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Review Article

We Are All in This Together—Whole of Community Pain Science Education Campaigns to Promote Better Management of Persistent Pain

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Abstract: Persistent pain is a major public health issue—estimated to affect a quarter of the world’s population. Public understanding of persistent pain is based on outdated biomedical models, laden with misconceptions that are contrary to best evidence. This understanding is a barrier to effective pain management. Thus, there have been calls for public health-based interventions to address these misconceptions. Previous pain-focussed public education campaigns have targeted pain beliefs and behaviours that are thought to promote recovery, such as staying active. However, prevailing pain-related misconceptions render many of these approaches counter-intuitive, at best. Pain Science Education improves understanding of ‘how pain works’ and has been demonstrated to improve pain and disability outcomes. Extending Pain Science Education beyond the clinic to the wider community seems warranted. Learning from previous back pain-focussed and other public health educational campaigns could optimise the potential benefit of such a Pain Science Education campaign. Pain Science Education-grounded campaigns have been delivered in Australia and the UK and show promise, but robust evaluations are needed before any firm conclusions on their population impact can be made. Several challenges exist going forward. Not least is the need to ensure all stakeholders are involved in the development and implementation of Pain Science Education public messaging campaigns. Furthermore, it is crucial that campaigns are undertaken through a health equity lens, incorporating underrepresented communities to ensure that any intervention does not widen existing health inequalities associated with persistent pain.

Perspective: Public misconceptions about pain are a significant public health challenge and a viable intervention target to reduce the personal, social, and economic burden of persistent pain. Adaptation of Pain Science Education, which improves misconceptions in a clinical setting, into the public health setting seems a promising approach to explore.

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Persistent Pain is a Public Health Priority Issue

Persistent pain is pain that persists or recurs for more than 3 months and includes both primary and secondary persistent pain.¹ Primary persistent pain cannot be better accounted for by another condition, whilst secondary persistent pain is considered as pain secondary to an underlying disease or condition.¹ Persistent pain is a major burden for patients and their families, health care systems, societies, and economies worldwide. It is the largest contributor to years lived with disability,²⁻⁴ and is estimated to impact one in four adults globally.⁵ Persistent pain is also associated with co-morbidity and lower life expectancy.⁶⁻⁸ Alongside the enormous personal, social, and financial costs to the individual,^{9,10} the societal economic burden of persistent pain, due to factors such as absenteeism and productivity loss, is considerable and comparable to other prevalent and costly health conditions such as cardiovascular disease, diabetes, and cancer.¹¹⁻¹³ In Europe, the estimated direct and indirect health care costs of persistent pain range from 2% to 3% of gross domestic product.¹⁴ The burden of persistent pain is projected to rise secondary to increases in physical inactivity and obesity, along with an aging population.¹⁵ Furthermore, persistent pain disproportionately impacts marginalised and disadvantaged groups, exacerbating health inequalities.⁶ However, it may be amenable to varying degrees of primary, secondary, and tertiary prevention^{16,17} thus demanding recognition as a high priority public health problem requiring management strategies that extend beyond individualised care.^{15,16,18,19}

A key issue at the heart of the global persistent pain problem is a fundamental lack of understanding of pain in all sections of society. Public misconceptions about persistent pain are rife and these misconceptions perpetuate cognitions and behaviours contrary to contemporary pain management. These misconceptions lead to patients seeking and choosing non-evidence-based pain management options. Health care professionals (HCPs) with such misconceptions are more likely to recommend non-evidence-based care, and health care commissioners with such conceptions may be more likely to direct resources to non-evidence-based pathways. This domino effect creates an environment where non-evidence-based care is perpetuated leading to poorer outcomes for all. As such, developing and implementing public education campaigns to address these misconceptions has been identified as a key public health priority.^{15,16} We aim to provide an argument for the need for a Pain Science Education (PSE) informed public health initiative to address public misconceptions about pain, as well as recommendations for what such an initiative might best include, and how it might best be delivered.

Public Beliefs about Persistent Pain Show Unhealthy Misconceptions

Consistent data from multiple countries show community misconceptions about pain are highly prevalent and

lead to unhealthy pain behaviours.²⁰⁻²⁵ For example, 65% of Irish people believe that *"If your back hurts, you should take it easy until the pain goes away"*²³ and 56% believe that *"Most back pain is caused by injuries or heavy lifting"*. Similarly, a recent Swiss study found that misconceptions concerning the fragility of the back, its vulnerability to injury, and its need for protection, were widely held.²⁵ These beliefs reflect a structural pathology-based understanding of persistent pain, that is, an understanding of pain as a marker of structural pathology.

In contrast, within the contemporary scientific literature, understanding and management of persistent pain is based on a biopsychosocial model, which considers the involvement of biological, psychological, and socio-environmental factors.^{26,27} It clearly differentiates tissue injury from pain and holds that pain is influenced by a wide range of factors, that pain has a protective role, and that persistent pain is often associated with substantially increased somatosensory stimulus-response profiles, consistent with an 'overprotective pain system'.²⁸⁻³¹ Several of these concepts have been identified by people with a history of persistent pain as being important learnings that underpinned their improvement or recovery.^{28,29}

Current guidelines for the assessment and management of persistent pain³²⁻³⁴ are consistent with the biopsychosocial model. These guidelines advocate management approaches including education and empowerment, active self-management, and psychological strategies. Despite this, as highlighted by the recent *Lancet* pain series,³⁵ and others, people with persistent pain continue to receive treatment that is consistent with the outdated structural pathology model. This model includes diagnoses and management strategies not supported by evidence or guidelines (eg, imaging, medications, bed rest, and surgery).³⁶⁻⁴⁰

Individuals holding stronger structural pathology beliefs about persistent pain are more likely to adopt unhealthy pain behaviours. These include passive coping strategies, avoidance of activity and paid work, greater use of bed rest as a management strategy, and increased likelihood to consult and utilise non-evidence-based medical resources.⁴¹⁻⁴⁵ At an individual level, processing health care information using a structural pathology framework will mean that evidence-based, biopsychosocial strategies such as active physical and psychological interventions are less likely to be adopted because they do not make logical sense as treatment options. As such, consumers will not expect these treatments and may be disappointed or feel unheard or invalidated if offered them. In contrast, non-evidence based, and often risky, biomedical interventions, such as opioids, make perfect sense^{46,47} and, as such, individuals expect and will often demand them. Within this complex context, individuals, and HCPs, can hardly be blamed for making suboptimal choices related to persistent pain management.⁴⁸

HCPs from multiple disciplines (eg, General Practitioners, Consultants, Nurses, Midwives, Psychologists, and Allied Health Professionals) are often highly trained in acute pain and injury management, but not in the management of persistent pain. They receive limited pain-specific education

during licensure, are usually immersed in a biomedically focussed curriculum, and graduate with a lack of confidence in their own pain management skills.⁴⁹ In addition to the lack of confidence in their own pain management skills, many clinicians have a fear of inaction related to concerns about the negative impacts on the patient-therapist relationship, missing a serious pathology, or litigation. This can promote biomedically oriented clinical decisions despite having biopsychosocially oriented beliefs, for example ordering diagnostic lumbar imaging in the absence of signs or symptoms of serious disease. They are often socialised into a work environment that fosters a biomedical approach⁵⁰ and we must remember that HCPs are also members of the public—their beliefs are also formed over time from multiple sources. Unsurprisingly, individuals' misconceptions are often reinforced by HCPs,⁵¹ family and peers,^{52–54} media coverage of celebrity or athlete's care,⁵⁵ misinformation regardless of intent,⁵⁶ and culturally-endorsed understandings of pain and health more generally.

Misconceptions Provide Systemic Barriers to Better Care and Outcomes

The pervasive nature of misconceptions around persistent pain is also likely to be key to the many systematic factors that act as barriers to shifting individual expectations and community norms about persistent pain and the best ways to treat it. For example, in Australia, Medicare (government funded universal health insurance) rebates for persistent pain treatment do not reflect World Health Organisation or professional society guidelines and largely act to reinforce poor practice and 'low value' treatments. Workforce limitations, especially in rural, remote, and other resource-poor areas, place severe time and referral network limitations on primary care HCPs.—Shifting a patient's understanding of their complex pain problem takes time and skills that are seldom available in such settings. Finally, the hyper-specialisation of medicine has acted to reinforce the biomedical model and create impractical and inaccessible escalation pathways for those challenged by persisting pain.

This 'difficult problem of health care',⁵⁷ in which clinical guidelines have had limited success in changing practice towards best care options, is clearly multifactorial. Indeed, better outcomes will require targeted and coordinated public health promotion efforts to shift pain-related beliefs amongst public and HCP groups.^{15,16,19,47} Previous initiatives with this intention have been implemented with varying degrees of success.

Previous Public Campaigns Targeting Pain Beliefs and Behaviours

Public health campaigns aimed at addressing unhelpful pain beliefs, and behaviours, have been recommended.^{15,16} An assessment of the impact of campaigns in the following high-income countries on back pain have been published;

Campaigns to Promote Better Management of Persistent Pain

Scotland,⁵⁸ Norway,⁵⁹ Australia,^{60,61} Canada,⁶² Denmark,⁶³ and France.⁶⁴ These campaigns have generally been targeted towards the public and HCPs. They have focussed on encouraging behaviours that promote recovery from acute low back pain. In a recent initiative, Sharma et al, (2021)⁶¹ addressed patients' beliefs associated with spinal imaging in the presence of low back pain and Karran et al (2018)⁶⁵ promoted among HCPs and compensation providers an approach to radiological findings that promoted movement and activity—the so-called 'GLITtER package'. Similarities can be found in the key messages delivered in these campaigns with the advice to 'stay active' delivered in a number of campaigns.^{58,60,64} Other messages related to the assurance that low back pain is not a serious or dangerous problem; the Australian campaign⁶⁰ also acknowledged the importance of a positive attitude to back pain.

The evaluation of these campaigns identified significant methodological limitations. A recent systematic review reported that only the public health campaign delivered in Japan, evaluated in three separate publications, was rated as being of overall strong quality using the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies.⁶⁶ The studies evaluating the other campaigns were rated as either moderate-to-weak quality with most studies lacking a comparison group and associated with selection bias.⁶⁶ However, they reported significant positive shifts in the beliefs of the public relating to staying active in the presence of back pain, although impacts upon behaviour were more variable.⁶⁶ The Australian campaign had the largest funding and subsequent reach, including workplace-based components,⁶⁰ and reported a significant reduction in back pain workers' compensation claims and total payments for back claims. In contrast, the Norwegian⁵⁹ and Scottish⁵⁸ campaigns that sought to replicate the Australian campaign, but with less funding and reach, reported no change in sickness behaviour. Where HCPs were surveyed, the results were less compelling. The Australian study⁶⁰ found positive changes in HCPs' beliefs lasting at least 4.5 years after the campaign finished. Other campaigns found limited shifts in HCP beliefs and subsequent patient advice.^{58,59} Sharma et al (2021)⁶¹ reported positive changes in the public's intention to request imaging and Werner et al (2008)⁵⁹ reported more evidence aligned use of x-rays. Conversely, Gross et al (2010)⁶² failed to find any effect on health care utilisation for low back pain.

The campaigns in these high-income countries described successful change in the beliefs of the public through the delivery of simple key messages focused upon reassurance and behavioural recommendations such as "staying active". However, these campaigns made little attempt to contextualise simple messaging by improving people's underlying understanding of persistent pain and its biopsychosocial nature. Simplistically, such campaigns told people *what* they should do but did not explain *why* they should do it. Such an approach might have a limited impact, in today's media rich environment laden with conflicting information, on an individual's critical health literacy and their capacity to make informed decisions about

their own health. The content and intent of these campaigns were consistent with an approach to behavioural change grounded in contemporary thought of the time—that ‘advice’ leads to change.

We contend that extensive progress in the field of behaviour change suggests that some degree of understanding of the problem is necessary to enable and empower individuals to make different choices about how they deal with their pain.⁶⁷ We propose that campaigns are needed to change both beliefs and behaviours, and that this can be best achieved by helping people to gain a deeper understanding of persistent pain. Examples can be taken from other fields, such as environmental behaviour change, where it has been shown that transformative education, which goes beyond giving information and raising awareness, to helping people “understand the given information” can lead to significantly more positive behaviours.⁶⁸ Future persistent pain campaigns should put a stronger emphasis on the understanding of ‘how pain works’, thus enabling and empowering individuals to make more informed choices about their own health. This could lead individuals to expect, and perhaps even demand, best care. Campaigns grounded in PSE would be ideally placed to achieve this.

Pain Science Education for the Public

Previous public education campaigns have focused on promoting beliefs and behaviours that are thought to promote recovery from acute back pain—remaining active despite pain and considering self-management strategies. However, dominant pain-related misconceptions render those behaviours counter-intuitive at best.⁴⁸ Recognition of these misconceptions as important unaddressed treatment targets triggered the development of Pain Neuroscience Education,⁶⁹ which has evolved to the current approach of PSE.⁷⁰ PSE differs from older pain education approaches in both content and delivery. It is grounded in contemporary education science; it deviates from cognitive therapy by using educational frameworks and techniques to shift the learner’s understanding of ‘how pain is experienced’, rather than ‘what to do about pain’.⁷⁴ Contemporary PSE has generic learning objectives or ‘target concepts’, which have been iteratively derived with insight from HCPs, scientists, and individuals currently or previously challenged by persistent pain.^{27–29}

Multiple randomised controlled trials and systematic reviews^{71–76} show that PNE (the precursor to PSE) offered a range of clinically important benefits for people with persistent pain. PSE can increase knowledge about the biological mechanisms involved in pain; the changes in sensitivity that occur as pain persists; the multifactorial nature of pain and the appropriateness of taking a biopsychosocial approach to management. PSE has also been shown to reduce pain-related worry, increase confidence in moving without reinjury,^{46,71,74} and enhance the pain and disability benefits of exercise.⁷⁵ Whilst, there have been questions about the

quality of previous systematic reviews of PSE,⁷⁷ a recent series of robust clinical trials for people with persisting back pain, each trial from a different research group, each trial taking a clearly biopsychosocial approach to the problem and each clearly grounded in and built upon PSE, have shown important and sustained benefits for a variety of outcome measures including pain, disability, pain related fear, catastrophising, and self-efficacy.^{78–80} A recent major network meta-analysis concluded that ‘pain education plus exercise provides the most sustainable benefits for persistent low back pain’.⁸¹ Finally, ‘real world data’ from Australia’s Veteran’s Mates programmes show a clear drop in opioid use in response to a PSE-based ‘patient and doctor’ intervention programme.⁸²

The clinical benefits of PSE raise the significant possibility that it will also offer value when delivered at a population level. The theoretical argument seems compelling:

- (i) Effective, biopsychosocial based, first-line treatments are not often delivered, and most individuals do not yet want them.^{15,83} This situation likely reflects HCP and community held norms about ‘how pain works’.
- (ii) By aligning public and HCPs understanding of pain with current scientific understanding, new community norms regarding ‘how pain is experienced’ will shift public expectations of care away from ‘low value’ (high cost—limited/no efficacy) structural pathology targeted interventions.
- (iii) PSE changes understanding of the factors that contribute to persistent pain to better align treatment with evidence-based best practice care. Ultimately, this empowers individuals to actively engage in self-management strategies such as exercise.
- (iv) Better alignment between individuals’ expectations and evidence-based care will result in more common delivery of effective treatments and thus, better clinical outcomes.
- (v) Better public understanding will reduce the stigma often associated with persistent pain,⁸⁴ creating more supportive environments within the home, workplace, and social settings.
- (vi) Whole of community education will also serve to align HCPs’ understandings and promote collaborative decision making with patient and care providers.

At their core, delivery of PSE at the individual level within a clinical environment and delivery of PSE en masse at the public health level share a common goal—to give people an understanding of pain that aligns, rather than contrasts, with contemporary scientific understanding. However, Public Health PSE campaigns require a shift on a spectrum from individually tailored information to mass coverage taking into consideration the content of the programme, the delivery methods used, the scope/reach of the activity, heterogeneous learners, and the intended deliverers and funders (Fig 1). Population level PSE aims to align public

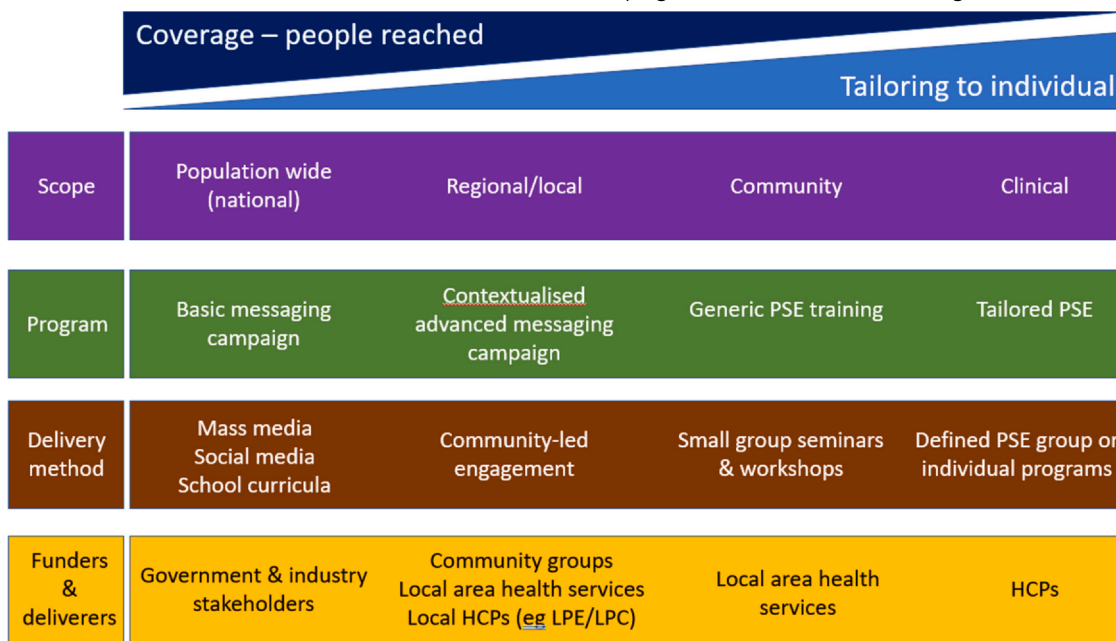


Figure 1. The spectrum from clinical to public health Pain Science Education. PSE, pain science education; HCPs, health care professionals; LPE, local pain educators; LPC, local pain collective.

understanding of pain with current scientific understanding. Two example public-facing initiatives, taking a whole of community approach, that are pursuing this aim are Australia’s non-profit initiative *Pain Revolution* (<https://www.painrevolution.org/>), and the UK’s *Flippin’ Pain* (<https://www.flippinpain.co.uk/>). These initiatives have identified similar ‘key messages’ (Table 1) that are based on learning objectives identified through an iterative process, grounded in the perspectives of improved or recovered consumers on ‘the most important concepts they learnt’.²⁹

Both campaigns use a theories of change approach where the achievement of a long-term goal is mapped out through the achievement of a series of short-term goals via activities, whilst considering a variety of assumptions and the resources available.⁸⁵ The models

developed by the campaigns closely align with evidence-based logic models of health literacy that illustrate the link between better understanding of one’s health condition (eg, persistent pain) and 1) better utilisation of health care, 2) better patient therapist relationships, and 3) better self-management.⁸⁶ The Theories of change model for the *Flippin’ Pain* Campaign is shown in Fig 2.

Pain Revolution and *Flippin’ Pain* take two approaches to align public understanding with current scientific understanding of pain. The first approach involves mainly didactic community outreach events and health promotion strategies, with pockets of interactivity. Face-to-face and online public facing events are delivered consisting of PSE-based presentations with clearly identified learning objectives, and interactive

Table 1. Key Messages in the *Pain Revolution* and *Flippin’ Pain* Community Pain Education Campaigns

<i>PAIN REVOLUTION (AUSTRALIA)</i>	<i>FLIPPIN’ PAIN (UNITED KINGDOM)</i>	
<i>Essential pain facts</i>	<i>Talking points and factsheets</i>	
Pain protects us and promotes healing	All pain is real no matter what is causing it	Persistent pain is common and can affect anyone
Persistent pain overprotects us and prevents recovery	Learn more about your pain	Hurt does not always mean harm
Many factors influence pain	Pain does not equal tissue damage	Everything matters when it comes to pain
There are many ways to reduce pain and promote recovery	Pain equals protection	Medicines and surgeries are often not the answer
	Pain depends on context	Understanding your pain can be key
	Pain and your protectometer	Recovery is possible
	Your overprotective pain system	
	Retrain your pain system	
	Being proactive about your pain	

NOTE. <https://www.flippinpain.co.uk/app/uploads/2021/10/Flippin-Pain-Key-Messages-Booklet.pdf> [accessed 14.12.2022]; <https://www.painrevolution.org/factsheets> [accessed 14.12.2022].

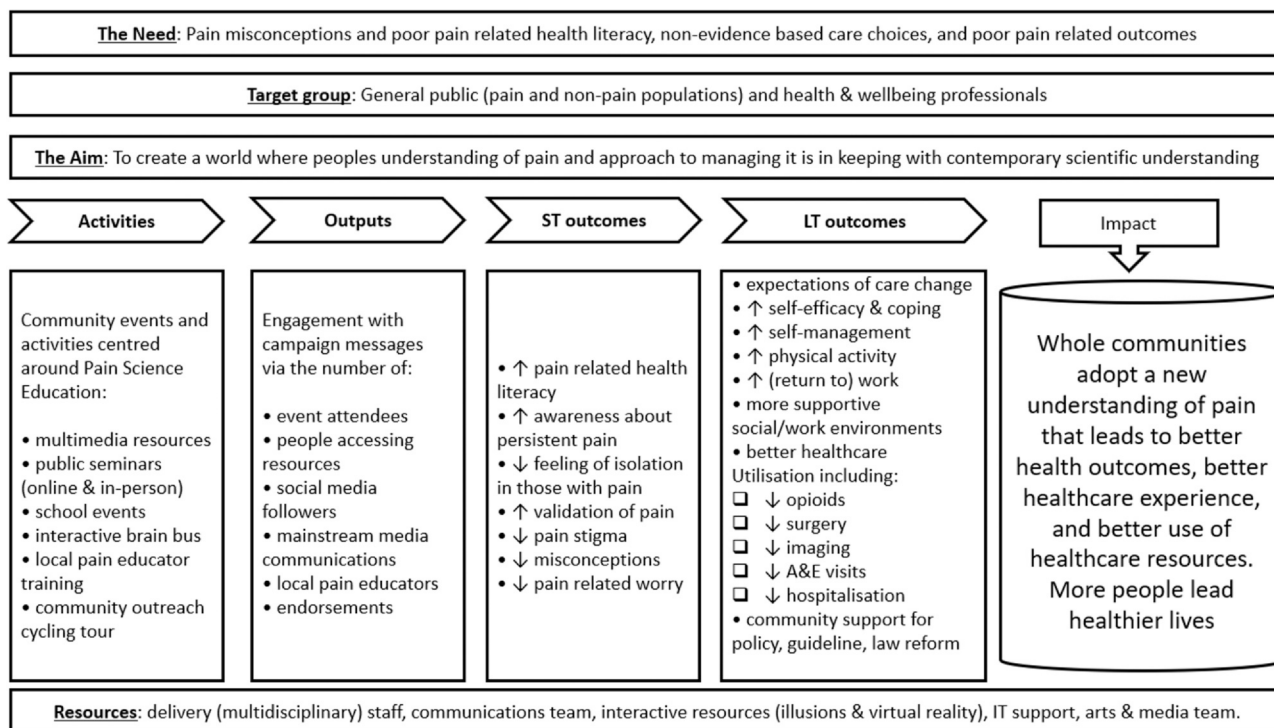


Figure 2. *Flippin' Pain*: Theories of change model. A&E, accident and emergency.

questions and answers panels. Presenters and panellists include HCPs and people with lived experience of recovery from persistent pain. In addition, street-based interactive experiential workshops are run in public spaces, such as shopping mall car parks and village greens, and at community festivals (eg, WOMADelaide and CarFest). These 'pop-up' workshops use multi-sensory illusions and Virtual Reality to engage members of the public and to present key campaign concepts in a non-threatening, entertaining manner. Online resources including educational websites, social media, and audio-visual materials are also made available. Both *Pain Revolution* and *Flippin' Pain* deliver a community Outreach Tour that packages these community and HCP outreach events and pop-up workshops, around a high-profile multi-day cycling event. The 2020 *Pain Revolution* Rural Outreach Tour delivered 19 events in 10 rural towns, with over 1,500 participants. Each event concluded with a specific 'call to action' to encourage participants to take another step in their journey towards further understanding pain.

The UK's *Flippin' Pain* also integrates an active social media platform and engages community and national media. To date, *Flippin' Pain* events have had almost 12,000 attendees, the campaign has over 9,000 followers on social media across multiple platforms, the website has had 23,000 website visits, and *Flippin' pain* videos have been viewed over 50,000 times on a dedicated YouTube channel. Each of these initiatives provisionally show measurable benefits among participants, for example improved pain-related knowledge,^{87,88} self-efficacy, intent to self-manage, and engagement with further online material [unpublished findings]. Whether these initiatives make an impact on population-level

clinical and cost-effective benefits, such as reduced work loss, surgical and hospital admission rates, analgesic prescriptions, and reduced stigma, remains to be evaluated.

The second approach for *Pain Revolution* and *Flippin' Pain* involves building capacity among HCPs to deliver PSE to their HCP peers, the wider community, and their patients, with a broad aim to facilitate increased expectation and delivery of guideline-based pain care. *Pain Revolution's* 'Local Pain Educator' and 'Local Pain Collective' programmes do this by training rural HCPs in pain science, PSE, and care, and then supporting them to deliver a tailored pain education programme to the HCPs in their region through a Local Pain Collective. Beyond the initial capacity building initiative, Local Pain Educators are encouraged and supported where possible to continue a leadership role in their community in shifting community norms, public expectations and HCP knowledge, skills, and competency.

To facilitate the adoption, sustainability, and scalability of these PSE-grounded campaigns, multiple evidence-based implementation strategies have been utilised. The strategies are focused on different communities. Table 2 provides a list of evidence-based implementation strategies identified by Grimshaw et al (2012)⁸⁹ targeting HCPs and the public. Those strategies include printed educational materials, educational meetings, educational outreach, local opinion leaders' involvement in the delivery of key messages, audit and feedback, and reminders. Strategies targeting key health policy and decision makers have included providing them with evaluation reports from previous implementations in neighbouring regions to raise their awareness of the campaign and highlight the potential

Table 2. Implementation Strategies for Delivering PSE at the Public Health Level

IMPLEMENTATION TECHNIQUE	DEFINITION*	CURRENT AND FUTURE IMPLEMENTATION STRATEGIES EMPLOYED WITHIN EXISTING PSE INFORMED PUBLIC HEALTH CAMPAIGNS
HEALTH PROFESSIONALS		
Printed Educational Materials	Distribution of published or printed recommendations for clinical care, including clinical practice guidelines, audio-visual materials, and electronic publications. The materials may have been delivered personally or through mass mailings.	Educational materials are available online, from printable e-handouts to links to bespoke educational materials such as Tame the beast (https://www.tamethebeast.org/) and the <i>Flippin' Pain</i> Formula (https://www.flippinpain.co.uk/formula/) which combine a variety of media including animations, infographics, YouTube video's and podcasts.
Educational meetings	Participation of health care providers in conferences, lectures, workshops, or traineeships	Health care professional focused events are run online and in-person ranging from 30 to 90 min events primarily consisting of didactic lectures followed by interactive questions and answers with a panel of experts (including people with lived experience, health care professionals, and scientists). There are also training courses run over multiple days for local pain educators.
Educational outreach	Use of a trained person who meets with providers in their practice settings to give information with the intent of changing the providers' practice. The information given may have included feedback on the performance of the provider(s)	Campaign educators run invited sessions bespoke for specific regional or professional groups in their practice settings with the intention of encouraging health care professionals to adapt a more biopsychosocial approach to care in keeping with evidence-based guidelines incorporating a Pain Science Education informed approach to care that incorporates active physical and psychological therapies.
Local opinion leaders	Use of providers nominated by their colleagues as 'educationally influential'	Local lead clinicians are invited to sit on the panel of experts in the interactive questions and answers sessions. They are also invited to facilitate the networking of the campaign team with other clinicians and groups within the region to maximise reach and increase buy-in to the campaign.
Audit and feedback	Any summary of clinical performance of health care over a specified period of time' to change health professional behaviour, as indexed by 'objectively measured professional practice in a health care setting or health care outcomes	During campaign events and communications objective audit data is commonly used to identify challenges and encourage buy-in to addressing those through a change in professional behaviour – for example using standardised regional opioid prescription statistics to encourage a reduction in opioid prescription and increase in opioid deprescribing/tapering activity in keeping with evidence-based guidelines and regional clinical drivers.
Reminders	Patient or encounter specific information, provided verbally, on paper or on a computer screen, which is designed or intended to prompt a health professional to recall information. This would usually be encountered through their general education, in the medical records or through interactions with peers, and so remind them to perform or avoid some action to aid individual patient care. Computer aided decision support and drugs dosage are included	A computer-based prompting system is being developed where health care professionals are reminded to communicate the key campaign messages to their patients and refer patients to the campaign website and associated educational resources.
CONSUMERS		
Written information	Written information is one of the most ubiquitous interventions targeting consumers	Educational materials are available online, from printable e-handouts to links to bespoke educational materials such as Tame the beast (https://www.tamethebeast.org/) and the <i>Flippin' Pain</i> Formula (https://www.flippinpain.co.uk/formula/) which combine a variety of media including animations, infographics, YouTube video's and podcasts.
Educational meetings	Participation of the public in workshops and public lectures/engagement events	Public focused events are run online and in-person lasting approximately 90 min consisting of didactic lectures followed by interactive questions and answers with a panel of experts (experts include people with lived experience, health care professionals, and scientists)

NOTE. These are aligned to the strategies identified by Grimshaw et al, 2012.⁸⁹ *These definitions are from Grimshaw et al, 2012⁸⁹ and are predominantly, but not all, definitions from the Cochrane Effective Practice and Organisation of Care (EPOC) group.

benefit of commissioning such a campaign in their region.

The potential economic impact of campaigns such as *Pain Revolution* and *Flippin' Pain* are important to consider. Change in individuals' beliefs could lead to improved health outcomes including quality-of-life and wellbeing, reduced health care utilisation, and reduced productivity loss.⁷¹ It may also help to improve adherence to medical advice, effectively manage long-term conditions, and positively impact clinical and other health outcomes over time. An appropriate economic evaluation method such as cost consequence analysis or cost utility analysis^{90,91} will be important to determine the cost effectiveness and economic implications of these (and similar) initiatives. Previous public health campaigns for persistent (back) pain have shown that such interventions can be cost effective,⁶⁶ however the evidence in this area is limited.

These whole of community pain education programmes are in their infancy, have not been robustly evaluated, and therefore are not yet delivered at scale. However, they clearly show potential, and it is reasonable to suggest that a next step is to optimise and enhance them by applying learnings from successful public education initiatives.

Learning From Successful Non-pain Based Public Health Initiatives

A great deal of learning can be gained from studying previously successful non-pain based public health initiatives. The 'Communities That Care' model, which has been implemented in Australia,⁹² South America,⁹³ Europe,⁹⁴ and the USA,⁹⁵ is one such initiative. It provides an example of a phased training strategy that supports municipal coalitions to measurably increase healthy child and youth development. This is achieved by assessing modifiable risk factors (eg, bullying, family conflict, low school commitment, tobacco and alcohol availability, lack of physical activity opportunities) and then increasing investment in evidence-based programmes to measurably reduce locally elevated risk factors. Simple concrete messages are embedded in broader contextual system-level changes in these programmes. The implementation of the 'Communities That Care' model has been associated with community-wide improvements in reducing substance use,⁹² crime,⁹⁶ injury⁹⁷ and in improving mental health.⁹⁸ The development of persistent pain problems in children and adolescents share risk factors (eg, family management of sleep and anxiety⁹⁹) that have been successfully targeted in 'Communities That Care' initiatives, and thus could potentially be utilised within a PSE grounded public health initiative.

Two particularly successful public health initiatives that have been implemented globally, addressed motor vehicle safety and tobacco control.¹⁰⁰ These initiatives focused on multiple levels of influence (eg, schools, worksites, and communities) to achieve behaviour change on a large scale; they have substantially reduced

accident-related death rates, and heart disease, cancer, stroke, and lung disease.¹⁰⁰ A recent review of these two initiatives highlighted a number of key commonalities that contributed to their success; 1) reciprocal determinism (people were influenced by the initiatives and in turn influenced the environment themselves by becoming agents of wider change in a variety of ways such as starting/joining advocacy groups), 2) research monitoring, surveillance, and evaluation, 3) comprehensive and culturally appropriate interventions, and 4) public support and advocacy.¹⁰⁰ Considering previous work has highlighted that pain education alone on a public health level is unlikely to be sufficient to facilitate change,¹⁰¹ incorporating these components alongside a PSE grounded initiative would seem crucial.

Given that education was central to the success of both motor vehicle and tobacco control, we propose that PSE delivered at the public health level could be an important catalyst and sustained contributor to a larger persistent pain public health initiative. Table 3 proposes a possible checklist of four factors to consider in relation to PSE aligned to previously successful public health initiatives. These factors occur at a national level outwith a public health campaign but can be influenced or catalysed by such campaigns 1) *Reciprocal determinism*—for example, pain education initiatives could lead to the development of social norms that foster pain management policies and environments that facilitate evidence-based care; 2) *Research, monitoring, surveillance, and evaluation*—for example, continued national monitoring of neurostimulator and opioid use and harms data could be used to monitor success and fed back to the public to demonstrate the impact of these medications; 3) *Comprehensive and culturally appropriate interventions*—for example, increased national and regional funding to support co-produced evidence based campaigns to improve pain related health literacy; 4) *Public support and advocacy*—for example, introduction of laws and taxation to inhibit non-evidence based care, such as prolonged use of opioids for persistent pain.

Engaging children in pain education should improve long-term impacts. In general, public health initiatives are underpinned by current understanding and are 'future-oriented'—endeavouring to prevent disease and enhance wellness through promoting informed choices and healthy behaviours.¹⁰² They should engage not only those who experience the condition, but also those who are 'well' or 'at risk', taking a whole of community approach.¹⁰³ In keeping with this, engaging and educating children and young people is important for the development of accurate health-related beliefs and behaviours for a variety of conditions.^{104–107} As such a pain-focused public health initiative should target 'well' individuals including children and young people.

Adopting a public health perspective also requires an acknowledgement that pain is significantly impacted by social and environmental circumstances, referred to as social determinants of health.^{18,108} Socioeconomic and environmental factors such as race, gender, low socioeconomic status, unemployment, low educational attainment, adverse work conditions, and rurality are all

Table 3. Factors Accounting for Previous Public Health Campaign Success, and Proposed Ideas to Implement These Factors for Persistent Pain Management

FACTOR	PERSISTENT PAIN MANAGEMENT
Reciprocal determinism	Interactions among passive/non-evidence based treatments, environments, and human behaviour create 'persistent pain risks' Supportive social norms, school curriculum, persistent pain management policies and environments interact to protect the public from these risks
Research, monitoring, surveillance, and evaluation	Persistent Pain prevalence data Opioid usage for persistent pain and harms data Research into persistent pain mechanisms/drivers/biopsychosocial influencers
Comprehensive and culturally appropriate interventions	Risk factors noted and interventions adopted, implemented, evaluated, and disseminated Federal, regional, and private funding for pain related health literacy campaigns rooted in Pain Science Education in schools, worksites, and communities Pain management programmes Increased access to resources (eg, support phone numbers, books, online self-management, green spaces, and community centres to exercise)
Public support and advocacy	Laws relating to opioid prescription Taxes on non-evidence-based practice treatments for persistent pain Comprehensive education and guideline implementation campaigns for health professionals and members of the public

NOTE. Based upon Gielen and Green (2015) which presented factors associated with successes in motor vehicle safety and tobacco control.

associated with higher prevalence and/or increased severity of persistent pain.^{7,109–113} With rare exceptions (eg, www.isshoos.org), pain management has been slow to move on these substantial drivers of pain and disability, although recognition of the impacts of social determinants on pain is growing.^{109,110,113–118} That health education initiatives often fail to impact the very groups that need them the most¹¹⁹ emphasises the criticality of considering social determinants when planning any education intervention. Pain-related public health programmes must apply a health equity lens to how they are conceived, implemented, and evaluated; they should make significant efforts to reach and engage marginalised groups with clear and inclusive messaging that can be understood by the widest number of groups possible.

Future Challenges for Pain Science Education-Grounded Public Health Initiatives

Implementing public health interventions that are effective and equitable is highly challenging.¹²⁰ When planning community-wide strategies to improve pain beliefs, it is important to acknowledge the majority of the data available concerning 'what pain means' is derived from non-representative samples, lacking input from disadvantaged or minority groups.¹²¹ Including additional pain-related items in national health surveys, which would be more representative of the general public, offers one strategy to better access seldom heard communities and reduce the selection bias involved in most survey research.¹²² However, there will be other groups for whom surveys will not be an appropriate tool for a variety of reasons. Thus, survey methods could be supplemented with more qualitative methods such as focus groups to explore seldom heard communities' beliefs, undertaken in collaboration with community partners with a research team

who themselves are culturally competent and aware.¹²³ Adopting such methods with all communities, not just seldom heard communities would be beneficial as we still don't understand exactly which (and how) barriers and facilitators affect public campaigns. Integrating this data into the development of PSE content within a co-creation framework, is an important step towards ensuring that the information is inclusive and sensitive; and offers potential to assist in bridging the gap that exists between researcher perspectives and broad public perceptions.¹²⁴ To minimise the risk that any initiative does not widen health inequalities,^{125,126} through co-design with disadvantaged and minority groups, future initiatives should be tailored and targeted to those groups within a wider community approach.

As well as considering health inequalities within countries it is also important to consider it between countries. Most PSE trials have been undertaken in high-income countries⁷⁴ and major campaigns tackling community-level understanding about pain have been based in English-speaking countries. Thus, it is important to ensure that PSE is also effective when delivered within low-to-middle income countries to ensure that health equality gaps between nations are not widened. However, recent clinical studies of PSE, from low-to-middle income countries including Brazil¹²⁷ and Iran¹²⁸ show promise.

Social media is a powerful communication tool. It can impact public beliefs and opinions¹²⁹ and as such it could play an important role in any PSE grounded public health initiative. The role of social media in public health is unclear, it has been identified as a source of potential harm and good.^{130–133} During the COVID-19 pandemic, it was described by some as the source of a toxic "infodemic" and by others as an emerging tool for public health good.¹³³ It exposes the public to misinformation, which is associated with inappropriate beliefs and negative health behaviours.¹³⁴ It can also expose the public to marketing materials for unhealthy

behaviours.^{135,136} A social media PSE public health initiative could help to counter such misinformation. Exactly how this should be done needs further research, however, applying a systematic approach such as the Social media and Public Health Epidemic and Response (SPHERE) model,¹³³ to maximise its potential benefits, may be an appropriate place to start. SPHERE could be used to identify key functions of social media for the campaign such as addressing misinformation, disseminating positive evidence-based information, and facilitating social connectedness between people with pain and their significant others. SPHERE could also be used to considering messaging in a systematic way to maximise impact such as the framing, the source, and timing of messages.¹³³ Social media strategies might be considered at local, national, and international levels.

Promoting the adoption of a 'new' approach to management of persistent pain in a system originally established on a structural pathology framework of pain is challenging. HCPs with outdated views that pain is caused and maintained solely by unresolved tissue pathology recommend treating with analgesic medications or passive physical treatments, or biomedically-based investigations and procedures. Patient expectations, perceptions of patient's expectations, time pressures, accustomed ways of practising, biomedically focused undergraduate training, and the difficulties of nuanced or personal discussions are some of the less obvious barriers to fully enacting a contemporary approach to pain care.^{137,138}

Broader system-wide fiscal challenges are also encountered, with pain often offered "a sceptical gaze demanded by political and legal regulatory frameworks, and dependent upon a narrow and outdated version of the biomedical model"(pp.12)⁵⁷ For example, a campaign designed to reduce opioid prescribing rates and promote active self-management may prompt apprehension from governments wary of creating an influx of additional visits to HCPs, over-burdening an already struggling health system. Advocacy for self-management promotes the use of community resources (eg, leisure centres), and this may highlight potential inadequacies of such resources. Health promotion initiatives must be sensitive to these 'system'-wide, cross-sectoral barriers to action. Contrastingly, widely advocating for education, activity-based and self-management approaches to persistent pain, may seem threatening to HCPs who deliver interventions that are not endorsed by evidence-based guidelines. By changing understanding of pain amongst the public, HCPs, and policy/decision makers PSE-grounded public health campaigns may help to facilitate de-implementation of ineffective or harmful approaches (eg, inappropriate diagnostic imaging, inappropriate medicine usage) so that resources can be re-directed to effective and safe approaches. The challenge to ensure that no one is left behind must be cognisant of these complexities.

Summary

Widespread misconceptions about the nature and best current treatments for persistent pain, grounded in an outdated structural pathology model, permeate all sectors

of society. Misconceptions contribute to poor public understanding of persistent pain, which negatively impacts upon pain related critical health literacy, and are a considerable barrier to tackling the problem of persistent pain. PSE has been shown to reduce pain misconceptions within clinical and one-to-one settings. Thus, public health education campaigns grounded in PSE present an exciting opportunity to improve public pain beliefs, but much work is required to optimise any such campaign. Such campaigns could build upon previous pain-focused and non-pain-focused campaigns. Key considerations include how, to whom, in what context and when, education should best be delivered. We must remain vigilant to ensure that campaigns are developed and delivered through a health equity lens to ensure that they address the needs of all sectors of society and narrow, rather than widen, existing pain related health inequalities. A small number of these campaigns currently exist but have not been robustly evaluated. Should they show the clinical, social, and economic impact they arguably promise, PSE-grounded whole of community education stands to shift consumer expectations and community norms about how best to prevent and overcome persistent pain.

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CGR is a named inventor on a patent for a sensory discrimination training based medical device which could be used in the management of persistent pain conditions. He is also the community pain champion for the *Flippin' Pain*TM campaign which is run by Connect Health Ltd. The consultancy fees for this role go directly to Teesside University, CGR receives no personal income for this role. He has received research funding from a number of commercial and non-commercial bodies including: NIHR, Innovate UK, Medtronics Ltd., MediDirect Ltd., 2PD Ltd., The Higher Education Academy, and The Health Foundation. Professional, corporate, and scientific bodies have reimbursed him for expenses related to presentation of research on pain and rehabilitation at conferences/symposia. He has received speaker fees for presentations on pain and rehabilitation.

JWP has received speaker fees for presentations on pain and rehabilitation. He receives royalties for books on pain education.

ELK has received speaker fees for presentations on pain and rehabilitation.

MOK has received speaker fees for presentations on pain and rehabilitation. MOK performs a Research Project Officer consultant role for the European Pain Federation (EFIC).

JWT is a voluntary director of the not-for-profit charity Communities That Care Ltd, which is cited in this manuscript. JWT is supported with salary funding as a Professor at Deakin University.

PAC has been reimbursed for travel costs related to presentations and advocacy meetings related to pain at scientific conferences/symposia. He has received lecturing fees for lectures on pain and pain assessment. PAC has received grants from the Chief Scientist Office, Scotland for pain related research.

912 The Journal of Pain

SBW has received speaker fees for presentations on pain and rehabilitation.

BMF has received consultancy fees from Grunenthal and un-restricted grants from Pfizer Health care and Ahaki Kasei. National pain societies have reimbursed her for travel costs related to presentation of research on pain at annual scientific meetings.

PG has received conference travel subsidies from the Rural Doctors Workforce Agency.

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Campaigns to Promote Better Management of Persistent Pain

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914 The Journal of Pain

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