Journal of the American College of Rheumatology* **59**(5), 632–641. doi:10.1002/art.23563
- Hill JC, Whitehurst DG, Lewis M, Bryan S, Dunn KM, Foster NE, Konstantinou K, Main CJ, Mason E, Somerville S (2011) Comparison of stratified primary care management for low back pain with current best practice (STarT Back): a randomised controlled trial. *The Lancet* **378**(9802), 1560–1571. doi:10.1016/S0140-6736(11)60937-9
- Hodder RK, Wolfenden L, Kamper SJ, Lee H, Williams A, O'Brien KM, Williams CM (2016) Developing implementation science to improve the translation of research to address low back pain: a critical review. *Best Practice & Research Clinical Rheumatology* **30**(6), 1050–1073. doi:10.1016/j.berh.2017.05.002
- Hush JM (2020) Low back pain: it is time to embrace complexity. *Pain* **161**(10), 2248–2251. doi:10.1097/j.pain.0000000000001933
- Karran EL, McAuley JH, Traeger AC, Hillier SL, Grabherr L, Russek LN, Moseley GL (2017) Can screening instruments accurately determine poor outcome risk in adults with recent onset low back pain? A systematic review and meta-analysis. *BMC Medicine* **15**(1), 13. doi:10.1186/s12916-016-0774-4
- Lin I, Wiles L, Waller R, Goucke R, Nagree Y, Gibberd M, Straker L, Maher CG, O'Sullivan PPB (2020) What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review. *British Journal of Sports Medicine* **54**(2), 79. doi:10.1136/bjsports-2018-099878
- Linton SJ, Nicholas M, MacDonald S (2011) Development of a short form of the Orebro Musculoskeletal Pain Screening Questionnaire. *Spine (Phila Pa 1976)* **36**(22), 1891–1895. doi:10.1097/BRS.0b013e3181f8f775
- Linton SJ, Nicholas M, Shaw W (2018) Why wait to address high-risk cases of acute low back pain? A comparison of stepped, stratified, and matched care. *Pain* **159**(12), 2437–2441. doi:10.1097/j.pain.0000000000001308
- Machado GC, Maher CG, Ferreira PH, Latimer J, Koes BW, Steffens D, Ferreira ML (2017) Can recurrence after an acute episode of low back pain be predicted? *Physical Therapy* **97**(9), 889–895. doi:10.1093/ptj/pzx067
- Maher C, Underwood M, Buchbinder R (2017) Non-specific low back pain. *The Lancet* **389**(10070), 736–747. doi:10.1016/S0140-6736(16)30970-9
- March L, Smith EUR, Hoy DG, Cross MJ, Sanchez-Riera L, Blyth F, Buchbinder R, Vos T, Woolf AD (2014) Burden of disability due to musculoskeletal (MSK) disorders. *Best Practice & Research Clinical Rheumatology* **28**(3), 353–366. doi:10.1016/j.berh.2014.08.002
- Michie S, van Stralen MM, West R (2011) The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science* **6**(1), 42. doi:10.1186/1748-5908-6-42
- Middleton A, Fritz SL, Lusardi M (2015) Walking speed: the functional vital sign. *Journal of Aging and Physical Activity* **23**(2), 314–322. doi:10.1123/japa.2013-0236
- National Institute for Health and Care Excellence (NICE) (2016) Low Back Pain and Sciatica in over 16s: Assessment and Management. Available at <https://www.nice.org.uk/guidance/ng59> [Verified 7 February 2021]
- NSW Agency for Clinical Innovation (2016) Model of Care: Management of People with Acute Low Back Pain. (Agency for Clinical Innovation: Sydney, NSW, Australia) Available at https://www.aci.health.nsw.gov.au/_data/assets/pdf_file/0007/336688/acute-low-back-pain-moc.pdf
- Nicholas MK, George SZ (2011) Psychologically informed interventions for low back pain: an update for physical therapists. *Physical Therapy* **91**(5), 765–776. doi:10.2522/ptj.20100278
- Nicholas MK, Costa DSJ, Linton SJ, Main CJ, Shaw WS, Pearce G, Gleeson M, Pinto RZ, Blyth FM, McAuley JH, Smeets RJEM, McGarity A (2020) Implementation of early intervention protocol in Australia for 'high risk' injured workers is associated with fewer lost work days over 2 years than usual (stepped) care. *Journal of Occupational Rehabilitation* **30**(1), 93–104. doi:10.1007/s10926-019-09849-y
- O'Cathain A, Croot L, Sworn K, Duncan E, Rousseau N, Turner K, Yardley L, Hoddinott P (2019) Taxonomy of approaches to developing interventions to improve health: a systematic methods overview. *Pilot and Feasibility Studies* **5**(1), 41. doi:10.1186/s40814-019-0425-6
- Qaseem A, Wilt TJ, McLean RM, Forciea MA (2017) Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Annals of Internal Medicine* **166**(7), 514–530. doi:10.7326/M16-2367
- Schofield DJ, Shrestha RN, Percival R, Passey ME, Callander EJ, Kelly SJ (2012) The personal and national costs of early retirement because

- of spinal disorders: impacts on income, taxes, and government support payments. *The Spine Journal* 12(12), 1111–1118. doi:10.1016/j.spinee.2012.09.036
- Shah PA (2017) A patient-centered approach to low back pain: science and strategies. *Consultant* 57(12), 685–690.
- Skivington K, Matthews L, Craig P, Simpson S, Moore L (2018) Developing and evaluating complex interventions: updating Medical Research Council guidance to take account of new methodological and theoretical approaches. *The Lancet* 392, S2. doi:10.1016/S0140-6736(18)32865-4
- Slade SC, Kent P, Patel S, Bucknall T, Buchbinder R (2016) Barriers to primary care clinician adherence to clinical guidelines for the management of low back pain. *The Clinical Journal of Pain* 32(9), 800–816. doi:10.1097/AJP.0000000000000324
- Viney S, Sides D (2017) Patient centred care through co-design. [Powerpoint presentation]. (Monash Health: Melbourne, Vic., Australia)
- Vos T, Lim SS, Abbafati C, *et al.* (2020) Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet* 396(10258), 1204–1222. doi:10.1016/S0140-6736(20)30925-9

Data availability. The data that support this study are available in the article and in FigShare at <https://doi.org/10.25949/20488191.v1>.

Conflicts of interest. The authors declare no conflicts of interest.

Declaration of funding. MA was funded by a Macquarie University Research Training Program full-time PhD scholarship. BFD was supported by a National Health and Medical Research Emerging Leadership Fellowship and is part of a team funded by the Australian Federal Government to develop and provide a free national online assessment and treatment service, the MindSpot Clinic, for Australians with anxiety and depression. The sources of support to MA and BFD had no involvement in the decision to submit the final manuscript for publication.

Acknowledgements. The authors thank the patients who participated in this study, as well as the staff of the MQ Health General Practice Clinic and Physiotherapy Clinic.

Author affiliations

^ADepartment of Psychology, Faculty of Medicine, Health and Human Sciences, Australian Hearing Hub, Level 2 and Level 3, 16 University Avenue, Macquarie University, Sydney, NSW 2109, Australia.

^BDepartment of Health Sciences, Faculty of Medicine, Health and Human Sciences, Ground Floor, 75 Talavera Road, Macquarie University, Sydney, NSW 2109, Australia.

^CDepartment of Psychology, Macquarie University, Sydney, NSW 2109, Australia.

^DMacquarie University Health Sciences Centre, 2 Technology Place, Macquarie Park, Sydney, NSW 2109, Australia.