

UCLA

UCLA Previously Published Works

Title

The Intersection of Dissemination Research and Acupuncture: Applications for Chronic Low Back Pain.

Permalink

<https://escholarship.org/uc/item/8j98j53m>

Authors

Roseen, Eric J
Purtle, Jonathan
Zhang, Weijun
et al.

Publication Date

2021

DOI

10.1177/2164956120980694

Peer reviewed

The Intersection of Dissemination Research and Acupuncture: Applications for Chronic Low Back Pain

Global Advances in Health and Medicine

Volume 9: 1–10

© The Author(s) 2020


Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/2164956120980694

journals.sagepub.com/home/gam



Eric J Roseen, DC, MSc^{1,2,3} , Jonathan Purtle, DrPH, MSc⁴,
Weijun Zhang, DrPH, BMed^{5,6}, David W Miller, MD, LAc⁷,
Andrea Wershof Schwartz, MD, MPH^{3,8},
Shoba Ramanadhan, ScD, MPH⁹ and
Karen J Sherman, PhD, MPH^{10,11}

Abstract

Background: Dissemination research is the study of distributing information and intervention materials to a specific clinical practice or public health audience. Acupuncture, a healthcare practice involving the stimulation of certain body points, often with thin needles, is considered an evidence-based treatment for low back pain (LBP), but is underutilized in the United States.

Body: We will use the example of acupuncture for LBP to identify opportunities to leverage dissemination research to increase utilization of acupuncture. Deficits in the awareness or knowledge of acupuncture may limit its adoption by patients and other stakeholders. Thus, we summarize methods to gather data on stakeholder awareness and knowledge of acupuncture for LBP, i.e., audience research. Engaging multiple stakeholder audiences (e.g., health system leaders, primary care providers, patients), is needed to generate knowledge on promising dissemination strategies for each audience. Audience segmentation is important for identifying population subgroups for whom adoption of acupuncture may require a more intensive or tailored dissemination strategy. To illustrate potential audience ‘segments’, our research discussion focused on developing dissemination strategies by age (i.e., older adults – those age 65 years or older, and younger adults – those under age 65). This decision was prompted by Medicare’s recent policy covering acupuncture for chronic LBP. We leverage current knowledge of barriers and facilitators of acupuncture use to discuss how further tailoring of dissemination strategies might optimize adoption of acupuncture in both groups of adults. Experimental study designs could then be used to compare the effectiveness of such strategies to increase awareness, knowledge, or adoption of acupuncture.

Conclusions: Conducting dissemination research may improve awareness and knowledge of acupuncture, and ultimately the adoption of acupuncture in biomedical settings. We anticipate that the concepts highlighted in this manuscript will also be helpful for those disseminating information about other complementary and integrative health approaches.

Keywords

implementation and dissemination, acupuncture, chronic pain, health policy

Received June 16, 2020; Revised November 5, 2020. Accepted for publication November 23, 2020

¹Department of Family Medicine, Boston Medical Center, Boston University School of Medicine, Boston, Massachusetts

²Department of Rehabilitation Science, MGH Institute of Health Professions, Boston, Massachusetts

³New England Geriatric Research, Education, and Clinical Center, VA Boston Healthcare System, Boston, Massachusetts

⁴Department of Health Management and Policy, Dornsife School of Public Health, Drexel University, Philadelphia, Pennsylvania

⁵Department of Medicine, UCLA Center for East-West Medicine, Los Angeles, California

⁶Division of General Internal Medicine and Health Service Research, Department of Medicine, David Geffen School of Medicine at UCLA, Los Angeles, California

⁷Department of Pediatrics, Connor Integrative Health Network, University Hospitals, Rainbow Babies and Children’s Hospital, Cleveland, Ohio

⁸Department of Medicine, Harvard Medical School, Boston, Massachusetts

⁹Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, Massachusetts

¹⁰Kaiser Permanente Washington Health Research Institute, Kaiser Permanente Washington, Seattle, Washington

¹¹Department of Epidemiology, University of Washington, Seattle, Washington

Corresponding Author:

Eric J Roseen, Boston Medical Center Dowling 5 South, 1 Boston Medical Center Place Boston, MA Massachusetts 02118-2369 United States
Email: eric.roseen@bmc.org



Background

Acupuncture, despite being effective for chronic musculoskeletal pain,^{1–5} is used by fewer than 2% of Americans each year.⁶ There are many factors that influence the adoption of even a proven therapy in health care systems. It is often cited that after a new intervention is developed, studied, and judged to be ‘evidence-based’ it takes an average of 17 years for that intervention to be widely implemented into usual care settings.⁷ The field of dissemination and implementation (D&I) research has developed to decrease this research-to-practice gap phenomenon. Dissemination research “is the scientific study of the targeted distribution of information and intervention materials specific to clinical practice or public health audiences.”⁸ It is designed to identify the most effective ways to communicate and circulate knowledge. Dissemination research is distinct from implementation research, which involves using strategies to integrate evidence-based interventions within specific settings.^{8,9} Little research has focused on the intersection of dissemination research and acupuncture. Identifying how to best communicate information on acupuncture, through dissemination research, will bolster efforts to integrate acupuncture in usual care settings.

We will use the example of acupuncture for low back pain (LBP) to identify opportunities to leverage dissemination research to increase utilization of acupuncture. LBP is a major source of disability and healthcare spending.^{10,11} The American College of Physicians recommends nonpharmacologic treatments, including acupuncture, as first-line therapy for acute and chronic LBP as of their 2017 clinical practice guideline.³ Yet, American adults with LBP are only slightly more likely to report receiving acupuncture in the previous year compared to the general population (3% vs. 2%).^{6,12} Acupuncture is rarely covered by insurance, limiting its use for LBP.¹³ A lack of knowledge of, or unfavorable attitudes toward, acupuncture can also impede patient^{14–19} and provider^{20–22} adoption of acupuncture. Less is known about the role of health system leaders, who may facilitate access to acupuncture via decisions made at the organizational level. On January 18, 2020, the Center for Medicare and Medicaid Services (CMS) announced its decision to cover acupuncture for chronic LBP in their Medicare population, removing a major barrier to acupuncture access among older adults. This policy has the potential to increase use of acupuncture for chronic LBP by Americans. However, the impact of this policy may hinge on whether information about acupuncture for LBP, and acupuncture reimbursement policy, reaches health system leaders, clinicians, and the patients who are most likely to benefit. The best way to

spread this information to these stakeholders is unknown.

In this commentary, we orient readers to important concepts in dissemination practice and research.^{23–25} We apply the concepts of audience research, audience segmentation, and dissemination effectiveness research.⁹ We organize potential messages for health system leaders, primary care providers (PCPs), and patients with LBP to demonstrate how dissemination strategies,²⁶ or discrete actions taken to increase the adoption of acupuncture for LBP, can be tailored to specific stakeholder audiences. We illustrate audience ‘segments’ by considering how these messages may be further tailored for adults above the age of 65 who now have insurance coverage for acupuncture through Medicare’s new policy and younger adults who will still typically pay out of pocket for acupuncture.

Acupuncture

Acupuncture involves the stimulation of certain body points, often with thin needles, for a therapeutic effect. In the United States there are approximately 37,000 Licensed Acupuncturists.²⁷ Research on acupuncture has increased significantly over the past 20 years²⁸ and acupuncture is considered an evidence-based practice for managing some conditions.⁴ For example, acupuncture is considered a first-line therapy for acute and chronic LBP.³

Low Back Pain

LBP is a major public health problem that can develop early in life and recur or persist across the life course.^{29,30} About four in five Americans will experience LBP at least once, resulting in more ‘years lived with disability’ than any other health condition.¹⁰ LBP is also among the most costly conditions in the United States, as a result of numerous outpatient visits, advanced imaging, and procedures.¹¹ Roughly a third of older adults report LBP³¹ and the implications of chronic LBP in older adults are more severe. Among older adults chronic LBP is associated with functional decline, falls, and increased mortality.^{32–34} Older adults are particularly vulnerable to adverse effects from pharmacological treatments for chronic LBP, such as renal dysfunction, hypertension, or bleeding due to NSAIDs or mental status changes and constipation due to opioids.³⁵

Dissemination Research

The spread of information on evidence-based practices often occurs through “push” and “pull” strategies.³⁶ Initially, scientists promote their work through “push” strategies (e.g., publishing in peer-reviewed journals,

press releases from their institution or the journal, or social media). Engaging stakeholders throughout the conduct of clinical research can allow for formal or informal opportunities to characterize key perspectives or audiences that can help shape or target messages for dissemination. Understanding patient demand, and how information about evidence-based practices is sought out, is also important. This is helpful for augmenting how information on acupuncture might be “pulled” into the community (e.g., by patients with LBP) through social networks, word of mouth, and other distribution channels.³⁷ Similarly, it is also useful to know where PCPs and healthcare leaders typically find information about acupuncture.

Dissemination strategies are used for spreading information about an evidence-based practice to improve awareness, attitudes, knowledge, and intention to adopt a specific evidence based practice.²⁵ Such strategies applied to acupuncture for LBP need to consider patients, those who might refer to acupuncturists (e.g., PCPs), and others who may be able to remove obstacles to care (e.g., health system leaders). While general strategies are important in spreading information regarding acupuncture broadly, unique barriers may exist for each stakeholder audience. More tailored approaches have advantages over selecting dissemination strategies that are intuitive or have been historically used.^{38,39} A systematic, stepped approach has been proposed to inform the development of credible, data-driven dissemination strategies: 1) formative audience research; 2) audience segmentation research; and 3) dissemination effectiveness research.⁹ Such an approach is commonly used in marketing and health communication fields, and is being adapted for use within the field of implementation science.^{23,24}

Formative Audience Research

Formative audience research seeks to generate data to provide an empirical foundation for the design and distribution of dissemination materials.^{40,41} This research can be used to describe the awareness, knowledge or behaviors related to acupuncture among different stakeholder audiences (e.g., health system leaders, PCPs, and patients with LBP). A range of D&I frameworks and models are available to help identify and prioritize relevant stakeholders.⁴² As an example, the Exploration, Preparation, Implementation Sustainment (EPIS) framework prompts attention to legislation, funding, policies, advocacy groups, organizational and practitioner networks, professional organizations, and technical assistance support systems.⁴³ Each stakeholder audience can influence decisions to adopt an evidence-based practice.⁴³ Relevant questions pertinent to formative audience research about acupuncture for LBP may include:

To what extent are health system leaders aware that acupuncture can be helpful for LBP? What factors make a PCP want to refer patients with LBP to acupuncture? To what extent do patients with LBP independently seek acupuncture?

Audience Segmentation Research

Once formative audience research has described a population of interest, audience segmentation can be used to identify subgroups with different propensities to be aware of or adopt acupuncture.⁴⁰ Among adults with LBP, the National Health Interview Survey has found Asian Americans, women, those with higher incomes, a college education, and those living on the West coast were more likely to use acupuncture.¹² Similarly, female physicians and those living on the West coast or Northeast are among the most likely to recommend acupuncture to patients with LBP.⁴⁴ Patients or physicians with these characteristics may need little additional information via dissemination strategies. It may be more important to further characterize populations less likely to adopt acupuncture for LBP. These may be more likely to benefit from more intensive dissemination strategies tailored to their unique attributes. Given that the list of individual predictors of acupuncture use is potentially long, identifying the most parsimonious cluster of modifiable characteristics may be particularly useful in identifying these subgroups. Latent class analysis is one quantitative approach for identifying distinct groups which are subsequently labeled by researchers based on combinations of important characteristics.²³

Dissemination Effectiveness Research

Once potential dissemination strategies have been identified, they should be evaluated for effectiveness. The strongest evidence will come from prospective studies that randomize stakeholders to receive different dissemination strategies where outcomes include increased awareness or knowledge of acupuncture, favorable attitudes toward acupuncture, and intention to adopt or actual adoption of acupuncture for LBP (e.g., proportion of patients with LBP who receive acupuncture). One such study compared a website with an ‘optimized design’ informed by four psychological theories and previous formative research to a standard website for patients with LBP.⁴⁵ They found that knowledge about acupuncture increased in participants in the optimized group, but an increase in knowledge did not translate to an increased willingness to try acupuncture for LBP.⁴⁶ Knowledge of acupuncture alone may not change behavior. Additional dissemination strategies that involve multiple stakeholders (patients, PCPs, and health system leaders) may be more effective.^{47,48} This research

could also compare a general set of strategies to a more tailored approach for specific audience segments (e.g., older and younger adults).

Tailoring Dissemination Strategies for Younger and Older Adults

In Table 1 we describe sources that stakeholders likely use, key dissemination messages, and potential dissemination research questions. While not an exhaustive list, these examples illustrate potential dissemination strategies that can be used in practice or tested through dissemination research.

To demonstrate potential audience ‘segments’ our discussion focuses on developing dissemination strategies by age (i.e., older adults – those who are age 65 years or older, and younger adults – those under age 65). This decision was prompted by Medicare’s recent decision to cover acupuncture for chronic LBP. While this attenuates financial barriers to acupuncture among older adults, a lack of insurance coverage among most younger Americans continues to be a substantial barrier to care.^{49,50} Well-designed dissemination strategies targeted at younger adults who cannot afford acupuncture may ultimately be ineffective because of the lack of coverage. Additionally, dissemination can increase disparities in care if such strategies are effective only in higher

Table 1. A Description of Stakeholder Perspectives for the Use of Acupuncture for Low Back Pain (LBP) in Younger and Older Adults Including the Sources They Turn to for Information, Key Dissemination Messages, and Potential Dissemination Research Questions.

	Adults with LBP	
	Age <65	Age ≥65
Patients with LBP		
Sources they turn to	Advocacy groups (American Pain Society)	Trade associations (AARP, Health in Aging Foundation, NIA)
Key messages	Acupuncture is safe and effective for LBP ^{1,2}	Medicare covers acupuncture for <i>chronic</i> LBP
Exemplar research questions	Determine which language is more effective: ‘evidence-based treatment for LBP’ or ‘complementary’ or ‘integrative’ treatment	Audience research needed in this understudied population and describe their knowledge about and attitudes toward acupuncture for LBP
Primary care providers		
Sources they turn to	General medicine journals (JAMA, Ann Intern Med, Ann Fam Med) Professional associations (Society of General Internal Medicine, American College of Physicians)	Geriatrics journals (J Am Geriatr Soc) Professional associations (American Geriatrics Society, Gerontological Society of America)
Key messages	Acupuncture is effective for LBP ^{1,2} CPGs recommend acupuncture for LBP ³ Acupuncture mechanisms ^{63–69}	Recommendations for persistent pain management ^{35,73} Available data suggest acupuncture is effective for LBP ^{74–76} Ongoing large pragmatic trial (1UG3AT010739)
Exemplar research questions	Determine which messages are more effective: messages that provide information on the effectiveness of acupuncture versus usual medical care; or messages that also incorporate information on plausible mechanisms of acupuncture	Audience research is needed in this understudied population to describe their knowledge about and attitudes toward acupuncture for LBP
Health system leaders		
Sources they turn to	Accrediting organizations (Joint Commission) Government agencies (US Department of Health and Human Services)	Payers (Centers for Medicare & Medicaid Services) Professional Associations (American Geriatrics Society, IHI/AFHS)
Key messages	Emphasize information that aligns with the priorities of health system leaders, such as treatment effectiveness, cost-effectiveness, patient demand	Organize information on acupuncture for LBP to align with the “4Ms” model of the AFHS initiative, ⁷¹ i.e., Mentation, Mobility, Medication (reduce polypharmacy), and what Matters most”
Exemplar research questions	Strategies tailored to health system mission statement versus a general strategy	Messaging aligned with “4Ms” versus a general strategy

CPGs: Clinical Practice Guidelines; AARP: American Association of Retired Persons; NIH: National Institute on Aging; AFHS: Aging Friendly Health System.

income patients who can afford to pay out of pocket.⁵¹ The current opioid crisis has put pressure on policy makers to manage pain with effective non-opioid treatments, and examples of acupuncture reimbursement for lower-income, younger adults by Medicaid are emerging.^{52,53} Some younger adults with private insurance already have an acupuncture benefit, e.g., Kaiser Permanente Washington covers acupuncture.²⁰ Once payment policies are in place in a wider range of plans, evidence-based dissemination strategies can inform health system leaders, PCPs, and patients about acupuncture's appropriateness for LBP.

Acupuncture for LBP in Younger Adults

Health System Leaders as a Dissemination Audience

Dissemination research could identify what information health system leaders need to know about acupuncture. Health care leadership includes both non-clinician leaders, such as health care executives, focused more on the business aspect of care, to various levels of medical leadership. Non-clinician leadership may be most interested in health services that are at least cost-neutral and hopefully cost-saving or revenue generating as well as being popular enough with patients that their brand stands out. Clinician leadership will focus more on evidence-based treatments that are incentivized by national policy, acceptable to their clinical staff and helpful for their clinical population. For clinicians especially, sharing a relevant clinical practice guideline or policy may be important (e.g., American College of Physicians LBP clinical practice guidelines, VA guidelines for pain management, HHS task force on pain management best practice recommendations).^{3,54,55} Communicating studies that suggest acupuncture is cost-effective compared to usual care is important,⁵⁶⁻⁵⁸ although health systems operating primarily via fee-for-service reimbursement may be more interested in the ability to generate revenue with an acupuncture service. Aligning dissemination strategies with data on patient demand or a health system's mission statement may also be important to some leaders.⁵⁹ Developing dissemination materials for both clinician and non-clinician leaders should identify and prioritize key information that will lead to the adoption of acupuncture in their health system.

Primary Care Providers as a Dissemination Audience

Communicating information on acupuncture to PCPs and their professional societies may enhance adoption of acupuncture. While the mention of 'acupuncture' can connote 'complementary' or 'alternative' medicine to some PCPs, others may already view acupuncture as part of usual care for LBP.²¹ PCPs who have used

acupuncture themselves are more likely to recommend acupuncture to their patients,²² so it may be more important to disseminate information to those who have no personal experience with acupuncture. It is unclear whether communicating acupuncture as an "alternative" is detrimental to the adoption of acupuncture by PCPs and other stakeholders, but could be tested. For example: "What is the effectiveness of messages that present acupuncture as a 'first-line therapy' for LBP versus acupuncture as a 'complementary' or 'alternative' approach on acceptability, appropriateness, and PCP referrals to acupuncture for LBP?"

As research on acupuncture is disseminated through push strategies by researchers, the specific information channels issued for dissemination may be important. PCPs often turn to peer-reviewed, general medicine journals (e.g., *Annals of Internal Medicine*, *JAMA*, *Journal of General Internal Medicine*, *Annals of Family Medicine*). The American College of Physicians guidelines for managing LBP, which recommend acupuncture, were published in the *Annals of Internal Medicine*,³ and a large individual-patient data meta-analysis of acupuncture for pain was originally published in the *Archives of Internal Medicine* (now *JAMA Internal Medicine*).¹ This meta-analysis included over 20,000 patients from 39 clinical trials of acupuncture for chronic pain, mostly back and neck pain, and found acupuncture clinically superior to usual care for pain relief.^{1,2} Highlighting literature published in trusted, general medicine journals is likely more effective than presenting research from acupuncture or other specialty journals.⁶⁰

Additional questions remain around what type of information is most compelling to PCPs. The meta-analyses described above² also found the effect sizes comparing acupuncture to "sham acupuncture" were much smaller than those comparing it to usual care. Some PCPs believe acupuncture is a placebo.⁶¹ It remains controversial in biomedical literature.⁶² Yet, mechanisms undergirding acupuncture's effectiveness have been observed. These include local effects related to needle placement, such as remodeling of underlying connective tissue,^{63,64} changes in local vasculature,⁶⁵ modulating muscle tone,⁶⁶ and an increase in extracellular adenosine, a neuromodulator with anti-nociceptive properties.⁶⁷ Acupuncture has been linked to the opioid receptor system⁶⁸ and acupuncture's effects on pain can be blocked by Naloxone.⁶⁹ Disseminating these multiple mechanisms, and thus communicating the biologic plausibility of acupuncture for LBP, may be important to some PCPs. However, it remains unclear whether disseminating information on specific mechanisms, versus presenting the pragmatic effectiveness of acupuncture over usual care, would result in more referrals to acupuncture by PCPs for patients with LBP.

Adults Aged <65 With LBP as a Dissemination Audience

Dissemination strategies presenting information to patients with LBP may want to rely less on peer-reviewed literature. While acupuncture has widespread name recognition, it has relatively low use among Americans.^{6,12} This suggests that awareness of acupuncture in general is high, although individuals may not know acupuncture is helpful for LBP¹⁵ or potentially covered by their health insurance.¹⁷ Additionally, a fear of needles, or pain from needles, may explain the low use of acupuncture.^{16,18} Using patient narratives to highlight the benefits of acupuncture for LBP may be more compelling than peer-reviewed literature. Patients who receive acupuncture appreciate the individualized approach to care,⁷⁰ and messages could leverage this patient centered aspect of acupuncture. In some settings (rural, low-income) it can be difficult to find an acupuncturist, so disseminating lists of local providers may be helpful. It is less clear how, or if, information should be tailored to patients who are not currently interested in acupuncture, i.e., patients afraid of needles, or who have a strong preference for another treatment (e.g., opioid medication). These may be important segments of the population where tailored messages could be effective. For example, information on the safety of acupuncture and/or the very thin diameter of acupuncture needles may be as important as general information about acupuncture or its effectiveness for LBP. It may also be important to evaluate what type of dissemination strategies are important for populations who are the least likely to use acupuncture (male, non-Hispanic black, and low-income Americans, and those living in the south).¹²

Acupuncture for LBP in Older Adults

Health System Leaders as a Dissemination Audience

Aligning dissemination strategies with existing frameworks used by health system leaders may augment the effectiveness of information about acupuncture for LBP. To meet the need of a growing population of older adults, greater numbers of health system leaders use the “4Ms” model of the Age-Friendly Health System Initiative,⁷¹ which captures key clinical concepts including “mentation”, “mobility”, “medication”, and “what matters most” to older adults.⁷¹ Understanding patients’ goals, priorities, and preferences can set the agenda for adopting the best treatments for managing musculoskeletal pain, maximizing mood and mobility, and minimizing additional medications. Acupuncture for LBP can help optimize the “4Ms” for older adults. Effective management of LBP can result in improved mobility and

lower pain,³⁵ and reduce the need for pain medications, attenuating concerns of polypharmacy.⁷² Being able to select a particular treatment (e.g., acupuncture) or avoid additional medications may be what “matters most” to some older adults with LBP, thus meeting their goals and priorities. Dissemination strategies that reframe information on acupuncture for LBP around the ‘4Ms’, compared to information not tailored in this way, may be more effective for increasing awareness of acupuncture for LBP among health system leaders, particularly among those who already endorse this paradigm.

Primary Care Providers as a Dissemination Audience

Geriatricians and other PCPs who serve older adults may turn to different sources for information on acupuncture, including age-specific academic journals, e.g., *Journal of the American Geriatrics Society (JAGS)*. Guidelines for managing persistent pain among older adults have encouraged the use of acupuncture as an adjunctive therapy.^{35,73} However, few studies on acupuncture have been published in *JAGS*, and none on acupuncture for LBP. Communicating data on acupuncture from studies that recruited only younger adults may be an ineffective dissemination strategy. We are aware of three small trials of acupuncture for LBP in older adults; all claimed positive results.^{74–76} This may be insufficient information for many PCPs who serve older adults. An ongoing, large, pragmatic clinical trial (n=789) is underway to evaluate the effects of acupuncture for LBP in older adults (1UG3AT010739). This four-healthcare system trial will feature relatively few exclusion criteria so results are maximally applicable to the older Medicare population. Dissemination of these findings to PCPs who care for older adults will be important.

Older Patients With LBP as a Dissemination Audience

Little information is available on the knowledge of or attitudes towards acupuncture among older adults. Audience research is needed. The recent decision by CMS to cover acupuncture for LBP has attenuated known financial barriers.¹³ However, details regarding Medicare copays for acupuncture are unavailable at this time, and higher copays have been linked with lower utilization in systems that already reimburse acupuncture for LBP. Direct to consumer messaging on Medicare coverage of acupuncture, potentially augmented by partnering with trusted information sources to which older adults turn (e.g., AARP, Health in Aging Foundation, National Institute on Aging) may increase awareness and adoption of acupuncture for LBP.

Discussion

Effective dissemination of information about an evidence-based practice is often a pre-requisite for its successful implementation within usual care settings.^{25,43} Acupuncture researchers should be aware of the various strategies by which they can “push” their findings to key stakeholders. Acupuncture researchers can also engage in dissemination research to help identify the most effective approaches to package and spread this information. A data-driven approach to developing dissemination strategies may be more effective than those based on anecdotes or intuition.⁹ We discussed a stepped approach that begins with identifying awareness, attitudes and knowledge of stakeholders (audience research), then identifying subpopulations with diverging dissemination needs (audience segmentation), and finally performing randomized trials that compare the effectiveness of competing dissemination strategies.⁹ While not an exhaustive discussion we believe this paper provides important guidance on how to identify, tailor, and evaluate dissemination strategies.

We focused on health system leaders, PCPs, and patients with chronic LBP. However, a wider range of stakeholders are interested in the implementation of acupuncture: caregivers and/or families of patients, biomedical specialists and educators, and their professional associations, acupuncture clinicians or educators and their professional associations, academic researchers, and insurers.⁷⁷ Dissemination research on spreading information about acupuncture for LBP to non-Medicare insurers is particularly needed. While interventions that target multiple stakeholders (i.e., multi-level strategies) are likely more effective than approaches that target a single stakeholder, it is rarely feasible to reach all potential stakeholders.^{47,48} Strategies that use multiple components, i.e., multi-faceted strategies, also are more effective than those that use a single-component.^{47,48} We described segmentation of audience data, which can elucidate subgroups of stakeholders for which strategies can be individualized, i.e., tailored strategies. It is easy to identify challenges in developing and testing multi-level, multi-faceted, and/or tailored strategies. The use of a D&I theory, model, or framework can help guide this complex task.⁷⁸

Dissemination of information on acupuncture for other health conditions may also be appropriate. In an evidence map of acupuncture clinical research, the Veterans Health Administration highlighted a number of areas where acupuncture may be helpful (e.g., cancer symptoms, osteoarthritis, dysmenorrhea, chronic neck pain, headache).⁴ The American Society of Clinical Oncology endorsed guidelines from the Society for Integrative Oncology including acupuncture for chemotherapy-induced nausea.⁷⁹ Use of acupuncture in

the acute care setting can alleviate symptoms, reducing reliance on opioids and other pain medications.^{80,81} Yet, it is unknown whether general dissemination strategies are effective for increasing awareness of acupuncture in different settings (acute care, outpatient care) and conditions (LBP, cancer). Formative audience research and audience segmentation research would help identify how acupuncture is perceived in each of these settings, and to generate or adapt dissemination strategies. This approach could also be applied to the broader field of complementary and integrative health (CIH) research. Tracking how dissemination strategies have been applied to various approaches (e.g., chiropractic care, massage therapy, yoga) may help identify strategies that are generally effective and whether unique dissemination strategies exist for particular treatments.

Conclusion

Given known barriers related to attitudes and beliefs of patients and providers around the effectiveness and cost of acupuncture, effective dissemination strategies are needed to enhance uptake of acupuncture for LBP. We have discussed the importance of communicating key information to various stakeholders and outline potential acupuncture-specific dissemination strategies that can be evaluated prospectively in dissemination effectiveness research. Such strategies may result in more rapid expansion in the use of acupuncture for LBP. Lessons learned about disseminating acupuncture can guide dissemination of other safe and effective CIH approaches for LBP and other health conditions.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: A Patient Centered Outcomes Research Institute (PCORI) Eugene Washington Engagement Award supported a stakeholder engagement workshop on dissemination and implementation research at the 2019 Society for Acupuncture Research meeting. Drs. Roseen and Zhang received support from the NIH Training Institute on Dissemination and Implementation Research in Health (TIDIRH). Dr. Roseen is the recipient of a career development award from the National Center for Complementary and Integrative Health (K23AT010487). None of the sponsors had any involvement in our decision to submit this manuscript or in the determination of its contents. None of the authors have any conflicts of interest to declare of relevance to this work.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Authors have received the funding from National Center for Complementary and Integrative Health.

ORCID iD

Eric J Roseen  <https://orcid.org/0000-0002-3240-6756>

References

- Vickers AJ, Cronin AM, Maschino AC, et al. Acupuncture for chronic pain: individual patient data meta-analysis. *Arch Intern Med.* 2012;172(19):1444–1453.
- Vickers AJ, Vertosick EA, Lewith G, et al. Acupuncture for chronic pain: update of an individual patient data meta-analysis. *J Pain.* 2018;19(5):455–474.
- Qaseem A, Wilt TJ, McLean RM, Forciea MA, Clinical guidelines committee of the American College of p. noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2017;166(7):514–530.
- Hempel S, Taylor SL, Solloway MR, et al. *Evidence Map of Acupuncture.* VA Evidence-Based Synthesis Program Reports Washington, DC: Department of Veterans Affairs (US); 2014.
- Skelly AC, Chou R, Dettori JR, et al. *Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review Update.* AHRQ Comparative Effectiveness Reviews Rockville, MD: Agency for Healthcare Research and Quality; 2020.
- Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL. Trends in the use of complementary health approaches among adults: United States, 2002–2012. *Natl Health Stat Rep.* 2015;79:1–16.
- Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. *J R Soc Med.* 2011;104(12):510–520.
- Brownson RC CG, Proctor EK. *Dissemination and Implementation Research in Health.* Oxford, England: Oxford University Press; 2018.
- Purtle J, Marzalik JS, Halfond RW, Bufka LF, Teachman BA, Aarons GA. Towards the data-driven dissemination of findings from psychological science. *Am Psychol.* 2020 Nov;75(8):1052–1066.
- Collaborators USBoD, Mokdad AH, Ballestros K, et al. The State of US Health, 1990–2016: burden of diseases, injuries, and risk factors among US states. *JAMA.* 2018;319(14):1444–1472.
- Dieleman JL, Cao J, Chapin A, et al. US health care spending by payer and health condition, 1996–2016. *JAMA.* 2020;323(9):863–884.
- Ghildayal N, Johnson PJ, Evans RL, Kreitzer MJ. Complementary and alternative medicine use in the US adult low back pain population. *Glob Adv Health Med.* 2016;5(1):69–78.
- Cherkin DC, Deyo RA, Goldberg H. Time to align coverage with evidence for treatment of back pain. *J Gen Intern Med.* 2019;34(9):1910–1912.
- Bishop FL, Lewith GT. Patients' preconceptions of acupuncture: a qualitative study exploring the decisions patients make when seeking acupuncture. *BMC Complement Altern Med.* 2013;13:102.
- Burke A, Nahin RL, Stussman BJ. Limited health knowledge as a reason for non-use of four common complementary health practices. *PLoS One.* 2015;10(6):e0129336.
- Dima A, Lewith GT, Little P, Moss-Morris R, Foster NE, Bishop FL. Identifying patients' beliefs about treatments for chronic low back pain in primary care: a focus group study. *Br J Gen Pract.* 2013;63(612):e490–e498.
- Greville-Harris M, Hughes J, Lewith G, et al. Assessing knowledge about acupuncture: a survey of people with back pain in the UK. *Complement Ther Med.* 2016;29:164–168.
- Hopton A, Thomas K, MacPherson H. The acceptability of acupuncture for low back pain: a qualitative study of patient's experiences nested within a randomised controlled trial. *PLoS One.* 2013;8(2):e56806.
- Rodondi PY, Bill AS, Danon N, et al. Primary care patients' use of conventional and complementary medicine for chronic low back pain. *J Pain Res.* 2019;12:2101–2112.
- Penney LS, Ritenbaugh C, Elder C, Schneider J, Deyo RA, DeBar LL. Primary care physicians, acupuncture and chiropractic clinicians, and chronic pain patients: a qualitative analysis of communication and care coordination patterns. *BMC Complement Altern Med.* 2016;16:30.
- Sharp D, Lorenc A, Feder G, et al. 'Trying to put a square peg into a round hole': a qualitative study of healthcare professionals' views of integrating complementary medicine into primary care for musculoskeletal and mental health comorbidity. *BMC Complement Altern Med.* 2018;18(1):290.
- Rodondi PY, Dubois J, Bill AS, et al. Primary care physicians' attitude and reported prescribing behavior for chronic low back pain: an exploratory cross-sectional study. *PLoS One.* 2018;13(9):e0204613.
- Purtle J, Le-Scherban F, Wang X, Shattuck PT, Proctor EK, Brownson RC. Audience segmentation to disseminate behavioral health evidence to legislators: an empirical clustering analysis. *Implement Sci.* 2018;13(1):121.
- Purtle J, Nelson KL, Bruns EJ, Hoagwood KE. Dissemination strategies to accelerate the policy impact of children's mental health services research. *Psychiatric Serv.* 2020 Nov 1;71(11):1170–1178.
- Leeman J, Birken SA, Powell BJ, Rohweder C, Shea CM. Beyond "implementation strategies": classifying the full range of strategies used in implementation science and practice. *Implement Sci.* 2017;12(1):125.
- Kirchner JE WT, Powell BJ, Smith JL, Proctor EK. Implementation strategies. In: Brownson RPE, Colditz G, eds. *Dissemination and Implementation Research in Health: Translating Science to Practice.* Oxford, England: Oxford University Press; 2018:245–266.
- Fan AY, Stumpf SH, Faggert Alemi S, Matecki A. Distribution of licensed acupuncturists and educational institutions in the United States at the start of 2018. *Complement Ther Med.* 2018;41:295–301.
- Ma Y, Dong M, Zhou K, Mita C, Liu J, Wayne PM. Publication trends in acupuncture research: a 20-year bibliometric analysis based on PubMed. *PLoS One.* 2016;11(12):e0168123.

29. Dunn KM, Hestbaek L, Cassidy JD. Low back pain across the life course. *Best Pract Res Clin Rheumatol*. 2013;27(5):591–600.
30. Hartvigsen J, Hancock MJ, Kongsted A, et al. What low back pain is and why we need to pay attention. *Lancet*. 2018;391(10137):2356–2367.
31. Hoy D, Bain C, Williams G, et al. A systematic review of the global prevalence of low back pain. *Arthritis Rheum*. 2012;64(6):2028–2037.
32. Leveille SG, Jones RN, Kiely DK, et al. Chronic musculoskeletal pain and the occurrence of falls in an older population. *JAMA*. 2009;302(20):2214–2221.
33. Di Iorio A, Abate M, Guralnik JM, et al. From chronic low back pain to disability, a multifactorial mediated pathway: the InCHIANTI study. *Spine (Phila PA 1976)*. 2007;32(26):E809–E815.
34. Roseen EJ, LaValley MP, Li S, et al. Association of back pain with all-cause and cause-specific mortality among older women: a cohort study. *J Gen Intern Med*. 2019;34(1):90–97.
35. Makris UE, Abrams RC, Gurland B, Reid MC. Management of persistent pain in the older patient: a clinical review. *JAMA*. 2014;312(8):825–836.
36. Becker SJ. Direct-to-consumer marketing: a complementary approach to traditional dissemination and implementation efforts for mental health and substance abuse interventions. *Clin Psychol (New York)*. 2015;22(1):85–100.
37. Kreuter MW, Bernhardt JM. Reframing the dissemination challenge: a marketing and distribution perspective. *Am J Public Health*. 2009;99(12):2123–2127.
38. Grimshaw JM, Thomas RE, MacLennan G, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess*. 2004;8(6):iii–iv, 1–72.
39. McCormack L, Sheridan S, Lewis M, et al. Communication and dissemination strategies to facilitate the use of health-related evidence. *Evid Rep Technol Assess (Full Rep)*. 2013;213:1–520.
40. Slater MD. Theory and method in health audience segmentation. *J Health Commun*. 1996;1(3):267–283.
41. Brownson RC, Jacobs JA, Tabak RG, Hoehner CM, Stamatakis KA. Designing for dissemination among public health researchers: findings from a national survey in the United States. *Am J Public Health*. 2013;103(9):1693–1699.
42. Tabak RG CD, Hook M, Brownson RC. The conceptual basis for dissemination and implementation research: Lessons from existing models and frameworks. In: Brownson RCG, Proctor EK, eds. *Dissemination and Implementation Research in Health: Translating Science to Practice*. Oxford, England: Oxford University Press; 2018:73–88.
43. Aarons GA, Hurlburt M, Horwitz SM. Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Adm Policy Ment Health*. 2011;38(1):4–23.
44. Stussman BJ, Nahin RR, Barnes PM, Ward BW. U.S. Physician Recommendations to Their Patients About the Use of Complementary Health Approaches. *J Altern Complement Med*. 2020;26(1):25–33.
45. Bishop FL, Greville-Harris M, Bostock J, et al. Using psychological theory and qualitative methods to develop a new evidence-based website about acupuncture for back pain. *Eur J Integr Med*. 2016;8(4):384–393.
46. Bishop FL, Greville-Harris M, Bostock J, et al. Supporting informed choice in acupuncture: effects of a new person-, evidence- and theory-based website for patients with back pain. *Acupunct Med*. 2019;37(2):98–106.
47. Mechanic D. Improving the quality of health care in the United States of America: the need for a multi-level approach. *J Health Serv Res Policy*. 2002;7 Suppl 1: S35–S39.
48. Chaudoir SR, Dugan AG, Barr CH. Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. *Implement Sci*. 2013;8:22.
49. Heyward J, Jones CM, Compton WM, et al. Coverage of nonpharmacologic treatments for low back pain among US public and private insurers. *JAMA Netw Open*. 2018;1(6):e183044.
50. Bonakdar R, Palanker D, Sweeney MM. Analysis of state insurance coverage for nonpharmacologic treatment of low back pain as recommended by the American College of Physicians Guidelines. *Glob Adv Health Med*. 2019;8: 2164956119855629.
51. McNulty M, Smith JD, Villamar J, et al. Implementation research methodologies for achieving scientific equity and health equity. *Ethn Dis*. 2019;29(Suppl 1):83–92.
52. Eaves ER, Hsu CW, DeBar LL, et al. Whole systems within whole systems: the Oregon health plan's expansion of services for back and neck pain. *J Altern Complement Med*. 2019;25(S1):S61–S68.
53. Davis RT, Badger G, Valentine K, Cavert A, Coeytaux RR. Acupuncture for chronic pain in the Vermont Medicaid population: a prospective, pragmatic intervention trial. *Glob Adv Health Med*. 2018;7:216495 6118769557.
54. Kligler B, Bair MJ, Banerjea R, et al. Clinical policy recommendations from the VHA state-of-the-art conference on non-pharmacological approaches to chronic musculoskeletal pain. *J Gen Intern Med*. 2018;33(Suppl 1):16–23.
55. U.S. Department of Health and Human Services. *Draft Report on Pain Management Best Practices: Updates, Gaps, Inconsistencies, and Recommendations*. Washington, DC: U.S. Department of Health and Human Services; 2018.
56. Herman PM, Poindexter BL, Witt CM, Eisenberg DM. Are complementary therapies and integrative care cost-effective? A systematic review of economic evaluations. *BMJ Open*. 2012;2(5):e001046.
57. Witt CM, Jena S, Selim D, et al. Pragmatic randomized trial evaluating the clinical and economic effectiveness of acupuncture for chronic low back pain. *Am J Epidemiol*. 2006;164(5):487–496.
58. Ratcliffe J, Thomas KJ, MacPherson H, Brazier J. A randomised controlled trial of acupuncture care for persistent low back pain: cost effectiveness analysis. *BMJ*. 2006;333(7569):626.

59. Santa Ana CF. The adoption of complementary and alternative medicine by hospitals: a framework for decision making. *J Healthc Manag.* 2001;46(4):250–260.
60. Wahner-Roedler DL, Vincent A, Elkin PL, Loehrer LL, Cha SS, Bauer BA. Physicians' attitudes toward complementary and alternative medicine and their knowledge of specific therapies: a survey at an academic medical center. *Evid Based Complement Alternat Med.* 2006;3(4):495–501.
61. Berman BM, Langevin HM, Witt CM, Dubner R. Acupuncture for chronic low back pain. *N Engl J Med.* 2010;363(5):454–461.
62. Finnerup NB. Nonnarcotic methods of pain management. *N Engl J Med.* 2019;380(25):2440–2448.
63. Langevin HM, Churchill DL, Wu J, et al. Evidence of connective tissue involvement in acupuncture. *FASEB J.* 2002;16(8):872–874.
64. Langevin HM, Bouffard NA, Badger GJ, Churchill DL, Howe AK. Subcutaneous tissue fibroblast cytoskeletal remodeling induced by acupuncture: evidence for a mechanotransduction-based mechanism. *J Cell Physiol.* 2006;207(3):767–774.
65. Sandberg M, Lundeberg T, Lindberg LG, Gerdle B. Effects of acupuncture on skin and muscle blood flow in healthy subjects. *Eur J Appl Physiol.* 2003;90(1–2):114–119.
66. Wang R, Li X, Zhou S, Zhang X, Yang K, Li X. Manual acupuncture for myofascial pain syndrome: a systematic review and meta-analysis. *Acupunct Med.* 2017;35(4):241–250.
67. Goldman N, Chen M, Fujita T, et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. *Nat Neurosci.* 2010;13(7):883–888.
68. Mayer DJ, Price DD, Rafii A. Antagonism of acupuncture analgesia in man by the narcotic antagonist naloxone. *Brain Res.* 1977;121(2):368–72.
69. Han JS. Acupuncture and endorphins. *Neurosci Lett.* 2004;361(1–3):258–261.
70. Foley H, Steel A, Cramer H, Wardle J, Adams J. Disclosure of complementary medicine use to medical providers: a systematic review and meta-analysis. *Sci Rep.* 2019;9(1):1573.
71. Fulmer T, Mate KS, Berman A. The age-friendly health system imperative. *J Am Geriatr Soc.* 2018;66(1):22–24.
72. Reid MC, Bennett DA, Chen WG, et al. Improving the pharmacologic management of pain in older adults: identifying the research gaps and methods to address them. *Pain Med.* 2011;12(9):1336–1357.
73. Persons AGSPoPPiO. The management of persistent pain in older persons. *J Am Geriatr Soc.* 2002;50(6 Suppl):S205–S224.
74. Grant DJ, Bishop-Miller J, Winchester DM, Anderson M, Faulkner S. A randomized comparative trial of acupuncture versus transcutaneous electrical nerve stimulation for chronic back pain in the elderly. *Pain.* 1999;82(1):9–13.
75. Inoue M, Kitakoji H, Ishizaki N, et al. Relief of low back pain immediately after acupuncture treatment—a randomised, placebo controlled trial. *Acupunct Med.* 2006;24(3):103–108.
76. Meng CF, Wang D, Ngeow J, Lao L, Peterson M, Paget S. Acupuncture for chronic low back pain in older patients: a randomized, controlled trial. *Rheumatology (Oxford).* 2003;42(12):1508–1517.
77. Sherman KJ. The Trials and Tribulations of Selecting Comparison Groups in Randomized Trials of Nonpharmacological Complementary and Integrative Health Interventions. *J Altern Complement Med.* 2020 Jun;26(6):449–455.
78. Tabak RG, Khoong EC, Chambers DA, Brownson RC. Bridging research and practice: models for dissemination and implementation research. *Am J Prev Med.* 2012;43(3):337–350.
79. Lyman GH, Greenlee H, Bohlke K, et al. Integrative therapies during and after breast cancer treatment: ASCO endorsement of the SIO clinical practice guideline. *J Clin Oncol.* 2018;36(25):2647–2655.
80. Federman DG, Zeliadt SB, Thomas ER, Carbone GF, Jr., Taylor SL. Battlefield acupuncture in the veterans health administration: effectiveness in individual and group settings for pain and pain comorbidities. *Med Acupunct.* 2018;30(5):273–278.
81. Reinstein AS, Erickson LO, Griffin KH, et al. Acceptability, adaptation, and clinical outcomes of acupuncture provided in the emergency department: a retrospective pilot study. *Pain Med.* 2017;18(1):169–178.