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Incorporating Acupuncture Into American Healthcare: Initiating a Discussion on Implementation Science, the Status of the Field, and Stakeholder Considerations

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Abstract

Introduction: The field of implementation science is the study of methods that promote the uptake of evidence-based interventions into healthcare policy and practice. While acupuncture has gained significant traction in the American healthcare landscape, its journey has been somewhat haphazard and non-linear.

Methods: In June 2019, a group of thirty diverse stakeholders was convened by the Society for Acupuncture Research with the support of a Patient Centered Outcomes Research Institute, Eugene Washington Engagement Award. This group of stakeholders represented a diverse mix of patients, providers, academicians, researchers, funders, allied health professionals, insurers, association leaders, certification experts, and military program developers. The collective engaged in discussion that explored acupuncture's status in healthcare, including reflections on its safety, effectiveness, best practices, and the actual implementation of acupuncture as seen from diverse stakeholder viewpoints.

Objectives: A primary goal was to consider how to utilize knowledge from the field of implementation science more systematically and intentionally to disseminate information about acupuncture and its research base, through application of methods known to implementation science. The group also considered novel challenges that acupuncture may present to known implementation processes.

Findings: This article summarizes the initial findings of this in-person meeting of stakeholders and the ongoing discussion among the subject matter experts who authored this report. The goal of this report is to catalyze greater conversation about how the field of implementation science might intersect with practice, access, research, and policymaking pertaining to acupuncture. Core concepts of implementation science and its relationship to acupuncture are introduced, and the case for acupuncture as an Evidence Based Practice (EBP) is established. The status of the field and current environment of acupuncture is examined, and the perspectives of four stakeholder groups—patients, two types of professional practitioners, and researchers—are explored in more detail.

Keywords

acupuncture, implementation and dissemination, stakeholders, acupuncture research

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Context of This Discussion

In June 2019, under the auspices of the Society for Acupuncture Research (SAR) and with Patient-Centered Outcomes Research Institute (PCORI) grant funding, a diverse group of stakeholders met to initiate conversation about the dissemination and implementation of acupuncture within American healthcare. The selected stakeholders represented a cross-section of the professional field of acupuncture, including patients, clinicians, researchers, payers, philanthropists, and representatives of local, state, and federal governments.

In this article, the perspectives of four stakeholder groups are explored in more detail— namely, patients, professional practitioners, and researchers. This subset of the full collection of stakeholders was chosen because of the authors' knowledge bases, and because a thorough exploration of these and the other categories is precisely the goal for future works. The authors of this paper continued to meet and expand on the discussion for nearly a year after the initial meeting. This work represents an attempt to not just describe the meeting and initial findings, but also to demonstrate how the concepts outlined at the in-person meeting can inform future work that can further connect the fields of acupuncture and implementation science. To our knowledge, this was the first gathering of such a broad and diverse stakeholder population with intent to discuss the intersections of acupuncture and implementation science. It is the hope of all stakeholders that this document serves to catalyze greater conversation about how issues related to practice, access, research, and policy-making in acupuncture can be informed by the field of implementation science.

Introduction to Implementation Science and Its Relationship to Acupuncture

The field of implementation science is the study of methods that promote the uptake of evidence-based interventions into healthcare policy and practice.[1,2] This field can be divided into dissemination research and implementation research. Dissemination research focuses on identifying effective ways to spread knowledge on evidence-based practices (EBPs) to relevant stakeholders.[1,2] Implementation research, in contrast, is concerned with the development of "implementation strategies" that can be used to increase the integration of EBPs within clinical settings.[1,2]

Acupuncture is an EBP that has been rigorously tested for a number of clinical applications; however, to date, the integration of acupuncture into modern healthcare systems has not been guided by implementation science. To support and optimize this effort, there is a need for acupuncture researchers, clinicians, and administrators to be more aware of concepts central to the field of implementation science. Collaboration among varied stakeholder groups is needed especially for acupuncture, as its optimal methods of application, training, and scope are yet to be defined.

Effective dissemination or implementation of an evidence-based practice within an established healthcare system may hinge on how the information is packaged, and whether the approach is systematic and comprehensive. Conceptual models and frameworks from the field of implementation science have been developed for various purposes, and are useful in guiding the systematic development of dissemination and implementation strategies in complex real-world settings.[3] Process models are particularly useful when describing or guiding the process of translating research into practice, and outline the phases or stages of the research-to-practice process, from the discovery and production of research-based knowledge to the implementation and use of research in various settings.[3] Other uses of implementation science frameworks include: identifying determinants of successful implementation of an EBP (facilitators and barriers); identifying implementation strategies that optimize or contend with these determinants; or to help evaluate whether dissemination and/or implementation strategies were successful.[4–7]

Conceptual components that influence the determinants include staff familiarity and training needs surrounding the EBP, patient acceptance, and structural factors such as work-flow dynamics, billing, resource allocation, and time management issues.[4] Advocacy within relevant departments, the presence of an expert in the EBP, and adequate funding are also requisite.[8]

When, however, the EBP to be incorporated is both unfamiliar and challenges assumptions of the existing paradigm and payment models, the barriers to dissemination of information about, and actual implementation of the EBP become more challenging. Translational research suggests that comparative effectiveness and cost-effectiveness studies conducted in real-world settings are sufficient for the uptake of a new intervention into usual, allopathic care, at least when that intervention is consonant with the existing medical paradigm.[8–12] Providers from the field of complementary and integrative health (CIH) may face additional challenges when entering mainstream clinical care settings. Unique barriers for CIH treatments exist. These include: cost of care provision, payment pathways, reimbursement potential, compliance, staffing of the EBP, patient preferences and individual belief systems, and other variables.

Acupuncture is an example of an EBP that has been rigorously tested and which is regarded as both clinically effective and cost-effective for multiple conditions, but that has not yet seen the incorporation into mainstream healthcare that one might expect. Despite the substantial

body of basic science and clinical research in acupuncture, the practice of acupuncture continues to be steeped in a metaphorical language that is culturally foreign to the United States and to the biomedical paradigm.[13] This leads to skepticism regarding the scientific basis of acupuncture and presents an essential challenge for integration into a conventional healthcare setting.

Defining "acupuncture" can be equally challenging, as many practitioners use acupuncture as part of a comprehensive system of health practices, but others use it as an isolated modality. Some practitioners utilize tailored treatment strategies, while others use protocolized treatment strategies. Many styles of acupuncture application are also seen in practice. Acupuncture may therefore be considered a complex, multifactorial set of procedures.[12] Returning to the core frameworks of implementation science, we can see that identification of facilitators and barriers, creation of strategies to optimize or contend with these determinants, and the consideration of evaluation models for quantifying and qualifying "success" demand novel thought.

Distinguishing Underlying Rules for the Dissemination and Implementation of Acupuncture From Specific Examples of Success

Participants of the working group were asked to identify and discuss examples where acupuncture has been successfully implemented within a multidisciplinary medical setting. The group discussed the components of the EBP (acupuncture) which included: into which departments or settings was acupuncture implemented; to what populations was acupuncture delivered; for what or which condition(s) was acupuncture applied; in what way were the finances considered, and others.

Distinguishing between the components of the EBP and the implementation strategies is often a fundamental challenge in implementation research.[6] More specific examples of this distinction emerged during the working event. In one instance it was noted that acupuncture had improved uptake in an inner-city, African American community after engaging elders from local churches, treating them, and then having those individuals be ambassadors to the rest of their community.

The underlying rule might be that when engaging community patient groups, practitioners should seek trusted individuals (aka "champions") within that demographic group that can allow entrée into the broader community with which they wish to connect.[14] In another setting, a legislative success for acupuncture was achieved in Washington State by shifting a focus on emphasizing only the "weak to moderate evidence base" for efficacy (due to low sample sizes) to highlighting that the evidence still does show strong clinical significance in the domain of effectiveness.[15]

Focusing on the effectiveness of acupuncture (how it performs in the real-life setting) rather than the efficacy (how it performs relative to placebo or control in the research setting) was more useful to legislators and regulators trying to solve real-life problems. This lesson reveals an underlying rule for acupuncture dissemination and implementation—the "slice of the evidence" presented must be most relevant to the decision-maker in question.

In a third example provided after the event, it was noted that in the military, when addressing barriers to the implementation of complementary and integrative medicine (CIM) into the VA and military healthcare systems, collaborators developed a strategy of teaching a variety of providers (medics, corpsman, nurses and physicians) a protocol-driven, auricular acupuncture technique coined "battlefield acupuncture." Over a 19-month period, 2,712 providers were trained. This was used to expose clinicians to the benefits of acupuncture for pain management, and opened the door to the VA actively engaging medical and licensed acupuncturists in the care of their patients.[16] The underlying rule was that creating familiarity and personal experiences with treatment bridged a gap for this specific group of providers.

Current Status of Acupuncture in Implementation Research

Implementation research is defined by the NIH as "the methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice, and hence improve the quality and effectiveness of health care."[17] While the use of "implementation strategies" to improve access to acupuncture in usual care settings has been done in practice, few have formally evaluated the effectiveness of implementation strategies on implementation outcomes. For example, stakeholder engagement and partnering with "champions" have been used, yet it remains unknown whether these or other strategies result in either improving the perceived acceptability, appropriateness, or feasibility of the implementation strategy in usual care medical settings, or for increasing the adoption of acupuncture specifically in these settings for a given condition.

Implementation strategies typically map directly to important barriers or facilitators, so identifying these determinants of successful implementation is often an important first step in implementation research. Developing and testing implementation strategies in real-world settings is needed, with special focus paid to how the strategy leads to a measurable outcome.

Most of the literature on acupuncture use in usual-care medical settings has been descriptive, for example, providing examples of how acupuncture has been added to a hospital or community health center.[18–21] The Veteran's Health Administration has described the use of acupuncture and identified barriers and facilitators to a wider range of CIH treatments for pain. Through interviews of 149 key stakeholders across eight VA locations, key facilitators (eg, program champions, leadership support, patient attitudes) and barriers (eg, difficulty hiring CIH providers, funding, coding/documenting CIH use, physical space) to successful CIH implementation have emerged.[22]

Additional research is needed to elucidate barriers or facilitators that may be unique to acupuncture for pain or other health conditions. Clinical trials evaluating information on implementation and effectiveness outcomes are starting to emerge in the literature. For example, a trial evaluating acupuncture's effectiveness for improving pain and symptom management in hospitalized patients with pain also interviewed stakeholders on barriers and facilitators to implementing acupuncture on busy inpatient hospital floors.[23,24] They found that stakeholders perceived the following as important barriers: lack of setting-specific data (acupuncture for pain in inpatient setting), provider time constraints, financial barriers including out-of-pocket costs to patients and lack of profit to the hospital, and uncertainty about whether acupuncture would be appropriate or helpful for a particular inpatient (and when during inpatient stay should it be applied?).[24]

Facilitators to acupuncture's use for pain and symptom management in a busy in-patient setting, included the opportunity for clinicians to observe the benefits of acupuncture among inpatients in their care. It also included witnessing patient demand for acupuncture, clearly seeing the ability of acupuncture to add value, and expanding treatment options for symptom management in the inpatient setting.[24] Lastly, their qualitative findings suggest a number of strategies thought to promote successful implementation (eg, acupuncture program champions, provider education) although the effectiveness of these strategies for implementation outcomes (eg, adoption) should be tested in future prospective clinical trials.

We are unaware of implementation studies that have prospectively compared two or more approaches of implementation. A comprehensive list of 73 implementation strategies organized by nine domains (the Education Resources Information Center (ERIC) taxonomy) is an important guide for selecting and combining implementation strategies.[25]

Implementation strategies that address multiple barriers at multiple-stakeholder levels are thought to be better than single strategy approaches, yet, comprehensive strategies with many components may be too expensive or time consuming to be feasible. We are unaware of any implementation science trials that have compared different sets of implementation strategies when implementing acupuncture. Such trials may be needed to help determine high-yield implementation strategies that can inform and focus future implementation efforts. For example, should implementation strategies focus more on the education of clinicians, patients, or both? Is the barrier to implementation actually more defined by the electronic medical record in use and its limitations, or are the most profound obstructions to be found in the domains of administration or reimbursement? Is the engagement of policy makers or hospital administrators most essential? The widespread adoption for acupuncture for pain in usual care settings may, in part, hinge on answering these important questions. Future research should evaluate the use of different strategies to increase the adoption of acupuncture into usual care settings.

Status of Acupuncture as an Evidence-Based Practice in the United States

In recent years, acupuncture as practiced in the United States has emerged as an evidence-based therapy in a growing number of multidisciplinary guidelines, predominantly surrounding its use for pain. In 2015 the Joint Commission revised guidelines for the management of pain to include nonpharmacological strategies including acupuncture. In 2016, the American Society of Clinical Oncology included acupuncture for chronic pain management as part of their adult cancer survivor care recommendations. Acupuncture was noted to be effective for low-back pain by the Agency for Healthcare Research and Quality in 2016, which informed clinical practice guidelines by the 2017 American College of Physicians, which recommended acupuncture for acute and chronic low back pain. Similar recommendations for low back pain were adopted in the 2017 clinical practice guidelines of the Department of Veterans Affairs. Most recently, in January of 2020, the Centers for Medicare and Medicaid services approved the use of acupuncture for chronic low back pain.

A recent article by Birch et al. surveyed trends in the inclusion of acupuncture into clinical practice guidelines and positive references to acupuncture between 1991 and 2017.[26] The results included 2189 positive recommendations for acupuncture within 1311 publications, with an increasing frequency trend. Pain was the most common positive reference with 1486 references relating to 107 pain indications. There were 703 recommendations related to 97 non-pain conditions. The groups making these recommendations were noted to show significant

diversity, coming from sources such as government health institutions, national guidelines, and medical specialty groups. The data came from around the world, but were especially abundant in Europe, North America, and Australasia.

The Status of the Field and Current Environment of Acupuncture

The rise in acupuncture's inclusion is creditable to many factors, which are intertwined with one another as briefly described below.

Patient Usage Threshold: While still at the loosely anticipated social tipping point of 25% for full self-propagation proposed by some researchers, the increasing trend in the use of acupuncture no doubt contributes to population uptake. Recent surveys suggest between 1% and 10% of U.S. adults have experienced acupuncture treatments. In 2007, 3.1 million Americans used acupuncture, which was significantly greater than in 2002, when 2.1 million adults received acupuncture treatments,[27–29] and there has been a steady linear increase in acupuncture usage from 2002 to 2012,[30] which continues to the present day. Studies of Complementary and Alternative Medicine use have shown benefits to patient perceptions of hope, health options, and improved healthcare experience. These secondary treatment benefits may also be driving the steady rise in acupuncture's popularity and expansion.[12]

Growth of the Research Base: In the past two decades, we have seen the explosion of the acupuncture literature base,[31] which has grown in multiple domains including basic science, randomized controlled trials (RCTs), systematic reviews, and discussions of implementation. In addition to many clinical trials (PubMed lists 3627 RCTs from 1998 to 2016), recent research has focused on better understanding the mechanisms of acupuncture. A broad range of innovative basic research studies have identified numerous biochemical and physiological correlates of acupuncture.[32] Mechanisms such as changes in neural processing in central and peripheral domains, release of endogenous opioids, changes in pain signaling, vasodilation and blood-flow dynamic effects, and others have led to numerous plausible, biological mechanisms for acupuncture. Nevertheless, key gaps in evidence regarding the biological basis of acupuncture points and meridians remain a barrier to acupuncture's perceived credibility and uptake. Further dissemination and implementation of acupuncture is likely to amplify the positive findings and increasingly inhibit criticism from stakeholders unaware of acupuncture research.[13]

Opioid Crisis: Above all other influencers, the opioid crisis has been the primary driver of efforts to find non-pharmacologic solutions to pain control, as the harms of current pain management strategies using opioids are recognized as a monumental cause of morbidity and mortality. It is estimated that strictly from a cost-estimation standpoint, harms from opioids near 78 billion dollars per year in the United States alone.[33] The evidence for acupuncture as an EBP to specifically address the opioid crisis was summarized by Tick et al. via the Academic Consortium in *Evidence-Based Nonpharmacologic Strategies for Comprehensive Pain Care: The Consortium Pain Task Force White Paper*,[34] and by Fan, Miller et al. in the white paper, "*Acupuncture's Role in Solving the Opioid Epidemic*."[35]

Increasing Payer Coverage: There is a trend towards the coverage of acupuncture, especially for pain-related conditions. The inclusion in January 2020 of acupuncture into Medicare specifically for chronic low back pain represents a monumental step forward for acupuncture recognition throughout the U.S. Medicaid programs in a number of states now provide some coverage for acupuncture services, expanding access to demographics who would not generally be able to afford self-pay.

Five states (Arkansas, California, Maryland, New Mexico, and Washington) consider acupuncture to be an essential health benefit. Overall, however, few non-pharmacologic therapies were offered under essential health benefit rules, despite recommendations by the American College of Physicians.[36]

Veteran Usage: One of the most striking examples of the increase in acupuncture utilization has been in the Veterans Health Administration (VHA). Acupuncture gained inclusion in the veterans' benefit package following the adoption of the Veteran Health Administration's Directive 1137, the Provision of Complementary and Integrative Health.[37] This provides that acupuncture be available to veterans when it is recommended as part of their care plan. The VHA created a qualification standard for licensed acupuncturists in February 2018, so this professional class is able to be hired to provide acupuncture services in VA medical centers.[38]

Although acupuncture has been practiced in the VHA for years by physician acupuncturists, chiropractic acupuncturists, and a small group of dually-licensed individuals, there is an expectation that acupuncture use will grow quickly with the inclusion of licensed acupuncturists providing the care. Tracking of usage and satisfaction by veterans over the coming years will reveal if this prediction is accurate. Following the 2019 MISSION Act, any veteran benefit that cannot be provided in a timely manner in relatively close proximity to the veteran requires the veteran be sent to a community care provider.[39] This includes the use of acupuncture services outside the VA walls through contracts between private, third-party administrators and the VHA.

Department of Defense: The use of acupuncture in the Department of Defense (DoD) system has also been

growing. A report published in Medical Acupuncture in 2018 retrospectively reviewed acupuncture usage.[40] It found that in 2014, 15,761 patients in the Military Healthcare System (MHS) database received acupuncture. Pain was the most frequent condition treated per this review. Battlefield acupuncture (a type of auricular acupuncture) was the first technique to be most systematically introduced to the DoD and played a significant role in creating inroads for subsequent, more comprehensive acupuncture strategies. An article in Nursing Outlook discusses the history of attempts to find non-pharmacologic pain options within the DoD and VA systems, and discusses implementation procedures for auricular acupuncture to meet said need.[41]

A review of integrative medicine usage in DoD military treatment facilities in general was also published in Medical Acupuncture in 2015.[42] This review showed acupuncture to be outpacing other integrative modalities in trend of use between 2005 and 2009. It should be noted that medical doctors and chiropractors have played the largest roles in moving these therapies forward within the DoD, as licensed acupuncturists have only recently gained a foothold as care providers at DoD healthcare facilities.

A similar article from 2018 notes, "for the estimated 270,000 military service men and women who transition each year to the VHA, acupuncture and other integrative therapies are familiar treatment options for conditions such as chronic pain.[40] Previous research demonstrates that these men and women will actively seek and request these therapies. It can be extrapolated that the normalcy of expectation of integrative care services, especially acupuncture, within the DoD and VA health systems drives both general consumer expectations, and lends a gravitas to legitimacy that only military and veteran endorsement can provide.[40]

Professional Delivery Group Development: Two primary groups have emerged as driving forces for advancing the existing dissemination and implementation of acupuncture research: the professional licensure group most broadly known as "licensed acupuncturists" and the body of medical doctors (MDs) and osteopathic physicians (DOs) practicing "Medical Acupuncture." The professional licensure group known predominantly as "licensed acupuncturists" was first established in the early to mid-1980s with the founding of the National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM) in 1983, the Accreditation Commission for Acupuncture and Oriental Medicine (ACAOM) in 1983, and the Council of Colleges for Acupuncture and Oriental medicine (CCAOM) in 1982.

The first professional national association for the field was also established around this time and was known as the American Association of Oriental Medicine (AAOM). This professional licensure group has been in development since the establishment of these core professional component organizations and has now produced approximately 38,000 graduates.[34]

The licensure group has diverse titling, including "Licensed Acupuncturist," "Doctor of Oriental Medicine," "Acupuncture Physician," "Registered Acupuncturist," "Traditional East Asian Medical practitioner," "Doctor of Acupuncture," and others as determined by state jurisdiction. These practitioners, however, share common core educational pathways. Critical developments are still underway for this professional group (see below), with three states still having no regulation, and Michigan becoming the 47th state to establish a practice act in December 2019.

In 2018, this professional licensure group was officially recognized by the Bureau of Labor Statistics (BLS) as a trackable profession, thus adding governmental endorsement as a strong legitimizing factor to the licensure group. Acupuncturists as a professional group also became seated with the American Medical Association Health Care Professions Advisory Committee (HCPAC) in 2019, engaging this perspective to the national conversation surrounding the coding and billing of medical procedures. In 2015 the American Society of Acupuncturists was founded and as of 2019 has brought together 34 state level professional associations working in the realm of regulation and professional membership. Through this federation style structure, more than 5000 practicing licensed acupuncturists have been brought into organized medicine.

The practice of "Medical Acupuncture," while lacking a specific content definition, has been an important force in engaging already practicing medical doctors to the professional practice of acupuncture. Soulie de Morant first brought acupuncture to the medical community in France in the 1930s. Dr. Paul Nogier published his famous paper in France on auricular acupuncture in 1957 (Loci Auriculomedicinae).[43] From there it spread to Western Germany in the 1950s under the influence of a number of physicians, including Gerhard Bachman and Jochen Gleditsch. Dr. Bachman was the founding father of the German Medical Acupuncture Association (DÄGfA), which is the largest Medical Acupuncture association in the world. Founded in 1983, today the International Council of Medical Acupuncture and Related Techniques (ICMART) is comprised of 80 Medical Acupuncture associations and colleges.

In the United States, physicians have been practicing Medical Acupuncture since the 1980s, and the American Academy of Medical Acupuncture was founded in 1987. Most broadly, the term "Medical Acupuncture" has been used to describe licensed physicians practicing acupuncture, regardless of the style of acupuncture practice. Currently, 300 hours of continuing medical education in

acupuncture and possession of an active medical license is the standard for physicians to claim acupuncture as a professional practice.

Medical doctors have been of paramount importance for the inclusion of acupuncture into mainstream medicine, and this continues to grow. This group most directly bridges the gap between acupuncture as a novel EBP and mainstream medical settings, having the certification of the dominant licensure group within their home medical domain. This growing interprofessional interest is likely to be somewhat self-reinforcing in promulgating interest in acupuncture.

We have recently seen a push to incorporate "dry needling" into the practices of physical therapists and athletic trainers. Though claims of a unique difference between dry needling and acupuncture continue to be made, dry needling is widely considered to be a subset of acupuncture practice (aka "orthopedic acupuncture") within mainstream, professional medicine.[44]

It should be recognized as well that the chiropractic medicine practitioner community has many professionals who also incorporate acupuncture into practice. The Council of Chiropractic Acupuncture and the benchmark-setting American Board of Chiropractic Acupuncture were established in 2005 and have set standards comparable to the Medical Acupuncture expectations.

Chiropractic acupuncture practice has, however, been more difficult to organize and consolidate as a recognizable force in mainstream medicine, legislation, and research, likely due to a number of factors. These include that the chiropractic licensure group is both still largely external to mainstream medical systems (unlike the MD and DO providers), and that the licensure group is not entirely committed to this specific system as its primary modality of practice (as are the licensed acupuncturists). Nonetheless, the presence of chiropractic providers offering acupuncture, and advertising this service even prior to and despite the establishment of its professional standard-setting bodies, created a familiarity with the term "acupuncture" that softened the soil for its general propagation. The combination of the factors above, from the opioid crisis to military usage, synergistically support one another in expanding acupuncture's need, normalcy, availability, legitimacy, expectation of use, service availability, and affordability within the American healthcare system.

Stakeholder Groups

As acupuncture and its influence have permeated and been influenced by the factors above, and as we recognize numerous interested parties in the needs outcry and programmatic, professional, and financial populations affected by demand, a more systematic description of stakeholder groups reveals its relevance. For implementation to proceed in a more scientific pattern, reviewing the obstacles and opportunities for each stakeholder category may be of primary utility. Therefore, defining these categories was one of the defining efforts of the SAR/PCORI working group.

Participants at the original meeting identified eight groups of initial influence: individual healthcare consumers, policy makers, institutions, payers, researchers, associations, providers, and educators (Figure 1). This list of stakeholders was considered sufficiently complete to help create a working model with the understanding that each domain could be broken down into further subdomains, and that stakeholder groups were not truly distinct. One individual might be a member of numerous stakeholder groups, and other permutations of categories might be derived. Further, categories can be subcategorized. For example, given current trends, the "Provider" category could be broken down into MDs/DOs, licensed acupuncturists, chiropractors, nurses, physical therapists, and even athletic trainers. Each of these groups has dramatically different obstacles and opportunities. Patient groups could be subclassified by race, income level, educational background, gender, age, etc.

For the purposes of initiating the exploration of acupuncture's intersection with implementation science, and recognizing that for each discussion of the characteristics, needs, and challenges of each stakeholder domain multiple papers could be generated, this primary paper focuses on an overview level of only four stakeholder groups: patients, licensed acupuncturists, medical acupuncturists, and researchers. Again, the authors and primary working group hope to inspire further and more in-depth explorations of all domains, and the permutations that emerge from that work. The discussions below are intentionally brief and meant to be exemplary rather than comprehensive.

Patient-Related Dissemination and Implementation Issues: A framework for considering challenges to the dissemination of information about acupuncture, and to the implementation of acupuncture as a health practice in the general patient population, can be structured using the framework identified by Herman et. al in her 2019 SAR presentation,[45] and originating in the work of Levesque et al.[46] (Figure 2) This matrix provides an excellent example of studying the underlying challenges various populations have regarding accessing all medical practices. It applies concepts mentioned earlier as to the value of identifying underlying structural rules affecting the environment of implementation and dissemination in general as distinct from any specific EBP.

It can be readily seen that many of these areas become more complex when presented with the challenge of acupuncture.

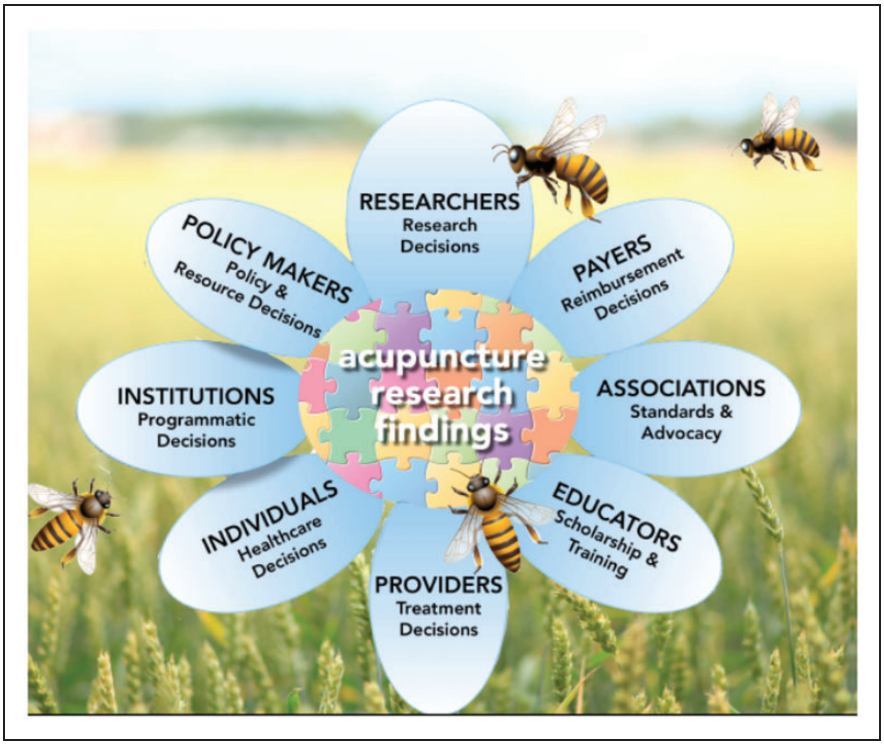

Figure 1. Stakeholder Groups.

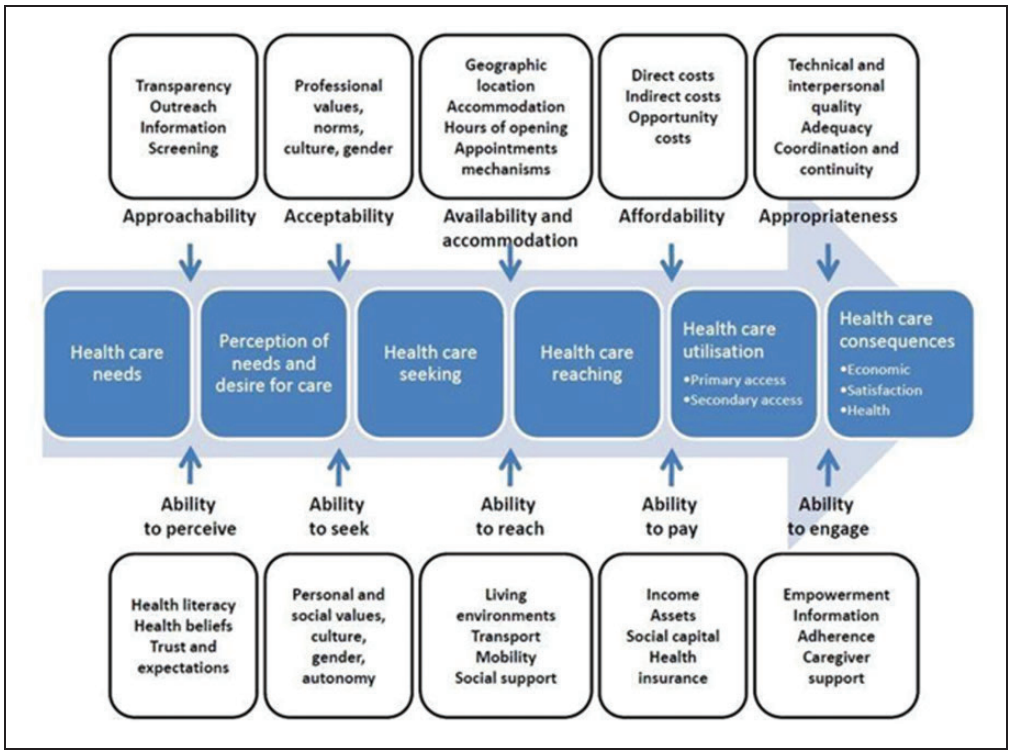

Figure 2. A conceptual framework of access to health care.

Transparency, Outreach, Information, Screening (Approachability) and Health Literacy, Health Beliefs, Trust and Expectations (Ability to Perceive): This domain may be limited by exposure to the core concepts of Chinese medicine, including expectations for treatment frequency, intensity, duration, experience, and anticipated investment. It may be limited by consumer experience with the primary provider groups, and becomes more complex by virtue of the language variation, novel diagnostic techniques, and overall framework of familiarity that fosters easy connection. Patients may rely on primary care providers to direct their care as well. Referral by an already trusted medical provider to acupuncture as a treatment option also would strongly reinforce public acceptance of this modality.

If the primary provider does not refer for treatment, many patients will not be aware of the option, and hence not perceive its potential. They may also need this type of endorsement to overcome fear of the unknown or skepticism to the practice. Patients and healthcare providers are largely unaware of the educational standards for the various provider groups and cannot therefore direct patients to the most-qualified providers. Patients, as well, are unaware of the educational infrastructures that develop and train acupuncture practitioners.

Professional Values, Norms, Culture, Gender (Acceptability) and Personal and Social Values, Culture, Gender, Autonomy (Ability to Seek): Acupuncture and Chinese medicine present a novel infrastructure with different healthcare values and norms. Some examples include the belief that illness holds valuable lessons and that it is consequent to prior actions in many cases, and that all disharmonies exist in a web of interrelationship. While not in conflict with current biomedical knowledge, in practice it is rare to see implementation of care that is premised on these underlying assumptions.

Care in Chinese medicine is also often non- or differently- hierarchical in nature, with patients expected to play a seminal role in the healing process. Patients may be less inclined to do more intensive treatment regimens compared to those involving simple pill consumption, despite more robust potential benefits (for example, a patient may be more willing to take ibuprofen for pain than engaging in regular self-care activity and stretching, despite the more global benefits the latter clearly provide.)

Geographic Location (Availability and Accommodation) and Living Environment, Mobility, Social Support (Ability to Reach): There is a limited number of acupuncture providers, and access to acupuncture does not consistently extend into many rural areas. The infrastructure of many practices is also limited in terms of ease of scheduling and other accessibility. Many acupuncture providers will not be able to provide extra support such as childcare during appointments or later hours. There are an estimated 38,000 licensed acupuncturists nationwide (if every graduate of the licensed acupuncturist training pathway were to be working), including 10,000 in California, with a handful of other states being overly represented in the distribution of licensed acupuncturists nationwide. With possibly 5000–10,000 medical acupuncturists trained, access to acupuncture services is extended, but these providers mostly are unable to provide acupuncture full-time, and services may be limited to experimental settings or specific hospital-based situations (eg, surgery and oncology).

Direct and Indirect Costs (Affordability) and Income, Assets (Ability to Pay): Much care remains fee-for-service and cash-based. This limits accessibility considerably, despite models attempting to remove the cost-barrier. Insurance companies only inconsistently cover services, and service coverage is often unduly limited to pain conditions.

Technical and Interpersonal Quality (Appropriateness) and Empowerment, Information, Adherence, Caregiver Support (Ability to Engage): This domain is often limited by training standards. The development of professionalism within the field is variable, with some providers notably having more skills and experience with patient engagement than others. Lack of familiarity with available services on the part of the patient may also lead to a lack of encouragement to pursue therapy. For example, family members may be less likely to encourage regular attendance for acupuncture than for physical therapy. Physicians may also be unaware of the evidence base for acupuncture, or more evidence may be needed, limiting formal scientific approval of acupuncture for the presenting condition. This may directly or indirectly inhibit patient engagement. A lack of public education also limits acceptability and exposure, thereby limiting the knowledge to seek the therapy.

Practitioner-Related Dissemination and Implementation Issues

Despite the gains noted above that have contributed to the growth of the licensed acupuncturist field, acupuncture as an EBP and its delivery by this group has hurdles to overcome. These include factors such as a lack of conceptual familiarity and acceptability, limitations in accessibility and adequate supply, patient acceptance, cultural expectations and concerns, reimbursement, and others.

Acupuncture emerges out of a complex, Chinese historical diagnostic and treatment framework, yet it can be applied in a simplified manner and from a westernized

viewpoint that is suited to pain relief. This dichotomy alone leads to vast disagreements among those who are fundamentally in support of acupuncture's effectiveness through many frameworks of application. Lack of unity in messaging internally intrinsically hampers dissemination about acupuncture, and thereby directly inhibits implementation.

There also remains a lack of agreement on the fundamental interpretation of classical concepts such as "what is an acupuncture point" and "what is an acupuncture channel." Acupuncture theory, as it emerged from classical Chinese medicine, remains in a state of partial translation, with new texts being translated regularly, thus providing an impressive growth of the literature base. There are also numerous styles of acupuncture in practice, from simplified western models to Japanese style, Korean style, Classical Chinese style, Tan, Tung, Five Element, and other schools of application. As understanding of and access to classical material and modern research expands, an optimal curriculum for entry level practice into the field is continuously in discussion.

Scope of practice is particularly varied in this professional group, with some states allowing diagnostic testing, dietary counselling, herbal medicine, injection therapy, worker's compensation inclusion, and body work, while others restrict practice to acupuncture only, with supervision by an MD either still required or only recently withdrawn. Insurance coverage is also highly variable, with conditions covered being considered variably "evidence-based" or "experimental" even within the same family of companies.

Many providers cannot receive third-party reimbursement for a broad swath of services they may provide, including at the most basic level the evaluation and management of patients, including nutritional, lifestyle, and exercise counselling as well as mental and emotional support services. This difficulty in receipt of reasonable remuneration for preventive and mental health services is clearly not unique to this licensure type. Despite these being part of standard training and certification, third-party reimbursement systems typically adhere to outdated models of payment, leaving practitioners primarily reliant on reimbursement for acupuncture services alone.

Regional variation in the acceptance of acupuncture in general is also evident, with nearly one third of practitioners in the United States residing in California alone, and higher concentrations of practitioners on the coasts and in larger urban areas. In some areas, acupuncture is part of essential health benefits, but in others, it is excluded from coverage. Because the basic presence of a service and service provider population are key initial factors to introducing that service to a potential patient base, areas with high market penetration advance more quickly into public awareness and into healthcare systems than areas with few practitioners and little public presence. Unlike larger professions such as the medical doctor population with nearly 1 million providers[47] nationwide as of 2016, or the physical therapy population with more than 265,000[48] providers nationwide, the licensed acupuncturist licensure group has at most 38,000 individuals ever trained into the field, with an unidentified percentage actively practicing.

Other challenges to the development of the professional group include poor job prospects post-graduation, with most providers still having to enter into private practice. It is rare that they are able to join a pre-existing group. This hurdle, coupled with the high expense of education for entry, points to a cap on the viability of growth for the licensure group as it stands.

"Gainful employment" rules require graduates of programs that accept federal student loan monies to show the attainment of a certain salary level within a proscribed time period post-graduation.[49] These rules have threatened to lead to the closure of up to half of the accredited U.S. licensed acupuncturist programs, and may again be a threat to programs in the future. These economic risks pose barriers to entry and hinder the attraction of new applicants to the field.

Research-Related Dissemination and Implementation Issues

Researchers have been trying to develop appropriate methods for the study of acupuncture. Prior reliance on placebo-style models for the study of acupuncture are being abandoned due to inherent problems with its design.[12] The utilization of "verum acupuncture" and "sham acupuncture" that underlie this study model has proven problematic due to the considerable treatment noise from the procedure identified as "sham." Sham acupuncture is not biologically inert in that it provides non-specific treatment effects along with some potentially specific effects of acupuncture, depending on the administration style. Experimentation with this research strategy and efforts to use so-called "sham" treatments have yielded results difficult for decision-makers to interpret.

The participation of the patient in the wellness process (with particular emphasis on emotional regulation, good dietary habits, and the avoidance of excesses) is an essential component of the classical system from which acupuncture emerged. Acupuncture would have been performed only after other methods of healing had been attempted, and with efforts to guide the patient's thinking and behaviors to benefit the therapeutic process. Treatment would continuously adapt, not only based on the presentation of the patient, but also on

the time of day the patient was treated, in what season, and in what climate.

Diet, lifestyle, mental state, and overall behavior change was classically expected of patients, thus modern efforts to administer acupuncture as if it were a pill or stand-alone procedure deviate from the very foundations upon which acupuncture is predicated. The therapeutic relationship is also paramount in the treatment process. All of these factors create challenges for research design that wishes to study acupuncture based on its classical roots.[50]

These challenges complicate the establishment of clear messaging on the strength of the evidence of acupuncture's effectiveness for a wide variety of clinical conditions. When a working understanding of the acupuncture research base demands nuanced and somewhat deeper appreciations for the research challenges, and when the knowledge of how acupuncture should be contextualized within the studies undertaken (efficacy vs. effectiveness, for example) is critical to knowing how to derive clinical recommendations from a research trial, concise messaging becomes difficult. Providers looking for a "gold standard" of research in acupuncture may be put off by the on-going debates on best research practices, and clinicians looking for quick treatment approaches may be deterred by the need to use acupuncture as a synergistic treatment strategy rather than a more linearly measurable single prescription. Predictably, difficulties in dissemination messaging on best practices, overall, will inhibit implementation clinically.

What is often lost in this discussion is that while many clinical trials report similar clinical outcomes associated with verum *vs.* sham acupuncture, both sham and verum treatments often outperform usual care only. The German Health Care system chose to adopt payment for low back pain for acupuncture despite this issue with verum and sham, because both methods performed better than usual care.[51]

Further confounding the dissemination and implementation of the scientific basis of acupuncture are deficits in training programs for licensed acupuncturists. These programs generally do not emphasize research methodology and fail to generate student-level experience. There is also a lack of access for this group to the literature base, with schools not having access to the comprehensive literature databases utilized by larger university systems. While licensed acupuncturists are the most highly trained group in the classical applications of acupuncture, very little of the entry-level curriculum, and only parts of the recently created doctoral-level curriculum, include significant training on evaluating literature and designing and carrying out research. Students are generally not exposed to research methodology nor asked to create publishable case studies or contribute otherwise to the literature base.

One solution to this had been the attempt to create an industry-specific, peer reviewed publication for the licensed acupuncturist community. The industry-specific, peer reviewed publication that had been available to the licensed acupuncturist community for more than five years (and for nearly 20 years under other titling) was *The Journal of the American Society of Acupuncturists* (JASA). The publication was an entry level journal and encouraged submissions from new authors and investigators. Providing both an example of what research should look like, and an impetus to publish, the journal encouraged the development of research and publication in the field.

Published in-house predominantly by volunteers, however, the journal lacked the resources to move to a professional publishing platform which would have expanded its online access and its indexing in databases. The journal closed in 2021 and publishing priorities transferred to the journal "Medical Acupuncture" which is the journal of the American Academy of Medical Acupuncture.

Closely working with schools that have Doctor of Acupuncture and Oriental Medicine (DAOM) programs, to require students to create appropriately structured, clearly written, publishable case studies as part of graduation requirements would enable graduates to gain valuable familiarity and comfort with publishing and help them think about cases in a more structured manner. It may also encourage them to refer to these published resources as they practice in clinic.

The primary journal of the MD practice group, *Medical Acupuncture*, is the official journal of the American Academy of Medical Acupuncture. Members of the Academy receive a print subscription and online access to *Medical Acupuncture* as a benefit of their membership. This bi-monthly, peer reviewed journal is written "for physicians, by physicians" and was just recently made available to open access. It is now indexed in PubMed Central as well. This important step will also likely encourage greater interest in publication from a broader group of researchers, expanding the formal, professional conversation. The level of involvement of licensed acupuncturists with this journal is in flux, but it may be able to fulfill some of the prior goals set by JASA in addition to its current publication priorities.

Discussion

Despite considerable challenges, acupuncture continues to advance into mainstream American healthcare and into healthcare systems worldwide. The structured dissemination and implementation of acupuncture, however, remains lacking. Advances are indeed being made,

but a central coordinating strategy to optimize uptake and impact is lacking.

As the professional acupuncture community gains sophistication in both acupuncture research and clinical application, and as the field gains momentum and begins to more strongly influence multiple stakeholder groups, more attention to the study of the science behind the dissemination and implementation of acupuncture as an EBP is essential.

Primary challenges to this process include the foreign origin of acupuncture, which can limit properly translated concepts. This "otherness" also engenders a general lack of recognition of the multiple potential physiologic effects of acupuncture and its other plausible mechanisms of action. Existing medical infrastructures also are challenged to bring this modality into care, due to their struggles to understand into which domains it is appropriate to integrate, and who are the properly qualified individuals to provide the service. Sustainable payment mechanisms are also lacking, and vast inconsistencies are present in the insurance industry concerning the status of acupuncture as an appropriately reimbursed EBP. Access to providers is also a challenge for numerous reasons, including low total numbers, recognizability, and integration into referral systems.

Strengths of acupuncture and its inclusion as a viable medical option include the rapidly growing evidence base, increasing public demand, the need to find non-pharmacologic options for pain control, and the existence of growing, though challenged, specific professional provider groups. Noteworthy growth of the licensed acupuncturist professional community is reflected in the presence of practice acts in currently 47 states, as well as increased interest in training by medical doctors and osteopathic physicians. Other professional groups such as physical therapists and nurses are expressing strong interest in the ability to provide acupuncture services. This is exemplified by the growth of "dry needling" and the efforts by nurses in Washington State, Arizona, and other locales to incorporate "medical acupuncture" into scope. Patients also increasingly seek acupuncture, reporting it to be both effective and pleasurable, and consumer demand (including among military personnel and veterans) is growing.

In places where acupuncture has been brought into healthcare systems, the identification of a champion for the integration, a knowledgeable provider of the service, reimbursement and funding solutions, and effective integration into the workflow structure each appear to be core elements of success. Effective study of this process, however, is limited, and presents fertile terrain for the field of implementation science.

How to best engage varying stakeholder groups, how to resolve regulatory and legislative obstructions, the means by which to better train providers in understanding and contributing to the scientific literature base, and the best practices in disseminating core information about acupuncture's status as an EBP to each stakeholder group in a way that can be optimally received, all remain areas for growth and development.

Conclusion

Acupuncture stands to benefit considerably from the application of knowledge found within the field of implementation science. If acupuncture is indeed as significant an intervention as it is beginning to appear, even only in the realm of non-pharmacologic pain treatment, its potential impact as an emerging "best practice" in public health could be profound. Those interested in advancing best practices around acupuncture's integration are becoming aware of the field of implementation science, and further dialog between the disciplines is likely to yield impressive information into how health care systems (including providers, consumers, and structures) adapt to the presence of this novel, valuable, evidence based practice.

The research resulting from this working group meeting hosted by SAR and sponsored by PCORI has revealed fertile ground for further exploration, and has also revealed a path forward for this much needed effort. Solutions to problems presented utilizing specific implementation science informed strategies would be of tremendous benefit to advancing this dialog. As the scientific research basis for the support of acupuncture in both basic science and clinical medicine continues to increase, it is time to more intentionally approach the task of developing adequate implementation strategies for the practice of acupuncture within the current medical framework.

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