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Acupuncture for the Critically Ill:
A Feasibility Study at Highland Hospital

By,

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Dedicated to

Mary Warfield,
who lent me the map;

Peter, Jennifer, Nicky, Chris, Hilary and Susie,
who aligned my compass;

And my classmates, JMP '16/'18,
who supplied snacks along the way.

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**Alternative in America:
The past, present, and potential for Acupuncture and Pain**

Part 1: Alternative Medicine in America: past to present

At the beginning of the 19th century, board-certified Medical Doctors (MD) did not exist, and medical care was offered by a variety of specialists and lay people. By the 20th century, the MD had become both a healer for upper-class maladies, and a dominating paradigm for medical care. In this section, I will explore the intervening hundred years during which America transitioned from a land of medical pluralism to a biomedical model dominated by the American Medical Association. Within this context, I will explore what is known about the popular use of “alternative,” or non-biomedical therapies for health, as well as the rationale for seeking non-traditional care. I will conclude by evaluating the interpretation of complementary and alternative medicine today.

1. History of unconventional medicine: 1800s through today

In the first half of the 19th century, health care was provided to the public by an assortment of folk healers, midwives, apothecaries, surgeons, clergy, and lay people. In the post-revolutionary first years of the 19th century, social rejection of British norms supported a growing antagonism for the orthodox Medical Doctor (MD) by the egalitarian, non-MD practitioners. At that time, the MD was rarely available, variably trained, and almost exclusively accessed by the rich. Yet this initial swell of opposition encouraged a sense of individuality and elitism among MDs, further bolstered by the Enlightenment’s scientific revolution and supported by economic self-interest.¹

By the 1820s, antagonism held by MDs and non-MD practitioners bred a divisive, adversarial relationship between disciplines. Ted Kaptchuk and David Eisenberg described the “war zone” between medical practices in their 2001 paper on the history of medical pluralism:

In the 19th century, U.S. medical pluralism was a war zone. Beginning in the earlier 1800s, the first wave of organized opposition to orthodoxy was led by the Thomsonians (botanical healing), Gramites (health food), homeopaths (microdilution medicine), hydropaths (water-cure therapies), and mesmerists (the “energy” healing of the time). Beginning at the end of the 19th century, a second advance was spearheaded by the osteopaths, chiropractors,

¹ Kaptchuk and Eisenberg, “Varieties of Healing. 1.”

drugless practitioners, and Christian Scientists... the ammunition of the medical conflict included rhetoric, legislative maneuvers, and nonfraternizing clauses...

...Samuel Hahnemann (1755 – 1842), the founder of homeopathy, claimed that the [MDs] (for whom he coined the term allopath) practiced a “non-healing art... which shortened the lives of ten times as many human beings as the most destructive wars and rendered many millions of patients more diseased and wretched than they were originally” (Hahnemann, 1980). Oliver Wendall Holmes (1809 – 1894), of Harvard Medical School, responded that homeopathy was “a mingled mass of perverse ingenuity, of tinsel erudition, of imbecile credulity, and of artful misrepresentation” (Holmes, 1842).²

Here we see that despite the varied philosophies and communities of non-MD practitioners, all united in opposition against the MDs. The disdain is shared on both sides, as seen in the insults launched by both Hahnemann and Holmes. Hahnemann believes his health care is grounded in healing the person, a focus he sees lacking in Holmes and his MDs. Holmes is filled with condescension, questioning the fundamental worth of homeopathy as a health tool as well as Hahnemann’s moral code as a citizen. Hahnemann’s concerns focus on patient outcomes, while Holmes’ on the methods of medicine. Holmes’ moralization of science is consistent with the belief perpetuated by the Enlightenment’s scientific community that an evidence-based algorithm for choosing care strategies was an ethical imperative for health providers. These bold, hyperbolic assumptions from both “sides” provide social context to the clash between paradigms, and suggest that personality and hubris likely played a role during the development of medical norms.

The first American Medical Association meeting in 1847 was held in the midst of these accusations, and it was during this meeting that the, “minimal requirements for medical education and training,” were established alongside a code of ethics.³ This code included rules for how medical doctors should work to minimize other medical structures, establishing the language of “quackery,” “cult medicine,” and “bogus practices” that would permeate orthodox thought for the next hundred years.^{4,5}

² Kaptchuk and Eisenberg, “Varieties of Healing. 1.”.

³ Riddick, “The Code of Medical Ethics of the American Medical Association.”

⁴ Kaptchuk and Miller, “Viewpoint.”

⁵ *Proceedings [of The] Third National Congress on Medical Quackery [held] October 7-8, 1966, Chicago, Ill.*

Whether the 1900s saw a decrease or surge in medical pluralism in the United States is largely unknown. I.S. Falk, a physician based in Pennsylvania, published his own health survey conducted between 1928 and 1931. Within this survey, Dr. Falk found that seeking medical care from “secondary practitioners and cultists,” remained common practice. Interestingly, the results of this survey showed that use of alternative models increased with wealth, from 5.5% in the lowest wage groups to 24% in the wealthiest. This trend contrasted receipt of orthodox medical care, which all families were found to access at equal rates regardless of wealth. These findings rebuked the widely held academic assumption that alternative medicine was an indigent, ignoble pastime: “there is a notion that the use of midwives, osteopaths, chiropractors, Christian Science practitioners, and others is characteristic of the poor and of the ignorant... such a relation becomes the exception rather than the rule when all practitioners of this class are considered together.”⁶

The next known major survey to assess alternative medicine use in the United States was completed nearly 70 years later, in 1990, by academic researchers. The study inquired on participant use of 16 “unconventional therapies” not taught in U.S. medical schools nor available in hospitals. Of the 1539 participants, 34 percent reported use of at least one unconventional therapy within the last year, ranging from 23 to 53 percent across different sociodemographic groups. Non-blacks between 25 and 49, living in the western United States, with some level of college education, and an annual income greater than \$35,000 were significantly more likely to use unconventional therapies. Of those who reported use, two out of three denied seeing an alternative provider, presumably achieving their unconventional therapy on their own. The remaining third reported visiting a provider an average of 19 times throughout the previous year, with an average charge of \$27.60 per visit – 64% paid for these visits entirely out-of-pocket. The researchers extrapolated from these statistics an average of 425 million visits to unconventional therapy providers within American in 1990, nearly 37 million more than the total visits to primary care physicians. In addition, unconventional therapy use accounted for an estimated \$10.3 billion in out-of-pocket medical expenses, \$2.5 billion less than out-of-pocket expenses for all hospitalizations in the United States in 1990.⁷

⁶ Falk, *The Incidence of Illness and the Receipt and Costs of Medical Care among Representative Families; experiences in Twelve Consecutive Months during 1928-1931*.

⁷ Eisenberg et al., “Unconventional Medicine in the United States – Prevalence, Costs, and Patterns of Use.”

This benchmark study was followed by a second survey in 1997 using the same study design. Results from this round showed use of unconventional therapies increased from 33.8% in 1990 to 42.1% in 1997 within a similar demographic, i.e. non-black, college-exposed individuals between 35-49 living in the west, though women were found to be more likely than men to use unconventional therapies. Similarly, visits to alternative practitioners increased, with nearly half of all users (46.3%) seeing providers, and over half of these (58.3%) paying for services entirely out-of-pocket. The team estimated that between \$21.2 and \$32.7 billion was spent on unconventional therapies in 1997, 45% more than that spent in 1990. Finally, the survey estimated that Americans made 243 million more visits to alternative therapy practitioners annually than to primary care physicians.⁸

Chronic conditions, back problems, anxiety, depression, and headaches remained the most common medical conditions for which unconventional therapy was sought in 1990 and 1997. Of the 16 therapies studied, use of herbal medicine, massage, megavitamins, self-help groups, folk remedies, energy healing, and homeopathy all increased between 1990 and 1997. Hypnosis, biofeedback, and acupuncture remained the least prevalent therapies. Slightly less than 40% of patients using unconventional therapies disclosed their use to their physician, a percentage that did not significantly change between 1990 and 1997.⁹

Five years following the 1997 report, a third survey was completed by the Centers for Disease Control and Prevention (CDC) estimating CAM use among U.S. adults. Compared to the 1539 and 2055 adults interviewed in 1990 and 1997 respectively, 31,044 individuals were interviewed in 2002 as part of a National Center for Health Statistics survey. The results of this survey showed that 36% of all respondents reported some form of CAM therapy within the past 12 months, 62% when prayer for health reasons was included. The most common therapies included prayer for one's own health by oneself, by others, or within a prayer group; natural products; deep breathing exercises; meditation; chiropractic care; yoga; massage; and diet-based therapies. Back and neck pain or issues, seasonal illness, joint pain or stiffness, and anxiety or depression were found to be the most common reasons for seeking and receiving CAM.¹⁰

⁸ Eisenberg et al., "Trends in Alternative Medicine Use in the United States, 1990-1997."

⁹ Ibid.

¹⁰ Barnes et al., "Complementary and Alternative Medicine Use among Adults."

The National Center for Health Statistics 2007 report, completed five years later, confirmed these findings, despite the omission of prayer for health and healing; once again, nearly four out of 10 adults reported using CAM within the last year. This report included statistics on children, finding 11.8% used CAM within the past year, often when a parent was also using CAM therapies. In 2002 and 2007, African Americans remained the least likely racial group to seek CAM. Finally, respondents reported that CAM use was often associated with delayed conventional medical care due to financial concerns when normal care options seemed excessively expensive.¹¹

Overall, these survey data suggest CAM use is far more prevalent than the term “alternative” might suggest. While frequency of use is not equal, it is still present across demographic profiles, presenting questions of familiarity, interest, and relationship to CAM therapies within separate demographic groups. While cost was not analyzed in the 2002 and 2007 CDC surveys, the net spending estimated in 1990 and 1997 suggests that Americans see enough value in CAM therapies to pay out-of-pocket. Determining the perceived qualities and effects of these CAM therapies would provide an important perspective for health policy makers interested in understanding the choices Americans make to improve and maintain their health.

2. Rational for complementary and alternative medicine: how patients perceive, seek, and use CAM therapies, and the perceived effects of CAM

The 1990 and 1997 surveys estimated that Americans were far more likely to visit a complementary or alternative medicine practitioner than their primary care physician, with 629 million visits to unconventional healers compared to 390 million visits to primary care docs in 1997. This dramatic imbalance led researchers at the University of Wisconsin to study the factors leading to the decision to receive or provide CAM therapies. Two studies were performed by Barrett et al. to examine the perception and rationale for using CAM. In the first study, 20 CAM practitioners and 17 users/clients of CAM were asked how they defined CAM, which therapies they practiced/used and why, how goals were accomplished, and how CAM compared to conventional care. In 2003, 32 CAM practitioners were asked further questions on the differences between CAM and conventional therapies, and whether and how they might be integrated.

¹¹ Barnes, Bloom, and Nahin, “Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007.”

Results from the 2000 and 2003 studies uncovered four themes from interviews with CAM clients and providers: holism, empowerment, access, and legitimization.¹²

These results complement earlier work completed by Ted Kaptchuk and David Eisenberg at Beth Israel Deaconess Medical Center, in which the themes uniting the diverse therapies constituting CAM are evaluated for their “persuasiveness” within an industrialized, “Western” world. Kaptchuk et al. argue that, “although disagreement [among the heterogeneous population of CAM therapies] exists, the depth and consistency of common intellectual, emotional, political, and health care preconceptions have contributed to the strength of the alternative medicine alliance.”¹³ Like Barrett’s work, this paper outlined four foundations of alternative medicine: nature, vitalism, “science,” and spirituality.

Pairing Barrett’s and Kaptchuk’s perspectives uncovers the parallel themes found in the academic-theoretical, patient, and provider perceptions of CAM. First, in holism. Participants in Barrett’s study described holistic care as requiring a “well-rounded approach to health.” CAM therapies met this standard by appreciating the patients, “social, psychologic, and spritual aspects,” in addition to their physical selves. Kaptchuk’s theme of spirituality asserts that alternative medicine allows patients to access scientific “causality in time and space” alongside “the domain of moral freedom and self-chosen values” of religion. This perspective sews together physical, philosophical and spritual planes, allowing patients to “discern ultimate meaning and make profound connections with the universe” within the context of healing. Holism, then, assumes philosophy and spirituality are dimensions of health, allowing patients to identify which of their many experiences and perspectives requires attention and healing.¹⁴

Spirituality is not part of conventional biomedicine, and is associated instead with individual providers. A 2009 study surveyed acupuncturists, naturopaths, internists, and rheumatologists and found that allopaths who self-described as spiritual and/or religious were more willing to integrate CAM into practice. The survey also found that allopathic providers were more likely to report religious affiliation, while naturpaths and acupuncturists were more likely to describe themselves as spiritual, and to extend

¹² Barrett et al., “Themes of Holism, Empowerment, Access, and Legitimacy Define Complementary, Alternative, and Integrative Medicine in Relation to Conventional Biomedicine.”

¹³ Kaptchuk and Eisenberg, “The Persuasive Appeal of Alternative Medicine.”

¹⁴ Goldstein et al., “Holistic Physicians and Family Practitioners.”

this spirituality to their understanding of the body and health.¹⁵ A 2012 metaanalysis examining religious and spiritual identities and CAM use similarly found that allopathic physicians identifying as spiritual were more likely to recommend CAM use, but found that religiosity was negatively correlated with recommending CAM.¹⁶ These findings suggest that a provider's personal spiritual or religious practice will influence their medical care in distinct ways, and that CAM providers may be more likely than MDs to engage in spiritual practice.

The next theme associated with CAM recipients in Barrett's work was empowerment as identified in both the decision to seek complementary or alternative care as well as in the procedures and mechanisms involved in CAM therapy. Respondants emphasized agency as a part of healing, as well as the importance of autonomy in health care: "I have to be part of the process in order for it to work," and, "I think the doctors' way of being is phasing out because people are getting more responsible for their health care." Additionally, patients reported empowerment by stepping into "alternative" terrain, an active investment in their wellness. This theme of empowerment parallels Kaptchuk's "vitalism," which he describes as a bridge between disease and healing: "when illness isolates, alternative health care allows a rescuing connection." Consciousness becomes the "primary arbitrator" of health: what the patient believes creates their narrative of health and healing. "The threat of disease is greatly diminished as a person's imagination, will, and belief are empowered with healing consequences," states Kaptchuk, pointing to the agency assigned our mind that lets us choose whether or not we are well, irrespective of scientific interpretation of disease. CAM methods see a person's agency and autonomy as central to the pathway toward healing.

Accessibility, the third theme described by Barrett's respondents, focused on the cost of seeking CAM within a conventional medical context. Because alternative therapies are not covered by conventional insurance plans, they often require out-of-pocket payment. This payment can become a barrier to access regardless of the patient's preferred model of health care. Patients perceive CAM methods aligning with the body's own healing mechanisms, a focus seen as lacking within conventional models of care.¹⁷ The access conflict ultimately leads to economic and political isolation, as individuals seek to define their own interpretation of healing within a pre-specified

¹⁵ Curlin et al., "Religion, Clinicians, and the Integration of Complementary and Alternative Medicines."

¹⁶ Ellison, Bradshaw, and Roberts, "Spiritual and Religious Identities Predict the Use of Complementary and Alternative Medicine among US Adults."

¹⁷ Lawenda, "Quackery, Placebos, and Other Thoughts."

health care context. CAM identifies with an alternative ideology of healing and self-care, forced to exist within our conventional economy in which pharmaceutical lobbies, insurance companies, and incentive systems play central roles in the delivery of care.

The theme of nature among CAM traditions demonstrates this tension: the “natural” treatment is, “a less artificial version of personhood...’purifying’ oneself of the toxic dimensions of civilization and their consequent diseases.” CAM rejects commodification as it rejects the technology-driven separation of human life from natural ecology: it is inherently outside the realm of an insurance-regulated system, requiring a freedom to define what is harmful, and what is not, working all the while alongside our body’s own healing agency. These traits pose practical challenges for implementation and access for those seeking and providing care.

Legitimization, the final theme mentioned by Wisconsin respondents, further emphasizes this divide. Provider perspectives on legitimacy generally held that CAM was proven and researched, while patients were less certain about the evidence, some specifically recognizing CAM’s lack of scientific evidence, while others certain of CAM’s efficacy were critical of study methods. It bears repeating that all patient respondents were active recipients of CAM, suggesting that questioning the legitimacy of CAM did not deter use. The efficacy of CAM was further described as unique from conventional medicine, as alternative therapies ascribed to a different type of healing. As an example, CAM therapies were described as less aggressive and quick to produce results than conventional medicine: “Chinese medicine has a top speed of 30 miles per hour and if your disease is going 45-50, you need to go to an allopathic because they can go 120.”

The reliance of CAM on independent paradigms is central to Kaptchuk’s theme of science. Each tradition is held to its own “science” depending on its intended methods, speed, and outcomes. As Kaptchuk points out, “many of these disciplines have a long intellectual tradition and sophisticated philosophy.” Indeed, the theory behind CAM models usually predates the modern allopathic theory, and professionalism includes equivalent instruction, materials, and apprenticeship for mastery.

Understanding a patient’s perception of his or her health after using CAM presents another area for inquiry. Nguyen et al. used the 2007 National Center for Health Statistics data to evaluate whether patients who use CAM self-reported increased health status and health improvement. Their study found that CAM users were more likely to rate their health as “excellent,” or “better” during the prior year than

individuals who did not.¹⁸ These findings are important to consider within the context of self-reported health, as individuals with “poor” self-reported health have been seen to have a two-fold higher risk of mortality than those with “excellent” self-reported health.¹⁹ Interestingly, low self-reported health status has long been associated with higher rates of health care resource use.²⁰ This suggests that individuals who receive CAM therapies are less likely to use conventional health care resources in excess, though the nature of this association has not been explored.

In sum, the Wisconsin research team found “belief-centered, value-laden, and sociocultural reasons” for CAM therapy use.²¹ These findings complement the “enduring attractiveness of alternative medicine...largely related to the experience encoded in its four basic cultural premises” of nature, vitalism, science, and spirituality.²² Individuals who seek alternative methods of healing report higher health status than those who do not, a behavior that is associated with improved health and reduced use of health care resources. We must assume this is due, in part, to the sense of agency and holism offered by CAM practices. Alternative models allow the individual seeking health and healing an intimacy with the method of healing received; a similar bond exists between healers and their art. These relationships have helped maintain the rich tradition of alternative healing despite historical rhetoric of otherness and illegitimacy.

3. Today: defining complementary, alternative, and integrative medicine

Complementary and alternative medicine (CAM) is the general term for a group of healing modalities that lie outside the mainstream of Western medical care. These modalities range from ancient to modern philosophies, traditions, and practices.

The National Institutes of Health opened an *Office of Alternative Medicine* in 1992, which grew to become the *National Center for Complementary and Alternative Medicine* (NCCAM)

¹⁸ Nguyen et al., “Use of Complementary and Alternative Medicine and Self-Rated Health Status.”

¹⁹ DeSalvo et al., “Mortality Prediction with a Single General Self-Rated Health Question. A Meta-Analysis.”

²⁰ Fylkesnes, “Determinants of Health Care Utilization--Visits and Referrals.”

²¹ Barrett et al., “Themes of Holism, Empowerment, Access, and Legitimacy Define Complementary, Alternative, and Integrative Medicine in Relation to Conventional Biomedicine.”

²² Kaptchuk and Eisenberg, “The Persuasive Appeal of Alternative Medicine.”

in 1998. Today, NCCAM categorizes CAM therapies into five major domains. These domains include energy therapies, biologically based therapies, manipulative and body-based methods, mind-body medicine, and alternative medical systems. The later category includes medical systems such as traditional Chinese medicine or Ayurveda, health care models with their own unique paradigm.

This naming convention “CAM” is inherently contradictory: a medicine cannot be complementary *and* alternative at once. The effect of this term is to categorize these modalities by their relationship to conventional, or Western medicine. Complementary techniques are approaches suitable for use *alongside* conventional, or Western, medicine. Alternative techniques are used in their stead. These distinctions are sometimes fixed, other times changing, always subject to interpretation. Herbal remedies, for example, are used by some cultures instead of pharmaceuticals, while in others they are used as supplements.²³

Integrative medicine (IM) is an approach to conventional care that attempts to combine both complementary and alternative therapies within a Western model. This concept is relatively new, not quite an established medical specialty, but rather a movement among medical providers in the process of gaining traction. The concept of IM formalized in 1999, when representatives from Duke University; Harvard University; Stanford University; University of California, San Francisco; University of Arizona; University of Maryland; University of Massachusetts; and University of Minnesota gathered to present their work on CAM research, education, and clinical care. This summit became the foundation for the Consortium of Academic Health Centers for Integrative Medicine (CAHCIM, also referred to as, “the Consortium”), a group of 56 member institutions committed to fostering mainstream adaptation and acceptance of IM in allopathic medical centers.

The Consortium defines integrative medicine as, “the practice of medicine that reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic approaches, healthcare professionals, and disciplines to achieve optimal health and healing.”²⁴ Andrew Weil and David Rakel, physicians central to the IM movement, describe it as, “[focusing] on the least invasive, least toxic, and least costly

²³ Consortium of Academic Health Centers for Integrative Medicine, “Complementary, Alternative, or Integrative Health.”

²⁴ Consortium of Academic Health Centers for Integrative Medicine, “Definition of Integrative Medicine.”

methods to help facilitate health by integrating allopathic and complementary therapies. These are based on an understanding of the physical, emotional, psychologic, and spiritual aspects of the individual.”²⁵

The National Institutes of Health, or NIH, do not explicitly define IM, stating that the, “array of non-mainstream health care approaches,” or CAM therapies, “may also be considered part of integrative medicine.” As an example, they describe cancer centers that offer acupuncture and meditation services alongside their conventional, or “usual” care programs. They further underline that IM is an ongoing, increasingly popular approach to health care, though, “a lack of reliable data makes it difficult for people to make informed decisions about using integrative health care.” They go on to explicitly state that the NCCIH uses the term “complementary health approaches,” rather than integrative medicine.²⁶

The contrast between the Consortium and Weil/Rakel definitions highlights a paradox in integrative medicine implementation exemplified by the NIH rebuttal. The Consortium definition highlights several virtues of integrative medicine that include the importance of an evidence base. Yet the assertion that IM is “informed by evidence,” is separate from the assertion that “all appropriate therapeutic approaches” are considered in order “to achieve optimal health and healing.” This distinction between established evidence and available therapies confounds usefulness and conventionality; if some CAM therapies are well studied while others are not, are they still equally considered within an IM setting? The NIH seems to think this so, and responds by questioning all complementary or alternative care models.

This distinction is made more explicit in the Weil/Rakel definition, in which therapeutic approaches are evaluated based on their invasiveness, toxicity, and cost – but not their evidence base, likely due to a lack of evidence for certain therapies. Like the Consortium, this definition explains that a holistic understanding of the patient leads to the IM practitioner’s blend of allopathic and complementary therapies: what this definition omits is any suggestion that these care decisions hinge on scientific data.

The NIH’s definition seems to directly respond to this separation of evidence from outcomes. Their example scenario illustrates this, as their hypothetical cancer center primarily offers mainstream medical care, yet loses validity by also offering non-

²⁵ Rakel, *Integrative Medicine*.

²⁶ Consortium of Academic Health Centers for Integrative Medicine, “Complementary, Alternative, or Integrative Health.”

mainstream options. Entwining non-evidence-based care into an orthodox system creates a “difficult” situation for patients making “informed” decisions. Still, IM is a growing phenomenon that patients continue to seek despite a deficit of “proof”. Perhaps patients do not prioritize the randomized control trials and strict study design as the NIH does, but instead seek authentic interaction with their provider with the goals of optimal health and healing.

The NIH definition of integrative medicine does suggest that CAM integration will become feasible and acceptable with “enough” evidence, an effort supported by integrative medicine leaders. The current landscape of CAM research suggests an underlying tension between mechanism and outcome. CAM modalities including yoga, acupuncture, and mindfulness have been the focus of significant research efforts, yet their mechanisms of benefit remain unclear. Acupuncture in particular has been subject to controversy as biomedical research struggles to make sense of clinical improvements without a clear mechanism. The structures and bodies governing health care access and progress have followed the NIH in their hesitation, framing unconventional therapies as complementary, and not integral, to care.

Perhaps one explanation for the challenge of finding biomedical evidence supporting CAM therapies stems from fundamental issues with biomedical science and study design. Indeed, proponents of integrative medicine often question whether nature of randomized control trials are particularly ill suited for their therapies. The conditions required for a randomized study design to occur are themselves variables of interest – there is no completely unbiased scenario. To use acupuncture for another example: the patients enrolled in a clinical trial are aware that they are in a study and that acupuncture is being evaluated. Whatever theories, experiences, and understandings they may have about acupuncture will remain in their mind throughout treatment, as will the doubt or enthusiasm associated with experimental intervention. Subjects within contrived circumstances will reflect the neuronal realities of a contrived experience; “human awareness and its potential distortion continues to operate even within the rarefied environment of a concealed RCT.”²⁷ Some examples of these biases include the uncertainty surrounding the possibility of receiving placebo, or heightened awareness of clinician and patient to outcomes associated with or occurring alongside treatment. In sum, the very nature of RCT’s “ideal experimental conditions (especially the use of concealment) can influence clinical endpoints in unpredictable ways.”²⁸

²⁷ Kaptchuk, “The Double-Blind, Randomized, Placebo-Controlled Trial.”

²⁸ Ibid.

Indeed, CAM therapies could lose therapeutic value when integrating into the conventional context. Today, these fundamental differences between alternative and conventional medical practices have led to incomplete attempts at integration. While some hospitals and clinics now offer CAM, practitioners are rarely employed in formal positions with salary and benefits. Patients interested in CAM therapies often face an extra cost, one that can easily become financially prohibitive. While some patients will never have the opportunity to begin receiving a CAM therapy, others may begin and prematurely terminate a therapy due to the cost. Furthermore, without being paid for their time spent collaborating with care teams, CAM providers are not incentivized to work alongside allopathic providers. While CAM practitioners may want to establish continuous, optimal care by, for example, attending rounds or formalizing referral systems, they are often unable to invest the time or effort.²⁹

A further complication of the pay-for-service strategy common to conventional medical occurs when integrative modalities begin to be considered commodities, erasing the holistic depth of their various philosophies. Offering CAM therapies in piecemeal packages is an appealing business model, attracting patients and increasing total revenue. But that does not make them the most beneficial options for patient care. These capitalistic assets are separate from their healing potential, and come with a risk of diluting or otherwise losing unidentified beneficial elements.³⁰ CAM incorporates a wide range of modalities, from yoga to meditation to prayer. While nutrition advice, for example, might be amenable to a limited number of individual visits, the cumulative effects of therapies like acupuncture are not well known.

Complementary and alternative medicine modalities pride themselves on their origin and maintained tradition outside and against the corporate capitalism that largely governs conventional health care. Yet this adversary, the business of health care, is not the same thing as the medical care itself. MDs, like alternative therapists, are committed to supporting life and healing. Perhaps by finding a peaceful space for communication and shared ideas, the rift started in the mid 19th century will be put to rest, and medical care can improve.

²⁹ Hollenberg, “How Do Private CAM Therapies Affect Integrative Health Care Settings in a Publicly Funded Health Care System?”

³⁰ Ibid.

Part 2: Acupuncture for Pain

The role of pain in medical care has grown significantly over the past fifty years. Widespread concern that pain was undertreated culminated in the mid-1990s, when Dr. James Campbell, President of the American Pain Society, suggested the inclusion of pain as a “fifth vital sign,” in an effort to make visible the patient experience of pain, and thereby increase the likelihood of treatment.³¹ Yet despite this effort, conventional biomedicine has largely failed to adequately address and manage pain. Today, pain continues to be the most common presenting complaint for all emergency department visits in the US.^{32,33,34} The vast majority of surgical (80%) and general medicine (53-60%) patients report experiencing pain during their hospital stay, while less than half report adequate pain relief.³⁵ Untreated pain has consequences for hospital management, including increased patient recovery time, higher rates of morbidity, and reduced patient satisfaction.³⁶ Patients with unrelieved pain experience reduced physical functioning and sense of well-being, poor sleep, and increased anxiety and depression. Untreated pain also increases the likelihood of developing chronic pain.³⁷ Undoubtedly, a patient’s quality of life is markedly diminished when in pain.³⁸

Pain itself involves physiological, psychological, and social experience that change with time and context. As a result, management involves an inherently multi-factorial challenge.³⁹ In this section, I discuss the need for more careful, empathic listening to patient experience. While barriers to effective pain management surely extend past those perpetuated by the physician, they are still important to consider in the context

³¹ Morone and Weiner, “Pain as the Fifth Vital Sign.”

³² Pletcher et al., “Trends in Opioid Prescribing by Race/ethnicity for Patients Seeking Care in US Emergency Departments.”

³³ Apfelbaum et al., “Postoperative Pain Experience.”

³⁴ Helfand and Freeman, “Assessment and Management of Acute Pain in Adult Medical Inpatients.”

³⁵ White and Kehlet, “Improving Postoperative Pain Management What Are the Unresolved Issues?”

³⁶ Apfelbaum et al., “Postoperative Pain Experience.”

³⁷ Sinatra, “Causes and Consequences of Inadequate Management of Acute Pain.”

³⁸ Becker et al., “Pain Epidemiology and Health Related Quality of Life in Chronic Non-Malignant Pain Patients Referred to a Danish Multidisciplinary Pain Center.”

³⁹ Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education, *Relieving Pain in America*.

of change. By the end of this discussion, I hope to make the case for considering complementary and alternative methods of care, specifically acupuncture.

1. Pain in America: considering new therapeutic approaches to pain

Pain is elusive and challenging, and allopathic methods to reduce or control pain have long been scrutinized for failed efficacy and deleterious long-term effects. New approaches to pain therapy are needed. Within this section, I will explore the history of patient narrative within the context of pain. I will then introduce the anthropologic notion of “structural competency,” as well as the literature-based theory of “narrative medicine,” as two models that question how the physician’s interaction with a patient can direct and limit quality of care. I will conclude this section by suggesting new approaches to pain management might incorporate these themes of individualism and holism to better approach and treat each patient. Ultimately, I suggest that acupuncture provides one such lens for achieving this goal within acute care settings.

Today’s conventional strategy for pain management focuses on pain relief using pharmaceutical analgesics, primarily opioids.⁴⁰ In 1982, the World Health Organization Cancer Unit published a set of guidelines for pain management known as the “pain ladder,” that continue to guide physician rational today.⁴¹ The ladder offers physicians a three-tiered ranking of pain medications. Patients are started on the “bottom rung,” and then moved up to the second, and then third level if their pain does not improve. The first level involves non-steroidal anti-inflammatory drugs; the second, weak opiates, like codeine; and the third, strong opiates, like morphine. Dosing at each level, but particularly the third, is subject to the patient’s pain tolerance and experience of side effects. Today, these analgesics are accompanied by adjuvant therapies to control for side effects, such as nausea, depression, sedation, insomnia, and anxiety.⁴² The WHO Analgesic Ladder supported in clinical medicine today follows in Figure 3.

⁴⁰ Pletcher et al., “Trends in Opioid Prescribing by Race/ethnicity for Patients Seeking Care in US Emergency Departments.”

⁴¹ Meldrum, “A Capsule History of Pain Management.”

⁴² Rosenquist, “Overview of the Treatment of Chronic Pain.”

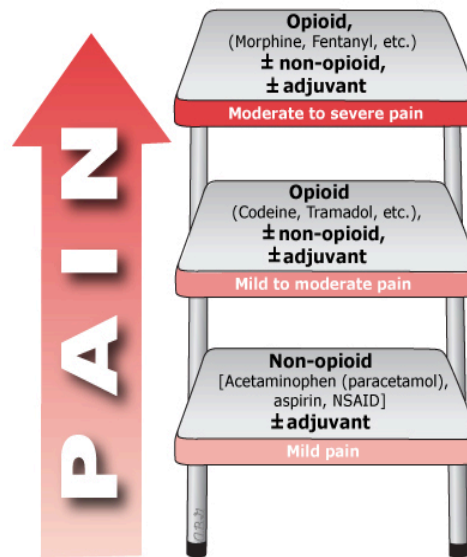


Figure 3: The WHO Analgesic Ladder, adopted from Rosenquist, 2013.

Epidemiologic analysis suggests that long-term opioid use is not associated with improved function or quality of life, but instead with adverse drug effects, such as dependence and overdose.⁴³ Indeed, while opioids are efficacious for relieving pain, their long-term effects have not been studied in clinical trials.⁴⁴ A systematic review of work evaluating the association between opioids and hyperalgesia suggests that pain receptors are up-regulated with both short and long courses of opioids, leading to permanent pain hypersensitization. This up-regulation is known as opioid-induced hyperalgesia, often mistaken for opioid tolerance in clinical settings, though the treatment for hyperalgesia is opposite that for tolerance.⁴⁵ The affect of such misdiagnosis can have major consequences for patient care and outcomes.

The WHO ladder conceals the one fact that all theories of pain agree on: that pain manifests differently in different bodies, even when the source of pain is the same.⁴⁶ While new analgesics have been introduced since the 1980s – tricyclic antidepressants like amitriptyline and imipramine, for example, as well as targeted anti-inflammatory agents like cox-2 inhibitors – the reliance and focus on pharmaceutical therapy continues to limit the opportunities for pain relief. Indeed, a study evaluating chronic

⁴³ Ballantyne, “Safe and Effective When Used as Directed.”

⁴⁴ Pedersen et al., “Long- or Short-Acting Opioids for Chronic Non-Malignant Pain?”

⁴⁵ Chen et al., “Clinical Interpretation of Opioid Tolerance versus Opioid-Induced Hyperalgesia.”

⁴⁶ Meldrum, “A Capsule History of Pain Management.”

opioid use for pain found that the most important characteristic of pain management was not the drug of choice, but the consistency of a dedicated physician.⁴⁷ As today's pain guidelines emphasize patient quality of life, physicians must consider their central role in understanding and hearing their patient, and evaluating the options for care above and beyond a three-step ladder.

Assessing Pain

When considering pain treatment, we begin with how pain is communicated. A complete pain assessment includes intensity, temporal pattern, and treatment-related factors such as how it is exacerbated or relieved, location, and interference with quality of life. Historically, each component was assessed using a unique tool, though the type of tool and process of implementation were not standardized. Indeed, recent pain research evaluating the existing tools in hopes for electing a universal measure have found the existing strategies inadequate for assessing and addressing these dimensions of pain.^{48,49}

Pain intensity is a single exception, currently measured in a universal manner using unidimensional scales. Three basic tools are used for establishing pain intensity. The first is the Numeric Rating Scale (NRS), in which patients are asked to identify a number between zero and ten that best describes their pain. In many instances, the NRS is accomplished using the Wong-Baker FACES Pain Rating Scale, which features 10 faces with varying intensities of smile or frown. The second, the visual analogue scale (VAS), offers patients a blank spectrum from no pain to worst possible pain, and asks them to identify where their pain lives within that spectrum. And the third, the Verbal Rating Scale (VRS), provides six descriptors (no pain, mild pain, moderate pain, severe pain, very severe pain, and worst possible pain) and asks the patient to identify with one. Research on these tools has not resulted in a recommendation for one over any other.⁵⁰

The use of unidimensional scales remains appropriately controversial; while their use promotes universality, a trait useful for care transfer as well as research purposes, it

⁴⁷ Portenoy and Foley, "Chronic Use of Opioid Analgesics in Non-Malignant Pain."

⁴⁸ Curlin et al., "Religion, Clinicians, and the Integration of Complementary and Alternative Medicines."

⁴⁹ Haugen et al., "Assessment and Classification of Cancer Breakthrough Pain."

⁵⁰ Hjerstad et al., "Studies Comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for Assessment of Pain Intensity in Adults."

may not appropriately assess analgesic requirement nor patient experience and disability. Still, the use of these scales is widespread, stemming in part from the movement in the 1990s to introduce pain as the “fifth vital sign,” to be measured alongside temperature, blood pressure, respiratory rate, and heart rate. Recent research confirms the multidimensionality of pain, and suggests that the unidimensional pain scale forces patients to confound their sensory experience with their emotional perception of the pain, resulting in misleading results that do more to limit treatment than improve outcomes.⁵¹

Multidimensional tools for assessing pain exist. In the 1960s, Ronald Melzack and Patrick Wall developed the Gate Theory Hypothesis for pain, broadening the scientific understanding of pain to include behavioral and psychological experience.⁵² Their work led to the study of the language of pain and the development of the McGill Pain Questionnaire, a tool for capturing and interpreting the many expressions of pain.

The McGill Pain Questionnaire is an extended checklist of descriptive words that ultimately categorize a patient’s narrative into sensory, affective, and cognitive components.⁵³ The patient is asked to complete the questionnaire, while the physician totals the score and evaluates the interplay between chosen descriptors as a complete or partial puzzle in the art of diagnosis and treatment. Elaine Scarry’s excellent book, *The Body In Pain*, describes the process of McGill Pain Questionnaire interpretation:

When heard in isolation, any one adjective such as “throbbing pain” or “burning pain” may appear to convey very little precise information beyond the general fact that the speaker is in distress. But when ‘throbbing’ is placed in the company of certain other commonly occurring words (‘flickering,’ ‘quivering,’ ‘pulsing,’ ‘throbbing,’ and ‘beating’), it is clear that all five of them express, with varying degrees of intensity, a rhythmic on-off sensation, and thus it is also clear that one coherent dimension of the felt-experience of pain is this ‘temporal dimension.’

From the outset, the McGill Pain Questionnaire assists the physician with precision and diagnosis, while simultaneously providing patients with a tool for identifying and expressing their experience. Melzack developed the word choices through surveying patients and using their chosen lyrics. In a way, this action gives voice to the patient

⁵¹ Clark et al., “Unidimensional Pain Rating Scales.”

⁵² Mendell, “Constructing and Deconstructing the Gate Theory of Pain.”

⁵³ Melzack, “The McGill Pain Questionnaire.”

experience, making real and relevant what might otherwise be considered irrelevant story.

Yet by choosing some words we limit others. Limiting the words patients use to describe their pain limits their autonomy over their bodies and sense of self, and limits the listener's insight into their source of pain and suffering. While a multidimensional approach like the McGill Pain Questionnaire certainly allows for greater nuance than, say, a scale from one to ten, it continues to perpetuate a commodification of patient narrative that may not ultimately serve health and healing.

Structural Competency and Narrative Medicine

Michael Taussig is one of many anthropologists who have examined the tendency within medical practice to make biological the languages “emanating from our bodies.”⁵⁴ Taussig argues that by classifying dialogue from a patient encounter in scientific terms, physicians deny the “human relations” of disease, and “reproduce a political ideology in the guise of... a biological and physical thinghood.” In other words, medicalizing a patient's experience is not an unbiased act, but instead a commitment to a particular politic and perspective. Taussig suggests that this political ideology is consistent with ideas promoted by Georg Lukacs, who married objectivity to materialism and capitalism, an act in service of the structuring and maintenance of markets. Taussig terms the commodification of patients *reification*, a process that ignores the patient's personal understanding as well as the medical doctor's interpretation of narrative – in other words, a process that erases the human connection. “Science,” Taussig writes, “cannot explain the human significance of physical effects.”⁵⁵

As reification turns person into thing, it similarly structures disease, focusing medical care on an outcome despite infinite unique pathways leading to disease and suffering. This simplification prevents thoughtful consideration of source, which in turn prevents thoughtful consideration of returning to normal, or healing. Without careful consideration of social, economic, and psychological factors that might predispose a body to disease, physicians perpetuate a hierarchy of power and health.⁵⁶ Writes Taussig, “disease is recruited into serving the ideological needs of the social order, to

⁵⁴ Taussig, “Reification and the Consciousness of the Patient.”

⁵⁵ Ibid.

⁵⁶ Metzl and Roberts, “Structural Competency Meets Structural Racism.”

the detriment of healing and our understanding of the social causes of misfortune.”⁵⁷ Ignoring or simplifying the pathways toward disease prevents thorough understanding of the political, social, and environmental factors that might injure a person’s health.

Paul Farmer’s work has emphasized the health impacts of structural violence, which he describes as, “violence exerted systematically – that is, indirectly – by everyone who belongs to a certain social order.”⁵⁸ Political, economic, and social constructs create a context in which people experience unequal health outcomes; in other words, the structures of society lead to disease. These upstream structures create a downstream context to health, one that some anthropologists hope medical schools will recognize as an essential competency for providing care. “Structural Competency” would supplant the existing “cultural competency,” or “cultural sensitivity” coursework, frameworks that Jonathan Metzl, Dorothy Roberts, and others contend are in themselves downstream of larger structures;

*Many health-related factors previously attributed to culture or ethnicity also represent the downstream consequences of decisions about larger structural contexts, including health care and food delivery systems, zoning laws, local politics, urban and rural infrastructures, structural racisms, or even the very definitions of illness and health. Locating medical approaches to racial diversity solely in the bodies, backgrounds, or attitudes of patients and doctors, therefore, leaves practitioners unprepared to address the biological, socioeconomic, and racial impacts of upstream decisions on social factors such as expanding health and wealth disparities.*⁵⁹

Structural competency is one of several efforts to move toward a more holistic understanding of patient experience. Narrative Medicine, developed by Rita Charon, offers another approach. Charon suggests that literature and story can offer insight to medical professionals on how to listen and create meaning from patient accounts. Medical students and physicians are encouraged to listen, read, write, and otherwise struggle with and experience patient stories so that they are exposed to not only new perspectives and frameworks, but the authentic emotion engendered by empathy.⁶⁰ Critics of narrative medicine argue that accounts of disease that lack social, political,

⁵⁷ Taussig, “Reification and the Consciousness of the Patient.”

⁵⁸ Farmer, “An Anthropology of Structural Violence.”

⁵⁹ Metzl and Roberts, “Structural Competency Meets Structural Racism.”

⁶⁰ Charon, “Narrative Medicine.”

cultural and economic context prevent participants from truly witnessing an experience of disease in long-lasting ways.⁶¹

As discussed above, we must assume that patients experiencing their own unique assortment of injuries – emotional, spiritual, and physical – will proffer varied narratives of their pain. The unidimensional approach of the numerical or visual analog scales purposefully work toward a universal expression of pain intensity. Melzack’s multidimensional tool helps physicians recognize the variability of pain experience, but does so through categories and normalized language. These established tools for understanding pain inevitably overlook the un-diagnosable secrets that these patients are sharing, the truth of their experience and challenge. They also take for granted the doctor in the room, overlooking interpretation and the skills necessary to listen, absorb, and condense the patient narrative into an affective treatment.

In conclusion, ample literature exists suggesting physicians must work against an overly-focused and scientific understanding of patient experience, making space for the emotional, social, economical, and political structures that lead to health and disease. Yet as American hospitals and clinics continue to rush toward hyper-efficient service, hope for extended and nuanced listening remains a logistical challenge. As Paul Farmer writes, “Now I have time only to see patients as a physician and precious little time for interviewing them. I miss this part of my work, but although I want to hear Anite’s story, I want even more to attend to her illness.”⁶² Pain assessments are a moment within the patient interview when the story and illness coexist as both physical and emotional expression. As such, assessments provide a particularly relevant space for innovation.

Medical anthropologists and liberal arts leaders have imagined curricula to address this need, and have begun disseminating their wisdom to medical schools and professional organizations. The clinical community would be wise to appreciate their ideas and begin incorporating therapies that can adjust to the limitless bounds of human experience. Some complementary and alternative medicine (CAM) modalities are specifically attuned to pain. As studies on utilization have shown, CAM honors patients by engaging with their whole, spiritual self, supporting unique understandings of healing and health. We might then consider pain-specific CAM modalities well suited to the subtleties of pain experience, both in improving the acute symptoms of pain, as well as addressing a patient’s relationship to pain. Acupuncture, as I will now

⁶¹ Wear and Aultman, “The Limits of Narrative.”

⁶² Farmer, “An Anthropology of Structural Violence.”

discuss, presents one such opportunity. As a dynamic and delicate therapy, acupuncture may provide a missing form of pain management in American hospitals.

2. Acupuncture use today

Within the domains of complementary and alternative medicine are whole medical systems. Examples include Ayurveda, a classical form of medicine found primarily in India, and Traditional Chinese Medicine (TCM). Acupuncture is a modality based within TCM, while also found in other east Asian medical traditions, including those of Japan and Korea. Acupuncture includes herbal preparations, massage (*tui na*), *qigong*, moxibustion, and needling, as well as other therapies used in combination or alone.^{63,64} In addition to these acupuncture-specific tools, acupuncturists commonly complete a thorough and unique patient history, as well as a tongue and pulse diagnosis. During or following treatment, acupuncturists may offer extensive patient education specific to their condition or physiology. Variation is seen in each component of acupuncture, from interview to needling technique. Examples of these variations as well as the multiple components involved in acupuncture treatment can be seen in Figure 2.

Acupuncture is based in an understanding of qi, or life energy, and its flow through the body. Qi is the energetic force that links together yin and yang, the essential dichotomy assumed to exist within all beings. Ted Kaptchuk explains ying and yang as “basic root intuitions,” within Chinese tradition, with yin associated with, “cold, darkness, being stationary, passiveness, receptivity, tranquility and quiescence,” and yang with, “heat, light, stimulation, excess, assertiveness, dominance, movement, arousal, and dynamic potential.”⁶⁵ When qi is stagnant, say, the balance between yin and yang in the body is lost, manifesting in a disease state. The therapeutic tools of acupuncture act to encourage or unblock qi, depending on the imbalance perceived during diagnosis.

⁶³ Burke et al., “Acupuncture Use in the United States”

⁶⁴ Langevin et al., “Paradoxes in Acupuncture Research.”

⁶⁵ Kaptchuk, “Acupuncture.”

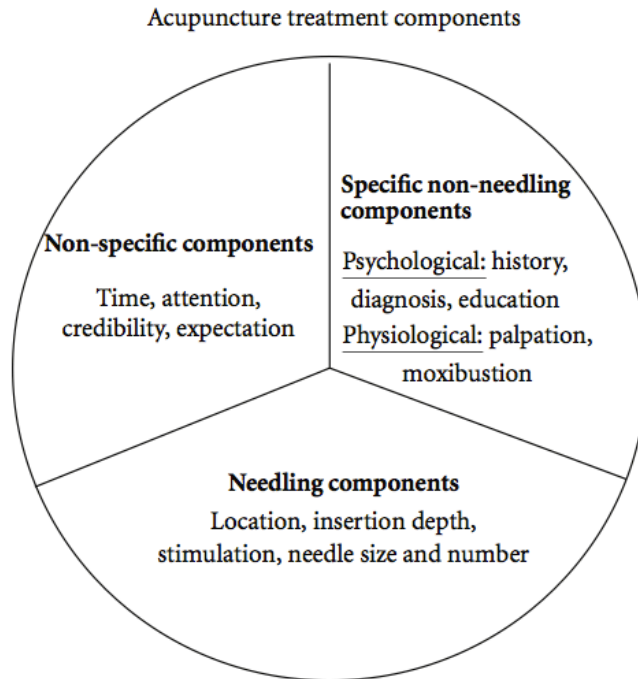


Figure 2: Components of acupuncture treatment arranged in nonspecific needling, specific non-needling, and needling. Specific components include characteristics of therapy unique to acupuncture treatment, while non-specific components may be experienced in other forms of health care. *Adapted from “Paradoxes in Acupuncture Research,” Langevin, et al.*

Today, acupuncture is one of the best-recognized alternative therapies in the United States, and one of the most common therapies suggested by referring physicians.^{66,67} Reviews of the 2002 National Center for Health Statistics data estimated that 4.1% of the population reported use of acupuncture at some point in their lifetime, a percentage that while lower than some therapies, such as chiropractic care (7.5%) and massage (5.0%), is significantly higher than other alternative systems, such as Ayurveda (0.1%) and naturopathy (0.2%). Similar to other types of CAM use, the most common reason for seeking acupuncture therapy was for musculoskeletal or pain

⁶⁶ Gordon, Sobel, and Tarazona, “Use of and Interest in Alternative Therapies among Adult Primary Care Clinicians and Adult Members in a Large Health Maintenance Organization.”

⁶⁷ Chen et al., “A Survey of Selected Physician Views on Acupuncture in Pain Management.”

conditions, specifically back pain.⁶⁸ Between 2002 and 2007, acupuncture use increased by nearly 30% in the United States.⁶⁹

Yet utilization is not universal. In 2002, variables that correlated with acupuncture use included living in the West or Northeast, identifying as an Asian female, achieving at least some college education, poor health status, and a history of smoking tobacco. Black and Hispanic individuals, and households with a limited income and education were found to be least likely to use acupuncture.⁷⁰ What accounts for these differences? Ethnic or cultural familiarity with acupuncture, financial flexibility, insurance and state-mandated health care policy, and geographic distribution of acupuncture therapists may all be at play.

Generally speaking, CAM use is seen to vary by racial and ethnic identification, as well as by type of CAM modality.^{71,72} As such, the correlation between acupuncture and Asian women may be explained through the appeal of shared cultural and ethnic ties with Traditional Chinese Medicine.⁷³ Use of CAM modalities within minority groups also differs by sociodemographic characteristics.⁷⁴ This is consistent with research evaluating the influence of price on utilization, which has shown that utilization increases when prices drop.⁷⁵ Still, a review of community acupuncture clinics found that while reduced cost acupuncture treatments increased the economic diversity of clients, it did not increase racial or ethnic diversity.⁷⁶ These findings taken together

⁶⁸ Burke et al., “Acupuncture Use in the United States.”

⁶⁹ Barnes, Bloom, and Nahin, “Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007.”

⁷⁰ Burke et al., “Acupuncture Use in the United States.”

⁷¹ Najm et al., “Use of Complementary and Alternative Medicine among the Ethnic Elderly.”

⁷² Upchurch and Wexler Rainisch, “Racial and Ethnic Profiles of Complementary and Alternative Medicine Use Among Young Adults in the United States.”

⁷³ Tom Xu and Farrell, “The Complementarity and Substitution between Unconventional and Mainstream Medicine among Racial and Ethnic Groups in the United States.”

⁷⁴ Brown et al., “Patterns of Complementary and Alternative Medicine Use in African Americans.”

⁷⁵ Sommers and Porter, “Price Elasticities for Three Types of CAM Services.”

⁷⁶ Chao, Tippens, and Connelly, “Utilization of Group-Based, Community Acupuncture Clinics.”

suggest that familiarity with and exposure to specific alternative modalities plays a greater role in determining use than financial flexibility.

Access to acupuncture is guided, in part, by each state's interpretation of the Affordable Care Act (ACA). In 2010, the ACA established Essential Health Benefits (EHBs), ten categories of care required by all insurance plans. The extent to which each EHB is covered, and the modalities included within a comprehensive package, are determined by each state's interpretation of "standard" treatment. Today, five states and four territories include acupuncture as standard, including California, Maryland, New Mexico, Alaska and Washington, as well as American Samoa, Guam, the Northern Mariana Islands, and the Virgin Islands.

Naming acupuncture a standard therapy suggests increasing access; yet the manifestation of the EHB mandate varies not only by state, but also by insurance company. While California law insists that outpatient acupuncture therapy be offered to patients enduring chronic pain and/or nausea, insurance companies are able to distinguish particular etiologies of chronic pain and nausea, and in so doing regulate how many and which patients are deemed eligible for acupuncture. This loophole allows insurance companies, rather than physicians, decide the "medical necessity" of acupuncture for individual conditions. As an example, the Aetna policy currently used by the University of California at Berkeley's Student Health Insurance Plan (SHIP) will cover acupuncture only in instances of chronic low back pain, migraine, nausea during pregnancy, knee or hip osteoarthritic pain, post-operative or chemotherapy-induced nausea, post-operative dental pain, or temporomandibular disorders. These medical conditions are further limited in specific instances. For example, patients with chronic low back pain who receive acupuncture are given four weeks to show signs of improvement. If pain is not reduced, the therapy is deemed ineffective, and acupuncture must be discontinued.⁷⁷ This interpretation of California's EHB mandate shows the role insurance companies may play in deciding who receives CAM therapies, and when.

The geographic distribution of therapists is yet another factor that may lead to unequal access to acupuncture. The distribution of acupuncture training academies may disproportionately expose certain populations to acupuncture and CAM use, leading to non-uniform acupuncture use nationwide. According to the Accreditation Commission for Acupuncture and Oriental Medicine, there are currently 68 accredited acupuncture schools in the United States. Of these, slightly under half (31) are found in western

⁷⁷ Aetna Clinical Policy Bulletin: Acupuncture. "Policy Number: 0135."

states, and over a quarter (17) in California alone.⁷⁸ The influence of distance on medical use has been studied extensively, and patients are far more likely to utilize services that are near their home.⁷⁹

To summarize, acupuncture is a multimodal therapy primarily associated with Traditional Chinese Medicine. Acupuncture use is increasing across the country, yet utilization continues to vary by ethnicity and race, socioeconomic status, and geography.

3. Acupuncture for pain: reviewing the evidence

Significant and wide-ranging research on the efficacy and safety of acupuncture for pain exists. Meanwhile, an estimated three million American adults receive acupuncture each year, most commonly for chronic pain therapy.^{80,81} Despite these advances and widespread popular appeal, acupuncture remains a controversial addition to conventional medical care, perhaps due to fact that the mechanism of benefit remains unknown.⁸² Within this section I will review the evidence suggesting acupuncture is an effective therapy for pain.

In 2011, leading academic acupuncture researchers gathered to address recent advances and shortcomings in the field; the meeting concluded with a published paper delineating the remaining paradoxes in research, and the necessary steps for moving forward. The paradoxes were twofold: first, that though research had shown acupuncture more effective than no-acupuncture, no significant difference had been seen between acupuncture and sham-acupuncture; and second, that the influence of needling parameters such as the location of needling points and style of needling used, was not clearly defined.⁸³ Today, acupuncture research is now largely categorized as pertaining to either the mechanism of action or the clinical implications for use.

⁷⁸ ACAOM: The Accreditation Commission for Acupuncture and Oriental Medicine, “Find A School.”

⁷⁹ Bonafede et al., “The Effect of Acupuncture Utilization on Healthcare Utilization.”

⁸⁰ Barnes, Bloom, and Nahin, “Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007.”

⁸¹ Sherman et al., “The Practice of Acupuncture.”

⁸² Vickers and Linde, “Acupuncture for Chronic Pain.”

⁸³ Langevin et al., “Paradoxes in Acupuncture Research.”

Studies evaluating the mechanism have benefitted from the advent of readily available functional magnetic resonance imaging (fMRI) scanners, which allow researchers to evaluate changes in brain activity during acupuncture treatment. Studies using fMRI have shown patterns of neural stimulation that align with classical acupuncture meridians thought to connect and direct qi. For example, the placement of an acupuncture needle in the foot on an eye-specific meridian produced the same brain activity as did stimulating the eye directly. Similar results have been seen with ear points thought to target the hand: when the auricular point was stimulated with a needle, the somatosensory region of the postcentral gyrus in the brain showed the same selective fMRI changes seen when stimulating the hand directly.⁸⁴ Results from fMRI studies have been reproduced in multiple centers successfully in some instances, and not in others. As a result, they remain an active area of study, one that hopes to contribute to understanding how specific needling parameters influence brain activity. Analgesia itself is thought to involve the limbic system, and so efforts are underway to target the best acupuncture pathways that may target and activate this region of the brain.^{85,86}

But what mechanism leads to these changes in brain activity? Several theories have been proposed; most popular relates to the mechanical stimulation of needles often performed by acupuncturists. During acupuncture, the therapist is trained to anticipate *de qi*, or the arrival of qi, in which the needle tugs or becomes taught, or the patient experiences dull pain, tingling, or sensation – an experience often compared to a fish taking the bait. Research suggests that in this moment, the underlying connective tissue undergoes extensive cytoskeletal remodeling, building fibers that wrap around the needle. As one end of the connective tissue winds, the other stretches: this winding and stretching are thought to trigger changes in connective tissue tension. Like the fMRI work, these studies contribute to the second paradox by examining the nuance of needle manipulation, while simultaneously bringing light to the essential mechanism of acupuncture necessary for answering the first paradox.^{87,88,89} Some research further suggest that dysfunctional tissue remodeling contributes to lower back pain, a link that

⁸⁴ Cho et al., “Acupuncture.”

⁸⁵ Zhang et al., “Evidence from Brain Imaging with fMRI Supporting Functional Specificity of Acupoints in Humans.”

⁸⁶ Biella et al., “Acupuncture Produces Central Activations in Pain Regions.”

⁸⁷ Langevin et al., “Connective Tissue Fibroblast Response to Acupuncture.”

⁸⁸ Langevin et al., “Biomechanical Response to Acupuncture Needling in Humans.”

⁸⁹ Langevin et al., “Evidence of Connective Tissue Involvement in Acupuncture.”

might further explain the improvements in back pain reported by patients receiving acupuncture.⁹⁰

Research observing the clinical usefulness of acupuncture have taken several shapes over the past twenty years, incorporating and, more recently, abandoning controlled studies involving “sham” acupuncture. Sham acupuncture was introduced as a way to blind patients to the therapy so that research could better fit within the hierarchical model of evidenced-based medicine. Typically sham involved the use of a retractable needle that mimicked the sensation of needling without actually penetrating the skin. These sham treatments were intended as mock treatments, missing the “vital” components of acupuncture under study. Yet sham needles were often placed above the same needle points and along the same meridians – and while they did not directly penetrate the skin, they certainly pushed against the collagen. The influence of these components of acupuncture are not understood. Moreover, control groups and intervention groups often both received the patient interview and diagnostic process characteristic of traditional chinese medicine. The therapeutic influence of this interview is also incompletely understood. In sum, the sham techniques used in an effort to create widely-accepted, western evidence for acupuncture efficacy in the 1980s, 1990s, and early 2000s often concealed potentially critical components of acupuncture’s mechanism within their controls.^{91,92,93} As of March, 2015, the NIH now deems “research comparing clinical outcomes of verum and sham acupuncture” a low priority.⁹⁴

In 2012, biostatisticians from the Sloan Kettering Cancer center combed the existing research for high-quality RCTs that evaluated the effect of acupuncture on nonspecific back or neck pain, shoulder pain, chronic headache, or osteoarthritis. All musculoskeletal pain had to have been present for four weeks prior to the intervention; the primary end point was measured more than four weeks after the initial

⁹⁰ Langevin and Sherman, “Pathophysiological Model for Chronic Low Back Pain Integrating Connective Tissue and Nervous System Mechanisms.”

⁹¹ Cherkin et al., “A Randomized Trial Comparing Acupuncture, Simulated Acupuncture, and Usual Care for Chronic Low Back Pain.”

⁹² Michalek-Sauberer et al., “Perioperative Auricular Electroacupuncture Has No Effect on Pain and Analgesic Consumption after Third Molar Tooth Extraction.”

⁹³ Langevin et al., “Paradoxes in Acupuncture Research.”

⁹⁴ National Institutes of Health, “Acupuncture Research - Areas of High and Low Programmatic Priorities.”

acupuncture treatment. Ultimately they found acupuncture superior to no-acupuncture and sham acupuncture for the treatment of chronic pain.⁹⁵

This study is now viewed as a pivotal moment in the history of acupuncture implementation, leading to conventional insurance companies covering acupuncture in mainstream medicine, and increasing popularity among physician referrals. Even before this study was published, physician opinion of acupuncture was warming. A 2007 – 2008 survey of physicians revealed an overwhelmingly positive attitude toward acupuncture use for pain management. Researchers at Massachusetts General Hospital sent 1,083 surveys through direct mail or email to physicians identified as working in pain management, with an 18.2% rate of response. These providers included primary care (48%), pain medicine (29%), oncology/palliative care (20%), rehabilitation (3%) and neurology (2%) physicians. The survey determined that 97% of these providers considered acupuncture a somewhat or very effective treatment for pain management. The most popular pain conditions leading to referral for acupuncture were lower back pain, fibromyalgia, myofascial pain, and neuropathic pain, followed by pelvic pain, abdominal pain, and complex regional pain syndrome. Physicians referred patients to acupuncture as both an adjuvant treatment to conventional pain therapies, and as an alternative treatment if conventional pain therapies failed to improve symptoms. These physicians assessed the effectiveness of acupuncture by evaluating their patient’s function, pain, analgesic use, side effects, and frequency of office visits, in addition to their feedback about the treatment. Of patients seen by responding physicians, 87% considered acupuncture either a somewhat or very effective therapy for their pain.⁹⁶ This trend is consistent with research conducted abroad, where acupuncture is also used for musculoskeletal pain, most commonly chronic back pain.⁹⁷

Interestingly, the majority of responders hailed from teaching hospitals or private practice rather than community hospitals. Lack of insurance was cited as a major barrier to acupuncture, as was inadequate or off-campus facility, low patient familiarity with the therapy, and the lack of efficacy evidence.⁹⁸ The majority of these barriers

⁹⁵ Vickers et al., “Acupuncture for Chronic Pain: Individual Patient Data Meta-Analysis.”

⁹⁶ Chen et al., “A Survey of Selected Physician Views on Acupuncture in Pain Management.”

⁹⁷ Hopton et al., “Acupuncture in Practice.”

⁹⁸ Chen et al., “A Survey of Selected Physician Views on Acupuncture in Pain Management.”

remain true today, particularly for community hospitals serving the uninsured and individuals with low and limited income.

Implementation, then, requires that we consider not only the efficacy of acupuncture, but the patients least likely to receive it elsewhere. Acupuncturists deny that transitioning away from private practice and into the public sphere will influence their work in any way.⁹⁹ Acupuncture leaders, thrilled at the prospect at expanding job opportunities and clinical influence, have established profession-wide policies to reduce the risk of injury or adverse events within conventional medical settings. These rules include using sterile needles, avoiding deep needle penetration in areas with heightened risk of infection, assigning a diagnosis before treatment, and others.¹⁰⁰ Within conventional medical practice, most pharmaceutical and biomedical therapies require pre-specified dosing and administration; without strict policies, the flexibility of diagnosis and treatment inherent to acupuncture may appear unregulated and, as a result, unsafe. These policies by acupuncturists signify a willingness to find ways to mold their therapy within the conventions of biomedicine.

Now integration remains up to the institutions of power. Research supporting the integration of acupuncture into community clinics has focused largely on its use as an adjuvant to primary care.¹⁰¹ Studies exploring the use of integrative medicine including acupuncture on inpatient populations have shown consistent improvements in pain when these CAM therapies are offered. These studies have included inpatient oncological, surgical, cardiovascular, medical, orthopedic, rehabilitation, and women's health populations.^{102,103,104, 105} Acupuncture has been found to reduce pain as well as improve anxiety when utilized in the Emergency Room.¹⁰⁶

⁹⁹ Bishop et al., "Health-Care Sector and Complementary Medicine."

¹⁰⁰ Cummings and Reid, "BMAS Policy Statements in Some Controversial Areas of Acupuncture Practice."

¹⁰¹ Stumpf, Kendall, and Hardy, "Mainstreaming Acupuncture."

¹⁰² Dusek et al., "The Impact of Integrative Medicine on Pain Management in a Tertiary Care Hospital."

¹⁰³ Cassileth and Vickers, "Massage Therapy for Symptom Control."

¹⁰⁴ Kutner et al., "Massage Therapy versus Simple Touch to Improve Pain and Mood in Patients with Advanced Cancer."

¹⁰⁵ Wu et al., "Effects of Acupuncture on Post-Cesarean Section Pain."

¹⁰⁶ Amos et al., "A Randomised Controlled Trial of an Integrative Approach Utilising Acupuncture for Back and Neck Pain in an Emergency Department Setting."

Missing from these populations are patients receiving care in the intensive care units. Only two studies have been completed to evaluate the feasibility of acupuncture for pain in an ICU; the first a feasibility study, and the second a ten-patient qualitative pilot on a pediatric population.^{107,108} A separate study evaluating the influence of acupuncture on the length of stay for acute-care patients was inconclusive.¹⁰⁹ This preliminary work suggests that acupuncture could indeed offer relief for acute pain, ultimately leading to reduced rates of untreated pain and the associated consequences.

¹⁰⁷ Painovich and Herman, “Acupuncture in the Inpatient Acute Care Setting.”

¹⁰⁸ Yeh et al., “A Preliminary Investigation on the Acceptance and Feasibility of Acupuncture in the Intensive Care Unit.”

¹⁰⁹ Painovich and Herman, “Acupuncture in the Inpatient Acute Care Setting.”

Acupuncture for Pain and Nausea in the ICU: A Feasibility Study in a Public Safety Net Hospital

Introduction:

Pain and nausea are two of the most common complaints among ICU patients.^{110,111,112} Recent guidelines suggest that patient stress due to discomfort is a major contributor to noxious ICU experiences, and that pain may contribute to decreased quality of life following ICU admission.¹¹³ This discomfort is mediated through the autonomic nervous system.¹¹⁴ Conventional evaluation and treatment modalities for pain in particular are limited, and evidence suggests nonpharmacological techniques may improve management and outcomes.^{115,116}

Acupuncture has been identified worldwide as an effective, low-cost intervention for relieving chronic musculoskeletal pain and reducing nausea and vomiting, in part due to its influence on the autonomic nervous system.^{117,118,119, 120} Acupuncture may reduce the requirement for conventional analgesics and antiemetics, without the same side effects.¹²¹ A recent survey of physicians revealed an overwhelmingly positive attitude toward acupuncture use for pain management.¹²² While acupuncture is commonly used in the outpatient, post-operative, rehabilitation, and oncology settings, there has

¹¹⁰ Aaron M Joffe, "Evaluation and Treatment of Pain in Critically Ill Adults."

¹¹¹ Collins, "Postoperative Nausea and Vomiting in Adults."

¹¹² Makic, "Management of Nausea, Vomiting, and Diarrhea During Critical Illness."

¹¹³ García Lizana et al., "Long-Term Outcome in ICU Patients."

¹¹⁴ Dowling, "Autonomic Measures and Behavioral Indices of Pain Sensitivity."

¹¹⁵ Aaron M Joffe, "Evaluation and Treatment of Pain in Critically Ill Adults."

¹¹⁶ Skrobik et al., "Protocolized Intensive Care Unit Management of Analgesia, Sedation, and Delirium Improves Analgesia and Subsyndromal Delirium Rates."

¹¹⁷ Takahashi, "Acupuncture for Functional Gastrointestinal Disorders."

¹¹⁸ Pfab et al., "Acupuncture in Critically Ill Patients Improves Delayed Gastric Emptying."

¹¹⁹ Hopton et al., "Acupuncture in Practice."

¹²⁰ Hui et al., "Acupuncture, the Limbic System, and the Anticorrelated Networks of the Brain."

¹²¹ Chernyak and Sessler, "Perioperative Acupuncture and Related Techniques."

¹²² Chen et al., "A Survey of Selected Physician Views on Acupuncture in Pain Management."

been very little research performed on acupuncture in an adult ICU in the United States.¹²³

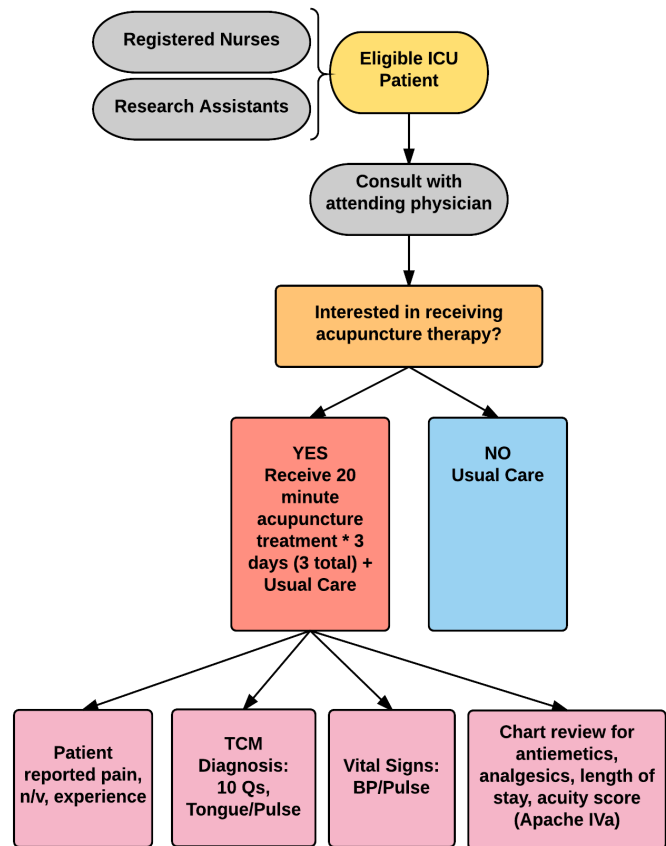
The aim of this study has been to explore the feasibility of providing acupuncture treatment to relieve pain and nausea symptoms in ICU patients. The hypotheses of this study are the following: that patients would be receptive to acupuncture treatment, that it could reduce pain and nausea symptoms, and that it might lower the requirement for conventional pain and nausea medications.

Methods:

This study was conducted at Highland Hospital in Oakland, California, a 230-bed safety net hospital with a 20-bed mixed medical/surgical ICU. The general study design used for this trial is depicted in Figure 1. Between November 3rd, 2014, and April 2nd, 2015, all ICU patients from the medical, surgical, trauma, and neurosurgical services were considered eligible.

Research assistants consulted with ICU registered nurses between 7:00 am and 8:00 am to assess which patients might be eligible to participate. Once identified, patients' physicians were contacted: once approval was granted, potential participants were approached about the study. The Internal Review Board requested that we assess patient eligibility only after patients consented to participation. As a result, patients who expressed interest and agreed to participate then signed informed consent. Then, the research assistant excluded any patients that were pregnant, unconscious, under 18 years old, with an active major psychiatric disease, or likely to be discharged from the hospital within three days. Next, medical charts were reviewed, and

Figure 1: Study Design



¹²³ Chen et al., "A Survey of Selected Physician Views on Acupuncture in Pain Management."

participants were excluded if their absolute neutrophil count was less than 1,000 per microliter, platelet count was less than 50,000 per microliters, International Normalized Ratio (INR) was greater than 1.7, Partial Thromboplastin Time (PTT) was greater than 45 seconds, if they had a known bleeding disorder, or were receiving therapeutic anticoagulation.

Acupuncture was performed by seven acupuncturists with Masters or Doctorate degrees in Traditional Chinese Medicine (TCM), a California board certification, and at least five years of clinical experience.

Acupuncturists came to the patient bedside within three hours of enrollment, and confirmed the patient's interest in acupuncture treatment and that the patient was currently experiencing pain and/or nausea. They then administered the pre-treatment patient survey. Participants experiencing pain were asked questions about the location, type, characteristic, and severity of pain on both 10-point numerical and visual analogue scales. Participants experiencing nausea were asked questions according to the Rhodes Index on the quality and severity of their nausea.

Following the pre-treatment survey, the acupuncturists collected TCM diagnostic information. The diagnostic evaluation began with a subjective review of standard questions (classically known as the "Ten Questions") used in Chinese medicine, including the patients' perception of body temperature, sweat, sleep, energy, memory and/or concentration, appetite/digestion, thirst, urination, bowel movements, mood, and, if appropriate, menstruation. Following this, the acupuncturist palpated the radial artery of each wrist, and visually examined the tongue. In addition, the acupuncturist noted the patient's blood pressure, heart rate, and performed a general physical exam.

After completing the diagnostic evaluation, acupuncturists identified the "excess" and/or "deficient" TCM pathologies observed in the patient. Excess pathologies included damp, damp-heat, stomach qi rebellion, and qi and blood stagnation. Deficient pathologies included yin deficiency, yang deficiency, and qi deficiency. The acupuncturists were encouraged to document any additional TCM diagnostic patterns observed.

Following the diagnosis, acupuncturists administered needles to eight predetermined point locations to a standard needling depth. Four points were chosen on the body and four in the ear for their known salutary effects on pain and nausea.^{124,125,126} The points

¹²⁴ Maciocia, *The Foundations of Chinese Medicine*.

chosen for this study included LI4, LIV3, P6, and ST36 on the most accessible extremity, and Shenmen, Sympathetic, Stomach, and Thalamus on the most accessible ear. The depth of insertion for each point followed the Peter Deadman’s protocol for acupuncture treatment. See Figure 2 for locations.

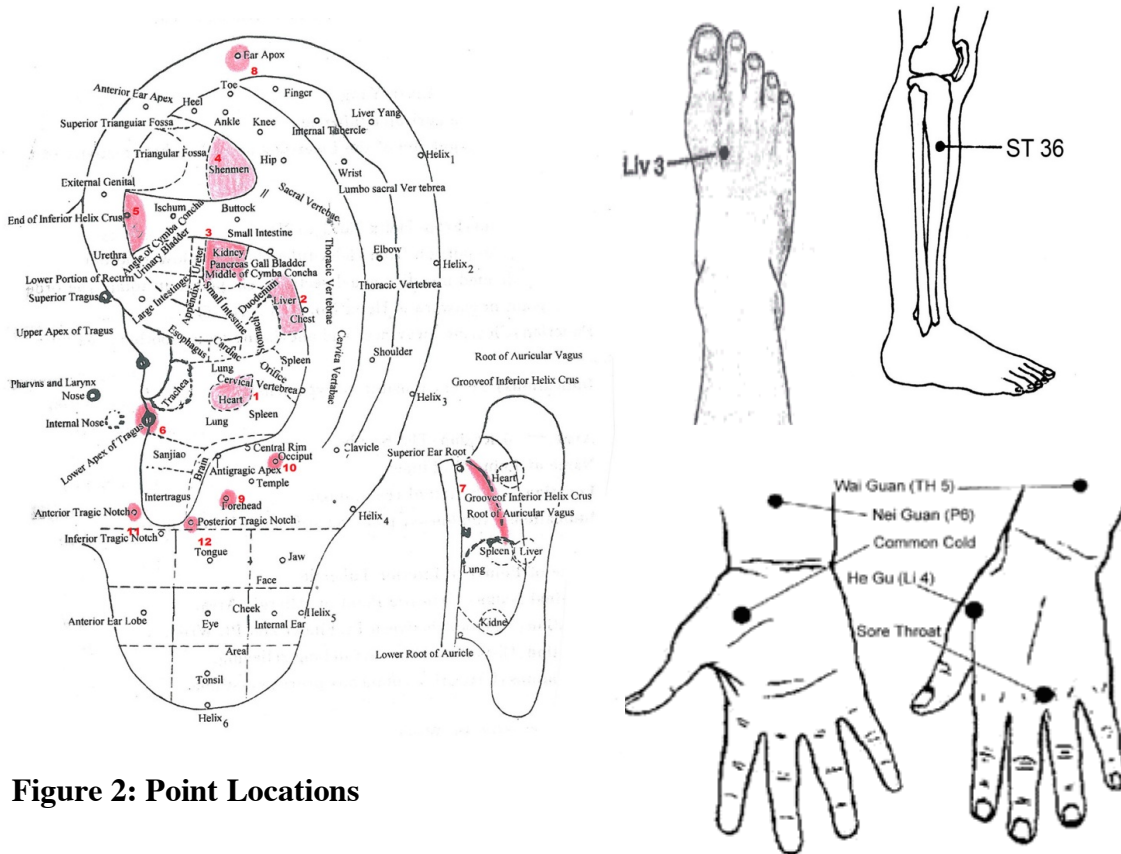


Figure 2: Point Locations

SEIRIN J Type .16 mm x 30 mm (40 gauge, 1 in) single use needles were used for the auricular points, and SEIRIN J type .20 mm x 30 mm (36 gauge, 1 in) were used for the body points. Guide tubes were used to reduce variation among acupuncturists. Needles were inserted until manual “De Qi” sensation was obtained by the acupuncturist. “De Qi” is experienced by patients as a numbness, tingling, fullness, or pressure at the point of insertion, and by acupuncturists as “needle grasping,” described as a tense, tight, and full sensation emanating through the needle.¹²⁷

¹²⁵ Maciocia, *The Practice of Chinese Medicine*.

¹²⁶ Xinnong, “Chinese Acupuncture and Moxibustion.”

¹²⁷ Yang et al., “Characterization of Deqi Sensation and Acupuncture Effect,” -.

The eight needles were retained for 20 minutes while the patient rested; any needles that fell out during this period were discarded and not reinserted. Following removal of the needles and a needle count, the acupuncturist left the patient's bedside, and alerted the primary nurse. The nurse, unaware of the pre-survey results, then administered a follow-up survey within five minutes of treatment, in which patients reported their pain level, subjective experience with the treatment, and distress caused by nausea according to the five-point grading scale within the Rhodes Index. Any adverse effects were also documented during this survey. Finally, the nurse documented pulse and blood pressure following treatment.

Patients received three days of treatment if they remained eligible on subsequent days. Ongoing pain or nausea was not a requirement for continued enrollment. Upon completion of the last treatment session, the patients were asked to complete a final survey on their overall experience of acupuncture, any additional effects noted, and whether they would recommend the treatment to other hospitalized patients.

In its entirety, the protocol took about 30-45 minutes to complete for each session. The study was approved by the Institutional Review Boards at Highland Hospital and the University of California, Berkeley.

The primary outcomes assessed were the proportion of patients offered acupuncture who accepted it, their perceptions of the effects of acupuncture treatment on pain and nausea, and the incidence of adverse effects related to acupuncture. Secondary outcomes included heart rate and blood pressure before and after acupuncture, and the medication use, APACHE score, and hospital length of stay for each participant. Descriptive variables of interest included patient description of acupuncture on each day and following treatment, frequency and pattern of TCM diagnosis, and demographic information on the participant population. Due to time limitations, medication information gleaned from the chart review was not complete at the time of analysis, and will not be included in this paper.

For statistical analysis, we compared pain and nausea scores before and after acupuncture using a Wilcoxon Signed Rank Test and longitudinal mixed effects model. All other variables were assessed using descriptive statistics.

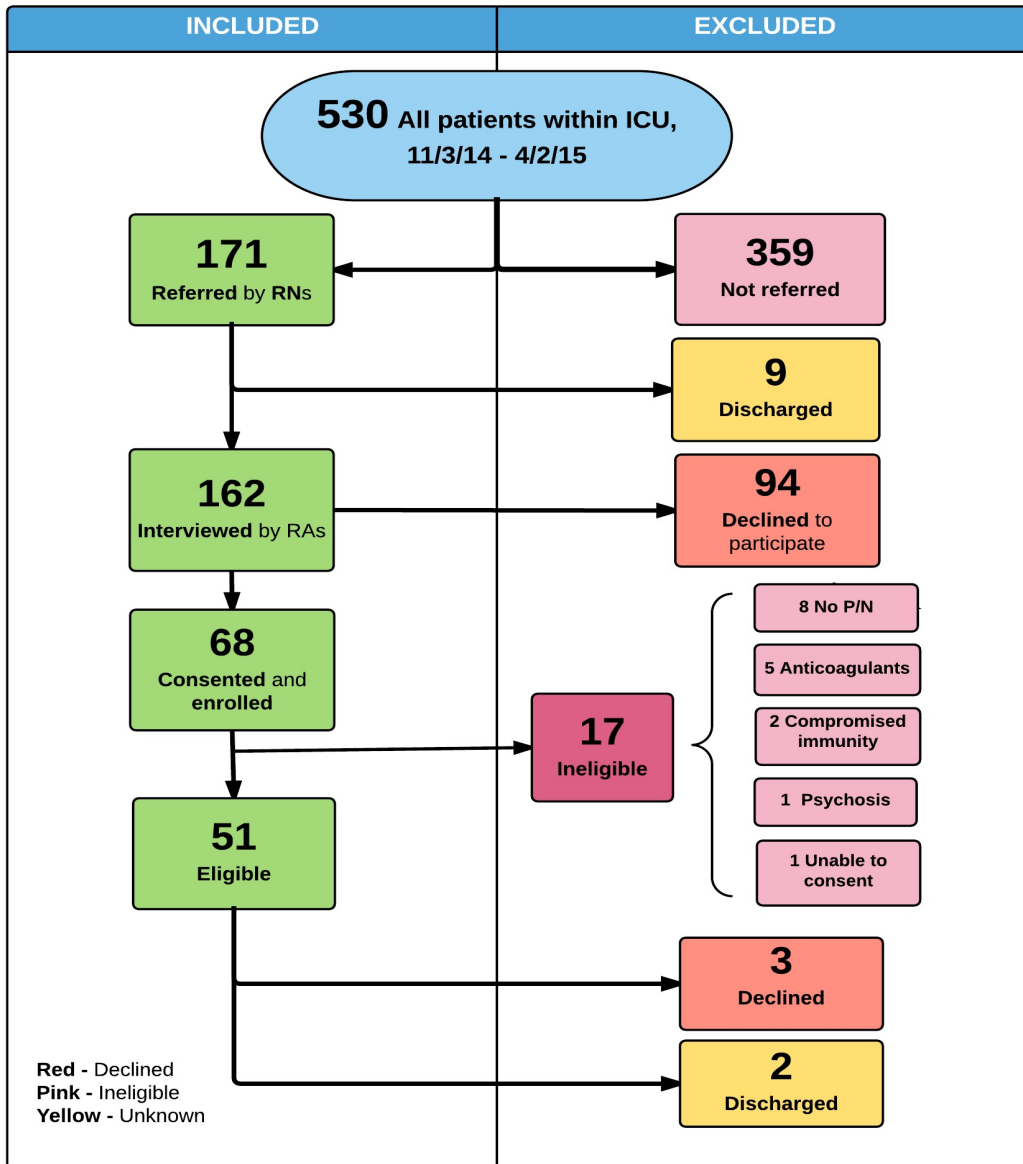
Results:

Overall, 76% of participants identified as male, and 24% female. Participants represented all four ICU services: general surgery (13%), trauma surgery (30%), neuro

surgery (4%) and medicine (52%). Patients identified as Caucasian (46%), Asian or Pacific Islander (11%), Latin or Hispanic (15%) and African American (28%). The average age was 47, with 35% of all patients between ages 18 and 40, 52% between 41 and 64, and 13% over age 65. Nearly half of study participants reported a high school level education or less (49%), while 32% had “some college,” and 19% had achieved a college degree or higher. When asked whether they were familiar with acupuncture, 68% reported that they were not, 30% stated that they were, and 2% did not know.

The results of patient recruitment are presented in Figure 3. During the study period, 530 patients were admitted to the ICU. Of these, 171 (32.2%) were referred to the research assistants (RAs) by the registered nurses as potential candidates for

Figure 3: Results of Patient Recruitment

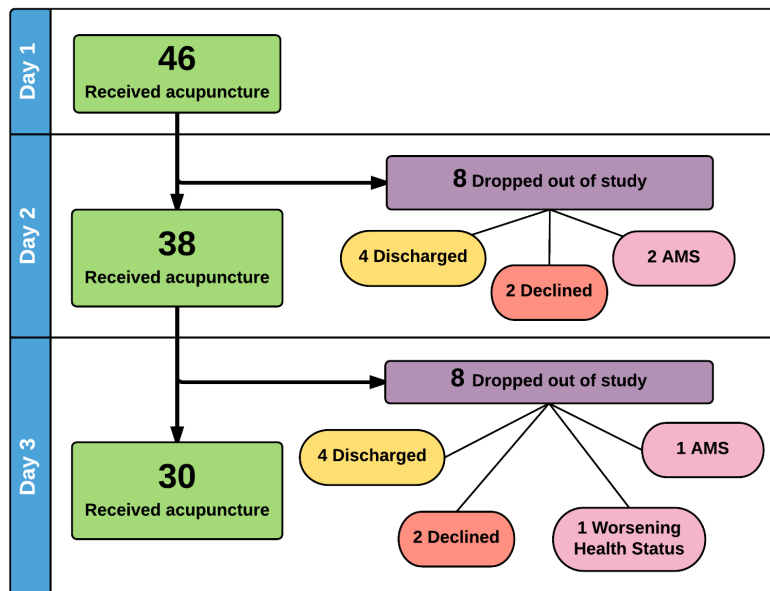


acupuncture. Nine patients were transferred from the ICU prior to RA interview. Of the remaining 162 patients, 68 (41.9%) consented to participate and were enrolled; of these, 22 (32.5%) were either ineligible, declined treatment following enrollment, or were transferred out of the ICU prior to receiving acupuncture, see Figure 3. Reasons offered by patients for declining participation were noted by RAs, and are summarized in Table 1.

Table 1: Reason for Declining Treatment

| | Total number | Percent of all referred patients |
|---------------------------------------|--------------|----------------------------------|
| Not interested | 35 | 21% |
| Moved from ICU | 28 | 17% |
| Ineligible | 28 | 17% |
| Negative connotation with acupuncture | 13 | 8% |
| Fatigue | 9 | 6% |
| Fear of needles | 9 | 6% |
| Family preference | 8 | 5% |
| Feeling unwell | 5 | 3% |

Figure 4: Number of Patients to Receive Acupuncture Treatment by Day. Patients discharged from hospital.



Ultimately 46 patients (67% of consented participants) received at least one day of acupuncture, see Figure 4. Altogether, 114 treatments were given: 45 of the 46 patients completed a post-treatment survey on day one, while all patients completed a post-treatment survey on subsequent days.

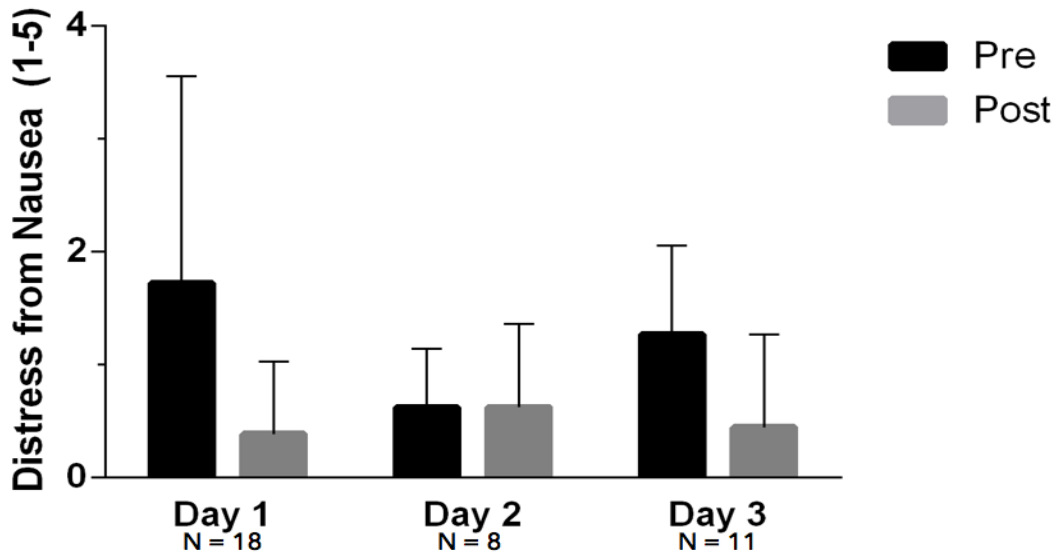
Patient perceptions of the effects of acupuncture treatment are detailed in Figure 5. The average self-reported pain level immediately following treatment decreased from the pain score reported immediately prior to treatment by 2.56 points on day one (standard deviation, SD, 2.66), 2.36 points on day two (SD 2.72), and 1.98 points on day three (SD 2.41). A Wilcoxon Signed Rank Test was used to evaluate the variance between pre and post pain measures, and found a statistically significant decrease in pain on all three days, $z < 0.05$. A repeated measures test comparing the variance in pain pre and post acupuncture over all three days showed a mean decrease of 2.36 (standard error 0.28), $p < 0.05$.

Of the patients with nausea, the mean self-reported distress score decreased by 1.33 points on day one (SD 2.00), 0.00 on day two (SD 0.93), and 0.82 on day three (SD 0.88). A Wilcoxon Signed Rank Test did not find a significant variation between nausea scores pre and post acupuncture; nor did a repeated measures test comparing pre and post scores on all three days, (0.517) $p > 0.05$.

Figure 5: Patient perceptions of the effects of acupuncture, by day

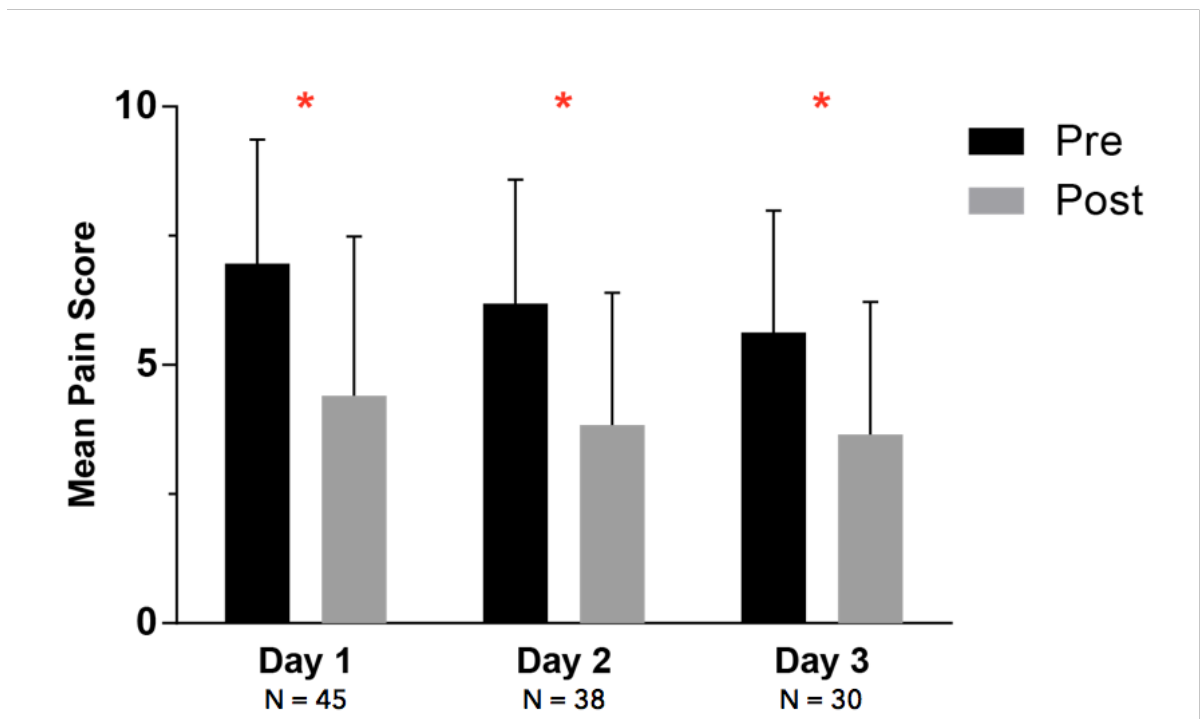
A. Mean pain score before and after acupuncture.

Whiskers represent standard deviation from the mean.

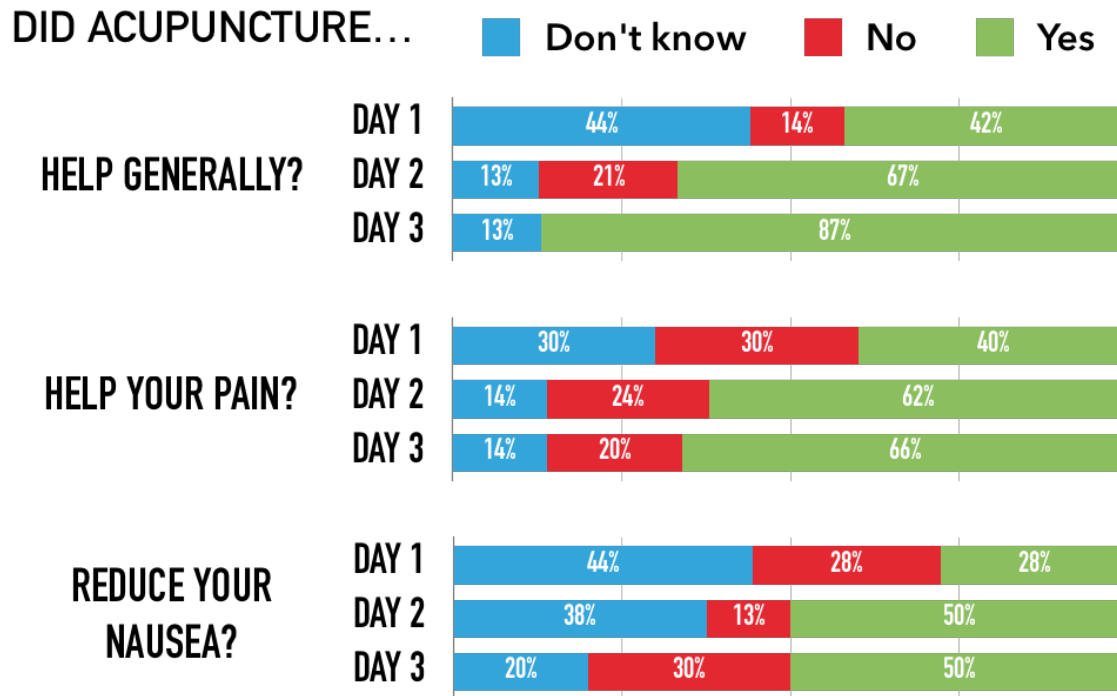


B. Mean nausea score before and after acupuncture, by day.

Whiskers represent standard deviation from the mean.



C. Patient responses to post-acupuncture survey, by day



Over the course of three acupuncture treatments, there was a progressive increase in the percentage of patients reporting an overall benefit of acupuncture. Responses to the final survey regarding the patient’s subjective experience of the treatment are included in Table 2. The majority responded that acupuncture helped with pain and nausea (77%), and that they would recommend acupuncture to other hospitalized patients (84%). Further, most patients described positive improvements with acupuncture (90%). Some found the therapy helped with other symptoms in addition to pain and nausea (61%), and most commonly had an anxiolytic effect (79%).

Table 2: Patient responses to final survey (n = 31)

| Post-treatment Questions | Strong agree | Agree | No preference | Disagree | Total |
|--|--------------|----------|---------------|----------|-------|
| Acupuncture treatments helped with pain and nausea | 13 (42%) | 11 (35%) | 6 (19%) | 1 (3%) | 31 |
| I would recommend acupuncture to hospitalized patients | 16 (52%) | 10 (32%) | 3 (10%) | 2 (6%) | 31 |

No major adverse effects were reported. Two patients reported side effects on the first day of acupuncture; the first experienced “a little pain,” with the insertion of the needle, while the second became agitated during the treatment and removed the needles after approximately 10 minutes. The latter patient ultimately was not able to answer the follow-up survey due to agitation. A third patient reported worsening nausea on the second day of treatment, and requested to be withdrawn from the study.

Over all three days of acupuncture treatment, acupuncturists inserted 909 needles, of which 16 fell out during treatment. The TCM diagnoses for treated patients are described in Table 3. The most common diagnosis for pain was qi and blood stagnation (43%) followed by qi deficiency (28%), followed by yin deficiency (18%). Qi and blood stagnation are commonly associated with pain. Stomach qi rebellion, often associated with nausea, was only seen in 3% of patients over the three-day treatment.

Table 3: Traditional Chinese Medicine Diagnoses for Treated Patients:

| DEFICIENCY PATTERNS | DAY 1 | | DAY 2 | | DAY 3 | |
|--|-------|-----|-------|-----|-------|-----|
| | N | % | N | % | N | % |
| Yin | 17 | 37% | 13 | 34% | 14 | 47% |
| Yang | 7 | 15% | 6 | 16% | 2 | 7% |
| Blood | 11 | 24% | 8 | 21% | 9 | 30% |
| Qi | 20 | 43% | 21 | 55% | 18 | 60% |
| Other Differentials Spleen Qi Deficiency; Liv/Ht/Kd Yin Deficiency; Organ Yang Deficiency | 18 | 39% | 11 | 29% | 14 | 47% |
| EXCESS PATTERNS | Day 1 | | Day 2 | | Day 3 | |
| | N | % | N | % | N | % |
| Damp | 5 | 11% | 6 | 16% | 6 | 20% |
| Damp Heat | 10 | 22% | 7 | 18% | 8 | 27% |
| Stomach Heat/ Stomach Qi Rebellion* | 6 | 13% | 4 | 11% | 5 | 17% |
| Qi & Blood Stagnation** | 39 | 85% | 31 | 82% | 26 | 87% |
| Other Differentials Liver Qi Stagnation;Damp Heat in Jiaos; Dampness in Organs/ Jiaos; Phlegm Stasis | 43 | 93% | 8 | 21% | 6 | 20% |

*ASSOCIATED WITH NAUSEA

**ASSOCIATED WITH PAIN

Finally, vital signs before and after acupuncture were analyzed. Heart rate was seen to decrease by 1.93 beats per minute (0.138), $p > 0.05$, while systolic blood pressure was found to decrease by 2.4 mmHg (2.78) $p > 0.05$, and diastolic blood pressure by 1.1 mmHg (.386), $p > 0.05$.

Discussion and Conclusion:

This study demonstrated that ICU patients are receptive to acupuncture treatment, and that such treatment may alleviate pain. Although there was no significant reduction in the Rhodes Index of nausea during the study, about half of the patients reported improvement in nausea following treatment.

Nurses deemed approximately one third of the patients admitted to the ICU eligible for recruitment and, of these, 42% consented to participation. This enrollment rate is similar to that found in the only other US study of acupuncture in an adult ICU, where 41% of patients accepted acupuncture treatment.¹²⁸ Both acceptance rates are higher than the 20% or less enrollment rates typically seen in clinical trials of ICU patients.^{129,130} Of the patients who declined, only 14% did so due to negative connotations with acupuncture or fear of needles. This contrast suggests that while critically ill patients are hesitant to engage in research, they may be more inclined to participate in studies perceived to be more potentially therapeutic than risky. Future research is needed to explore why critically ill patients may or may not be interested in acupuncture as an adjunct therapy for pain and/or nausea.

Over the enrollment period, 114 treatments were completed in 46 patients, compared with 64 treatments in 20 patients in the Yeh study. Of the 46 eligible patients in our study, 66% received the complete three-day treatment, similar to the 65% completion rate noted by Yeh. The primary reason for missing treatment days in our study was discharge from the hospital (50%), followed by altered mental status (25%). This result is consistent with patient refusal in the Yeh study. Adverse effects were minimal in both studies, and no obstacles were identified that might limit acupuncture

¹²⁸ Yeh et al., "A Preliminary Investigation on the Acceptance and Feasibility of Acupuncture in the Intensive Care Unit."

¹²⁹ Meduri et al., "Methylprednisolone Infusion in Early Severe ARDS."

¹³⁰ Girard et al., "Efficacy and Safety of a Paired Sedation and Ventilator Weaning Protocol for Mechanically Ventilated Patients in Intensive Care (Awakening and Breathing Controlled Trial)."

treatment in the ICU. These results are consistent with previous research on adverse effects associated with acupuncture, which tend to be minor (bruising, nausea), and extremely infrequent (1 per 1000 treatments).¹³¹

According to the National Center for Health Statistics, most recipients of acupuncture tended to be female, highly educated, and Asian.^{132,133} In contrast, our patients were predominantly male (77%), African American or Hispanic (60%), having achieved a high school education or less (50%). In addition, the majority of patients were acupuncture naïve (68%).

The decrease in pain scores achieved by acupuncture in our study is similar to that seen in acupuncture studies in other settings.¹³⁴ The mean decrease observed, 2.39, is above the commonly accepted threshold for clinically relevant analgesia.¹³⁵ Although not an end point in our study, nearly half (49%) of all participants spontaneously reported an anxiolytic effect from acupuncture. A strong association between anxiety and pain has been demonstrated in a variety of conditions.¹³⁶ Moreover, anxiety has been described as limiting future quality of life following ICU admission.¹³⁷ Further research is needed to understand whether acupuncture or other tools may relieve pain through anxiolysis within an ICU.

This study was intended to assess the feasibility of acupuncture therapy within an ICU, and was not designed to establish the efficacy of acupuncture for pain or nausea relief. To that end, this study lacked a control group of no or sham procedures, randomization, or blinding process, and was completed with a relatively small sample size (N=46). The small sample size limited our analysis to broad categories, and did not allow analysis of associations between acupuncture experience and various disease types,

¹³¹ MacPherson et al., “A Prospective Survey of Adverse Events and Treatment Reactions Following 34,000 Consultations with Professional Acupuncturists.”

¹³² Barnes et al., “Complementary and Alternative Medicine Use among Adults.”

¹³³ Barnes, Bloom, and Nahin, “Complementary and Alternative Medicine Use among Adults and Children.”

¹³⁴ Vickers et al., “Acupuncture for Chronic Pain: Individual Patient Data Meta-Analysis.”

¹³⁵ Ruysse-Witrand, Tubach, and Ravaud, “Systematic Review Reveals Heterogeneity in Definition of a Clinically Relevant Difference in Pain.”

¹³⁶ McWilliams, Goodwin, and Cox, “Depression and Anxiety Associated with Three Pain Conditions.”

¹³⁷ García Lizana et al., “Long-Term Outcome in ICU Patients.”

medical teams, and forms of pain (chronic vs acute). Moreover, the study was performed at a single center, and our results cannot be generalizable.

While our results show that patients reported decreased pain over time consistent with an effect of acupuncture treatment; in the absence of a control group, we cannot be sure that this is not due to the natural improvement of the underlying condition. However, patients did report a decrease in pain directly following acupuncture on each day of treatment. Without a complete review of each patient's timing and dose of analgesic and antiemetic medications, however, we cannot conclusively attribute this decrease to acupuncture.

Pain and nausea are known to involve complex psychologic patterns that may be influenced by environment, context, and interactions. We could not control for the style and personality of each research assistant completing recruitment, each acupuncturist throughout their diagnostic procedure, nor each nurse completing the post-acupuncture survey. Likewise, we could not control for potential covariates such as the comfort of each room, the proximity to other potentially noxious stimuli (nearby noise or distress, for example), or the condition on admission to ICU. These covariates may influence patient perception of pain or nausea worsening and relief, potentially biasing our assessment of the role of the intervention in a positive or negative direction.

In conclusion, this study demonstrates that acupuncture is feasible, safe, and well accepted in an ICU setting. Participating patients reported improvement in their symptoms and an overall beneficial effect. These results warrant a larger, randomized, prospective trial on acupuncture in an ICU setting.

Citations:

- “Acupuncture Research - Areas of High and Low Programmatic Priorities.” NCCIH. Accessed May 4, 2015. <https://nccih.nih.gov/grants/acupuncture/priorities>.
- Amos, Z, M Yoav, A Guy, F Adi, M Yigal, and BH Shmuel. “A Randomised Controlled Trial of an Integrative Approach Utilising Acupuncture for Back and Neck Pain in an Emergency Department Setting.” *European Journal of Integrative Medicine* 4 (2012): 23–24.
- Apfelbaum, Jeffrey L., Connie Chen, Shilpa S. Mehta, and Tong J. Gan. “Postoperative Pain Experience: Results from a National Survey Suggest Postoperative Pain Continues to Be Undermanaged.” *Anesthesia and Analgesia* 97, no. 2 (August 2003): 534–40, table of contents.
- Ballantyne, Jane C. “‘Safe and Effective When Used as Directed’: The Case of Chronic Use of Opioid Analgesics.” *Journal of Medical Toxicology: Official Journal of the American College of Medical Toxicology* 8, no. 4 (December 2012): 417–23. doi:10.1007/s13181-012-0257-8.
- Barnes, Patricia M., Eve Powell-Griner, Kim McFann, and Richard L. Nahin. “Complementary and Alternative Medicine Use among Adults: United States, 2002.” *Advance Data*, no. 343 (May 27, 2004): 1–19.
- Barnes, PM, B Bloom, and R Nahin. “Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007.” CDC National Health Statistics Report. CDC, December 10, 2008.
- Barrett, Bruce, Lucille Marchand, Jo Scheder, Mary Beth Plane, Rob Maberry, Diane Appelbaum, David Rakel, and David Rabago. “Themes of Holism, Empowerment, Access, and Legitimacy Define Complementary, Alternative, and Integrative Medicine in Relation to Conventional Biomedicine.” *Journal of Alternative and Complementary Medicine (New York, N.Y.)* 9, no. 6 (December 2003): 937–47. doi:10.1089/107555303771952271.
- Becker, N., A. Bondegaard Thomsen, A. K. Olsen, P. Sjøgren, P. Bech, and J. Eriksen. “Pain Epidemiology and Health Related Quality of Life in Chronic Non-Malignant Pain Patients Referred to a Danish Multidisciplinary Pain Center.” *Pain* 73, no. 3 (December 1997): 393–400.
- Biella, G., M. L. Sotgiu, G. Pellegata, E. Paulesu, I. Castiglioni, and F. Fazio. “Acupuncture Produces Central Activations in Pain Regions.” *NeuroImage* 14, no. 1 Pt 1 (July 2001): 60–66. doi:10.1006/nimg.2001.0798.
- Bishop, Felicity L., Nicola Amos, He Yu, and George T. Lewith. “Health-Care Sector and Complementary Medicine: Practitioners’ Experiences of Delivering Acupuncture in the Public and Private Sectors.” *Primary Health Care Research & Development* 13, no. 3 (July 2012): 269–78. doi:10.1017/S1463423612000035.

- Bonafede, Machaon, Andrew Dick, Katia Noyes, Jonathan D. Klein, and Theodore Brown. "The Effect of Acupuncture Utilization on Healthcare Utilization." *Medical Care* 46, no. 1 (January 2008): 41–48. doi:10.1097/MLR.0b013e3181589b7d.
- Brown, Carolyn M., Jamie C. Barner, Kristin M. Richards, and Thomas M. Bohman. "Patterns of Complementary and Alternative Medicine Use in African Americans." *Journal of Alternative and Complementary Medicine (New York, N.Y.)* 13, no. 7 (September 2007): 751–58. doi:10.1089/acm.2006.6392.
- Burke, Adam, Dawn M. Upchurch, Claire Dye, and Laura Chyu. "Acupuncture Use in the United States: Findings from the National Health Interview Survey." *Journal of Alternative and Complementary Medicine (New York, N.Y.)* 12, no. 7 (September 2006): 639–48. doi:10.1089/acm.2006.12.639.
- Cassileth, Barrie R., and Andrew J. Vickers. "Massage Therapy for Symptom Control: Outcome Study at a Major Cancer Center." *Journal of Pain and Symptom Management* 28, no. 3 (September 2004): 244–49. doi:10.1016/j.jpainsymman.2003.12.016.
- Chao, Maria T., Kimberly M. Tippens, and Erin Connelly. "Utilization of Group-Based, Community Acupuncture Clinics: A Comparative Study with a Nationally Representative Sample of Acupuncture Users." *Journal of Alternative and Complementary Medicine (New York, N.Y.)* 18, no. 6 (June 2012): 561–66. doi:10.1089/acm.2011.0128.
- Charon R. "Narrative Medicine: A Model for Empathy, Reflection, Profession, and Trust." *JAMA* 286, no. 15 (October 17, 2001): 1897–1902. doi:10.1001/jama.286.15.1897.
- Chen, Lucy, Mary Houghton, Lindsey Seefeld, Charlene Malarick, and Jianren Mao. "A Survey of Selected Physician Views on Acupuncture in Pain Management." *Pain Medicine (Malden, Mass.)* 11, no. 4 (April 2010): 530–34. doi:10.1111/j.1526-4637.2010.00815.x.
- Chen, Lucy, Michael Sein, Trang Vo, Shihab Amhmed, Yi Zhang, Kristin St Hilaire, Mary Houghton, and Jianren Mao. "Clinical Interpretation of Opioid Tolerance versus Opioid-Induced Hyperalgesia." *Journal of Opioid Management* 10, no. 6 (December 2014): 383–93. doi:10.5055/jom.2014.0235.
- Cherkin, Daniel C., Karen J. Sherman, Andrew L. Avins, Janet H. Erro, Laura Ichikawa, William E. Barlow, Kristin Delaney, et al. "A Randomized Trial Comparing Acupuncture, Simulated Acupuncture, and Usual Care for Chronic Low Back Pain." *Archives of Internal Medicine* 169, no. 9 (May 11, 2009): 858–66. doi:10.1001/archinternmed.2009.65.
- Cho, Zang-Hee, Terrence Dale Oleson, David Alimi, and Richard C. Niemtzwow. "Acupuncture: The Search for Biologic Evidence with Functional Magnetic

- Resonance Imaging and Positron Emission Tomography Techniques.” *The Journal of Alternative and Complementary Medicine* 8, no. 4 (August 1, 2002): 399–401. doi:10.1089/107555302760253577.
- Clark, W. Crawford, Joseph C. Yang, Siu Lun Tsui, Kwok-Fu Ng, and Susanne Bennett Clark. “Unidimensional Pain Rating Scales: A Multidimensional Affect and Pain Survey (MAPS) Analysis of What They Really Measure.” *Pain* 98, no. 3 (August 2002): 241–47.
- “Clinical Policy Bulletin: Acupuncture.” *Aetna*, April 7, 2015. http://www.aetna.com/cpb/medical/data/100_199/0135.html.
- “Complementary, Alternative, or Integrative Health: What’s In a Name?” *NCCIH*. Accessed February 18, 2015. <https://nccih.nih.gov/health/whatiscaam>.
- Cummings, Mike, and Frankie Reid. “BMAS Policy Statements in Some Controversial Areas of Acupuncture Practice.” *Acupuncture in Medicine: Journal of the British Medical Acupuncture Society* 22, no. 3 (September 2004): 134–36.
- Curlin, Farr A., Kenneth A. Rasinski, Ted J. Kaptchuk, Ezekiel J. Emanuel, Franklin G. Miller, and Jon C. Tilburt. “Religion, Clinicians, and the Integration of Complementary and Alternative Medicines.” *Journal of Alternative and Complementary Medicine* 15, no. 9 (September 2009): 987–94. doi:10.1089/acm.2008.0512.
- “Definition of Integrative Medicine.” *Consortium of Academic Health Centers for Integrative Medicine*, November 2009. <http://www.imconsortium.org/about/home.cfm>.
- DeSalvo, Karen B., Nicole Bloser, Kristi Reynolds, Jiang He, and Paul Muntner. “Mortality Prediction with a Single General Self-Rated Health Question. A Meta-Analysis.” *Journal of General Internal Medicine* 21, no. 3 (March 2006): 267–75. doi:10.1111/j.1525-1497.2005.00291.x.
- Dusek, Jeffery A., Michael Finch, Gregory Plotnikoff, Lori Knutson, and Penny George Institute for Health and Healing Inpatient Care Team. “The Impact of Integrative Medicine on Pain Management in a Tertiary Care Hospital.” *Journal of Patient Safety* 6, no. 1 (March 2010): 48–51. doi:10.1097/PTS.0b013e3181d10ad5.
- Eisenberg, David M., Ronald C. Kessler, Cindy Foster, Frances E. Norlock, David R. Calkins, and Thomas L. Delbanco. “Unconventional Medicine in the United States – Prevalence, Costs, and Patterns of Use.” *New England Journal of Medicine* 328, no. 4 (January 28, 1993): 246–52. doi:10.1056/NEJM199301283280406.
- Eisenberg, D. M., R. B. Davis, S. L. Ettner, S. Appel, S. Wilkey, M. Van Rompay, and R. C. Kessler. “Trends in Alternative Medicine Use in the United States, 1990–1997: Results of a Follow-up National Survey.” *JAMA* 280, no. 18 (November 11, 1998): 1569–75.

- Ellison, Christopher G., Matt Bradshaw, and Cheryl A. Roberts. "Spiritual and Religious Identities Predict the Use of Complementary and Alternative Medicine among US Adults." *Preventive Medicine* 54, no. 1 (January 2012): 9–12. doi:10.1016/j.ypmed.2011.08.029.
- Falk, I. S. *The Incidence of Illness and the Receipt and Costs of Medical Care among Representative Families; experiences in Twelve Consecutive Months during 1928-1931*. Chicago, Ill., 1933. <http://hdl.handle.net/2027/coo.31924003462599>.
- Farmer, Paul. "An Anthropology of Structural Violence." *Current Anthropology* 45, no. 3 (June 1, 2004): 305–25. doi:10.1086/382250.
- "Find A School." ACAOM: *The Accreditation Commission for Acupuncture and Oriental Medicine*. Accessed December 20, 2014. www.acaom.org/find-a-school/.
- Fylkesnes, K. "Determinants of Health Care Utilization--Visits and Referrals." *Scandinavian Journal of Social Medicine* 21, no. 1 (March 1993): 40–50.
- Goldstein, M. S., C. Sutherland, D. T. Jaffe, and J. Wilson. "Holistic Physicians and Family Practitioners: Similarities, Differences and Implications for Health Policy." *Social Science & Medicine* (1982) 26, no. 8 (1988): 853–61.
- Gordon, N. P., D. S. Sobel, and E. Z. Tarazona. "Use of and Interest in Alternative Therapies among Adult Primary Care Clinicians and Adult Members in a Large Health Maintenance Organization." *The Western Journal of Medicine* 169, no. 3 (September 1998): 153–61.
- Haugen, Dagny Faksvåg, Marianne Jensen Hjermsstad, Neil Hagen, Augusto Caraceni, Stein Kaasa, and European Palliative Care Research Collaborative (EPCRC). "Assessment and Classification of Cancer Breakthrough Pain: A Systematic Literature Review." *Pain* 149, no. 3 (June 2010): 476–82. doi:10.1016/j.pain.2010.02.035.
- Helfand, Mark, and Michele Freeman. "Assessment and Management of Acute Pain in Adult Medical Inpatients: A Systematic Review." *Pain Medicine* 10, no. 7 (October 2009): 1183–99. doi:10.1111/j.1526-4637.2009.00718.x.
- Hjermsstad, Marianne Jensen, Peter M. Fayers, Dagny F. Haugen, Augusto Caraceni, Geoffrey W. Hanks, Jon H. Loge, Robin Fainsinger, Nina Aass, Stein Kaasa, and European Palliative Care Research Collaborative (EPCRC). "Studies Comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for Assessment of Pain Intensity in Adults: A Systematic Literature Review." *Journal of Pain and Symptom Management* 41, no. 6 (June 2011): 1073–93. doi:10.1016/j.jpainsymman.2010.08.016.
- Hollenberg, Daniel. "How Do Private CAM Therapies Affect Integrative Health Care Settings in a Publicly Funded Health Care System?" *Journal of Complementary and Integrative Medicine* 4, no. 1 (2007). doi:10.2202/1553-3840.1056.

- Hopton, A. K., S. Curnoe, M. Kanaan, and H. MacPherson. "Acupuncture in Practice: Mapping the Providers, the Patients and the Settings in a National Cross-Sectional Survey." *BMJ Open* 2, no. 1 (January 1, 2012): e000456. doi:10.1136/bmjopen-2011-000456.
- Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. The National Academies Collection: Reports Funded by National Institutes of Health. Washington (DC): National Academies Press (US), 2011. <http://www.ncbi.nlm.nih.gov/books/NBK91497/>.
- Kaptchuk, Ted J. "Acupuncture: Theory, Efficacy, and Practice." *Annals of Internal Medicine* 136, no. 5 (March 5, 2002): 374–83.
- Kaptchuk, Ted J. "The Double-Blind, Randomized, Placebo-Controlled Trial: Gold Standard or Golden Calf?" *Journal of Clinical Epidemiology* 54, no. 6 (June 2001): 541–49. doi:10.1016/S0895-4356(00)00347-4.
- Kaptchuk, Ted J., and Franklin G. Miller. "Viewpoint: What Is the Best and Most Ethical Model for the Relationship between Mainstream and Alternative Medicine: Opposition, Integration, or Pluralism?" *Academic Medicine: Journal of the Association of American Medical Colleges* 80, no. 3 (March 2005): 286–90.
- Kaptchuk, T. J., and D. M. Eisenberg. "The Persuasive Appeal of Alternative Medicine." *Annals of Internal Medicine* 129, no. 12 (December 15, 1998): 1061–65.
- Kaptchuk, T. J., and D. M. Eisenberg. "Varieties of Healing. 1: Medical Pluralism in the United States." *Annals of Internal Medicine* 135, no. 3 (August 7, 2001): 189–95.
- Kutner, Jean S., Marlaine C. Smith, Lisa Corbin, Linnea Hemphill, Kathryn Benton, B. Karen Mellis, Brenda Beaty, et al. "Massage Therapy versus Simple Touch to Improve Pain and Mood in Patients with Advanced Cancer: A Randomized Trial." *Annals of Internal Medicine* 149, no. 6 (September 16, 2008): 369–79.
- Langevin, Helene M., Nicole A. Bouffard, David L. Churchill, and Gary J. Badger. "Connective Tissue Fibroblast Response to Acupuncture: Dose-Dependent Effect of Bidirectional Needle Rotation." *Journal of Alternative and Complementary Medicine (New York, N.Y.)* 13, no. 3 (April 2007): 355–60. doi:10.1089/acm.2007.6351.
- Langevin, Helene M., David L. Churchill, Junru Wu, Gary J. Badger, Jason A. Yandow, James R. Fox, and Martin H. Krag. "Evidence of Connective Tissue Involvement in Acupuncture." *FASEB Journal: Official Publication of the Federation of American Societies for Experimental Biology* 16, no. 8 (June 2002): 872–74. doi:10.1096/fj.01-0925fje.
- Langevin, Helene M., and Karen J. Sherman. "Pathophysiological Model for Chronic Low Back Pain Integrating Connective Tissue and Nervous System Mechanisms." *Medical Hypotheses* 68, no. 1 (2007): 74–80. doi:10.1016/j.mehy.2006.06.033.

- Langevin, Helene M, Peter M Wayne, Hugh Macpherson, Rosa Schnyer, Ryan M Milley, Vitaly Napadow, Lixing Lao, et al. "Paradoxes in Acupuncture Research: Strategies for Moving Forward." *Evidence-Based Complementary and Alternative Medicine: eCAM* 2011 (2011): 180805. doi:10.1155/2011/180805.
- Langevin, H. M., D. L. Churchill, J. R. Fox, G. J. Badger, B. S. Garra, and M. H. Krag. "Biomechanical Response to Acupuncture Needling in Humans." *Journal of Applied Physiology (Bethesda, Md.: 1985)* 91, no. 6 (December 2001): 2471–78.
- Lawenda, Brian D. "Quackery, Placebos, and Other Thoughts: An Integrative Oncologist's Perspective." *Oncology (Williston Park, N.Y.)* 26, no. 8 (August 2012): 762, 764–65; discussion 765.
- Meldrum, Marcia L. "A Capsule History of Pain Management." *JAMA* 290, no. 18 (November 12, 2003): 2470–75. doi:10.1001/jama.290.18.2470.
- Melzack, R. "The McGill Pain Questionnaire: Major Properties and Scoring Methods." *Pain* 1, no. 3 (September 1975): 277–99.
- Mendell, Lorne M. "Constructing and Deconstructing the Gate Theory of Pain:" *Pain* 155, no. 2 (February 2014): 210–16. doi:10.1016/j.pain.2013.12.010.
- Metzl, Jonathan M., and Dorothy E. Roberts. "Structural Competency Meets Structural Racism: Race, Politics, and the Structure of Medical Knowledge." *Virtual Mentor* 16, no. 9 (September 1, 2014): 674. doi:10.1001/virtualmentor.2014.16.9.spec1-1409.
- Michalek-Sauberer, Andrea, Harald Heinzl, Sabine M. Sator-Katzenschlager, Gabriel Monov, Erich Knolle, and Hans Georg Kress. "Perioperative Auricular Electroacupuncture Has No Effect on Pain and Analgesic Consumption after Third Molar Tooth Extraction." *Anesthesia and Analgesia* 104, no. 3 (March 2007): 542–47. doi:10.1213/01.ane.0000253233.51490.dd.
- Morone, Natalia E., and Debra K. Weiner. "Pain as the Fifth Vital Sign: Exposing the Vital Need for Pain Education." *Clinical Therapeutics* 35, no. 11 (November 2013): 1728–32. doi:10.1016/j.clinthera.2013.10.001.
- Najm, Wadie, Sibylle Reinsch, Fred Hoehler, and Jerome Tobis. "Use of Complementary and Alternative Medicine among the Ethnic Elderly." *Alternative Therapies in Health and Medicine* 9, no. 3 (June 2003): 50–57.
- Nguyen, Long T., Roger B. Davis, Ted J. Kaptchuk, and Russell S. Phillips. "Use of Complementary and Alternative Medicine and Self-Rated Health Status: Results from a National Survey." *Journal of General Internal Medicine* 26, no. 4 (November 5, 2010): 399–404. doi:10.1007/s11606-010-1542-3.
- Painovich, Jeannette, and Patricia M. Herman. "Acupuncture in the Inpatient Acute Care Setting: A Pragmatic, Randomized Control Trial." *Evidence-Based Complementary and Alternative Medicine : eCAM* 2012 (2012). doi:10.1155/2012/309762.

- Pedersen, L., P. C. Borchgrevink, I. I. Riphagen, and O. M. S. Fredheim. "Long- or Short-Acting Opioids for Chronic Non-Malignant Pain? A Qualitative Systematic Review." *Acta Anaesthesiologica Scandinavica* 58, no. 4 (April 2014): 390–401. doi:10.1111/aas.12279.
- Pletcher, Mark J., Stefan G. Kertesz, Michael A. Kohn, and Ralph Gonzales. "Trends in Opioid Prescribing by Race/ethnicity for Patients Seeking Care in US Emergency Departments." *JAMA* 299, no. 1 (January 2, 2008): 70–78. doi:10.1001/jama.2007.64.
- Portenoy, R. K., and K. M. Foley. "Chronic Use of Opioid Analgesics in Non-Malignant Pain: Report of 38 Cases." *Pain* 25, no. 2 (May 1986): 171–86.
- Proceedings [of The] Third National Congress on Medical Quackery [held] October 7-8, 1966, Chicago, Ill.* [Chicago] : [s.n.], 1966.
- Rakel, David. *Integrative Medicine: Expert Consult Premium Edition - Enhanced Online Features and Print, 3e.* 3 edition. Philadelphia, PA: Saunders, 2012.
- Riddick, Frank A. "The Code of Medical Ethics of the American Medical Association." *The Ochsner Journal* 5, no. 2 (2003): 6–10.
- Rosenquist, Ellen. "Overview of the Treatment of Chronic Pain." *UpToDate*, April 7, 2015. http://www-uptodate-com.ucsf.idm.oclc.org/contents/2785?search=WHO+pain+ladder&source=graphics_search&imageKey=ONC/63298#H335588659.
- Sherman, Karen J., Daniel C. Cherkin, David M. Eisenberg, Janet Erro, Andrea Hrbek, and Richard A. Deyo. "The Practice of Acupuncture: Who Are the Providers and What Do They Do?" *Annals of Family Medicine* 3, no. 2 (April 2005): 151–58. doi:10.1370/afm.248.
- Sinatra, Raymond. "Causes and Consequences of Inadequate Management of Acute Pain." *Pain Medicine (Malden, Mass.)* 11, no. 12 (December 2010): 1859–71. doi:10.1111/j.1526-4637.2010.00983.x.
- Sommers, Elizabeth, and Kristen Porter. "Price Elasticities for Three Types of CAM Services: Experiences of a Boston Public Health Clinic." *Journal of Alternative and Complementary Medicine (New York, N.Y.)* 12, no. 1 (February 2006): 85–90. doi:10.1089/acm.2006.12.85.
- Stumpf, Steven H., D. E. Kendall, and Mary L. Hardy. "Mainstreaming Acupuncture: Barriers and Solutions." *Complementary Health Practice Review* 15, no. 1 (January 1, 2010): 3–13. doi:10.1177/1533210110374640.
- Taussig, M. T. "Reification and the Consciousness of the Patient." *Social Science & Medicine. Medical Anthropology* 14B, no. 1 (February 1980): 3–13.
- Tom Xu, K., and Tommie W. Farrell. "The Complementarity and Substitution between Unconventional and Mainstream Medicine among Racial and Ethnic Groups in

- the United States.” *Health Services Research* 42, no. 2 (April 2007): 811–26. doi:10.1111/j.1475-6773.2006.00628.x.
- Upchurch, Dawn M., and Bethany K. Wexler Rainisch. “Racial and Ethnic Profiles of Complementary and Alternative Medicine Use Among Young Adults in the United States: Findings From the National Longitudinal Study of Adolescent Health.” *Journal of Evidence-Based Complementary & Alternative Medicine* 17, no. 3 (October 2012): 172–79. doi:10.1177/2156587212450713.
- Vickers, AJ, AM Cronin, AC Maschino, G Lewith, H MacPherson, and NE Foster. “Acupuncture for Chronic Pain: Individual Patient Data Meta-Analysis.” *Arch Intern Med* 172, no. 19 (2012): 1444–53.
- Vickers, Andrew J., and Klaus Linde. “Acupuncture for Chronic Pain.” *JAMA* 311, no. 9 (March 5, 2014): 955–56. doi:10.1001/jama.2013.285478.
- Wear, Delese, and Julie M. Aultman. “The Limits of Narrative: Medical Student Resistance to Confronting Inequality and Oppression in Literature and beyond.” *Medical Education* 39, no. 10 (October 2005): 1056–65. doi:10.1111/j.1365-2929.2005.02270.x.
- White, Paul F., and Henrik Kehlet. “Improving Postoperative Pain Management What Are the Unresolved Issues?” *Anesthesiology* 112, no. 1 (January 2010): 220–25.
- Wu, Hung-chien, Yu-chi Liu, Keng-liang Ou, Yung-hsien Chang, Ching-liang Hsieh, Angela Hsin-chieh Tsai, Hong-te Tsai, et al. “Effects of Acupuncture on Post-Cesarean Section Pain.” *Chinese Medical Journal* 122, no. 15 (August 5, 2009): 1743–48.
- Yeh, Eugene C., James M. Mirocha, Anna Brantman, Xiu Ling Ma, Yi Qiao, C. Noel Bairey Merz, and Heather D. Jones. “A Preliminary Investigation on the Acceptance and Feasibility of Acupuncture in the Intensive Care Unit.” *ICU Director*, January 24, 2013, 1944451612472700. doi:10.1177/1944451612472700.
- Zhang, Wei-Ting, Zhen Jin, Fei Luo, Lei Zhang, Ya-Wei Zeng, and Ji-Sheng Han. “Evidence from Brain Imaging with fMRI Supporting Functional Specificity of Acupoints in Humans.” *Neuroscience Letters* 354, no. 1 (January 2, 2004): 50–53. doi:10.1016/j.neulet.2003.09.080.