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Complementary and Integrative Health Services in a Low-resource Community: a Retrospective Examination

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COMPLEMENTARY AND INTEGRATIVE HEALTH SERVICES IN A LOW-RESOURCE
COMMUNITY: A RETROSPECTIVE EXAMINATION

by

Barbara M. Wesson

A Dissertation Submitted in
Partial Fulfillment of the
Requirements for the Degree of

Doctor of Philosophy
in Health Sciences

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May 2017

ABSTRACT

COMPLEMENTARY AND INTEGRATIVE HEALTH SERVICES IN A LOW-RESOURCE COMMUNITY: A RETROSPECTIVE EXAMINATION

by

Barbara M. Wesson

The University of Wisconsin – Milwaukee, 2017
Under the Supervision of Professor Ron Cisler

Study Background and Significance: Complementary and Integrative Health (CIH) continues to be widely utilized despite a lack of consensus regarding its efficacy. Since 2001, CORE El Centro (CEC) has been providing acupuncture, massage, reiki, and mindful movement classes, charging sliding scale fees in a low-resource, primarily Latino community; underrepresented in the CIH literature.

Purpose: This study examined the association between CIH use (time and treatment), subjective well-being assessments, biometrics records, as well as the association of reduced fees on service utilization in a low-resource community.

Methods: CEC provided information from 1278 de-identified client records spanning 24-months. Within those records, 622 clients had received four or more treatments. Data preparation included reduction of 29 dependent variables (the subjective well-being questions) into four Health Factors (cognitive, emotional, physical, and medical). Additional dependent variables included total number of health conditions reported and a General Health response. Independent variables included length of engagement and types and frequencies of services used.

Associations were examined between level of payment for services, utilization, and health conditions. Spaghetti and scatter plots were used to explore trends of change across time. Paired sample tests assessed significant change between assessments.

Results: General Health, Total Health Conditions, and three Health Factor scores improved over time. Biometric health status indicators did not change significantly, but were within normal range at the first recording. Clients receiving four or more treatments averaged 12 treatments over eight months. A significant inverse association existed between payment level and Health Conditions. Clients in the low payment level group that reported more Health Conditions used more services and clients in the highest payment level group that reported fewer Health Conditions used more services.

Conclusion: The cost of CIH may be one of the primary barriers to utilization, because when fees for service are scaled to income a low-resource community will use CIH. The Latino community demonstrated they will use CIH. Increased use by individuals with chronic conditions was supported. Subjective health and well-being improved. This study supports the rich history of research asserting the complexity in the study of CIH in a community-based center.

Future Directions: There is a need to create community based research to further understand CIH as well as the socioeconomic and cultural influence inherent in CIH utilization. The next step is to create deeper partnerships between Universities and health care systems toward developing systems for tracking, monitoring, and analysis that are effective for both research and practitioners of CIH.

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This work is dedicated to all the
practitioners, clients, supporters, and researchers
of complementary and integrative health and community-based research.

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LIST OF ABBREVIATIONS

BPS	Biopsychosocial Model
CEC	CORE El Centro
CHA	Complementary Health Approaches (acupuncture, massage, reiki)
CIH	Complementary and Integrative Health
EBR	Evidence Based Research
ITP	Integrative Treatment Plan
NCCIH	National Center for Complementary and Integrative Health
NHIS	National Health Interview Survey
NIH	National Institute of Health
TCM	Traditional Chinese Medicine
PBR	Practice Based Research
SAC	Self-Assessment of Change
SST	Social Support Theory
TT Ever	Total number of treatments ever
TTM	Transtheoretical Model of Change
WSR	Whole Systems Research

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CORE El Centro, all the staff and clients, I couldn't have done this without you. I have watched this facility move from two offices with two therapists and one phone to 6 treatment rooms, a movement studio, over 25 practitioners and 20 staff and growing. CORE serves over 2000 people a year, providing massage, acupuncture, reiki, energy work, health education, movement classes, and social justice work. Over 15 years, CORE has grown deep roots in the Milwaukee community and created affordable natural health services through sliding scale fees. Making complementary health approaches affordable has changed the landscape of demographics in complementary health. It is my vision to create a community based research facility for the study of Complementary and Integrative Health at CORE El Centro. This dissertation is the stepping stone to that vision. And again, Dr. Cisler became a perfect fit as this adventure played out.

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COMPLEMENTARY AND INTEGRATIVE HEALTH SERVICES IN A LOW-RESOURCE COMMUNITY: A RETROSPECTIVE EXAMINATION

Introduction

The Problem

Thirty-five years of research in the Complementary and Integrative Health (CIH) field has yielded over 47,000 peer-reviewed journal articles, 650 CIH Systematic Reviews, and 700 Cochrane reviews. Although individual studies report significant changes, reviews continue to report weaknesses in the rigor and quality of studies (Lauche et al., 2015; C. A. Smith, Hay, & MacPherson, 2010; Zoorob, Chakrabarty, O'Hara, & Kihlberg, 2014) resulting in high external validity and low internal validity. One of the weaknesses stems from the naturalistic settings of the studies, which increases confounding variables and bias compared with the laboratory environment. But results from artificial environments may not translate to the community based centers. The National Center for Complementary and Integrative Health recognizes the need to study the complexity of CIH interventions in the “real world” context of integrative care practices with the rigor of a randomized control trial (NCCIH, 2016b). In 2002, the White House Commission Report suggested that community health centers be given special consideration for the study of CIH, but this has not been reflected in funding from the National Institute of Health (Commission, 2002). This study will expand the knowledge regarding the use of CIH in a community based center.

Despite weak evidence of efficacy, about 35% of the US population utilizes CIH approaches (Clarke, Black, Stussman, Barnes, & Nahin, 2015). This covers a broad range of treatments, from products and supplements to established therapies that have been recognized by the National Center for Complementary and Integrative Health. Demographics remain similar to the 2007 National Health Interview Survey data, with the exception of an increase in yoga

participation and overall increase in use by Latinos. The average CIH client is white, female, 40-65 years of age, and college educated (Felicity L. Bishop & Lewith, 2010; Nahin et al., 2007). Felicity L. Bishop and Lewith (2010) also found that 61% of those who report use of CIH also report having one or more chronic conditions. Income is not consistently related to CIH use (Felicity L. Bishop & Lewith, 2010). There is a gap in knowledge regarding CIH use in minority and disenfranchised populations. This may be due to the economic inaccessibility or knowledge of services. The available data for this study is unique as it addresses both income and race/ethnicity socio-demographics.

Interest in complementary and integrative health (CIH) has steadily increased since the 1970s, The Office of Alternative Medicine was created in 1992 and in 1998 the National Institute of Health established the National Center for Complementary and Alternative Medicine (NCCAM). In 2014, NCCAM's Research Divisions reorganized into several branches and Congress approved a name change to the National Center for Complementary and Integrative Health (NCCIH). Today NCCIH uses the term "complementary health approaches" (CHA) to describe most approaches used by the public. Within CHA, there are two sections. One section is Natural Products such as herbal treatments and pro-biotics. The other section is Mind/body Practices such as massage, reiki, yoga, and acupuncture. "Integrative health" (IH) is defined as the utilization of both traditional medical services and CIH as part of a health treatment plan (NCCIH, 2016b). This study offers insight into complementary health approaches of Mind/body Practices through clinical data mining of 24 months of health assessments, treatment plans, and biometrics collected by a community-based natural healing center as part of their protocols.

Significant challenges in conducting research exist within a community-based environment. Typical of non-profit centers, this organization has not had the resources to

properly administer measurement tools or analyze outcomes, but data is available (Bonnie Horrigan, Sheldon Lewis, Donald I. Abrams, & Constance Pechura, 2012a). Systematic reviews find missing data, vague reporting, and low completion rates in studies that reveal data collection measures (Linde, 2009). Practitioners of CIH are often not interested in formal research for numerous reasons (Linde, 2009). A common concern is the perceived rigidity of protocols within a randomized controlled trial that intrude on the practitioner's ability to individualize dosage, length of treatment, or type of treatment at any time during the treatment plan (Fleming, Schwab, Nouer, Wan, & LeDoux, 2012). A second challenge in practice based research is inadequate control groups and the ability to truly blind the participants and practitioners regarding treatment or sham control (pretending to treat). Finally, patient-reported outcome measures (PROMs) remain a challenge (McKenna, 2011). Viewed as unreliable, subjective patient outcomes represent shifts in well-being that often extend beyond the initial presenting problems (Cheryl Ritenbaugh et al., 2011). Historically, these aspects have been labeled "non-specific outcomes" that practitioners of CIH find to be important but are rarely measured. These challenges of community-based practice and research protocols are creating opportunities to explore new methods of inquiry (Fønnebø et al., 2007).

The Opportunity

While the natural sciences explore the neurobiology of Complementary and Integrative Health (CIH) and randomized clinical trials seek efficacy, there is room in the social sciences to explore the effectiveness of CIH in a population of people already engaged in the use of such products and services. CORE El Centro, the site of this data set, has made a concerted effort to create and collect outcomes data from clients. Not unlike other integrative health centers, the missing pieces are consistent collection and the analysis of the wealth of data (Bonnie Horrigan,

Sheldon Lewis, Donald I Abrams, & Constance Pechura, 2012b) that has been collected, and continues to accumulate. This has created a naturalistic longitudinal opportunity, stymied by resources. The data that has been collected by CORE El Centro represents information that was deemed important for the organization's goals, to relay outcomes to funders, and as part of the annual report. The organization created their own survey, and data collection was inconsistent. This may be partly due to no 'data gatekeeper' but also reluctance on the part of CIH practitioners to comply with data collection.

Historically, academic researchers reject agency data because of its methodological challenges (e.g. missing data, non-standardized measures, missing key variables, etc.). However, agency data represents a large amount of easily accessible, quantitative data that can offer meaningful insight to the organization and propel future outcomes research. It is an optimal beginning point to analyze current patterns and operationalize outcomes measures for CORE/El Centro in preparation for systematic long term research. Epstein (2010) has been conducting retrospective practice based research for 30 years in social work research. Retrospective practice based research allows practitioners the freedom to work within the constraints of their field versus the constraints of research. CIH therapies, especially when used for chronic conditions are often not a straight trajectory of healing (Rugg, Paterson, Britten, Bridges, & Griffiths, 2011), or a prescriptive process (Ezzo, 2007). Using retrospective research design, practice-based research/practitioner teams can inform the study of this uneven trajectory of improved health and well-being, especially for those with chronic conditions.

Practice-based research in this community setting provides bi-directional educational opportunities for the research community and natural health practitioners to develop methods regarding control groups in a community based facility. Understanding the trajectory of natural

health and including analysis of characteristics of attrition and use in this setting may provide a natural control group. Novel methods of measurement will provide a foundation for rigorous longitudinal prospective studies in natural CIH environments (Epstein, 2010) without compromising protocols within the natural health profession.

Ritenbaugh, et al. (2011) addressed the challenges in measuring the non-specific subjective changes reported by natural health users. They labeled these changes “emergent outcomes” and differentiated these outcomes from traditional patient-reported outcomes which are generally symptom or treatment specific. In conjunction with the development of tools that will measure emergent outcomes, this team of researchers have begun the work of developing a Whole Systems Research (WSR) model. WSR is interested in the interactions of the environment, physical, cognitive, emotional and spiritual aspects of the client and support networks as well physical diagnoses and symptoms. The site of this study has been tracking emergent outcomes for two years with a focus on systemic health.

This current project provides an opportunity to inform in several areas. The quantity of information that has been collected by the natural health center is rich data regarding in the subjective feelings of well-being in two groups of under-represented populations, low income and Latino, before and after CIH services. Integrating practice based research will provide a depth of knowledge to develop a Whole Systems Research model of longitudinal prospective studies across the spectrum of health; prevention, acute needs, and symptom maintenance of chronic health conditions or treatment of serious illnesses.

Purpose and Specific Aims

This retrospective research, within the context of a community health center, will fill a gap in the study of CIH service use in the low-income and Latino community, two complex

populations not generally represented in CIH research. The data collected for this study includes both objective data (e.g., blood pressure, BMI, heart rate) and subjective self-report assessments of health and well-being. A secondary purpose will be the examination of trends of CIH use over 24 months (e.g., including types of services used and length of engagement) and explore possible relationships between payment for services, utilization, reported health conditions, and reports of well-being.

Aim 1 of this retrospective research study is to describe service use and examine the subjective responses and basic biomarkers of complementary and integrative health services users in a low-income, primarily Latino community through formal analysis. Alternative hypothesis 1.1 is that individuals who received four or more CIH services will report improvements in physical, cognitive and emotional health. Alt. hypothesis 1.2 is that changes will improve incrementally as a function of time engaged with CEC and treatment frequency (completing a treatment plan and staying for maintenance).

Aim 2 of this study is to examine patterns of CIH use, general health, health conditions and costs incurred by the clients. The alternate hypothesis is that when payment for services is scaled to household size and income, CIH use will follow different patterns than those found in the most recent population health data (Clarke et al., 2015).

LITERATURE REVIEW

The Recent History

A significant number of systematic reviews in Complementary and Integrative Health have been completed, generally using the gold standard of research, the randomized control trial, as a template (Linde, 2009). Individually, studies will report significant changes in symptoms being studied in relationship to one or more treatment modalities of Complementary and

Integrative Health (CIH). But when analyzed in a systematic review, most conclusions report the need for more rigor, more studies. For example, when considering the effect of acupuncture on fibromyalgia, most studies are excluded from review. The few that remain use different types of acupuncture, report challenges with control groups and sham acupuncture (putting needles in non-acupoints or not using needles at all), blinding of practitioners, and ultimately true blinding in subjects. Linde (2009) cautions against heterogeneity caused by combining differing populations, outcomes, or interventions. A Cochrane massage review revealed questions of treatment combinations, practitioner qualifications, adequate doses, and appropriate control groups (Ezzo, 2007). Sood, Sood, Bauer, and Ebbert (2005) found methodological diversity even in the database search opportunities for systematic reviews. P. Li, Qiu, and Qin (2015) conducted a meta-analysis of RCTs of acupuncture treatment of Bell's palsy and found a higher effective response rate but also a high heterogeneity among the studies and a high risk of bias in most aspects of the methodology. The consensus of these reviews is CIH needs more rigor in the research. So where is the breakdown? Why do so few studies of CIH hold up under the rigors of Evidence-Based Research and the Cochrane Review standards?

Despite this lack of rigor, the National Institute of Health continues to support NCCIH research, to the dismay of some scientists. In an editorial, Paul Offit (2012) describes the millions of dollars of tax payer money as wasted by NCCIH research. Marcus and Grollman (2006) criticize the research of NCCIH as driven more by politics than science. Furnham (1997) addresses those who suggest that the study of natural healing methods represents a flight from science, suggesting that instead of running from science, society is more comfortable thinking about therapies outside the medical model. Edzard Ernst and Chatwin (2005) take this further and wonder if the sociological driven studies (their characterization) are doing more harm than

good, legitimizing CIH use without evidence of benefit but simply by consumer use. Systematic reviews, including the Cochrane reviews, lend support to the criticisms of CIH. Exclusion, heterogeneity, methodological weaknesses, lack of control groups, cross-sectional studies, inadequate reporting of or small effect sizes, and a general lack of details compromise many of the articles reviewed (Edzard Ernst, 2012; Ezzo, 2007; Marcus & Grollman, 2006). This translates to a compromise in replicability. Reviewers have also remarked that most often, especially for the study of approaches like reiki, there are not enough studies with rigor draw any conclusions (M. S. Lee, Pittler, & Ernst, 2008). Other criticisms include a focus too broad in the type of treatment or condition being treated, or so narrow that few studies have been completed. These medically trained researchers are asking that research in CIH use the same standards the scientific community has been using to advance allopathic medicine. This is not possible without financial support to carry out research with such rigor. Offit (2012) may complain about wasted money, but the 2015 budget for NCCIH was just 0.4% of the total budget of the National Institute of Health, one of the smallest budgets at NIH (less than buildings and facilities). An additional 0.6% is spent on NCCIH through other programs such as the National Cancer Institute.

Clearly most of our nation's \$31 billion health research budget continues to fund research of traditional medicine (NIH, 2016). This research has advanced medical science (Mehta, 2011) and created a nation that lives longer, but with more chronic conditions (Sierpina, 2006). The overall health of our nation continues to decline. Since the 1980s the number of people diagnosed with diabetes type 2 has tripled, hypertension has increased 4.5% and obesity has increased 12% (CDC, 2014). The causes of this shift in our nation are broad and complex, many of them involving social determinants of health. More fast food, more sedentary jobs, less

physical activity, higher expectations of workplace productivity, higher unemployment in low income populations, the increase in poverty, unsafe neighborhoods, and a decrease in consumption of fresh foods, are just some of the suspected contributors (Bircher & Kuruvilla, 2014). Advances in medical science and social determinants of health seem to follow different trajectories which creates more health inequities. Moskowitz and Bodenheimer (2011) suggest moving from an evidence-based medicine approach to an evidence-based health approach that extends beyond clinic doors and look for “up-stream interventions”. CIH offers this upstream approach.

Complementary Health Approaches

The National Center for Complementary and Integrative Health has created two major tracks of CIH approaches, natural products and mind/body practices. Acupuncture, massage, and energy healing modalities such as reiki are considered mind/body practices (NCCIH, 2016b). Often considered collectively, the histories of acupuncture, massage and reiki are as varied as the protocols, education, and training of each discipline. Acupuncture can be found in history dating back thousands of years. The education is three to four years long, with 1-3 licensing exams per state and national examinations. The cost to become a licensed acupuncturist ranges from \$40,000 to \$90,000 (Kiethananda, 2011). Acupuncture is at the forefront of CIH research and has thousands of articles and systematic reviews (Sood et al., 2005). Classical massage was developed in the early 1800s. Massage therapists complete about 700 hours of education and have both state and national licensing regulations. The cost of massage training is about \$10,000 (NCBTMB, 2016). Massage is also well represented in peer-reviewed research journals. Reiki was developed in the mid-19th century in Japan. Educational training is generally completed over a weekend and the costs are minimal. No licensing is required. Research regarding reiki

outcomes is less prolific in academic journals. The common factor that brings these practices under one umbrella is natural health, a broad concept that uses practices and products that assist the body in boosting its own natural ability to heal.

Complementary and Integrative Health practices work with the “energy” within the body, the “vitalism” of the human condition (Coulter & Willis, 2004). It is this “energy” or “vitalism” as the mechanism of benefit that is troubling to the scientific community because it is difficult to isolate (Vickers & Linde, 2014). It is, however, not a problem for the general population worldwide. Over 35% of the United States (Clarke et al., 2015), 42% of Australians (Coulter & Willis, 2004), and 42% of the UK (Felicity L. Bishop & Lewith, 2010) used CIH approaches at least once in the last 12 months. Professional athletics have sports massage therapists on staff (Brummitt, 2008). The use of traditional herbs and plants is centuries old. Half the population of China uses herbal remedies (Tilburt & Kaptchuk, 2008). Healing Touch, which is similar to reiki in the use and movement of vital energy, is commonly used in hospital settings and is nationally accredited by the American Nurses Credentialing Center (Hart, 2012). Meditation has been found to decrease activity in parts of our brain involved in rumination, common in anxiety and depression (Taylor et al., 2012). Acupuncture is an ancient practice (Chon & Lee, 2013) that was found effective for 28 different diseases or conditions and 80% of the 129 countries represented in the World Health Organizations acknowledge use (Chan, 2013).

Acupuncture. An important aspect of Traditional Chinese Medicine (TCM), acupuncture has been used in Eastern cultures for over 3000 years (W. Huang, Kutner, & Bliwise, 2013), migrating to Europe and the United States in the 19th century. In 1997, the National Institute of Health’s Consensus Development program found sufficient evidence to expand the use of acupuncture and encouraged further study (NCCIH, 2016b). Since that time, thousands of

articles have studied acupuncture in relation to many different conditions and diseases. Enough systematic reviews have now been conducted to allow a review of the reviews (Sood et al., 2005). Although the reviews report significant weaknesses in design, there is enough evidence for research to continue, now with more rigor.

Acupuncture involves the insertion of fine needles into specific points (called acupoints) of the body to correct energy, or Qi (pronounced *chee*), imbalances in the body (C. A. Smith et al., 2010). According Chinese medicine, Qi is an inner energy that sustains the living being and imbalances, or interruptions to one's Qi, are the cause of illness and disease (Chon & Lee, 2013). One method of balancing one's Qi is acupuncture, the stimulation of particular points where the energy may be blocked. Classic theory teaches practitioners about 365 points, located on 14 main meridians (or channels) that run from foot to head in both directions (Kaptchuk, 2002). Although some points are commonly used by practitioners, each treatment is unique based on a current assessment. Most practitioners utilize about 150 points and individual sessions usually involve inserting needles into 5-15 different sites (Kaptchuk, 2002). A course of treatment is generally 6 to 12 sessions, and most sessions are 45-60 minutes in length (Chon & Lee, 2013). To address the issue of safety, H. MacPherson, Thomas, Walters, and Fitter (2001) recruited acupuncturists from the British Acupuncture Council to monitor effects from services for four weeks. A total of 574 practitioners agreed to participate and reported on over 34,000 treatments. No serious adverse effects and only 43 minor adverse events were reported. Mild transient effects were reported in 15% of treatments. Witt et al. (2011) and Wu et al. (2015) found similar results in their review of adverse effects of acupuncture. Bleeding and pain at the needle points were the most common adverse effects and resolved without further treatment within 3 days (Witt et al., 2011). Feeling relaxed and feeling energized were the most common transient effect reported (H.

MacPherson et al., 2001). Acupuncture has been found effective for several specific conditions, including nausea, vomiting, chronic and acute pain and quality of life.

Pain has been associated with a lower quality of life rating, affecting feelings of well-being. Capturing the prevalence of pain in the population is challenged by the methods used in classifying pain (Landmark, Romundstad, Dale, Borchgrevink, & Kaasa, 2012). Landmark et al. (2012) found considerable stability in recall of pain over time in a longitudinal study of chronic pain. Over 4500 individuals participated in a 12-month study, answering recall questions regarding pain at 5 points in time. Prevalence of moderate pain over 6 months was 28% (95% CI 37 to 30). If defined solely by duration of six months or longer, the prevalence was 47% (95% CI 45-49). Finding relief for this population has been inconsistent.

Acupuncture as treatment for chronic pain has been found effective in pain management for osteoarthritis, low back pain, headaches, fibromyalgia, and chronic pain. Manyanga et al. (2014) conducted a systematic review and meta-analysis of acupuncture in the management of osteoarthritis symptoms. They included 12 trials with 1763 participants and found significant reductions in pain intensity, improved functional mobility, and quality of life. Wei Huang, Bliwise, Carnevale, and Kutner (2010) conducted a small clinical trial in 24 subjects with osteoarthritis. Subjects were randomized into one of four groups to receive true acupuncture (TA) or sham acupuncture (SA) for knee pain and sleep disturbances. Group one received TA for pain, and SA for sleep. Group two received SA for pain and TA for sleep. Group three received TA for both. Group four received SA for both. True acupuncture for either pain, sleep or both resulted in better reports of decreased pain and improved sleep than with sham acupuncture. TA for pain was also associated with better general health, vitality and improved functioning. TA for sleep was associated with better ratings for social functioning.

Acupuncture has been found to decrease nausea and vomiting across situations including during pregnancy, postoperatively, and as a side effect of cancer treatment. C. Smith, Crowther, and Beilby (2002) conducted an RCT to treat nausea and vomiting during pregnancy. A total of 593 women who were 14 weeks or less pregnant, experiencing nausea and vomiting, were recruited and randomized into 4 groups; traditional acupuncture, acupuncture at site p6 only (a site determined to have significant effect on nausea), sham acupuncture, and no acupuncture. Women in the traditional acupuncture and p6 acupuncture experienced a significant decrease in nausea and dry retching after week one compared to no acupuncture and the trend continued through week four of the trial. There was no decrease in vomiting for any group. A systematic review and meta-analysis involving 30 RCTs of acupuncture at site p6 vs no acupuncture was conducted in 2013. The analysis included 1276 patients who received traditional acupuncture ($n=281$), acupressure ($n=580$) or electro-acupoint ($n=426$) and 1258 control subjects. Compared with no acupuncture control, acupuncture significantly reduced acute (0-6 hours post-) vomiting and delayed (0-24 hours post-) onset nausea after surgery, but not acute nausea or delayed onset vomiting. Studies that utilized acupressure and electro-acupoint used sham acupuncture in the control group and tested only 0-24 post operatively. The review found both types of acupuncture significantly reduced both nausea and vomiting 0-24 hours post-surgery (Cheong, Zhang, Huang, & Zhang, 2013). Rithirangsiroj, Manchana, and Akkayagorn (2015) conducted a randomized cross-over study comparing acupuncture with a 5-HT3 receptor pharmaceutical (ondansetron) that is commonly used for side-effects during cancer treatment. They recruited 70 gynecologic cancer patients and randomly assigned them to receive acupuncture prior to chemotherapy and the following day, or a single dose of ondansetron prior to chemotherapy. Additional doses of ondansetron were provided to pharmaceutical group if needed for nausea or vomiting following

treatment. During the second cycle of treatment, patient groups were switched so all patients received both types of treatment for nausea and vomiting. Both groups experienced similar control of acute nausea or vomiting, but patients receiving acupuncture experienced significantly less delayed onset nausea or vomiting. The acupuncture group also reported significantly less constipation and insomnia and higher overall quality of life scores. CIH researchers are finding that beyond the improvement of physical symptoms, mental and emotional health and well-being are also improved after services (Cheryl Ritenbaugh et al., 2011).

Acupuncture is being used to treat a spectrum of mental and emotional health, from depression (H. MacPherson, Elliot, Hopton, Lansdown, & Richmond, 2013) to general well-being (Upchurch & Rainisch, 2014). This led to research examining mental health improvements with acupuncture in conjunction with prescription medication versus medication as a monotherapy. Chan and colleagues (2015) found acupuncture in combination with antidepressant medication to be more effective than antidepressants alone and with a faster response rate. MacPherson et al. (2013) conducted a randomized controlled trial comparing change in depression inventory scores in three arms; acupuncture vs usual care (consulting their general practitioner), counseling vs usual care, and acupuncture vs counseling. They found both acupuncture and counseling significantly reduced depression at both three and six months after intervention compared to usual care. At 12 months, there was no longer a significant difference between groups. It is possible that to maintain the benefits of acupuncture it needs to be administered on a regular basis. Walling (2006) offers a prescriptive theory for acupuncture, with preventive interventions as a primary level of care to assist in bringing the autonomic nervous system into homeostatic balance. This balance may improve the level of general well-being which in turn may improve coping mechanisms and decrease susceptibility to stress-induced

illnesses. Whereas pharmaceuticals are primarily targeted agents, often with adverse side-effects, acupuncture seeks systemic balance by modulation of the nervous system (Wei Huang, Kutner, & Bliwise, 2011).

The study of acupuncture to date has demonstrated that there is value in acupuncture treatment for several conditions. NCCIH is actively funding high quality research that explores the treatment itself and the best way to measure changes. A current listing of trials funded on ClinicalTrials.gov, shows nine studies involving acupuncture and pain, fibromyalgia, breast cancer, and diabetic neuropathy. Several of these studies involve functional Magnetic Resonance Imaging (fMRI) as one of the measurements. As this technology advances, the mystery of our vital energy may become measurable. Liu et al. (2012) found that nodal centralities in functional networks of the brain are affected by specific acupuncture points. They also reported that sham acupuncture did not produce the same changes in brain networks. R. E. Harris et al. (2009) used fMRI scans to measure binding at opioid receptor sites in fibromyalgia patients receiving acupuncture. Patients receiving acupuncture showed significantly more binding than patients receiving sham acupuncture.

As with all basic science, this must be translated to the community at large where treatment protocol is less standardized, asking clients to complete batteries of tests is unreasonable, and fMRI machines are not readily available. Practitioners of CIH are already convinced of the benefits of their profession, are not trained in research, and lack the time and finances to consider conducting what traditional science considers quality research. Yet, the typical clinic carries rich information about CIH services that has not been utilized past the treatment of the clients. The study of this secondary research may reveal evidence of significant change to direct prospective community based studies.

Massage. Massage therapy was first recorded in China in 2598 BC and is found in ancient texts from India, Greece, and the Roman Empire (Goats, 1994). Massage therapy resurfaced in the mid-1800s. Educational programs have been developed worldwide and licensing requirements in the United States exist at both the state and national levels. Approximately 7% of the population has experienced a massage in the last 12 months (Clarke et al., 2015). The most common massage therapy practiced is Swedish massage consisting of four primary soft tissue manipulation techniques (Goats, 1994; Weerapong, Hume, & Kolt, 2005). Effleurage is a smooth, gliding movement over the skin. Petrissage involves kneading, pressing, or rolling of soft tissues under or between the hands. Friction is described as a penetrating pressure delivered by the fingertips. Tapotement is a rapid striking of the tissues with the various parts of the hand. Additional techniques such as trigger point release, myofascial release, hot stone and Thai massage require specialized training. Over 80 different forms of massage have been identified, many developed in the last 30 years (Sherman, Dixon, Thompson, & Cherkin, 2006). This rapid development of massage techniques and protocols created a lack of consistent terminology (Ezzo, 2007). Sherman et al. (2006) developed a massage taxonomy to create a common language among therapists and researchers and identified four primary goals of massage; 1) relaxation, 2) to address clinical issues, 3) movement re-education, or 4) energy work.

Similar to acupuncture, each massage treatment delivered is unique to the individual due to practitioner training, expertise, theoretical assumptions, and symptoms reported by the client (Moyer, Dryden, & Shipwright, 2009). A course of treatment is generally four to eight sessions, and most sessions are 60-90 minutes in length (Sherman et al., 2006). Individuals also receive massages sporadically, with the average person receiving 3 treatments a year (Shim, Schneider,

& Curlin, 2014). Most commonly, clients are unclothed and covered with a sheet on a table designed for body work. Massage may be conducted in a chair designed for massage and clients remain clothed. Chair massage is generally 30 minutes in length. Thai massage is most commonly conducted on a large mat on the floor and clients remain clothed and 60-90 minutes.

Yin, Gao, Wu, Litscher, and Xu (2014) conducted a systematic review of adverse events of massage therapy in pain-related conditions. 40 studies met their inclusion requirements. These studies recorded a total of 138 adverse events, primarily related to the neck or spine. Although the authors titled the article a review of massage therapy, only two articles listed the practitioner as a massage therapist. 28 articles could not identify the practitioner, six listed Chiropractors, and six listed different types of doctors, and one case was from a spouse. Chiropractic is a manipulation of structure, often the spine, whereas massage therapy involves minimal manipulation or none and primarily the manipulation of soft tissue. If only massage practitioners were included in the study by Yin et. al, the number of adverse events totaled two. Furlan et al. (2012) assessed adverse effects as part of a systematic review of massage as a treatment for low back pain. Eleven of 25 studies included information on adverse events. Pain was the most common adverse event reported by 1%-25% of patients in four studies. Allergy to massage oil by 5.5% of patients was reported in one study. One study reported intense post treatment soreness and other study reported skin discomfort. Four studies reported no adverse events occurred. The most recent systematic reviews in a number of populations report few or no adverse events (E. Ernst, 2003; Kalichman, 2010; Keeratitanont, Jensen, Chatchawan, & Auvichayapat, 2015; Kumar, Beaton, & Hughes, 2013).

Massage research is being conducted in numerous environments and populations. In neonatal intensive care units, massage is being used to stimulate healing. Ang et al. (2012)

conducted a RCT of massage therapy on the immune system of infants in a neonatal unit. They enrolled 120 infants (58 massage and 62 in a control group). Infants in the massage groups received three 15-minute massages per day for a maximum of four weeks or until discharged. All massages were conducted by a nurse certified in infant massage therapy behind a screen. Control infants were also taken behind the screen, but not touched. Immune response was measured by the number of natural killer (NK) cells and their function, cytotoxicity or killing off of harmful or potentially harmful cells. Viruses are an example of targets of NK cells. Secondary measures of weight gain, length of hospital stay and reduction in infection were also recorded. The average number of days of intervention was eleven, the control average was twelve days. The primary aim of the study, to increase NK cells was not realized. But NK cell cytotoxicity, which is a protective factor for the immune system was significantly higher in the massage group. Final weight was also higher in the treatment group, but no other variables were significant.

A quasi-experimental design to study infant massage in two neonatal units in University hospitals (Abdallah, Badr, & Hawwari, 2013) compared changes in weight, pain responses using the Premature Infant Pain Profile (PIPP), length of stay, breast feeding duration, and neuro-development outcomes for infants using the Bayley Scales of Infant Development. In this study, mothers of infants in the treatment group ($n=32$) were trained in specific techniques of massage over 3 training sessions. Mothers were instructed to massage infants one time a day for ten days. Each session was 10 minutes, at a specific time of day, and massage in a specific order with no talking to the infant to reduce any confounding effects of voice. Infants in the control group ($n=34$) received the same services except massages. Infants who were massaged had significantly lower scores on the PIPP after massage and at discharge. At one year 50 infants completed the Bayley Scale and infants that received massage scored significantly higher. There

were no differences in length of stay, motor scores, weight, or length of breast feeding.

Massage therapy is practiced in post-operative settings and treatment centers as well. Halm (2015) reviewed 10 studies that compared objective and subjective outcomes of massage interventions on cardiac surgery patients. Most of the studies used multiple occasions of massage in 10-20 minute bouts. Only two studies found positive effects over controls related to blood pressure or respiratory rate. In subjective areas, eight of the studies reported significant decreases in intervention patients over controls in pain reports, five studies reported significant decreases in anxiety, mood, or depression, and three studies reported significant decreases in muscular tension. The Mayo clinic in Rochester, MN developed a massage program to enhance the recovery of cardiac patients. In two studies, they reported significant changes in pain, anxiety and tension in the massage group compared with the control groups (Rodgers et al., 2015; Wang, Sundt Iii, Cutshall, & Bauer, 2010).

M. S. Lee, Lee, and Ernst (2011) reviewed RCTs of the effect of massage for breast cancer patients. They reported that massage therapy may be helpful, but only six studies met inclusion criteria and risk of bias was high. In 2016, another group of researchers conducted a review of breast cancer and massage therapy (P. L. T. Lee, Tam, Yeh, & Wu, 2016). They also found a small number that met inclusion criteria ($n=7$), and only three had been completed after Lee, Lee & Ernst's review. In both of these reviews, eight of ten studies had samples sizes of less than twenty patients. Reviewers found it difficult to report significant results due to dosage differences (from one per day for three days to 30 minutes 2-3 days a week for 3-5 weeks) and several different types of measurement tools were used. Studies have explored training significant others to deliver the massage (Collinge et al., 2013; Najafi et al., 2014) and found patients reported significant changes in pain and quality of life aspects. When relief from pain is

not available, massage has been shown to improve subjective states of relaxation.

Massage is being utilized in hospice environments (Dain, Bradley, Hurzeler, & Aldridge, 2015). Studies have explored training significant others of patients in hospice settings to deliver the massage (Collinge et al., 2013; Najafi et al., 2014) and found patients reported significant changes in pain and quality of life aspects. Dain et al. found 21% of 591 hospices employed massage therapists, primarily 1.5 full-time positions or less. An RCT comparing massage with simple touch was conducted to assess pain and mood in patients with advanced cancer in 15 U.S. hospices (Kutner, 2008). Subjects included 380 patients with any type of cancer and pain rated greater than 4 on a 1- to 10-point scale. They measured pain intensity and its interference with daily living. The control group (n=192) received touch with both hands for three minutes in ten locations with no movement of hands while touching, interrupted conscious healing intentions with mental exercises and had no previous experience with body work or energy work. Massage improved mood immediately after treatment more than simple touch, but both groups experienced significant improvements in symptom distress and quality of life. This supports theories that simple touch can impact subjective feeling states (Davis, Hanson, & Gilliam, 2016).

There is evidence that massage can improve depression and anxiety in some populations. HIV patients scored significantly lower on two depression scales after four weeks of massage that continued through weeks six and eight compared with light touch and no intervention (AlBedah & Poland, 2013). A review of the use of massage for reducing anxiety, and depression in oncological palliative care found physiological relaxation to be connected to a decrease in anxiety (Falkensteiner, Mantovan, Müller, & Them, 2011). Breast cancer patients reported decreased mood disturbances after five weeks of massage compared with a no intervention group (Huntley, 2010). The authors did not find a significant difference in cortisol levels between

groups. A randomized pilot study of older adults compared eight massage sessions with eight guided relaxation sessions over four weeks and found significant positive changes in well-being, perceived stress, anxiety, and depression in the massage group (Sharpe, Williams, Granner, & Hussey, 2007). These studies may not generalize to the population at large but they offer an insight to direct future research.

One of the most common areas of massage research involves patients with acute and chronic pain. Massage has been widely used as a treatment for fibromyalgia, a disorder that causes chronic muscle pain and fatigue. A small study of 24 women with fibromyalgia was conducted to measure changes in cortisol, serotonin levels, pain intensity, and quality of life after receiving massage two times weekly for three months (Rodrigues Oliveira et al., 2015). No control group was used. Significant changes were reported in quality of life and serotonin levels, but not for pain levels or cortisol levels. Kalichman (2010) conducted a review of two single arm trials (no control group) and six RCTs (with sham or alternative treatments) and found massage provided significant short term benefits in symptom relief for individuals with fibromyalgia. This included, restorative sleep and decreased pain. A review by Y.-h. Li, Wang, Feng, Yang, and Sun (2014) reported similar results in their meta-analysis of the effectiveness of massage for fibromyalgia and found that for those receiving five or more treatments the benefit was increased. In addition to fibromyalgia, RCTs have studied the effect of massage for low back pain (acute, subacute, and chronic) and report significant decreases in pain (Kumar et al., 2013; Netchanok, Wendy, Marie, & Siobhan, 2012). Generally, the reported effects are short term.

A criticism of massage therapy, and other CIH services research is that long term treatment effects are not measured (Farber & Wieland, 2016; Nahin et al., 2007) or, when measured, effects do not last over time (Cook, Wellman, Cherkin, Kahn, & Sherman, 2015;

Field, Diego, Delgado, Garcia, & Funk, 2011). Compared to a control group of individuals with hand pain, those in the four-week treatment group experienced significantly less pain, increased grip strength, decreased anxiety, and decreased depression (Field et al., 2011). There was no follow up to assess long term relief. A systematic review of massage therapy for neck pain found moderate evidence for decreased pain compared with inactive controls (wait group), with superior immediate effects (Cheng & Huang, 2014). A meta-analysis comparing differing types of massage and the effect on fibromyalgia showed a large effect on pain after treatment, with a progressive reduction in benefit over time (Yuan, Matsutani, & Marques, 2015). They also found the effects of decreased anxiety and depression reduced over time. These results suggest that massage may be an effective health maintenance tool. An academic search provided no long-term study of massage treatments for maintenance or prevention.

Research on the mechanisms underlying the effects are massage are also elusive (Kumar et al., 2013) but as technology improves researchers are able to explore the impact of massage on our internal environment.. Waters-Banker, Dupont-Versteegden, Kitzman, and Butterfield (2014) are examining the effects of massage on the inflammatory process at the cellular level. At the time of muscular injury, a cascade of chemical and hormonal processes decreases the sensitivity of the nerves. If uncontrolled it can cause chronic pain. Further, depending on the type of mechanical stimulus (such as massage), the signaling cascades within cells changes. They postulate that massage may accelerate the production of M₂ macrophages which signal the tissue repair process and inflammation reduction. Using animal models, Waters-Banker et al. (2014) demonstrated that muscles treated with 30 minutes of injury, one time daily for four days, recovered muscular function faster than non-massaged muscles. Their pilot study also found that as delay in receiving massage increased, it's effectiveness decreased. They pointed out that

damage to muscles could be additive over time if cells are not offered recovery time or recovery stimulation.

A team of researchers (Morhenn, Beavin, & Zak, 2012) recruited 95 people, placing 65 in a massage group and 30 in a rest control group to examine the effects of a 15 minute back massage compared with a control group that rested for 15 minutes. They took blood draws from both groups before and after just 15 minutes of treatment or rest and found significant changes in oxytocin, a hormone found to increase trust and empathy. They measured adrenocorticotropin hormone (ACTH), a precursor to cortisol, which is released in response to stressors. They measured beta-endorphins, as others have proposed this may be the mechanism that reduces pain. Finally, they measured nitric oxide which causes smooth muscle relaxation. Results showed a significant rise in oxytocin and a significant decrease in ACTH in the massage group. In the control group, ACTH increased significantly. Nitric oxide decreased 35% in the massage group, with the resting group showing a 140% increase. Finally, beta-endorphins decreased 29% in the massage group with no change in the control group. The authors suggest caution, as massage only accounted for a large portion of variation in oxytocin and a small portion in the remaining physiologic variables. This type of research is bringing us closer to finding the mechanisms of effective massage therapy.

The work by Waters-Banker et al. (2014) supports the usefulness of massage at an early stage of injury in animal models. Understanding these mechanisms in combination with outcomes of many studies reporting improvements in subjective feeling states suggests that massage may be beneficial as a prevention and maintenance tool in general, just as good nutrition and regular exercise is. Kutner (2008) demonstrated that the physiological impact of touch cannot be ignored. Continued study of the benefits of massage as prevention with long

term studies will be important to determine the best dosage of massage to promote homeostasis (Cook et al., 2015; Keeratitanont et al., 2015).

Reiki. An organized system of healing from Japan, Mikao Usui received the information in the 20th century and created a program of training and delivery of reiki. In Japanese, ‘rei’ means universal, and ‘kei’ means life energy (Janine Joyce & G. Peter Herbison, 2015). Mikao Usui’s system is currently widely used among Reiki practitioners as their foundation of knowledge. The International Association of Reiki Professionals (IARP) defines reiki as a spiritual healing art that is passed from master to student through an attunement process, a part of all Reiki trainings. The website states the qualities of Reiki include a transmission of healing energy through the hands that is not guided by the practitioner, but that energy itself has the wisdom to travel within the body. Reiki is not based on specific religious beliefs, but on the belief that subtle energy exists in the body (IARP, 2016). This parallels the premise of vital energy from Traditional Chinese medicine philosophies.

Reiki therapy is considered part of biofield energy, an electrical or magnetic field present in all humans and animals (Toms, 2011). Just as the heart produces an electrical signal that can be measured, the body as a whole produces electrical or bioenergetic signals (Thrane & Cohen, 2014) that can be moderated by energy healing practices such as reiki. A typical reiki session lasts 30-90 minutes. Clients lay fully clothed on a bodywork table. The practitioner uses a series of up to twelve hand placements to create a flow of energy. Practitioners do not direct the energy, but serve as a conduit, as a hose is a conduit for water (Thrane & Cohen, 2014). Included in this review are also studies involving Healing Touch and Therapeutic Healing practices. Healing Touch, developed in 1989 and used primarily by nurses, is a continuing education course within the American Holistic Nurses Association. Healing Touch is characterized by light

touch, heart-centered intention, and healing on all levels (mental, emotional, physical, spiritual). It has five levels of training. Therapeutic Touch, developed in 1972, trains practitioners learn to attune to the universal field of energy and direct it to their clients. Healing Touch (HT) is common among nurses. All three of these practices share the philosophy of balancing the energies within and around the physical body. Today, hundreds of studies have been completed within hospital systems, Universities and in community settings (Hart, 2012).

Three systematic reviews between 2008 and 2015 (J. Joyce & G.P. Herbison, 2015; M. S. Lee et al., 2008; Thrane & Cohen, 2014) demonstrate both the flaws and the potential of reiki. The most recent was a Cochrane review that included only three studies (J. Joyce & G.P. Herbison, 2015) addressing the effect of reiki on anxiety and depression. Although the studies were generally well done, the sample sizes were small and changes in depression and anxiety were minimal or non-significant. The reviewers did report that confidence intervals were wide, leaving space for the possibilities of beneficial (and harmful) effects. In one of the studies reviewed, researchers did find a three way interaction between session, reiki group, and high (negative) mood (Bowden, Goddard, & Gruzelier, 2011). In comparing the High Mood group, paired t-tests revealed significant improvement in mood in the reiki group over the control group. As is common in the study of CIH services, although this review by Joyce & Herbison assessed the effect of reiki on anxiety and depression, only one study recruited people who would be likely seek help for these conditions. The other two studies recruited people with cancer and pain, and assessed depression and anxiety as part of the study. It is clear more studies need to be completed seeking information on a specific condition.

M. S. Lee et al. (2008) included nine studies in their systematic review. Conditions, interventions and main outcomes varied among all the studies. The conclusion was insufficient

evidence to recommend reiki for any condition. Five of the nine studies in this review reported significant changes in 1) reduction of present pain, depression and anxiety, 2) significant reductions in stress and depression, 3) improved pain control and quality of life, 4) less pain and fewer requests for analgesics, and 5) fatigue. Conclusions of the reviewers were based on a lack of methodological rigor. Thrane & Cohen (2015) included six studies in their systematic review. All six studies were included in the previously discussed reviews. Whereas, J. Joyce and G.P. Herbison (2015) found no significant effects in a study by Richeson, Spross, Lutz, and Peng (2010), Thrane & Cohen reported a significant decrease in anxiety with a large effect size ($d = 2.08$) and a significant increase in anxiety in the control group with a large effect size ($d = -.208$). Further, Thrane & Cohen concurred with the original study, finding a very large between group difference. These reviewers noted that each study reached significance for at least one outcome and reported effect sizes ranging from ($d = .28$) to ($d = 1.82$) for the reiki interventions across the studies.

Of interest in the systematic review by Thane & Cohen (2015) was the discussion of sample size, one of the greatest challenges reported by a number of studies. The median sample size was 24. The reviewers reported researchers had indicated a recruitment time of 15 months to over two years to achieve a sample size of 24. Two studies reported difficulty with control groups, as individuals refused to participate if not in the reiki treatment group (Olson, Hanson, & Michaud, 2003) or dropped out of the study (Gillespie, Gillespie, & Stevens, 2007). In alignment with massage and acupuncture, this review noted methodological weaknesses such as highly variable intervention timelines, from two treatments to 12 weeks for reiki treatments, make true comparisons difficult. Also troublesome are control groups that use another type of intervention, such as Relaxation Response Therapy. Researchers must take into account that this type of

therapy may produce benefits reducing significance between the treatment intervention and control group.

Reiki as a treatment is primarily associated with improvements pain, mental health, and subjective states of well-being. A pilot study of Healing Touch therapy was conducted with sickle cell disease patients who were having a Vaso-Occlusive (extreme) pain episode (Thomas, Stephenson, Swanson, Jesse, & Brown, 2013). Researchers reported a slow enrollment period of six months, with a total of 24 patients (twelve in intervention and 12 in control group). Results were inconclusive, reporting trends of decreased anxiety, stress and pain in patients receiving Healing Touch. The control group in this study received music and a person in their room for the same 30-minute time period. The authors stated the music was used to lessen the sounds from the hospital during the treatment. Music has been found to be calming in hospital situations (Clement-Cortes & Pearson, 2014), so the presence of music for the control group may be confounding, music could have contributed to the control group changes. Richeson et al. (2010) included post intervention interviews in their study and found that most participants reported feeling “relaxed” after treatments. Some participants indicated the effects of their reiki treatment lasted beyond the treatment and reported increased insight into pain in their bodies.

Research is exploring the effects of reiki and chemotherapy (Catlin & Taylor-Ford, 2011), examining comfort and well-being in an outpatient setting. This study denotes the challenge of the control group, as both reiki and sham reiki produced significant changes in comfort and well-being compared with a standard care control group. Once again the advances in science have brought about the ability to study the response to touch through individual nerve fibers in the skin (Denworth, 2015). Afferent nerve fibers at skin level have been found to have both rapid and slow touch systems. Rapid touch systems alert us to pain and other sensations we

might want to move from quickly. The slow touch, or gentle touch system may provide a neurobiological connection to the social brain (McGlone, Wessberg, & Olausson, 2014), the human connection. This type of insight brings into questions the ability to use ‘sham reiki’ or ‘sham massage’ as a control measure if touch is included.

The mechanisms of reiki are being investigated through research of changes in the autonomic system such as heart rate and blood pressure. A study was conducted to measure these and other factors during a reiki treatment (Mackay, Hansen, & McFarlane, 2004). Participants were randomized into three groups of rest, reiki, and sham reiki. Measures were in real time and included heart rate, systolic, diastolic, and mean blood pressure, cardiac vagal tone, cardiac sensitivity to baroreflex, and respiration. Baseline data was collected during a 15-minute rest period. The intervention period lasted 30 minutes and was followed by a 10-minute rest period. Both reiki and sham reiki groups experienced significant changes in heart rate, cardiac vagal tone, cardiac sensitivity to baroreflex, and breathing rate. The reiki group also experienced significant changes in diastolic blood pressure and mean blood pressure. The control group experienced no significant changes. The sample size was small ($n=45$) in this study, but the changes reported in the autonomic nervous system warrant larger studies. One possible confound not mentioned by the researchers was the effect of being attached to multiple machines during a reiki treatment.

To test the power of healing energy systems in general, researchers conducted an experiment to test proliferation in cell cultures of human bone, skin and tendon (Gronowicz, Jhaveri, Clarke, Aronow, & Smith, 2008). Cell cultures were treated for two weeks and received varying numbers of ten minute treatments per week of Therapeutic Touch. All cells types demonstrated a significant increase in proliferation compared with untreated control cultures

with two treatments per week. Researchers found dosage ranges for all three types of cultures. Phase two of the experiment included an additional group of cell cultures that received a placebo, sham Therapeutic Touch cultures. Graduate students with no knowledge of Therapeutic Touch administered treatment. Besides the instruction of how to move their hands, they were instructed to count back from 1000. The changes in proliferation fell between the treated and control groups of the Phase one portion of the study. This study not only speaks to the power of healing touch, but the need to explore the dosage required to elicit change. Critics of energy medicine dismiss the effects in humans as placebo effects mediated thru expectations, beliefs, and past experiences. Gronowicz et al. (2008) conducted a well-designed RCT with an experienced principal investigator. Their three year challenge of publication suggests a bias in the literature toward this type of study (Monzillo & Gronowicz, 2011). Yet, petri dish cultures may provide the evidence scientists require to design RCTs with humans that test changes in our cellular make-up as a result of energy healing methods.

Summary. Significant research has been conducted in the last 30 years with varying degrees of quality in each discipline but a consistent message of the need for more research. CIH research began in response to the increase in use in the general population, creating opportunities for effectiveness research before efficacy studies could be completed in controlled settings (Ezzo, 2007). The challenges include research that is conducted by non-researchers and research regulators and funders without expertise in the subject being studied (Fønnebø, 2011). Research by the natural health community is conducted with inadequate funding to fully develop a study and data collection with no staff or funds to analyze the data (Horrihan et al., 2012a; Linde, 2009). A majority of CIH studies have been excluded from systematic reviews because they did not meet review criteria. Critics highlight inadequate sample sizes, weak designs, incomplete

analysis descriptions and significant selection bias (Edzard Ernst, 2012). Systematic reviews reveal limited numbers of studies for specific conditions with specific treatments resulting in a comparison of numerous conditions with a single treatment or a single condition with multiple methods of treatment. For example, a study of Cochrane reviews of acupuncture and pain conditions included 8 different types of pain conditions (Myeong Soo Lee & Ernst, 2011). Vickers and Linde (2014) conducted an individual patient meta-analysis of 29 original trials of acupuncture that varied in types of chronic pain, measurement tools, static or patient directed protocols and different types of control groups.

For a number of reasons, developing appropriate control groups has been a challenge for all modalities of CIH being reviewed. Generally, researchers have three choices; 1) no treatment, 2) sham treatment, or 3) an alternative treatment. No treatment seems like a logical choice, but in a phase II trial of reiki, patients refused to participate in the study when they learned there was a chance they would be in a control group and not receive reiki (Olson et al., 2003). Developing a sham procedure is challenging for CIH practices because a practitioner still needs to interact with participants. Participants experience up to 60 minutes of attention in some manner, which impacts their physiology. This is especially relevant in the fields of massage and energy healing. Both generally require some sort of touch, or near touch, which produces non-specific results (Ezzo, 2007). The result is that sham control groups present with significant changes after the “treatment”. Vickers & Linde (2014) conducted a meta review of 15,000 chronic pain patients over 31 clinical trials and found standardized mean differences of medium effect (.42 to .57) for acupuncture compared with no acupuncture. Effects varied from very small to medium (.15 to .62) for acupuncture vs. sham acupuncture. Similarly, patients in active cancer treatment received reiki, sham reiki, or standard care (Catlin & Taylor-Ford, 2011) and no differences were

found between the reiki and sham reiki groups, but both presented significantly different results than standard care. In the view of the RCT then, reiki is no different than placebo reiki. Yet, if both groups demonstrated significant differences then standard care, perhaps there is an unexplained aspect. In acupuncture, generalized effects may still be experienced by skin penetration and stimulation, especially if the sham points are close to the actual points (W. Huang et al., 2013). Other studies have found similar results regarding sham acupuncture. Li & Kaptchuk (2002) found in two RCTs of low back pain that individualized acupuncture, formula acupuncture, and sham acupuncture were all equally superior to usual care, including at a one-year follow-up. In an early study of acupuncture treatment for fibromyalgia, R. E. Harris et al. (2009) found similar trends for sham vs. traditional acupuncture reporting a clinically significant decrease in pain that was not dependent on needle location (traditional or sham). Researchers of Parkinson's disease are exploring the expectation of benefits and the release of dopamine, a classic example of the placebo effect (Schmidt, Braun, Wager, & Shohamy, 2014). The release of dopamine suggests it is far from a placebo, or that the placebo effect has been misunderstood. Longitudinal studies of the natural course of both treatment and health conditions may provide information not accessible through a treatment and control group limited time study.

Protocol of service delivery is considered a key aspect of a RCT. Practitioners of CIH are classically trained to tailor the treatments based on information from clients. Acupuncturists may add or remove points based on a viewing of the tongue and three different pulse patterns before each session. Yet, treatments have a general protocol. MacPherson, Elliot, Hopton, Lansdown & Richmond (2013) published a detailed article of acupuncture protocol in the treatment of depression. Practitioners were directed to treat patients using traditional protocol, including dosage. Researchers tracked the points used in 266 patients and the number of times the point

was used. Practitioners used just twenty different points (of a possible 365) and ten points were used 50% of the time, demonstrating real world practices are generally consistent across practitioners. Massage generally uses five different patterns of movement and pressure and sessions may be tailored differently based on information from the client. Reiki has 12 different hand positions and a general method of delivery. Yet, a client may ask for a particular focus. Strict protocol is one reason practitioners are not eager to participate in research, it does not reflect what happens in real world practices (Kumar et al., 2013).

Very few studies have begun to address CIH as an option for maintenance of symptoms for chronic conditions or as prevention measures. Yet, in secondary analysis of the National Health Interview Survey adults who exercised more, were former smokers and casual drinkers were more likely to use CIH products and services. Obese individuals were less likely to use CIH. A second group of individuals reporting chronic health conditions were also more likely to use CIH products and services, with odds increasing as conditions increased (Nahin et al., 2007). To answer questions regarding maintenance and prevention, research will require the development of longitudinal studies in natural settings.

The new 5-year strategic plan for the National Center for Complementary and Integrative Health carried over objectives from the previous plan regarding 1) studies in community based clinical settings and 2) the use of CIH to manage symptoms of pain, anxiety and depression. They included objectives that develop research opportunities to study the safety and efficacy in community-based settings and foster interdisciplinary collaborations and partnerships (NCCIH, 2016a). Measurement tools used in traditional RCTs are burdensome for community-based settings. Outcomes measures will need to address the subjective aspects of well-being, those that have often been labeled non-specific outcomes (Cheryl Ritenbaugh et al., 2011). Practitioners

and researchers as partners will open up new research opportunities that engage rather than direct the practitioners (Epstein, 2011).

Systematic reviews raise questions regarding what the evidenced based medicine model may be missing. Non-specific outcomes, the complexities of social determinants of health, and the integration of mind, body, spirit, and emotions into research is no easy task (Ostermann, Beer, Bankova, & Michalsen, 2013). In a secondary analysis of the 2007 National Health Interview Survey, Nguyen, Davis, Kaptchuk & Phillips (2010) found what seems to be an oxymoron, that CIH users were more likely to have chronic conditions, yet rated their health better than non-CIH users and rated their health better than in the previous year. Integrative Health Models in general and Whole Systems Research in particular are interested in developing methodology that captures these complexities of CIH as it relates to health and well-being in a broader context. The biopsychosocial model is a foundation for the study of Complementary and Integrative Health through Whole Systems Research (R. Hoenders, Willgeroth, & Appelo, 2009).

Theoretical Framework

Noble (2012) calls for the return to a systems approach, which suggests that the nature of a system cannot be defined by its parts. CIH researchers are responding to the lack of research-based evidence by considering new, more effective methods. Dr. Ted Kaptchuk, Director of the Harvard-wide Program in Placebo Studies and the Therapeutic Encounter is calling for a paradigm shift. “Unlike western medicine, in which signs and symptoms are used analytically to isolate an underlying mechanism, East Asian medicine seeks to discern a qualitative image in the overall gestalt or regions of a person’s signs and behaviors” (Kaptchuk, 2002, p. 375). These two views of health can be brought together in a Whole Systems Research Model of Complementary

Table 1.

Relevant Objectives in NCCIH 2016 Strategic Plan: Exploring the Science of Complementary and Integrative Health. Top Priorities of Plan.

Objective 1: Advance Fundamental Science and Methods Development

1.3 *Develop new and improved research methods and tools for conducting rigorous studies of complementary health approaches and their integration into health care.*

Objective 2: Improve Care for Hard-to-Manage Symptoms

2.1 *Develop and improve complementary health approaches and integrative treatment strategies for managing symptoms such as pain, anxiety, and depression.*

2.2 *Conduct studies in “real world” clinical settings to test the safety and efficacy of complementary health approaches, including their integration into health care.*

Objective 3: Foster Health Promotion and Disease Prevention

3.1 *Investigate mechanisms of action of complementary and integrative health approaches in health resilience and practices that improve health and prevent disease.*

3.2 *Study complementary health approaches to promote health and wellness across the lifespan in diverse populations.*

3.3 *Explore research opportunities to study and assess the safety and efficacy of complementary health approaches in nonclinical settings such as community- and employer-based wellness programs.*

Objective 4: Enhance the Complementary and Integrative Health Research Workforce

4.1 *Support research training and career development opportunities to increase the number and quality of scientists trained to conduct rigorous, cutting-edge research on complementary and integrative health practices.*

4.2 *Foster interdisciplinary collaborations and partnerships.*

www.nccih.nih.gov/about/plans

and Integrative Health. This model can then be applied to several of the objectives in the new strategic plan set out by the National Center for Complementary and Integrative Health in 2016. Table 1 outlines the relevant objectives that can be addressed through Whole Systems Research in this community based facility.

Descartes and his colleagues made a conscious decision to separate the mind, emotions and spirit from the body/brain for the advancement of medicine and the blessing of the church (Ecks, 2009). The body became viewed more like a machine, something to be fixed when broken (Taipale, 2015). In the 1800s physiologist Claude Bernard began to understand the body as a series of relationships that independently maintained a fluid environment (Cooper, 2008; Goldstein & Kopin, 2007). Walter Cannon expanded the work of Bernard and established the term ‘homeostasis’ in the early 1900s. He postulated that the outer

environment of the body was also involved in homeostasis of the adrenal and sympathetic nervous system, including emotional distress (Cooper, 2008) which became known as the ‘flight or fight’ response. Today we know that activities of daily life impart our ever vigilant sympathetic nervous system to action, seeking steady states directed by the brain, referred to as ‘allostasis’(Goldstein & Kopin, 2007). Picking up the work of Cannon, Hans Selye redefined the concept of stress to a non-specific response of the body to demands placed on it. Modern concepts of stress and advances in the sciences have advanced Selye’s findings. Some of these include ‘allostatic load’ which is defined as the point at which the body can no longer adapt or return to homeostasis (Sterling & Eyer, 1988) due to continual or extreme stress. Stressors are now classified as genetic, environmental, or experiential creating effects are both physical and psychiatric (Goldstein & Kopin, 2007). Although Walter Cannon may not have had the evidence of Sterling and Eyer, in 1932 he wrote not just of homeostasis of the body, but of our social worlds as well. He expressed that living beings were open systems that influence and were influenced by the environment, and that instability in the social organism would lead to human suffering (Cooper, 2008). The mid-20th century struggled with topics not uncommon to the health care system today. The continued domination of molecular biology, vested political, social, and economic interests in the delivery of health care, the lure of technology reducing the patient to parts, and the difficulty in the measurement of subjective outcomes represented the professionalization of biomedicine (Engel, 1977).

Biopsychosocial Model. In the 1970s, George Engel, a professor of psychiatry, experienced the field of medicine question the relevance of treating psychosocial issues within the medical field. The debate involved the removal of the field of psychiatry from medicine into a new discipline with which to treat behavioral and psychological problems (Engel, 1977). In

Engel's view, the reductionist biomedical model had become narrowly focused on biological aspects of patients to the exclusion of the subjective experience (Wade, 2015). While the physician-psychiatrist community debated whether psychiatry was congruent with the medical model of disease, Engel questioned the biomedical model itself (Engel, 1977). According to Engel, the biomedical model dictated that disease is independent of social behavior and even within complex phenomena is a known or unknown primary principle that is biological in nature. This led him to formulate a model based on a premise that physicians needed to address the physical, mental, and social aspects of the patient (Borrell-Carrió, Suchman, & Epstein, 2004).

The Biopsychosocial Model was developed by Engel as a challenge to the medical community in response to a growing dissatisfaction by the public of cold and impersonal medical care (Engel, 1977). The premise of the model at its most basic level was that the biology of a patient could not be separated from the internal psychology of the patient or the social environment around him or her. Cannon and Selye had demonstrated this many years prior, but the Cartesian dualism is strong (Ecks, 2009). The biopsychosocial (BPS) model has been explored for over 40 years now. Depending on the area of study, it has experienced acceptance and resistance. Health care (Ormstad & Eilertsen, 2015), rehabilitation (Wade, 2015), patient-centered medicine (Henningsen, 2015), clinical psychology (Deacon, 2013), and the military (Crawford et al., 2013) have all explored the use of the biopsychosocial model to broaden the understanding of how psychosocial issues impact the individuals with whom they work.

Deacon (2013) challenges the assumptions of the biomedical model in its aim to discover the "magic bullet" (p.847) biologic agents that will target the chemical imbalance that would explain ill mental health. There is a larger question that was asked back in 2010. Is there a feedback response from psychiatric medications that worsens the disease over time (Whitaker,

2010)? Deacon and Whitaker are not shy about suggesting that organizations such as the American Psychological Association, the National Institute of Mental Health, the National Institute on Drug Abuse, and the National Institute on Alcohol Abuse and Alcoholism along with a number of patient advocacy groups, in an effort to legitimize mental illness, are advocating the biomedical model. Psychiatry and the organizations above joined forces with pharmaceutical

Table 2

Quotations from Prominent Sources Regarding the Biomedical Model

Source	Quote
Steven Hyman, M.D., former NIMH Director (1996–2001)	“[Mental disorders] are real illnesses of a real organ, the brain, just like coronary artery disease is a disease of a real organ, the heart.” (2004)
Thomas Insel, M.D., National Institute of Mental Health (NIMH) Director	“Many illnesses previously defined as ‘mental’ are now recognized to have a biological cause.” (2007) “It has become an NIMH mantra to describe mental disorders as brain disorders.” (2011)
And then he said:	
Thomas Insel, M.D., National Institute of Mental Health (NIMH) Director	“Medications developed over the past five decades have been prescribed widely but have not been sufficient for reducing the morbidity and mortality of mental disorders.” (2012)
But he said this:	
Nora Volkow, M.D., National Institute on Drug Abuse Director	“Drug addiction is a disease of the human brain.” (2010) “It is considered a brain disease because drugs change the brain — they change its structure and how it works.” (n.d.)
National Alliance on Mental Illness	“Mental illnesses are biologically based brain disorders.” (n.d.) “Mental illnesses are serious medical illnesses.” (n.d.) “A large body of scientific evidence suggests that OCD results from a chemical imbalance in the brain.” (n.d.)
And she said this:	
Joseph Coyle, M.D., Editor of Archives of General Psychiatry	“Chemical imbalance is sort of last-century thinking. It’s much more complicated than that. It’s really an outmoded way of thinking.” (2012)
But he said this:	
H. Christian Fibiger, Ph.D., former vice president of neuroscience at Eli Lilly and Amgen	“Psychopharmacology is in crisis. The data are in, and it is clear that a massive experiment has failed: despite decades of research and billions of dollars invested, not a single mechanistically novel drug has reached the psychiatric market in more than 30 years.” (2012)
And she said this:	
American College of Neuropsychopharmacology	“The biological basis for psychiatric illness is now well established.” (2012)
WebMD	“When you have depression, chemicals in your brain called neurotransmitters are out of balance.” (2009)
MayoClinic.com	“If you have depression, you may have a serotonin imbalance.” (2010)
Otsuka America Pharmaceuticals	“When activity of key brain chemicals is too high, Abilify lowers it. When activity of key brain chemicals is too low, Abilify raises it.” (2006)
But he said:	
Ronald Pies, M.D., Editor of Psychiatric Times	“In truth, the ‘chemical imbalance’ notion was always a kind of urban legend — never a theory seriously propounded by well-informed psychiatrists.” (2011)
	(Deacon, 2013)

companies who spend millions of dollars a year to tell the public, through advertising, what drugs to take to manage their brain disease (Deacon, 2013; Whitaker, 2010). Table 2 offers a sample of statements from prominent sources regarding the biomedical model in relationship to mental health and alludes to the confusion that exists in mental health today.

Wainwright, Russell & Yiannakou (2011) conducted an ethnographic study of the BPS model in a specialty clinic for chronic constipation in England. The results suggest the psychosocial aspect of the model was difficult for both staff and patients. Staff related that some patients were not willing to discuss psychosocial aspects of life in relation to their disease, and the staff was not always sure how to address it. The authors suggest that the meaning of psychosocial is easily translated as “all in your head” instead of a complex interaction of biological, psychological and social components, which includes stress (of poverty, violence, economy, complex home contexts, etc.). From the patient perspective, the authors uncovered a fear of being dismissed or not being taken seriously if they revealed psychosocial difficulties and related feeling embittered or confused when their mental state was questioned. Yet, they reflected wanting to be treated as a whole person, not just as their physical symptoms. The BPS model insists on a multi-level focus that involves the whole person.

Researchers are using the BPS model as a foundation to develop broader perspectives for more effective treatments of post-stroke fatigue and depression (Ormstad & Eilertsen, 2015). The authors brought in the known biological determinants of the acute ischemic stroke to explore the relationships between biologics and depression, biologics and fatigue, and depression and fatigue. Ormstad & Eilertsen found that, biologically, fatigue could be predicted by stroke but not depression. Depression may develop over time, particularly if fatigue is not acknowledged or addressed. Addressing the balance of activity and rest, the social aspect of the model, may help

reduce the chances of developing depression.

Some of the criticisms of BPS model revolve around a lack of specificity and a need to address additional aspects of care, such as the history of health care relationships (Suls, Krantz, & Williams, 2013; Wainwright et al., 2011), the importance of not just social, but social-cultural understandings ((Henningsen, 2015), and the education of the model into medical school curriculum (Edozien, 2015). Borrell-Carrió et al. (2004) suggest using the terms ‘mind’ and ‘body’ simply to focus the attention, with an understanding that they are not dualistic. They also suggest using complexity theory which prescribes to the knowledge that it is impossible to know all the influences of health and disease. This open system allows for guideposts without absolutes for health practitioners. Benning (2015) argued that the BPS model did not extend far enough into the subjective aspects of personal meaning and spirituality of the patients. Henningsen (2015) felt the model could not explain medically unexplained symptoms, common in chronic conditions and complex symptoms of disease and treatment. To address these concerns, it is important to look for theories and models nested within the BPS model.

Psychosocial Models. Nested within the biopsychosocial model are interpersonal, intrapersonal, community, and societal models and theories that support the study of complex systems (Coreil, 2001). The components of this study are supported by the Transtheoretical Model (TTM) of change, Social Support Theory (SST), cultural models, and the impact of social determinants of health. Both TTM and SST involve emotions, cognitions, perspectives and behavior at the individual level as they relate to decisions people make about their health. The location of this study is in the Latino community and the natural healing center involved strives for cultural competence in all aspects of programming. The population within this study struggles with a number of social determinants of health including poverty, social stigma around

Stages of Change

Adapted from Prochaska, L.O. & DiClemente, C



Figure 1. The Transtheoretical Model/Stages of Change. (James O. Prochaska, DiClemente, & Norcross, 1992)

immigration, food deserts, economic instability, and access to health care.

Transtheoretical Model of Change. The

Transtheoretical model of change includes five stages which determine the likelihood that change will occur (Figure 1). Progression through these changes is bi-directional and implies change over time, not a single event in time (Velicer, Prochaska, Fava, Norman, & Redding, 1998). The first two stages, pre-contemplation and contemplation are both stages of

inactivity. Individuals within these stages of change are unlikely to utilize CIH services, as the effort to change is greater than they are prepared to make. Changes in health, such as development of a chronic health condition such as diabetes, may push the individual in pre-contemplation into the preparation phase (James O. Prochaska et al., 1992). At this stage, the individual will actively look for help, and seek information to move into the action stage. It is during this stage that relapse is more common, but rarely back to pre-contemplation. Proponents of TTM suggest that at six months of successful behavior change, the individual has progressed to maintenance. Vigilance is still required. Development of self-efficacy, the belief that change is possible is imperative for moving successfully through the stages (Callaghan, Khalil, & Morres, 2010; Lenio, 2011). In this retrospective study, the clients generally fall into pre-contemplation, preparation, or action stages. They may have been referred for services and take steps to inquire about services. They may even make an appointment, but do not keep it. At the preparation stage, individuals will also make an appointment and may or may not keep it. If they do come for

treatment at this stage, they may not continue services past 2 or 3 treatments. In the action stage, individuals are motivated to complete treatment plans. The maintenance stage is achieved when they schedule and keep appointments past completion of their treatment plans. Individuals at this stage are invested in managing symptoms or staying healthy. As individuals move through the stages of change, support offered in the early phase of the action stage could keep the trajectory moving. One question to ask is what type of support?

Not all social support is received in the same way for different life experiences. Responses to support are moderated by culture, general health, social determinants of health, and perceptions of the individual (Gottlieb & Bergen, 2010). There are a number of perspectives under the umbrella of Social Support Theory (Coreil, 2001; Lakey, 2000) that address the impact of relationships on stress and health. It is well documented in the literature that there is a positive association between social support and the stress response (J.O. Prochaska & Clemente, 1982; Stein & Smith, 2015; Uchino, Bowen, Carlisle, & Birmingham, 2012). Social support has been associated with a buffering effect of physical symptoms from daily stressors among healthy women (Stein & Smith, 2015). Community-belonging was found to be strongly related to one's ability to change health behaviors (Hystad & Carpiano, 2012).

The influences of poverty impact both adults and children in the community. Early stressful life experiences involving struggles with money were found to influence health across the lifespan via inflammation and dysregulation within the immune system (John-Henderson, Stellar, Mendoza-Denton, & Francis, 2015). This immune response was found to become activated in young adults placed in unsupportive situations compared with young adults who did not perceive to be of low SES in their childhood (John-Henderson et al., 2015). Alferi, Carver, Antoni, Weiss, and Durán (2001) examined the relationship between emotional and instrumental

social support and pre-surgery versus post-surgery distress in low income Hispanic women during treatment for breast cancer. They found that support from the spouse and women family members differed. Prior to surgery, instrumental support from spouse and emotional support from women family members both predicted less distress. Alferi et al. (2001) also found that distress could erode support from women in the family. Pre-surgical stress predicted less instrumental support after surgery, post-surgical stress predicted less instrumental stress at three months, and less emotional and instrumental at twelve months.

A sense of community, feeling supported and a part of the community, have been found to buffer the physiological effects of stress (Peterson, Speer, & McMillan, 2008). The exchange of social support may also strengthen a community to develop resources to improvement the environment, what is called social capital (Heaney & Israel, 2008). Yet, there is a segment of the population that enjoys more opportunities, more social capital, and more resources, and policy makers are included in this group. It is a responsibility to use this power to take action on health inequity to bring about change (Schofield, 2007). All levels of our society need to work together to address the challenges of health and well-being (Bircher & Kuruvilla, 2014).

In Complementary and Integrative Health and Whole Systems Research, the relationship between practitioner and patient is considered of primary importance (Cheryl Ritenbaugh, Verhoef, Fleishman, Boon, & Leis, 2003). Social support, whether emotional, appraisal, or informational, may be associated with these relationships and create a perspective shift in non-specific outcomes of CIH. In the natural healing center of this study, there is a conscious attempt to build a sense of community. This is manifested by additional educational programs and groups that are specifically intended to build social networks.

Cultural Awareness. This study will be conducted in the Latino community. There is a

gap in understanding related to the use of CIH in the Hispanic population as it is reported that only 22% of non-White Hispanics used CIH in the most recent national survey (Clarke et al., 2015) but 67% of clients in the natural health center utilized in this study identify as Hispanic. CORE El Centro has created a culturally competent environment with bi-lingual staff and practitioners, interpreters when needed, a peaceful ambiance, involvement with the community in the development of assessment tools and Community Health Worker training. What is the significance of providing services in a culturally competent, economically accessible manner? Valle (1986) examined social networks within Hispanic communities and found distinct (to the culture) networks and interactions at work. The networks included kinship, aggregate (community at large), and 'linkpersons' (people who created connections between others). Interactions, placed upon an axis, were identified as friendship (lateral) and instrumental (vertical). Friendship was found to be more stable but did not predict social support (as seen above in the study by Alferi et al. (2001)). Instrumental interaction was a determining factor in social support. Roman Valle placed individuals called *servidores* along the instrumental axis. His description was similar to that of the Community Health Worker today, whose umbrella goals are to provide support as people navigate better health. CORE/El Centro is engaging Community Health Workers as bridges to integrative health.

Social Determinants of Health

The Meikirch Model of Health from Switzerland states "Health is a state of well-being emergent from conducive interaction between individuals' potentials, life's demands, and social and environmental determinants" (Bircher & Kuruville, 2014). In the study of stress responses to life's demands, resiliency appears to be a critical component that is rarely discussed in the physician's office (Fricchione, 2014). Yet, stress has been found to contribute to a myriad of



Figure 2. Five Key determinants for Healthy People 2020 Initiative (ODPHP, 2016)

diseases that are in turn stressing the nation’s health systems (Abegunde, Mathers, Adam, Ortegón, & Strong, 2007). The Office of Disease Prevention and Health Promotion has created Healthy People 2020 to promote good health for all (ODPHP, 2016). The advisory committee has deemed five areas critical to the health of the nation (Figure 2). While all 5 areas are indeed critical for a healthy nation, this study will focus on three of these areas

including economic, health and health care, and the social and community context. These three areas are all impacted by each other both positively and negatively.

The costs of chronic health conditions affect economics of both individuals and communities and to increase attention to psychological and physiological potentials of individuals with chronic conditions will begin to heal the divide (Bircher & Kuruvilla, 2014). Highly controversial, and deeply tied to economics, is the spending of government dollars by private pharmaceutical companies, not only for new drug research, but marketing and lobbying as well (Citizen, 2001). Advertising budgets have increased over 40% since 1997 and pharmaceutical federal lobbying amounted to \$262 million in 2000 (Citizen, 2001). In 2014, pharmaceutical companies spent over \$249 million in lobbying efforts, and contributed nearly \$32 million to political campaigns (Lazar, 2015). Clearly, these economics, policies, and regulations have not changed between 2001 and 2014. It is outside the scope of this study to examine the intricacies of the relationship between the U.S. National Institute of Health,

pharmaceutical companies and the public's reliance on a quick fix for conditions that could be remedied by a change in lifestyle or environmental improvements. But Complementary and Integrative Health stands in opposition to the pharmaceutical companies when practices that engage the natural healing properties of the body may reduce the need for drugs, particularly for conditions that are associated with stress. As stated previously, 4% of the NIH budget is allocated to NCCIH, with another 6% allocated within other departments for a total of 1% of the annual budget. This is an economic inequity. The call from both public and private sectors of medical health is that there is not enough research based evidence to promote CIH. Yet, additional research dollars are not allocated into CIH for quality trials.

Currently, many individuals cannot afford CIH services as a maintenance or prevention measure as services are generally not covered by insurance companies or Medicare. CIH is primarily an out-of-pocket expense and the most used services average \$40 (chiropractic), \$62 (massage), \$72 (acupuncture) and \$105 (naturopathy) per treatment with the average number of treatments per year ranging 2-5. Cost may explain why the demographic that most uses CIH is white, educated and reports higher incomes. Reasons for using CIH are generally for 1) pain related issues not well treated with conventional medicine and 2) enhancing health and preventing disease (Hawk, Ndetan, & Evans, 2012). As demonstrated in the literature review, treatments of CIH often result in feelings of relaxation, peace, and decreased pain with few, if any adverse effects. If longitudinal studies of CIH use were financially supported, would researchers find significant physiological changes in stress hormones over time? Is there a possibility that long-term use of CIH services could alter our neurological and physiological processes? And if these processes were altered, might people be able to think more clearly about other health behavior choices that would have an additive factor? If CIH were covered by health

plans as drug treatments are covered, would more individuals use CIH? It is hoped that a retrospective examination of 24 months of CIH use will offer some insight into the possibility that CIH services offer much more than a placebo effect.

Community Health Workers (CHWs). Community Health Workers have been assisting people in navigating health systems for 60 years (Singh & Sachs, 2013). Where once they were lightly trained and utilized primarily for community education programs, today they navigate social-care problems, health promotion, gather data, improve communication, and improve efficiency within health systems (M. Harris, 2013). Demographically, Community Health Workers (CHWs) are similar to those they are serving both culturally and economically. CHWs are rarely research partners (Pinto, da Silva, & Soriano, 2012), but they are becoming a topic of research themselves (Ghorob et al., 2011; Goldman, Ghorob, Eyre, & Bodenheimer, 2013; Heisler et al., 2009). Three studies examined the effectiveness of CHWs as peer coaches for patients with diabetes.

Ghorob et al. (2011) conducted a RCT examining diabetes clinical outcomes, self-efficacy, and self-care activities in poorly-controlled patients who received peer coaching with those who received usual care over a six-month period in San Francisco. They recruited 400 patients and trained 21 CHWs who also had diabetes. After six months, the diabetes patients who received peer coaching reduced their blood sugar levels significantly. Goldman et al. (2013) conducted qualitative interviews with the peer coaches in Ghorob's study to explore their perspectives and experiences being a coach. Three themes emerged in their roles; advisor, supporter, and role model. They recounted beginning with social support, building trust and reassuring the participants. They problem-solved challenges and educated participants regarding the many facets of diabetes and self-care. The peer coaches reported feeling empowered by the

experience. Heisler et al. (2009) conducted a qualitative study in Detroit with 40 participants from a successful CHW led diabetes self-management program. Prior to the program, participants reported being dissatisfied with the information received from their doctor regarding care for their diabetes. They attributed this to the time constraints on the parts of the doctor. Participants reported feeling supported and that they received valuable information from the CHWs on how to manage their diabetes. They also noted that they didn't realize how much they had not known about caring for their diabetes before engaging with the CHWs.

One explanation for the success of CHWs is 'praxis', their ability to "combine indigenous and technical knowledge, overcome personal and environmental challenges and impact patient outcomes" (Pinto et al., 2012, p. 940). Pinto et al. (2012), from Brazil, found that not only do CHWs inform patients about disease self-management, they also teach medical staff about the challenges of the patients. CHWs are part of the fabric of healthcare in Brazil. A community clinic will have one physician, one nurse, and 15 CHWs. In qualitative interviews, CHWs described themselves as experience-based experts with similar strategies as those interviewed by Goldman et al. (2013). Changes in America's healthcare has created an opportunity for CHWs to step into a larger role and sustainable employment (Bovbjerg, Eyster, Ormond, Anderson, & Richardson, 2013). Bovbjerg et al. (2013) have outlined a number of workforce issues to consider including "professionalizing" of the role, which risks a shifting of alliance to the health care system away from the patient. This would signal a significant shift away from the connection to community, of primary importance as a CHW, and one of the values listed from participants receiving services. As the roles of CHWs are defined, it is clear that America's Affordable Care Act wants to invest in CHWs as they are included 14 times in three sections of the Affordable Care Act provisions (Bovbjerg et al., 2013).

In summary, a biopsychosocial model of care creates an opportunity to examine the relationship between patients and the health care system. Beginning with the dissatisfaction of the biomedical model to treat the psychosocial variables in medicine to the expansion into other health fields, the model provides a place to bring a convergence of ideas to an intervention that meets the needs of the whole person. Comprehensive health care needs to be proactive in determining where a patient lies on the TTM continuum of stages. Health care professionals need to provide information regarding contextual, network, and social support in the local community. Community health workers have the ability to bridge traditional care with services in the community and can do so with cultural competence. Policy and political arenas will be required to take a look at the resources and open the gate to more prevention and maintenance beyond drugs which carry any number of side effects and negative interactions, including CIH services.

Reductionist strategies such as randomized control trials assume there is an “active ingredient” to be isolated from social and environmental factors for identification and seeks the direct cause-effect relationship. From the long history of systems models, has emerged a Whole Systems Research Model of complementary and integrative health which sees health as a complex function of an individual’s actions with his or her internal and external environments, including multiple health care systems (Marja J. Verhoef et al., 2005). Systems theory at the basic level involves interdependence or the complex interplay of a number of parts and whole systems research implies a non-linear relationship between factors (Wade, 2015) that encompass the individual and the world around.

The New Paradigm

Whole Systems Research (WSR). The concept of Whole Systems Research (WSR) for study of Complementary and Integrative Health (CIH) was formally discussed in 2002 at a

roundtable discussion of leaders in CIH from around the world. It is a model being developed by scientists, researchers, practitioners, and users who are engaged in complementary and integrative health medicine. After the first roundtable, Cheryl Ritenbaugh et al. (2003) developed a set of key research issues to be developed to move Whole Systems Research forward (Table 3).

Table 3

Key Research Issues within Whole Systems Research

1. Appropriate designs and analysis strategies
2. Study of the interaction of patients and practitioners
3. Healthcare Environment
4. Understanding and measuring CIH diagnoses and treatment decisions
5. Choice of study outcomes

Whole systems researchers recognize that the perpetual themes of weakness in CIH research may not be the subject matter, but the methods

themselves. Outside of a controlled environment, complex and pressing problems create confounding variables (Epstein, 2010). The classic randomized control trial philosophy to determine a single best treatment for all patients (Cheryl Ritenbaugh et al., 2003) runs counter to the philosophy of complementary and integrative health (CIH) practices.

The challenge is to envision components of an intervention as a network, meaning none of the components can be isolated (Marja J. Verhoef et al., 2005). The objective of the RCT is to minimize interference, to isolate all other factors to study specific biomedical endpoints. Isolating one variable is not just extremely difficult in the study of CIH, it is often undesirable (Cochrane & Possamai-Inesedy, 2012). The objective of Whole Systems Research (WSR) is to include those variables that cause interference. Following the logic of Temoshok’s work in biopsychosocial oncology, the conventional hypothesis of ‘Treatment A produces Health Benefit Y’ is replaced with ‘Treatment A, in conjunction with b, c or d, produces Health Benefit Y’ (Temoshok, 2004; Marja J. Verhoef et al., 2005). The cause/effect ideology is the residue from early clinical trials in cellular research, independent of socially constructed realities (Price, 1992) and is limiting in the study of complex systems (Marja J. Verhoef et al., 2005). Model validity of

WSR will include appropriate designs that capture changes in complex adaptive systems without the need to isolate the parts of the system. This challenges the RCT assumption of specificity and internal validity (Walach, Falkenberg, Fønnebo, Lewith, & Jonas, 2006).

The patient-practitioner relationship is considered to be a potent force in treating the patient (Epstein, 2011; Ezzo, 2007; Kaptchuk, 2002) and deserves a more significant place in research (Sutherland & Ritenbaugh, 2004). This is true in both conventional and complementary medicine (Fønnebo, 2015). Although face-to-face time with conventional physicians has decreased to an average of 18 minutes per visit (Gottschalk & Flocke, 2005), this does not seem to be the most significant factor for patient satisfaction as it relates to the relationship (Marja J Verhoef et al., 2004). Ernst (2012) suggests that CIH proponents imply that the patient-practitioner relationship is unique to CIH, forgetting that tenants of treating the whole person, feeling understood, and deserving time are also central to conventional medicine. Yet, in a qualitative study asking why patients continue to use CIH, they cite the relationship with the practitioner and feeling empowered most often (Felicity L Bishop, Yardley, & Lewith, 2010). An important consideration is the overall amount of time spent with CIH practitioners in the course of a treatment. It is simply easier to develop a bond with someone when being seen an hour a week or more over weeks or months. It is possible that our health care systems and not necessarily our physicians are playing a role in perceived dissatisfaction with conventional practitioners.

Forrest, Shi, von Schrader, and Ng (2002) examined the patient-physician relationship through the lens of the managed care system that has emerged in the United States. They suggest that there are a number of points along the continuum that could impact the relationship. This includes a forced choice of primary physicians that both restricts and decreases continuity as

employers shift plans to reduce costs, sometimes more than once a year. Second, primary physicians act as gatekeepers to specialists, but according to rules of a managed plan. If access is limited, patients may incorrectly blame the physician. This may also be perceived by patients as a physician's inability to advocate for the patient. Those patients who had no insurance reported the most dissatisfaction with physician relationships. Developing measurement tools appropriate to CIH outcomes that reflect patient-practitioner values is a key issue. A factor not yet prevalent in the literature is the environment itself as a key component (Hsu, Bluespruce, Sherman, & Cherkin, 2010). CIH practitioners consider environment and ambiance to be an aspect of their service and strive to create environments that are quiet and have a sense of peace and support.

In the shifting landscape of health care, Integrative Medicine programs are increasingly co-located in traditional health care systems (Ostermann et al., 2013). Integrative Medicine has been defined 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” (Hugh MacPherson, Peters, & Zollman, 2009). This represents bringing whole systems practices into traditional settings, where patients can explore complementary treatments when conventional interventions are not providing results or to manage the symptoms brought on by medical interventions (C. Johnson, 2009; Cheryl Ritenbaugh et al., 2003). This extends the possibilities to conduct long term naturalistic studies as patients are located in one environment (Park, 2012). Physicians and CIH practitioners have opportunities to collaborate, and both specific physical effects and emergent outcomes may be tracked (C. Johnson, 2009). Integrative centers, often within medical centers, with more resources, more access to University personnel, and patients with more disposable income have

the opportunity to be the evidence-based research facilities and increase the efficacy of CIH services.

The Bravewell Collaborative study was initiated to understand the use of Integrative Medicine centers in the United States. The intention was to capture information from Integrative Medicine to advance the field. Twenty-nine centers offering consultative, comprehensive and primary care from around the United States were selected to participate. The centers employed physicians, massage therapists, meditation instructors and acupuncturists most often and 93% provided individualized treatment plans for 20 clinical conditions. Conditions most often reported were chronic pain, GI conditions, depression, stress and cancer. Analysis revealed a significant concordance of interventions for treatments across centers. This provides good information for future natural health prescriptions (Horrigan et al., 2012b). This collaborative did not capture community-based centers or private practitioners and required sophisticated database systems from which to pull the information.

Whole Systems Research places importance on emergent outcomes that may be important to patients but often go unnoticed or are dismissed by clinicians and researchers (Thompson et al., 2011). In the past, outcomes that were not specific to the aims of the RCT were called non-specific and often included quality of life aspects that are very important in the everyday world (Malm, Fedovskiy, & Eberhard, 2009). People with chronic conditions such as diabetes (Dham, Shah, Hirsch, & Banerji, 2006), arthritis (Rao, 1999; Ünsal & Gözümlü, 2010), fibromyalgia (Hardy-Pickering, Adams, Sim, Roe, & Wallymahmed, 2007), and residual effects from cancer (Frenkel, Sierpina, & Sapire, 2015) are using CIH approaches to reduce symptoms regardless of the research-based evidence. This is an opportunity for the research community to find upstream methods of evaluation, perhaps looking patterns of outcomes (Elder et al., 2006),

to health that have been challenging to study empirically (W. Huang et al., 2013).

Practice-based research (PBR). Practice-based research is a model that engages practitioners across disciplines to participate in research (H. MacPherson et al., 2008) to bridge the gap between practice and research (Epstein, 2015). For some this simply means that practitioners model their practice after evidence-based research to determine if it translates to the real world (Santos & Santos, 2015). Epstein (2015) refers to this as a pipeline, with information moving in one direction. His alternative is a highway, where information can run in both directions. Irwin Epstein (2010) has dedicated his career to the development of a practice-based research model for social workers. This is a practical model to apply to CIH research in a community-based setting that supports bi-directional education of practitioners and researchers.

The framework of Whole Systems Research, described as non-hierarchical, networked, cyclical, flexible and adaptive (Marja J. Verhoef et al., 2005) is suited to research in the community with a practice-based research model. Research at the community/practitioner level is complex. Practice-based research is an opportunity to engage practitioners, users of CIH and researchers to strengthen not only the community, but find the best way to conduct research without sterilizing the environment. Community-based participatory research engages the community support which enhances quantity and quality of data (Viswanathan et al., 2004). Practitioner directed protocol development brings an authenticity to individualized care protocol and the practitioner/client relationship to direct the course of dosage, frequency, and type of CIH service (Walach et al., 2006) that will yield results relevant to the practitioners (Barkham, 2014; Epstein, 2011). This framework will engage the CIH practitioners through participation in determining research questions, co-creating better tools to capture change, and designing prospective studies with researchers as partners (Barkham, 2014).

Few longitudinal studies of CIH approaches currently exist (Bishop & Lewith, 2008). Community-based, practitioner driven research is an ideal fit for longitudinal studies in the natural environment (Santos & Santos, 2015). Change within a complex system (being a human living in the world) needs a longer period of time to study than used in most conventional clinical trials (C. Ritenbaugh et al., 2010). Longitudinal studies are required to track meaningful changes (Park, 2013) in self-reports of well-being, especially in clients with chronic conditions. It is generally not the philosophy that CIH practices will cure chronic conditions, but will help manage the symptoms, provide relief, and bring a sense of peace and relaxation (Fønnebø et al., 2007). At one time, these were considered the non-specific or placebo effects and dismissed. Today, we know that producing a relaxation response may alter stress hormones and over time may shift the allostatic load closer homeostasis. The complexity lies in the individuality of the person receiving treatment. Community based natural healing centers with practitioners willing to engage in research is the ideal location to take a long look at the natural trajectory of improved health. Communities offer the opportunity for longitudinal research. When community health centers are part of the fabric of a community, they can mobilize community members.

Emergent outcomes. For the individual, outcomes of their experience can be quite personal. Many people seeking CIH services suffer from chronic conditions or illnesses requiring extensive medical intervention, such as cancer. This population is seeking relief from symptoms or an alternative to medications (Kakai, 2013). Chang, Wallis, and Tiralongo (2012) interviewed 326 people with type 2 diabetes about CIH usage. They found that prior to diagnosis about 22% of the sample reported using CIH services. After diagnosis, those reporting CIH use increased to 61%. Ünsal and Gözümlü (2010) conducted a cross-sectional study of CIH use by patients with arthritis and found that 76% of this population had used at least one form of CIH in the previous

year. Using long term studies of populations with chronic conditions provides opportunities to find patterns of outcomes and dynamic interactions of change in presenting conditions and global (whole system) improvements (Elder et al., 2006).

Leading researchers in Whole Systems Research of CIH have developed a retrospective assessment tool called the Self-Assessment of Change (Cheryl Ritenbaugh et al., 2011; Thompson et al., 2011). The Self-Assessment of Change (SAC) was developed to address the non-specific outcomes reported that are beyond biomedical goals and may or may not have been expected. This measurement instrument is designed to measure positive valence, not just the absence of negative states (Cheryl Ritenbaugh et al., 2011). Most patient reported outcomes aim to measure specific symptoms or physical functioning, with less focus on psychosocial components of personal change. Cheryl Ritenbaugh et al. (2011) used ethnographic and psychometric methods to identify emergent outcomes. In Phase I they identified relevant concepts through a search of subjective outcomes in the literature, interviewed individuals who reported transformational experiences with CIH and began to create phrases that represented the descriptions. A second group that also experienced profound shifts took part in a ‘think aloud’ focus group from which 18 pairs of words were created (Thompson et al., 2011). Phase II focused on content validity through five revision processes via cognitive interviews, again with individuals that had experienced significant shifts in well-being following CIH treatments (Thompson et al., 2011). The Self-Assessment of Change has been found valid and reliable and is grounded in lay language. This instrument holds the potential to capture multi-dimensional changes beyond presenting conditions (Appendix A).

Summary

This work is an opportunity to inform the field regarding CIH usage in two populations,

low income and Latino, that are currently under-represented in peer reviewed journals (Hoerster, Butler, Mayer, Finlayson, & Gallo, 2012). Clarke et al. (2015) found that 20% of poor adults versus 38% not-poor adults used CIH. The majority of the population sample in this study is at or below poverty level. CORE El Centro supports social economic justice with payment for services provided using a sliding scale fee based on income and household size. The average payment for a service is \$22 and 80% of clients request a reduced fee. In a secondary analyses of results from the National Health Interview Survey 22% of Hispanics reported using some form of CIH compared with 39% of non-Hispanic whites (Clarke et al., 2015). The current study site, located in a primarily Latino area, reports that 67% of the clients are Latino. This study will provide information regarding the use of CIH services in the low-resource and Latino community when payment for services is a sliding scale fee (from \$11 - \$65) which is determined by household size and income.

This study also addresses a gap in the literature of longitudinal repeated measures naturalistic studies of CIH (Park, 2012). There is a call from the National Center for Complementary and Integrative Health to broaden the scope of study to the “real world” environment (NCCIH, 2016a). Felicity L. Bishop and Lewith (2010) conducted an in-depth review of community based surveys regarding CIH use between 1995 and 2006. They found 97% employed cross-sectional designs, collecting data in one point of time. The current study spanned 24 months in a longitudinal within (changes in assessments) and between subject (level of payments, length of engagement, and number of services) retrospective examination of CIH use in a community based setting with an opportunity for data collection over two or three time points. Finally, this study addressed a new paradigm in the study of CIH. Whole Systems Research with a focus on effectiveness of CIH through community-based research.

The general population is already using CIH regardless of a lack of efficacy (H. J. R. Hoenders, Appelo, & Jong, 2012). CORE El Centro has created data collection tools from a practice-based research framework (Epstein, 2010). The tools used and methods followed were developed by the practitioners, staff, and community members. All treatment plans were individualized. Protocol and standards were based on professional guidelines within each discipline, not research objectives. This study examined data that has been collected for professional and organizational use.

Aim One of this retrospective research study was to describe service use and examine the subjective responses and basic biomarkers of complementary and integrative health services users in a low-income, primarily Latino community through formal analysis. Alternative hypothesis 1.1 was that individuals who received four or more CIH services would report improvements in physical, cognitive, and emotional health. Alternative hypothesis 1.2 was that changes would improve incrementally as a function of time engaged with CEC and treatment frequency (completing a treatment plan and staying for maintenance).

Aim 2 of this study was to examine patterns of CIH use, general health, health conditions and costs incurred by the clients. The alternate hypothesis was that when payment for services was scaled to household size and income, CIH use would follow different patterns than those found in the most recent population health data (Clarke et al., 2015).

METHODS

Community Clinic Setting and Participants

CORE El Centro (CEC) is a unique clinic setting in its practice of complementary and integrative health serving a low income, primarily Latino population. CORE El Centro is located on the near south side Walker's Point area of Milwaukee, WI. Services are available in Spanish

and English. There are six individual treatment rooms, a 1700 sq. ft. movement studio, a front office, a child activity room, staff offices and staff/volunteer cubicles. During the period of data studied, 12 practitioners, paid contractor or volunteer, provided 60-80 hours of CIH services a week. All practitioners, regardless of being paid or a volunteer, hold all the necessary credentials and licenses with experience ranging from 6 months to more than 30 years. Several staff members are also practitioners. Services available during 2014 and 2015 included energy healing (i.e., reiki, crystal stone healing, reconnection healing), massage (i.e., Swedish, Thai, therapeutic, and cranial sacral), and acupuncture (community and private sessions). CORE El Centro (CEC) regularly offers workshops on a variety of topics, including nutrition, healthy cooking classes, women’s health, Spanish/English language classes, and meditation. Group mind/body fitness classes are offered 2-3 times a day, 6 days a week. This clinic is a volunteer-supported organization. Over 100 individuals a year donate time valued at more than \$300,000 each year.

Table 4
Socio-Demographics for the City of Milwaukee (Latino Milwaukee: A Statistical Portrait)

Socio-Demographics 2015	White Non-Hispanics	Latino/Hispanic
Population %	54%	10%
Native Born		73%
Unauthorized Foreign Born		55%
Gender – M	48%	51%
Composition by Age	↓ % in younger	↑ % in younger
Homeowner	69%	38%
Household - Female Head	4%	16%
Income < \$25K	18%	33%
Poverty Level	8%	29%
Education (HS)	95%	62%
Nonemployment (M/F)	13.7/18/1%	13.7/32%

As outlined in Table 4, Latino/Hispanics comprise 10% of the population of the metro area of Milwaukee. Levine (2016) recently completed a comprehensive study of the current Latino population of Milwaukee. The study found that compared with the white non-Hispanics (which make up 54% of the metro population) 33% of Latinos earn less than \$25K, 29% are

below the poverty level, and only 62% have a high school diploma. While males have a similar unemployment rate to Whites in the city, they are more often employed in lower wage jobs and

female Latinos are unemployed at nearly twice the rate of White females. The Latino population of Milwaukee is comprised of more young people than the White Population.

Records from all CEC clients, 18-95 years old, who received CIH services between January 2014 and December 2015 were utilized for one or more analyses in this retrospective study. During this 24-month period, 1278 unique adult individuals received at least one service at CORE El Centro. Figure 3 details the information available from the total sample including costs, treatments, demographics, and time engagement periods.

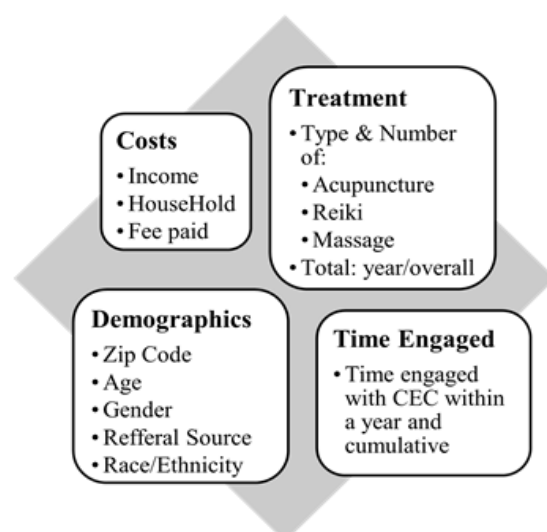


Figure 3. Full sample variables utilized to understand the population served (N=1278).

Table 5
Inclusion Criteria for Sample Sizes of Aims One and Two

Aim One: Changes in Cognitive, Emotional, and Physical Health		
Full Sample N=1278		
4+ Treatments during 24-month period?		
✓		↘
No		Yes
Excluded n=656		Included n=622
Aim Two: Association Between Health Conditions and Ability to Pay on Service Utilization		
Full Sample N=1278		
Completion of at least one Health Assessment during 24-month period?		
✓		↘
No		Yes
Excluded n=442		Included n=836

Table 5 shows the inclusion criteria for sample groups that were created for the Aims of the study. Aim one required that individuals receive four or more services during the 24-month period for a sample of 622 client records. The inclusion requirement of four treatments was determined by analyzing the number of treatments recommended by practitioners. The average was 6.94 with a standard deviation of 3.17. One SD below the mean was 3.77, which was rounded up to four. Aim two required responses from at least one health assessment for a

sample of 836 client records.

Instruments/Measures/Data Sources

CORE El Centro clients are asked to sign an informed consent release for program analysis and evaluation of information collected during their service visits. Information for analysis was collected and recorded in three files utilized by staff at CORE El Centro (CEC): 1) the General Data File, 2) the Administrative File, and 3) the Payment File. The General Data File is the primary source for the consolidation of outcomes information. The Administrative File contains demographics and visit history details. The Payment File contains all scheduled visits (including cancellations) and amount paid.

General data file (prior to consolidation from other sources). The General Data File contained information collected from Integrative Health Assessments, biometric records, and Integrative Treatment Plans. It was the source for the annual consolidation of information. Relevant information from the Administration and Payment Files was imported into the General Data File for use in grant writing and reports to funders, annual reports, and marketing materials. Once organized and reduced, the General Data File is the most complete annual snapshot of the activities of CORE El Centro.

Integrative health assessment (Assessments). Using a Practice Based Research Model (Epstein, 2011; Green, 2008) CEC staff, practitioners, and community members created the version of the health assessment used during this time period. The English version of the assessments can be found in Appendix B1 & B2. All assessments and forms are available in Spanish. Challenges of literacy, comprehension, translation into Spanish, and length were addressed. The result was a unique health assessment. CEC informally tested several iterations of assessments to evaluate changes in physical health, subjective feeling states and perceptions of

personal well-being of clients. Client feedback and focus groups results guided revisions to the assessment that was utilized in 2014 and 2015. The assessment was found to be understood by a majority of the clients (Flesch-Kincaid Reading Level of 6.3), culturally competent, translated to Spanish effectively, and relevant to the natural healing center's objectives. It was not tested for validity or reliability.

Clients were asked to complete a pre-assessment prior to the first session. After each session, clients were asked to complete a post-assessment. Assessments were administered by the staff at the reception desk or practitioners. Clients may have completed the pre- or post-assessment, may have answered all or some of the questions, may have taken it home (and may or may not have returned it), or may have refused to complete one. Volunteers entered the information from assessments into a General Data File Excel spreadsheet.

The pre-assessment requested demographic information including gender, date of birth, address, family income and household size, race/ethnicity, country of origin, and referral source. The post-assessment contained the question of "Have you met your goals?". Both pre- and post-assessments listed 25 physical conditions and requested that clients check all that apply (see Appendix B.1). Examples were cancer, neck pain, weight concern, diabetes, fibromyalgia, women's health issues, Bell's Palsy, etc. Conditions checked were summed for a "total conditions" score. If no conditions were checked, a zero was placed in the "total conditions" column. There was not a "no conditions" choice for clients to check.

Clients were asked to rate their general health "poor", "fair", "good", "very good", or "excellent". These words were later transformed for analysis to 1=poor, 2=fair, 3=good, 4=very good, and 5=excellent. They were asked to circle on a 0 to 7 rating the number of days they had exercised in the previous week. Three questions were used to self-report physical and mental

health over time. These questions are listed in Table 6 and were taken from a Health Survey on the Center for Disease and Control’s website (www.cdc.gov). The exact location of those three questions on the website can no longer be determined.

Table 6

Questions on the Assessment Asking about Health in the Last 30 Days

-
1. Now thinking about your physical health, which includes physical illness and injury: In the past 30 days, how many days was your health not good? _____ Or circle N/A (not applicable)

 2. Now thinking about your mental health, which includes stress, depression, and problems with emotions: In the past 30 days, how many days was your mental health not good? _____ Or circle N/A (not applicable)

 3. During the past 30 days, how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation? _____ Or circle N/A (not applicable)
-

The subjective section of the assessment listed 24 well-being words or phrases. Clients were asked to circle a number 1 to 5, or not applicable (N/A) that best described that aspect in their daily life. In addition to numbers, words were attached to the numbers (1 = very poor, 2 = poor, 3 = neutral, 4 = good, and 5 = very good) and three faces (a frown = 1, a neutral face = 3, and a smile = 5). Examples included, physical strength, ability to cope, happiness, understanding my health, ability to listen to my body, energy level, flexibility, etc. Finally, five items labeled depression, stress, anxiety/nervousness, pain, and nightmares were listed and scaled not applicable (N/A) or 1 = mild, 5 = moderate, and 10 = severe. Faces are also used with a smile face = 1, a neutral face = 5, and a frown = 10. Clients were asked to rate the intensity of each item. Appendix B.2 provides a complete list of words/phrases. There is a section for comments on all assessments that were not included in this evaluation.

Biometrics. CORE El Centro collected basic biometrics of blood pressure, heart rate, and weight prior to each treatment session (see Appendix C for form). Height was also obtained which allowed a BMI to be calculated. Practitioners were responsible for collecting this information and recording it on a “Biometrics” paper form. The collection of this information was inconsistent among practitioners. Clients were also free to refuse to have them taken. Blood

pressure and heart rate was taken with a GE Healthcare, LifeSource UB-521. Practitioners reported the device was not always working properly. Weight was taken from a strain-gauge scale. Information from the biometrics form was entered into the General Data File and the paper version stored in the client files.

Integrative treatment plans (ITPs). Practitioners typically completed ITPs with clients during the initial appointment (see Appendix D for the form). These may have contained referral source, reason for visit, level of pain, goals, and service(s) recommended, including type, frequency, and duration. Clients may have refused to complete the ITP. Clients may have been using services for prevention or general wellness and may not have required an ITP. Integrative Treatment Plans were entered into the General Data File by volunteers when created and then placed in the client files.

Administrative file. The Administrative File held electronic client records (active and inactive) in the Microsoft Windows Access program. Records included name, address, gender, date of birth, dates of services, types of service, and total number of services. This file was maintained by front office staff and volunteers. This file was used to cross check correct name, date of birth, and visit history as it was the most accurate record for capturing these pieces of data. Visit history included type of visit (acupuncture, massage, energy work, or cranial sacral therapy) and total number of visits, including cancellations and “no show” information.

Payment file. The Payment File contained a daily record of appointments (including clients who were “no show”, cancelled the appointment, or filled in for the no show or cancelled appointment), the type of appointment, and fees collected. Information included date of service, name, type of service, payment, or type of cancellation. Each month approximately 5000 rows of information was recorded. This raw data was always retained for cross-checks. Information from

this record was consolidated monthly into a report form to determine programming hours and unique individuals served. This was the most accurate location to determine payments made for services. It was used as a cross-reference for name and visit history.

Procedures

Over nine months, prior to IRB approval, the data from 2014 and 2015 was reorganized as part of this researcher's employment position of Outcomes Coordinator. Each year was organized independently before collapsing into one General Data file for all 24 months. The files were repeatedly cleaned to remove duplicates, missing information was searched for through cross-checking the files and inaccurate information was corrected. Visit history information, including treatment type and frequency, and dates of service was added at the end of each year. The literature has described the challenges of data collection in community-based centers (Horrigan et al., 2012b; Linde, 2009). This data collection was typical of these challenges. The data organization, cleaning, consolidation, and reduction that was necessary to begin to examine this data was extensive. The following is a summary of the process of preparing the data for analysis.

Organization of files. Prior to the employment of the researcher, the data from the health assessments, biometrics and treatments plans was entered and organized by date, not by client. For 2014, each data point was entered into a new row that created 4463 rows of data for 659 unique clients, instead of 659 rows (one for each client). Considerable time was needed to reorganize the data from 2014. In mid-2015, when this researcher stepped into the position, volunteers began to enter data with information for each client in one row. This created 679 rows of unique client data for 2015.

Data cleaning of files. Entry errors in the General Data File in both years were

significant. Unique client totals were reduced by almost 200 in each year after correcting for names (errors included misspelled names, multiple names for one person, first and last names reversed). Date of birth was often missing in the General Data file, as were completion dates of assessments and treatment plans. Corrections were made by cross-checking the names, IDs, and birthdates from the Administrative File. There were considerable missing values in the health assessments. All missing values were coded with a 99, to differentiate those who didn't answer a question with those who didn't complete an assessment at all. If no conditions were marked from the health assessments, the blanks were considered a no to the condition and a zero was added to denote "no".

The administrative file was the most accurate for names and dates of birth. The visit history section was completed in the beginning of each week and reflected appointments that were scheduled. If a client did not complete the session, it was supposed to be noted in the visit history. This was not always changed and the Payment File was used to cross-check for "no shows" and cancellations providing a more accurate visit history for each client.

The payment files also contained entry errors including misspelled names, multiple names for one person, first and last names reversed, missing payments, and no treatment type or program information. The Administrative File was used to cross check names and treatment type (acupuncture, massage, or energy work). If a client received more than one treatment in the year, the payment received could be found in the payment file, as it had records of all treatments. If no information was found, the front office staff could generally find that information.

Data consolidation. The reorganization of the data was completed at the end of each year as information from the Administrative and Payment Files were consolidated in the General Data File. Several columns in the General Data File were dedicated to information from the

Administrative File. This included 1) date of first service ever, 2) date of first service in that year, 3) date of last service in that year, 4) total number of treatments during that year, 5) total number of treatments ever, and 6) frequency of each type of treatment during that year. With dates of service information entered, the client's age was calculated, as well as total time engaged in the year and total time engaged ever. From the types of treatment received columns, a column for total types of treatments was completed.

The average payment received from each client was retrieved from the Payment File and recorded in the General Data File. There were considerable missing values for household income, so the Sliding Scale Payment table was used to estimate the annual income of each client and added to the General Data File. Clients that did not complete assessments or Biometrics were identified by the Payment File. The Payment File was merged with the General Data File. This created duplicates for those records that were already in the General Data File. Duplicates were removed and the remaining names were cross-referenced with the Administrative File to add date of birth, gender, and visit history information (dates of service, type, frequency, and total number of treatments).

The above processes were completed for both years independently. Once the files were complete, 2014 and 2015 General Data Files were collapsed into one file for this research project. The consolidation created 292 duplicate records consisting of clients who were engaged for both years. Each of these duplicates were merged into one row. If more than three Health Assessments were completed between years, dates were used to maintain the first assessment, last assessment and the assessment dated closest to the middle. If more than two biometric readings existed, the first and last within the 24-month period were used. At this point, all records of clients less than 18 years of age and those records without a date of birth were

removed. The data was de-identified by giving each record a study specific ID, beginning at 1. The following identifiers were removed from the General Data File: CORE El Centro client ID, first and last names, date of birth, dates of services, dates of assessments, dates of integrative treatment plans, and zip code.

A “Determination of IRB Submission” form was completed and an Exemption Waiver was granted by the University of Wisconsin – Milwaukee Institutional Review Board (2.16.2016). The de-identified copy of the data was then used for analyses purposes, and per the IRB, the records with identifiers were copied to a flash drive and removed from CORE El Centro’s file system. Variables approved for use are located in Appendix E.

Data reduction and reorganization of de-identified general data file. The new General Data File was still a very large data set with 1278 records and 228 columns of potential variables of interest. Data elimination decisions were made to make the data more manageable. The original dependent variables of highest interest included: 1) general health responses, 2) “last 30 days” responses, 3) health conditions, 4) exercise responses, and 5) well-being responses from the Assessment. Biometrics including: 1) BMI, 2) heart rate, and 3) blood pressure readings. The original independent variables of interest included: 1) length of engagement, 2) treatment frequency and 3) types of treatments (acupuncture, massage, energy work, and cranial sacral therapy) received. Sociodemographic information including age, gender, race/ethnicity, estimated annual income, household size, and payments for services was retained. The health conditions section of the Assessment contained 25 possible condition responses. A decision was made to remove the individual health conditions and retain only the “total health conditions” column. This decision was later reversed and the checked conditions responses items were retrieved from the IRB approved master de-identified General Data File. The recommended

treatment frequency from the treatment plans was retained for possible use in analysis. Referral information was summarized and then removed from the data set.

Table 7
The Reorganization of Assessment Times. Items in Grey Were Moved Over to "Mid-Assessments"

ID	Initial Assessment 1	Mid Assessment 2	Final Assessment 3
1	x	x	x
2	x	x	x
3	x		← x
4	x		
5	x		← x
6	x		← x

Data reorganization. Prior to deidentification, the health assessments had been recorded by date. If there were three assessments, they were recorded by date: first, middle, and last. If only two assessments were completed, they were treated as first and last and were recorded with a blank in the middle section (see

record numbers 3, 5, and 6 in Table 7 as an example). For all records with no mid-assessment but having a final-assessment, the final assessment responses were moved over to the mid-assessment location. In Table 7, that movement can be seen in records 3, 5 and 6. This was completed with syntax in SPSS23. This same procedure was completed with the general health response columns and total conditions columns.

Within the well-being questions, 24 items were rated 1-5 (5 being very good) and five items were rated 1-10 (10 being severe). The five items that were rated 1-10 were transformed so that a response of '10' became "mild" in rating. Total time engaged with CORE El Centro had been calculated in "year" increments. This was changed to months to match length of engagement for the 24-month period.

Several categorical independent variables were created for use in the descriptive analyses. One transformation of the treatment variables included creating groups of treatment frequency (1=1-3, 2=4-6, 3=7-9, and 4=10+ treatments) over 24-months. Within each type of treatment, the same treatment frequency groups were created with the addition of a 0=0 group. Length of engagement during the 24-month period was split into four groups (1=0-6 mo., 2 = 6.01-12 mo.,

3 = 12.01 – 18, and 4=18.01 – 24). Two groups were created from the time engaged ever including four groups (in months) of (0, 1=1-30, 2=31-60, 3=61-99, and 4=100+). A second grouping consisted of two groups (in months) of 1=1-30 and 2=31+. The five-group variable regarding completion of an integrative treatment plan was reduced to a 4-group variable composed of 0=no, 1=yes, 2=no plan, and 3=not enough information. Exercise responses were reclassified into a three-group variable (1=low, 2=medium, and 3=high). A four-group variable of reported health conditions was created (0=0, 1=1-2, 2=3-4, and 3=5+). To obtain a more complete composite of the economic aspect of the population, an estimated income level variable was calculated for the missing income data using payments recorded and CORE El Centro's sliding scale fee table. A three-group payment variable was created from individual payments (\$0-20, \$21- 30, and \$31-65. Appendices G.1 - G.3 offer a detailed view of frequencies for each group of variables created.

The final step in reorganization was the creation of three “Visit” variables (Visit 1, Visit 2, and Visit 3). The time factor used to determine visits was “length of time between assessments” variables. The original variables were created from the actual dates located on the assessments and consisted of the time (in months) between assessment one and assessment two and assessment one and assessment three. The first visit contained “0 months” and was tied to responses from assessment one. This was done to put all records in a beginning time point regardless of actual start date. The length of time between assessment one and assessment two was transformed to visit two and was tied to responses from assessment two. The length of time between assessment one and assessment three became the third visit and was tied to responses from assessment three. The visit variables allowed the data to be reconfigured from a wide view format with all responses for a record on one line to a long view with responses from (up to

three) different time periods on unique rows. To utilize the Biometric readings in the long form, one set of dummy variables for BMI, heart rate, and blood pressure was created for Visit 3. Both the long view and the wide view formats were used for analysis.

Data reduction. A missing values analysis confirmed a high number of missing values across the records. Appendix F contains a complete table of missing values showing percent missing in the variables of interest ranged from 22% to 86%. The missing values for the responses to the “mental/emotional health in last 30 days” questions (see Table 6, p. 62) were high over all three time periods (assessment one - 55%, two - 70%, and three - 86%). Because of the high frequency of missing values from the “last 30 days” questions, and communication from the staff at CORE El Centro that these questions were confusing for clients, they were excluded from analysis. There was a trend of increased missing responses overall from assessment one to assessment three (37%, 51%, and 72%, respectively). Although the percent of missing values was significantly above the cut-off of an “acceptable” amount (2%), Little’s test of Missing Completely at Random was not significant (Chi-Square = 3192.91, DF = 4019, $p = 1.00$), meaning missing values were determined to be missing completely at random. The mean responses to “number of days of exercise in the previous week” across the three assessments were $M = 2.40$ ($SD = 1.90$), $M = 2.46$ ($SD = 1.81$), and $M = 2.44$ ($SD = 1.9$), respectively. These variables were combined for an average exercise response and this variable was included the sample characteristics.

A principle component analysis was performed to reduce 93 dependent variables into a more manageable set of interpretable variable constructs. The first assumption of this analysis required that the sample was adequate and that the proportion of communality among variables was high. The Kaiser-Meyer-Olkin measure of sampling adequacy was .945 and Bartlett’s Test

Table 8

Rotated Component Matrix^a for Original Variables of Health and Well-Being

Items	Components and Associated Communalities				Comm.
	1	2	3	4	
Strgth1			0.810		.776
Breath1	0.400		0.579		.570
Energy1	0.465		0.693		.749
Flex1	0.437		0.685		.682
Med1				0.636	.537
Sleep1b	0.584		0.374		.534
Weight1b	0.487		0.439		.519
SEstm1	0.819				.758
Happi1	0.759				.697
Social1	0.714				.592
Spirit1	0.798				.695
BdyComf1	0.673		0.456		.701
ThinkPos1	0.812				.753
BP1	0.311			0.788	.759
Relation1	0.646			0.330	.625
Eating1	0.628			0.423	.649
Cope1	0.814			0.302	.779
BS1				0.823	.771
EmotHlth1	0.829				.781
UdrstHlth1	0.621			0.377	.598
BodyList1	0.729			0.308	.692
Focus1	0.662		0.325		.575
Resource1	0.627			0.392	.574
Finances1	0.665			0.444	.654
Depress1		0.881			.824
Stress1		0.884			.794
Anxiety1		0.897			.821
Pain1		0.731			.601
Nghtmar1		0.610			.406

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.^a

a. Rotation converged in 6 iterations.

Bolded items were retained in the Component

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.945
Bartlett's Test of Sphericity	Approx. Chi-Square	6667.599
	df	406
	Sig.	0.001

of Sphericity (communality) was significant at $p = .001$ (Table 8). The table of

communalities revealed that each variable was accounted for by the new factors by at least 40% (see "Comm." Column in Table 8).

Four factors had an eigenvalue of greater than one and together they explained 67% of the total variance (Appendix H). This was confirmed by the scree plot (Appendix H).

Although the Varimax rotation converged after 6 rotations, factors did not converge into a simple structure. Fifteen of the variables loaded onto two factors. Forcing the variables to load onto two or three factors did not create a simple structure, so a decision was made to keep all four factors and make choices to move variables that loaded onto more than one factor into the factor with the highest loading (Table 8), with one exception. The variable "Comfort in my Body" (BdyComf1) loaded higher on Factor One (what became the Cognitive Health Factor), but was placed into Factor

Three (what became the Physical Health Factor). This was done because in the Spanish speaking clientele (nearly 70% of this sample), this question is more literal in nature, and taken to mean how comfortable is their physical body. The final four factors, Cognitive Health, Emotional Health, Physical Health, and Medical Health accounted for 45%, 13%, 4.5 % and 4.4 %, respectively, of the variance.

Table 9

The New Health Factors with the Number of Responses Required for Inclusion, and the Original Response Variables Nested Within

New Factor	Original Variables
Cognitive (required 10 of 15 possible responses)	Self Esteem, Happiness, Social Participation, Spiritual Well-being, Ability to Think Positively, Health of Relationships, Eating Habits, Ability to Cope, Emotional Health, Understanding my Health, Ability to Listen to my Body, Concentration and Focus, Use of Community Resources, Ability to Manage Finances, Sleep
Emotional (required 4 of 5)	Depression, Stress, Anxiety/Nervousness, Pain, Nightmares
Physical (required 5 of 6)	Physical Strength, Ease of Breathing, Energy Level, Flexibility, Weight, Comfort in my Body
Medical (required 2 of 3)	Client <i>perceptions</i> of their Blood Pressure, Blood Sugar Level, Medication Level

To improve the robustness of the sample sizes within the factors, a conditional mean was imposed on each factor. Inclusion was determined by a minimum number of responses in a record to the variables within the factor. For example, fifteen variables loaded onto Factor 1, Cognitive Health. For a record to be included in Cognitive Health, a response was required for at least 10 variables. Factor Two, Emotional Health, required responses on a least four of the five variables. Factor Three, Physical Health, required responses on five of six variables. Factor Four, Medical Health, required responses on two or three variables. The Medical Factor represented the subjective responses of the client's *perspective* of their health conditions, not the actual state of their biomedical health status indicators. Table 9 provides the new factor names, the conditional means imposed for each factor, and the original variables nested within each factor.

Data Analysis

The data was examined for trends and patterns through three descriptive analytic

methods: spaghetti plots, scatter plots, and cross-tabulations. Variables of time (24-months and cumulative), total Health Conditions reported, total number of treatments used, types of treatments used, and the Health Factor and General Health scores were manipulated in different combinations. To manage the amount of missing data, all dependent variables from the assessments were treated independently. This allowed for a record that may have been excluded from analysis of the Cognitive Health Factor (due to too many missing values), for example, to still be included for analysis of the Emotional Health Factor.

Spaghetti plots. These were created for Cognitive Health, Emotional Health, Physical Health, Health Conditions, and General Health with time in months on the x-axis and the scores for each assessment of the dependent variable on the y-axis. A line connected each assessment completed, creating a visual representation of trends of change for the sample. Additional series were run after splitting the sample into groups by 1) treatment frequency (24-months), 2) treatment frequency (cumulative), 3) total types of treatments used, and 4) each type of treatment by frequency for a total of 35 Spaghetti Plots for each of the dependent variables. Both Loess and Linear lines of trend were inserted to assess trends. The Loess line provides a smoothing of changes that are not linear in nature and can curve with subtle changes. Linear lines also provided a corresponding confidence range in which most the cases fell.

Scatter-plot diagrams. These were created using the Aim One sample ($n=622$) of four or more treatments. These diagrams were used to visually explore the dependent variables over time. Time (24-months) was placed on the x-axis with the change scores from the Cognitive Health, Emotional health, and Physical Health Factors on the y-axis. A Loess line and a linear line with confidence intervals were inserted into each diagram to assess trends of change.

Cross-tabulation tables. These were created using the full sample to explore the

direction of response changes between visit one and visit two of the General Health and Total Health Conditions dependent variables. Additional tables were created with the same variables after splitting the sample into groups by 1) number of treatments in 24-months, 2) total treatments ever, and 3) payment groups. McNemar chi-square association tests were used to examine directional change toward better General Health Scores and fewer Total Health Conditions. Somer's *d* test of association was used to compare Total Health Conditions and payment levels.

Paired sample t-tests. These were completed using the Aim One sample ($n=622$). A series of t-tests were run comparing General Health responses, Total Conditions, and each of the four Health Factors from assessment one and assessment two, assessment one and assessment three, and assessment two and assessment three. A second series, using the same assessment combinations, was completed for each of the Health Factor change scores. In all the series, every pair, except Total Conditions, was “flipped” so that positive changes would be reported as positive integers. A t-test was conducted comparing the Biometric Health Status Indicators from first and last set of readings. A t-test was conducted with an inclusion criteria of five or more conditions only for Aim Two analysis. The Shapiro-Wilk test of normality and Box Plots were used to test for normality and possible outliers. A point estimate and confidence of the mean difference was calculated along with the statistical significance and Cohen's *d* effect sizes. A total of 27 paired sample t-tests were completed for six dependent variables. A significance level of $p = .05$ was chosen and Bonferroni correction was utilized changing the significance required for all t-tests to $p = .008$.

Results

Sociodemographic Characteristics

This study offered insight into Complementary and Integrative Health (CIH) service use in a population unique not only because of its demographics (low income and Latino), but also in the amount and type of CIH use. During the 24-month period assessed, 49% of clients used four or more CIH treatments. Table 10 shows that for those who received at least four treatments, the average number of visits in the 24-month period was 11.7 ($SD = 11.6$) and clients were engaged for an average of 8 months ($SD = 7.58$). Services used ranged from 4 to 91 treatments (24-months) and 4 to 292 treatments (cumulative). The average cumulative time engaged with CORE El Centro was 2.5 years with a standard deviation of the same. When the outliers of those with

Table 10
Summary of Average Treatment Frequency and Length of Engagement

Treatments and Time	<i>N</i>	<i>Min. - Max.</i>	<i>Mean</i>	<i>Std. Deviation</i>
Treatments:				
Total Treatments (24 months)	622	4 - 91	11.7	11.66
Total Treatments (Cumulative)	622	4 - 292	25.8	32.79
Acupuncture	622	0 - 62	6.1	7.73
Massage	622	0 - 63	3.9	7.70
Cranial Sacral	622	0 - 13	0.3	1.25
Energy Based Treatments	622	0 - 50	1.5	4.17
Time:				
Total Months Engaged (24 mo.)	622	.27 - 24	8.1	7.58
Total Months Engaged (Cum.)	622	0 - 154	30.1	32.78

more than 100 visits were removed, the average number of treatments and average length of engagement changed minimally or not at all. A detailed table of the frequency of types of treatment for the Aim One sample ($n=622$) is in Appendix I.

According to the information reported by clients, the average user of CIH services at CORE El Centro is female and 45 years of age. She is Latino, living in a household of three with an annual household income of less than \$35,000 (Table 11). If she doesn't stop coming before her fourth treatment, she is likely to stay eight months, have 12 treatments, and there is a 30% chance she will receive at least 2 different types of services. If she has five or more conditions,

Table 11

Demographics for CORE El Centro

Demographics 2015	Average	Range
Race/Ethnicity:		
Latino/Hispanic	69.7%	
Caucasion	21.5%	
African Am.	4.4%	
Asain Am.	1.5%	
Native Am.	1.0%	
Gender - F	77%	
Age	44.6	18 - 90
Household	3.04	0 - 7
Income	\$35,000	\$0 - \$>65K

assessment one. On assessment two, 19.6% reported no conditions, 20% reported 1-2, 17.9% reported 3-4 and 28.7% reported five or more conditions. The average number of conditions reported in assessments one and two was $M = 3.75$ ($SD = 3.02$) and $M = 3.22$ ($SD = 2.87$), respectively. Appendix G.3 provides a full table of total health conditions reported as categorical variables of 0, 1-2, 3-4 and 5+ conditions.

Back pain was the most common condition, marked by 51.4% of clients on assessment one. Table 12 provides the conditions reported by those who completed assessment one and two.

she is likely to stay longer and receive more services. She is likely to be overweight or obese and exercises an average of 2.5 days a week. She is probably going to pay about \$22 for each treatment and spend about \$250 over 12 months.

Health conditions. Of those who completed

assessments, 17.9% reported no conditions 21.1% reported 1-2, 24.9% reported 3-4, and 36% reported five or more on

Table 12

Health Conditions Reported by CORE El Centro Clients at Assessments One and Two

Condition	Assessment One <i>n</i> = 836		Assessment Two <i>n</i> = 518	
	Freq.	Valid %	Freq.	Valid %
Back Pain	433	51.4	209	40.3
Neck Pain	374	44.4	187	36.1
Headache	327	38.8	173	33.4
Difficulty Sleeping	280	33.3	131	25.3
Joint Pain	253	30.0	146	28.2
Weight Concern	232	27.6	130	25.1
Wakes Up Early	183	21.7	91	17.6
Trauma	144	17.1	58	11.2
Obesity	131	15.6	72	13.9
Gastrointestinal Issues	127	15.1	66	12.7
Allergies	103	12.2	56	10.8
High Blood Pressure	103	12.2	65	12.5
Panic Attacks	86	10.2	32	6.2
Diabetes	72	8.6	53	10.2
Women's Health	69	8.2	26	5
Chronic Fatigue Syndrome	45	5.3	18	3.5
Asthma	43	5.1	26	5
Attention Deficit Disorder	40	4.8	21	4.1
Undiagnosed	35	4.2	19	3.7
Fibromyalgia	32	3.8	21	4.1
Cancer	23	2.7	8	1.5
Bell's Palsy	15	1.8	16	3.1
Lupus	3	.4	3	0.6
Autism	2	.2	3	0.6
Multiple Sclerosis	1	.1	1	0.2

McNemar chi-square confirmed significant improvement in back pain from assessment one to assessment two ($\chi^2(1) = 13.729, p = .001$), a decrease of 11.1%. No other conditions shifted significantly.

Aim One: Changes in Cognitive, Emotional, and Physical Health

The following analyses were used to examine CIH utilization and focused on the clients that received four or more CIH services during the 24-month period ($n = 622$). Besides “as needed” types of recommendations in the client integrative treatment plans, four treatments were generally the minimum number of treatments recommended by practitioners. Alternative hypothesis 1.1 is that individuals who received four or more CIH services will report improvements in physical, cognitive and emotional health. Alt. hypothesis 1.2 is that changes will improve incrementally as a function of time engaged with CEC and treatment frequency (completing a treatment plan and staying for maintenance).

Table 13
Tests of Normality of Health Factor Change Scores

Health Factor change scores	Shapiro-Wilk		
	Statistic	df	Sig.
CogH Change12	.950	60	.015
CogH Change13	.831	60	.000
CogH Change23	.936	60	.004
EmoH Change12	.976	60	.275
EmoH Change13	.953	60	.022
EmoH Change23	.976	60	.277
PhyH Change12	.939	60	.005
PhyH Change13	.922	60	.001
PhyH Change23	.922	60	.001
MedH Change12	.934	60	.003
MedH Change13	.900	60	.000
MedH Change23	.942	60	.007

CogH = Cognitive
 EmoH = Emotional
 PhyH = Physical
 MedH = Medical

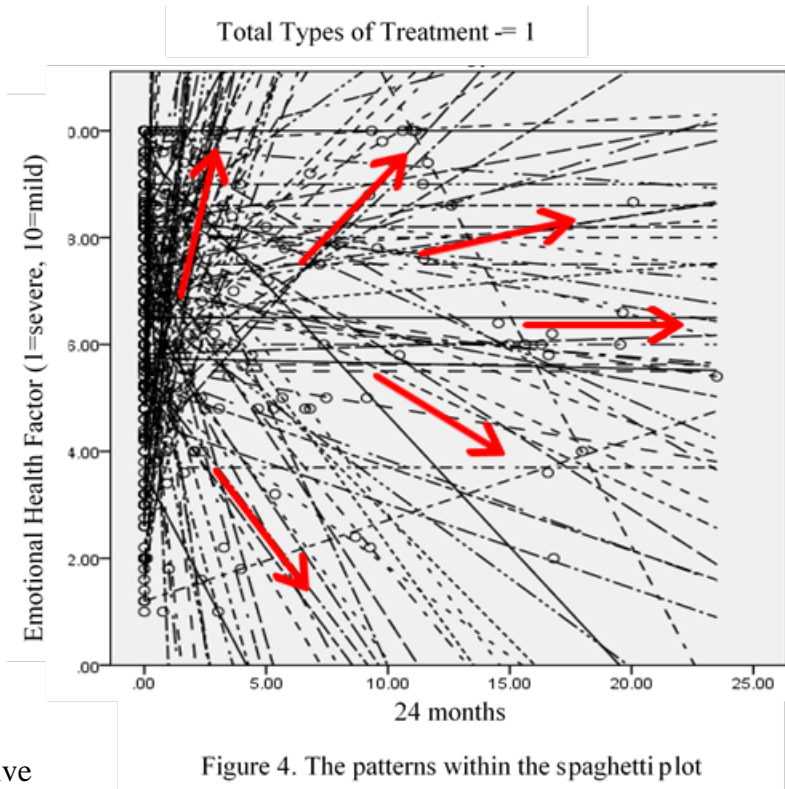
Testing for normality in the dependent variables.

The assumption of normality for Health Factor change scores was only satisfied for changes between Emotional Health on assessments one and two and Emotional Health on assessments two and three, as demonstrated by Shapiro-Wilk’s tests ($p = .28$, and $p = .28$, respectively). Table 12 shows the normality test results from all the Health Factor change scores with significance ranging between $p = .001$ and $p = .022$, meaning there was significant non-normality in the data. Box plots revealed a total of 20 positive and 21 negative outliers (2 standard deviations from the mean) and one extreme negative and eight extreme positive outliers

(more than 2 standard deviations from the mean). Each Health Factor had three to eight outliers.

Examining direction of change trends in the data. The spaghetti plots represent direction of change and the results of this analysis revealed evidence of trends toward positive changes in health as well as evidence of heterogeneity within the sample. Each dependent variable (y-axis) was measured for change by plotting the health assessment responses over 24 months (x-axis). Numerous split-

group iterations with each dependent variable were completed including 1) treatment frequency, 2) type of treatment, 3) total of treatment types received, and 4) length of time engaged. Each iteration produced similar results with changes in multiple directions, including sharp increases between zero and five



months, and a great deal of variety. Figure 4 is a typical example of the movement in the Spaghetti Plots. The arrow in the upper left corner highlights a number of sharp positive increases in Emotional Health in the first 5 month of the timeline as well as movement in many other directions. Appendix J provides four additional spaghetti plots as examples of the types of patterns that persisted through all the spaghetti plots when the sample was split by number of treatments and type of treatments.

To visually assess the changes in scores over time, scatter plots were created for the

Cognitive Health, Emotional Health, and Physical Health Factors. The mean change scores of the Health Factors between assessments one and two were calculated and then plotted on the y-axis with the 24-month time period on the x-axis. Figure 5 offers a visual of the change scores between assessment one and two for The Cognitive Health Factor.

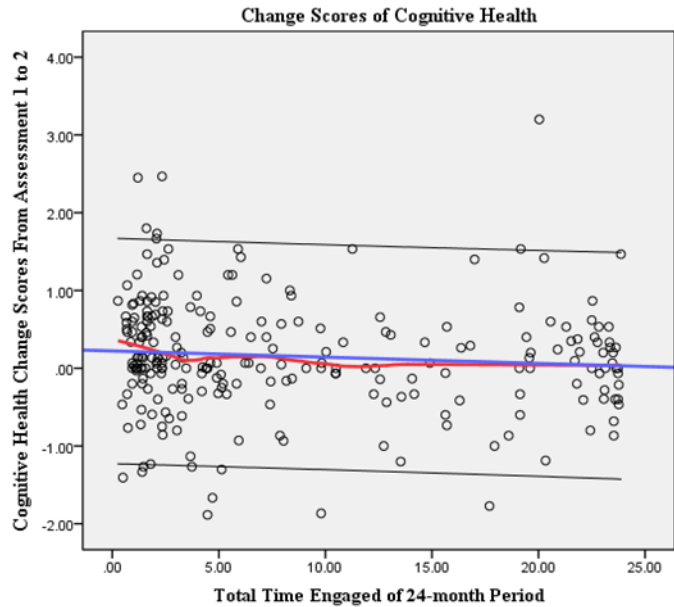


Figure 5. A scatter plot depicting a trend of no change in Cognitive Health change scores between assessments one and two.

The red line is the Loess Line of change with the ability to show uneven change. The blue line is the linear line of change. Both lines reflect no real change above or below 0.00 on the y-axis. Appendix M provides scatter plots of change scores between assessment one and two for the Cognitive, Emotional, and Physical Health Factors. Each of the plots, visually demonstrates a trajectory of uneven progress that hovers very close to 0.00 or no change, with a very slight downward trend in Cognitive and Emotional Health.

Examining direction of change over time. Cross-tabulation tables of responses to the General Health questions at assessment one and two were created to assess directional change in self-reported overall health. McNemar’s chi-square was used to determine the probability of positive directional general health after receiving services. This was found to be significant ($\chi^2(10) = 33.8, p = .001$) in the responses from assessment one to assessment two. Table 14 demonstrates that responses were different after treatment, and trended in a positive direction.

The greyed boxes in the table represent the number and percentage of clients that

Table 14

Cross-Tabulation of General Health for Two Assessments Demonstrating Change over 24-months with Arrows Denoting Direction of Change

		General Health 2					Total	
		1	2	3	4	5		
General Health 1 (GH1)	1=poor	Count	6	10	3	1	1	21
		% within GH1	28.6% →	47.6%	14.3%	4.8%	4.8%	100.0%
	2=fair	Count	4	50	48	12	5	119
		% within GH1	3.4%	42.0% →	40.3%	10.1%	4.2%	100.0%
	3=good	Count	0	16	78	31	2	127
		% within GH1	0.0%	12.6%	61.4% →	24.4%	1.6%	100.0%
	4=very good	Count	0	3	19	45	7	74
		% within GH1	0.0%	4.1%	25.7%	←60.8%	9.46%	100.0%
	5=excellent	Count	1	1	3	6	8	19
		% within GH1	5.3%	5.3%	15.8%	31.6%	←42.1%	100.0%
Total		Count	11	80	151	95	23	360
		% within GH1	3.1%	22.2%	41.9%	26.4%	6.4%	100.0%

McNemar's chi-square ($\chi^2(10) = 33.8, p = .001$)

reported the corresponding scores on both assessments. Arrows in the greyed boxes represent the primary direction of change for the client scores that had changed. For example, of the 119 clients that rated their health fair (2) at the second assessment, 42% had rated themselves fair in the first assessment. To left, 3.4% had lowered their score to poor. To the right, 40.3% raised their general health good (3), 10.1% raised their General Health very good (4), and 4.3% changed their score to excellent. Of the 74 individuals who rated their general health very good initially, 60.8% rated it very good again. To the left, 25.7% lowered their score to "good (3)" and 4.1% to fair. Nineteen individuals rated their health excellent, and 42% rated their general health as excellent at the second assessment, 31.6% lowered their rating to very good, and 26.4% lowered to good, fair, or poor.

The sample ($n = 622$) was then split by treatment frequency (see Appendix K.1 for a full table of results) and showed no significant directional change between assessment responses at time one and two for 4-6 treatments ($\chi^2(8) = 10.829, p = .212$) or 10+ treatments ($\chi^2(9) = 33.795,$

$p = .100$). The group with 7-9 treatments had too many missing values to calculate. The participant records were then split into four groups by length of engagement ever (< one month, 1-30 months, 31-99 months, and 100+ months). Appendix K.2 contains a full table of results for total time engaged. Only the 1-30-month group movement was significant ($\chi^2(10) = 32.893$, $p = .001$), with the same trends toward improvement as in Table 14.

Table 15
Cross-Tabulation of Total Health Conditions for Two Assessments Demonstrating Change over 24-months with Arrows Denoting the Directional Change

		Total Conditions Group 2				Total	
		0	1-2	3-4	5+		
Total	0	Count	27	19	10	6	62
		% within TC1	43.5% →	30.6%	16.1%	9.7%	100.0%
Conditions Group 1 (TC1)	1-2	Count	17	39	17	9	82
		% within TC1	20.7%	←47.5% →	20.7%	11.0%	100.0%
	3-4	Count	19	27	36	26	108
		% within TC1	17.6%	25.0%	←33.3% →	24.1%	100.0%
	5+	Count	12	28	25	75	140
		% within TC1	8.6%	20.0%	17.9%	←53.5%	100.0%
Total		Count	75	113	88	116	392
		% within TC1	19.1%	28.8%	22.4%	29.6%	100.0%

McNemar's chi-square ($\chi^2(6) = 17.0$, $p = .009$)

Cross-tabulation tables of responses to Total Health Conditions (Table 15) presented significant trends of movement ($\chi^2(6) = 17.0$, $p = .009$), but in both directions. For example, of those who reported one or two conditions at assessment one, 21% (left) reported no conditions at time two and 31% reported more conditions. Those reporting three to four conditions in assessment one experienced movement in both directions, with 25% movement to five or more conditions (right), 25% decreasing to one or two conditions, and 9% to no conditions. Of those reporting five or more conditions, 54% reported five or more again, with 17.9% reporting 3-4, 20% reporting one to two and 8.6% reporting no health conditions. When the sample was split by treatment frequency (Appendix K.3), McNemar chi-square tests were insignificant except in the

7-9 treatments group ($\chi^2(6) = 14.913, p = .021$), and the trend was for fewer total conditions in clients reporting 3-4 or more than five. When the sample was split into four groups by cumulative length of engagement (Appendix K.4), McNemar chi-square was $\chi^2(6) = 17.494, p = .008$. Movement was in both directions. The Health Factors were not compared due to the incremental scale of responses, the result of the principle component analysis. Individual cells did not hold enough information.

To test the working hypothesis that completing a treatment plan and continuing for maintenance would show positive changes in health, a chi-square test for association was conducted between completing treatment plans and Health Factors change scores for those receiving four or more treatments. For each Health Factor, one or more cell frequencies were less than 5. There were no statistically significant associations between completing the treatment plan and a change in Cognitive Health ($\chi^2(3) = 1.953, p = .582$), Emotional Health ($\chi^2(3) = .869, p = .833$), Physical Health ($\chi^2(3) = .933, p = .817$), or Medical Health ($\chi^2(3) = 1.780, p = .619$).

Testing for change across assessments. Table 16 contains the paired t-tests series that were completed to compare changes in client response scores after receiving four or more treatments ($n = 622$). Using Bonferroni's adjustment of $p = .008$ and Cohen's d for effect size, significant improvements were found for General Health ($M = .244; SD = .924, t(539) = 5.020, p = .001, d = .26$), Total Conditions ($M = .582; SD = 2.770, t(391) = 4.158, p = .001, d = .26$), Cognitive Health ($M = .154; SD = .734, t(242) = 3.276, p = .001, d = .18$), Emotional Health ($M = .527; SD = 2.630, t(250) = 3.173, p = .002, d = .20$), and Physical Health ($M = .224; SD = .841, t(234) = 4.089, p = .001, d = .26$). No significant positive changes were found for Medical Health ($M = -0.020; SD = 1.026, t(186) = -0.261, p = .794$).

Table 16

Mean Change in Subjective Health Assessment Scores and Total Health Conditions from Three Time Periods for Integrative Health Clients at CORE El Centro

Assessment 1-2	Assessment 1			Assessment 2			A1-A2	SD	t	df	p	Effect Size
	M	SD	Min - Max	M	SD	Min - Max	M Δ					
General Health	2.88	0.99	1.0 - 5.0	3.08	0.94	1.0 - 5.0	0.244	0.924	5.020	359	0.001	0.26
Total Conditions	3.75	3.02	0.0 - 15.0	3.22	2.87	0.0 - 15.0	0.582	2.770	4.158	391	0.001	0.26
Cognitive Health	3.54	0.81	1.0 - 5.0	3.63	0.74	1.0 - 5.0	0.154	0.734	3.276	242	0.001	0.18
Emotional Health	6.18	2.25	1.0 - 10.0	6.63	2.21	1.0 - 10.0	0.527	2.630	3.173	250	0.002	0.20
Physical Health	3.34	0.83	1.0 - 5.0	3.51	0.76	1.0 - 5.0	0.224	0.841	4.089	234	0.001	0.26
Medical Health	3.60	0.95	1.0 - 5.0	3.58	0.93	1.0 - 5.0	-0.020	1.026	-0.261	186	0.794	0.00

Assessment 1-3	Health Assessment 1			Health Assessment 3			A1-A3	SD	t	df	p	Effect Size
	M	SD	Min - Max	M	SD	Min - Max	M Δ					
General Health	2.88	0.99	1.0 - 5.0	3.09	0.95	1.0 - 5.0	0.207	0.935	3.081	192	0.002	0.22
Total Conditions	3.75	3.02	0.0 - 15.0	3.17	2.81	0.0 - 15.0	0.763	2.851	4.008	223	0.001	0.27
Cognitive Health	3.54	0.81	1.0 - 5.0	3.63	0.74	1.0 - 5.0	0.108	0.729	1.685	128	0.094	0.15
Emotional Health	6.18	2.25	1.0 - 10.0	6.72	2.24	1.0 - 10.0	0.455	2.576	2.067	136	0.041	0.18
Physical Health	3.34	0.83	1.0 - 5.0	3.54	0.81	1.0 - 5.0	0.144	0.865	1.828	120	0.070	0.17
Medical Health	3.63	0.98	1.0 - 5.0	3.51	0.99	1.0 - 5.0	-0.086	1.131	-0.726	90	0.470	0.00

Assessment 2-3	Health Assessment 2			Health Assessment 3			A3-A2	SD	t	df	p	Effect Size
	M	SD	Min - Max	M	SD	Min - Max	M Δ					
General Health	3.08	0.94	1.0 - 5.0	3.09	0.95	1.0 - 5.0	0.026	0.834	0.433	191	0.666	0.00
Total Conditions	3.22	2.87	0.0 - 15.0	3.17	2.81	0.0 - 15.0	0.205	2.394	1.284	223	0.201	0.00
Cognitive Health	3.66	0.78	1.0 - 5.0	3.66	0.78	1.0 - 5.0	0.060	0.632	1.084	129	0.280	0.00
Emotional Health	6.63	2.21	1.0 - 10.0	6.72	2.24	1.0 - 10.0	0.034	2.120	0.185	134	0.854	0.00
Physical Health	3.51	0.76	1.0 - 5.0	3.54	0.81	1.0 - 5.0	-0.018	0.766	-0.261	120	0.794	0.00
Medical Health	3.51	0.99	1.0 - 5.0	3.51	0.99	1.0 - 5.0	0.037	1.001	0.349	90	0.728	0.00

From assessment one to assessment three, client scores changed significantly in General Health ($M = .207$; $SD = .935$, $t(192) = 3.081$, $p = .002$, $d = .22$), and Total Conditions ($M = .763$; $SD = 2.851$, $t(223) = 4.008$, $p = .001$, $d = .27$). No significant changes in client health scores were found for Emotional Health ($M = .455$; $SD = 2.576$, $t(136) = 2.076$, $p = .041$, $d = .18$), Cognitive Health ($M = .108$; $SD = .729$, $t(128) = 1.685$, $p = .094$), Physical Health ($M = .144$; $SD = .865$, $t(120) = 1.828$, $p = .070$), or Medical Health ($M = -0.020$; $SD = 1.026$, $t(186) = -0.261$, $p = .794$). From assessment two to assessment three, there were no significant changes in client scores for any of the dependent variables.

A paired sample t-test was completed for the Biometric readings; BMI, heart rate, and blood pressure (systolic and diastolic are represented independently of each other). The records included the first and last biometric readings taken during the 24-month period. Only changes in systolic readings were found to be significant ($M = 2.02$, $SD = 16.58$, $t(388) = 2.407$, $p = .017$, $d = .12$). The full results of the changes in biometric readings are located in Table 17.

Table 17

Mean Change in First and Last Biometrics for Integrative Health Clients at CORE El Centro

Health Indicator	First Reading			Last Reading			$M \Delta$	SD	t	df	Sig. (2-tailed)	Effect Size
	M	SD	Min - Max	M	SD	Min - Max						
BMI	29.70	6.74	10.83 - 66.56	30.08	6.68	10.76 - 64.99	.077	1.53	.898	316	.370	
Heart Rate	77.12	12.75	46 - 175	76.91	11.33	49 - 115	.000	10.82	0.000	389	1.000	
Systolic Bp	122.32	17.91	71 - 197	121.24	16.78	63 - 186	2.023	16.58	2.407	388	.017	.12
Diastolic Bp	73.72	12.19	22 - 162	72.82	12.02	45 - 126	.763	11.12	1.352	387	.177	

Aim Two: Association Between Health Conditions and Ability to Pay on Service Utilization

Aim Two examined patterns and associations of CIH use, general health, health conditions and payment for services by the clients. The alternate hypothesis is that when payment for services is scaled to household size and income, CIH use will follow different patterns than those found in the most recent population health data (Clarke et al., 2015).

A sample was created for Aim Two with inclusion requiring completion of the first health assessment ($n = 836$), which would include a broader sample in the comparison of payments for

Table 18

The Association Between Payment for Treatment and Assessment One Health Conditions Presents an Inverse Relationship with Lower Income Associated with More Use

Payment Level		Count	Total Conditions				Total
			0	1-2	3-4	5+	
\$0-15	Count	25	45	53	99	222	
	% within Pay Level	11.3%	20.3%	23.9%	44.6%	100.0%	
\$16-30	Count	45	44	67	69	225	
	% within Pay Level	20.0%	19.6%	29.8%	30.7%	100.0%	
\$31-65	Count	11	8	8	9	36	
	% within Pay Level	30.6%	22.2%	22.2%	25.0%	100.0%	
Total	Count	81	97	128	177	483	
		16.8%	20.1%	26.5%	36.6%	100.0%	

Pearson Chi-Square ($\chi^2(6) = 18.7$, $p = .005$).

services and health conditions. A Pearson chi-square test for association was conducted between payments for treatments and total number of Health Conditions (grouped) reported in Assessment One. All expected cell frequencies were greater than five. There was a modest ($\phi = 0.139, p = .005$) statistically significant association between payment level and the number of Health Conditions for receiving services ($\chi^2(6) = 18.707, p = .05$). Table 18 shows that as the conditions increased, clients in the lowest pay group were more likely to use services (44.6%) than clients in the highest pay group (25%). Conversely, clients in the highest pay group were more likely to use services when reporting no conditions (30.6%) compared to clients in the lowest pay group (11.3%). Clients in the middle pay group were more likely to use the services when reporting 5 or more conditions (30.7%) than when they reported zero conditions (20%).

Testing for change across assessments. To learn more about the group of clients that reported five or more health conditions, a paired sample t-test was conducted using the Aim One sample ($n=622$), with inclusion limited not only to four or more treatments but also clients reporting five or more conditions ($n=177$). Table 19 shows that client scores from assessment one to assessment two, using Bonferroni's adjustment of $p = .008$, showed significant improvement in Total Conditions ($M = 2.193; SD = 2.92, t(139) = 8.883, p = .001, d = .75$), General Health ($M = .277; SD = .610, t(129) = 5.174, p = .001, d = .45$), Cognitive Health ($M =$

Table 19

Mean Change in Subjective Health Assessment Scores and Total Health Conditions from Assessment One to Assessment Two for Integrative Health Clients Reporting 5 or More Initial Health Conditions

Health Conditions	Assessment One			Assessment Two			Paired Differences					
	<i>M</i>	<i>SD</i>	Min - Max	<i>M</i>	<i>SD</i>	Min - Max	<i>M</i> Δ	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	<i>Effect Size</i>
Total Conditions	7.14	2.03	0.0 - 15.0	4.95	3.42	0.0 - 15.0	2.193	2.921	8.883	139	.001	0.75
General Health	1.44	0.53	1.0 - 5.0	1.44	0.53	1.0 - 5.0	.277	.610	5.174	129	.001	0.45
Cognitive Health	3.33	0.66	1.0 - 5.0	3.53	0.71	1.0 - 5.0	.202	.701	2.762	91	.007	0.29
Emotional Health	5.72	2.23	1.0 - 10.0	6.43	1.96	1.0 - 10.0	.712	2.666	2.736	104	.007	0.26
Physical Health	3.06	0.72	1.0 - 5.0	3.35	0.75	1.0 - 5.0	.288	.834	3.314	91	.001	0.35
Medical Health	3.43	0.94	1.0 - 5.0	3.39	0.95	1.0 - 5.0	-.042	1.055	-.328	66	.744	0.00

.202; $SD = .701$, $t(91) = 2.762$, $p = .007$, $d = .29$), Emotional Health ($M = .712$; $SD = 2.666$, $t(104) = 2.736$, $p = .007$, $d = .26$), and Physical Health ($M = .288$; $SD = .834$, $t(91) = 3.314$, $p = .001$, $d = .35$). No significant changes in client health scores were found for Medical Health ($M = -.042$; $SD = 1.055$, $t(91) = -.328$, $p = .744$).

Summary of Results

The organization of this information revealed both similarities and uniqueness between the sample population that used Complementary and Integrative Health (CIH) services at CORE El Centro (CEC) and general population results from the most recent National Health Interview literature (Clarke et al., 2015; P. J. Johnson, Jou, Rhee, Rockwood, & Upchurch, 2016). The typical client for both was 45 years old and 77% were female. Then the socio-demographic culture changes by income, race/ethnicity, and education. Those using CIH services in this sample were of lower income, primarily Latino, and less educated, all populations that are under-represented in the literature. The 24-month timespan of this study allowed for a unique examination of the length of engagement and characteristics of use regarding types of treatments used when payment for services is scaled to income.

The positive changes in subjective self-reports of individuals who received four or more CIH services were statistically significant, even with Bonferroni's adjusted significance level of $p = .008$. General Health, Cognitive Health, Physical Health, and Emotional Health all improved between both assessments one and two and assessments one and three, but not between assessment two and three. This suggests a positive change early that persists over time. Total Health Conditions decreased significantly in the same manner. There were no statistically significant changes across assessments for the Medical Health Factor which represented the client's perception of their blood pressure, blood sugar, or medication level. The average client

BMI was 30, which falls into the obese range, and did not change.

Improvements in General Health, Health Conditions, Cognitive Health, Emotional Health, and Physical were not statistically significant between assessments two and three, suggesting that improvement happened earlier and was maintained. Finally, there was no significant association between completion of a treatment plan and improvements in subjective health assessment. A chi-square test was not statistically significant for associations between completion of a treatment plan and any of the dependent variables.

The spaghetti plots and scatter plots revealed the complexity of this sample in the many directions of change in each diagram. In addition to the trends of positive changes, there were trends of an association between total length of engagement and a decrease in General Health, and the Health Factors. This may be related to the second Aim that found an association between those with more conditions and frequency of treatments received.

When payments for services were scaled to income, CIH use revealed different patterns than those found in the most recent population health data (Elewonibi & BeLue, 2016; P. J. Johnson et al., 2016). Lower income (\$0 - \$20K annual income) clients, were more prevalent than higher income (\$41K and above) clients (47% and 13.6%, respectively). The low pay group was more likely to use services if they had more health conditions than the highest paying group. Conversely, the highest paying group was more likely to use services if they had fewer health conditions. Appendix L provides the cross-tabulations showing a significant association across all three time periods. The average total payments for the 24-month period for those who received 4 or more treatments was \$247 ($SD = \276.54), with the average payment of \$22 per treatment. Clearly the low-income population will use CIH if they can afford it and this pattern extends into the middle-income population as well. The costs associated with CIH are part of the

complexity in the study of CIH.

Discussion

The purpose of this study was to examine the impact of Complementary and Integrative Health (CIH) utilization at a natural healing center that serves primarily low income and Latino clients. The length of time that data was collected (24 months) offered an opportunity not just to determine if changes in subjective well-being were significant, but to explore engagement timeframes and types of treatments used by this community. Sample characteristics revealed clients that used CIH services more than typically found in the literature (Clarke et al., 2015; Elewonibi & BeLue, 2016; Ghildayal, Johnson, Evans, & Kreitzer, 2016; Landmark et al., 2012) but often for the same reasons in the current literature. Overall, improvement was noted for three of the four the subjective Health Factors (cognitive, emotional, and physical), the General Health scores, and reported Health Conditions from Assessment One to Assessment Two. There is a gap in the literature regarding CIH use by these populations and this study expanded the knowledge base of CIH use in the low income and Latino population when payment for services is adjusted to household size and income.

Many interesting characteristics of this population emerged as the data was prepared for analysis. While Clarke et al. (2015) reported a decreasing trend in CIH use by Hispanic adults, the racial/ethnic make-up of this sample was 69.7% Latino/Hispanic. Elewonibi and BeLue (2016) found that use of CIH services was lowest among non-citizens. Although citizenship information is not collected by CORE El Centro, the organization is aware that clients may be non-citizens of the United States. Elewonibi and BeLue (2016) concluded that costs associated with CIH services may play a role in the low percentage of non-citizen use. Non-citizens comprised a very small percentage (8.2%) of their sample. The sample in this project does not

reflect their findings.

The literature reports that pain, specifically back pain, is the primary reason for CIH use (Ghildayal et al., 2016). This was true of this population as well, with 51% reporting back pain. The top reasons for seeking treatment were all pain related (44% neck pain, 39% headache, and 30% joint pain) except difficulty sleeping (33%), which may also be related to pain. Because mental health indicators, such as depression and anxiety, were part of the health assessments, it is not known how many clients presented with mental health as their primary issue.

Table 20
Percentage of Different Types of Treatments Experienced by Those Reporting 2+ Health Conditions in the National Health Survey and by Clients at CORE El Centro

Type	National Average*	CORE Average
Acupuncture	1.9%	53%
Massage	10%	50%
Energy Work	0.5%	30%
Cranial Sacral	0.3%	7%
2 or more types	30%	30%

*, Falci, Shi, and Greenlee (2016)

Individuals seeking relief from other chronic conditions is reported in the literature as a common reason for seeking treatment. In a recently published secondary analysis of the National Health Interview Survey, Falci, Shi, and Greenlee (2016) reported that 33% of the population reported having one-two chronic

conditions. In this study, of those who reported conditions, 80% listed at least one-two conditions. After receiving services, the percentage of clients reporting five or more conditions declined from 36% to 29% and clients reporting one-two conditions increased from 21% to 29%. Whereas Falci et al. (2016) found those with chronic conditions are most likely to use natural health products, the population of CORE El Centro differs in regard to types of CIH used. Falci et al. (2016) reported that 1.9% of those surveyed had experienced acupuncture in the last twelve months, while 53% of CORE El Centro clients had experienced acupuncture. Table 20 shows that this difference in use persisted for all the modalities offered at CORE El Centro.

Secondary analysis studies of the National Health Interview Survey of 2012 are now

being published (Clarke et al., 2015; Falci et al., 2016; Ghildayal et al., 2016; P. J. Johnson et al., 2016). The reports confirm what has been found in this sample population regarding reasons for seeking treatment, but what is different in this population is the frequency of use of these treatment modalities, the length of engagement, and the income/payment relationship. It is possible that the longer length of stay was related to both the sliding fees but also the subjective health and well-being benefits. These analyses all discuss the perceived subjective benefits reported by users of CIH, suggesting the need for more studies that explored the subjective outcomes of CIH. The clients of CORE El Centro demonstrated through their subjective responses that they experienced significant cognitive and emotional improvements, even when reporting multiple health conditions.

Finally, the literature is calling for more longitudinal studies that address the specific use of CIH products and services, particularly for individuals with multiple chronic conditions (Falci et al., 2016) and pain (Ghildayal et al., 2016). CORE El Centro is poised to answer this call. Because CIH service costs are scaled to income, this center treats more people with more conditions for longer periods of time. This allows a client with chronic conditions or pain a longer timeframe in which to learn to manage their health and well-being, which may include decreasing a dependence on pain medication. This is a completely different picture of use than the reported national average of 3 treatments in a 12-month period (P. J. Johnson et al., 2016).

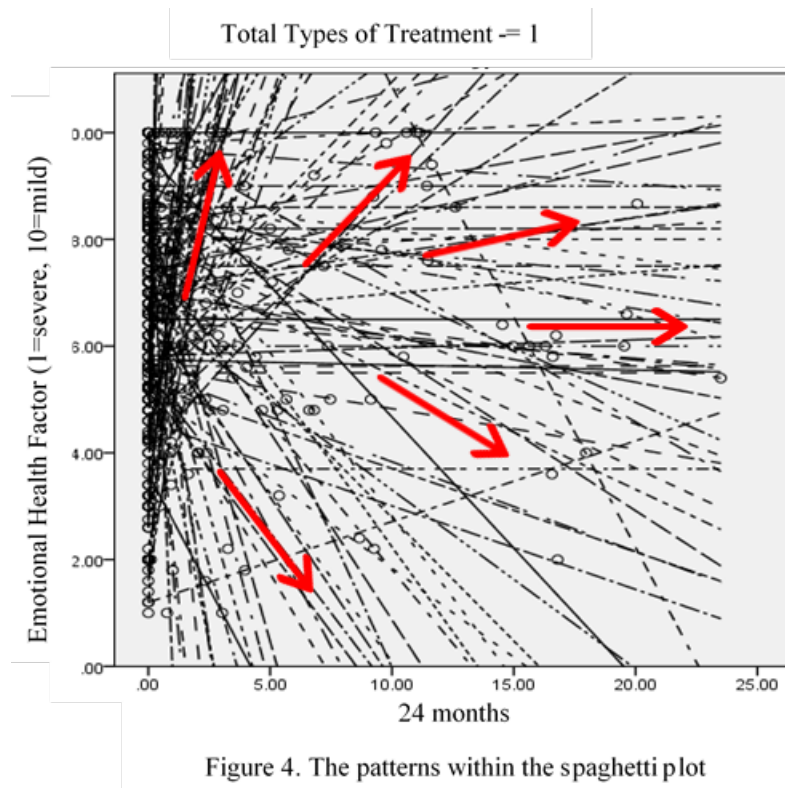
Of interest from a Trans-Theoretical Model of Change view is the difference between those who stop receiving services after one to three treatments and those who continue after four. Knowing that clients who complete at least four treatments are more likely to continue with services speaks to the value of Community Health Workers as Health Navigators in the beginning of a client's treatment plan. It may be that those who do not continue are unable to

navigate through the barriers of transportation, changing work schedules, family issues, and other social determinants. Finances are just one of the challenges in this low-income Latino community. Community Health Workers offer culturally competent social support as clients navigate the barriers to better health.

This natural health center offers services that extend beyond acupuncture, massage, and energy work to bring people into a sense of community and belonging. While the original variables of subjective health and well-being addressed social support and community resources, the distilling of them into four Health Factors may have obscured the change in these aspects that clients feel when they engage for more than four treatments.

Changes in Physical, Cognitive and Emotional Health

Client’s subjective responses to questions about health and well-being across the health assessments improved significantly. The biometrics, conversely, did not improve. This may be related to the fact that the average heart rate and blood pressure readings were within normal



range at the first set of readings. Less than 12% of the clients reported blood pressure as a health condition and less than 9% reported diabetes as a health condition. Thus, no significant changes were reported in the biomarker health status indicators, except for the systolic blood pressure, and the effect size

was very small. The sample population's BMI was not within normal limits, and did not change. The average number of days of exercise per week is low for this sample at less than three days. With movement opportunities available at CORE El Centro, transitioning clients into movement classes is an area to engage Community Health Workers as a movement support system.

While the paired sample t-tests reported significant changes in client's subjective feelings about their Cognitive, Emotional, and Physical Health, the spaghetti plots showed a visual image of numerous patterns of change over time (Figure 4), demonstrating the heterogeneous composition of the population at CORE El Centro. Individuals receive services for prevention, acute injuries and chronic conditions, major physical problems such as strokes, chronic conditions, recovery from trauma, and palliative care. The trajectories of health will be different for each of these unique populations making the patterns in the spaghetti plots a typical pattern.

The criticisms of many of the systematic reviews of complementary and integrative health (CIH) research revolve around the weaknesses in sample heterogeneity, poor designs, over-generalizations. This study suffered from heterogeneity, weaknesses in data collection and quality. It also reflected the challenges inherent in community-based research. This study found statistically significant changes in health and well-being, but the combination of treatments with the numerous conditions (Linde, 2009; Park, 2012) offers no causation. The sample size was robust, but people came to CORE El Centro for different reasons (25 possible conditions, or none), used one to four types of services perhaps from different practitioners, and had received from one to 292 treatments. Clearly there were outliers. Individuals stayed engaged with CEC from one day to 13 years. This population heterogeneity was complicated further by the uneven timeframes of the completion of integrative health assessments, the missing values, and the trend of non-compliance in the completion Health Assessments.

When considering the message of the spaghetti plots, the heterogeneity is quite remarkable and reflects the challenge addressed in the Objectives of the National Center for Complementary and Integrative Health. In the real world, people of all ages (18-90), with zero to fifteen conditions, from all income levels, and differing family dynamics seek out services in community-based centers. The Spaghetti Plot in Figure 4 reveals this diversity in the sample population. This represents an opportunity to find systems that can track the differences of multiple populations in one center. It was clear that there was no *one* pattern, but there were many patterns reflecting the complexity of the population. Of interest is the sharp increase within the first five months.

The length of engagement of this population revealed patterns that implied that people may “come and go” for services. During the data organization about 25% of the sample was common to both years and those with over 5 years of engagement may have only received 2-3 services in the 24-month period of study. This may represent the use of CIH for prevention or maintenance. It certainly warrants further study.

The cross-tabulation series revealed rich information. The literature presents the value of “trajectories” (Rugg et al., 2011) of improvement that may not be captured in short duration studies. The shifting of General Health and Health Conditions responses within the cross-tabulation tables reflected this

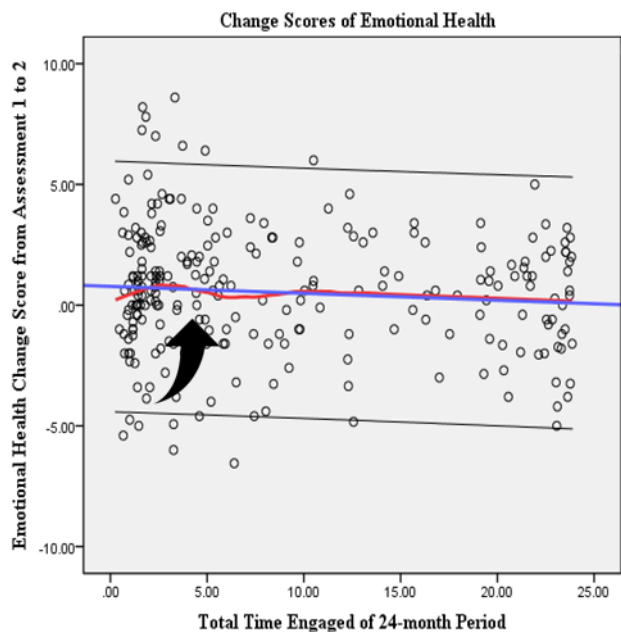


Figure 5. The red Loess line reflects the uneven trajectory of change that may occur in the course of CIH treatment.

uneven trajectory. The scatter plot in Figure 5 visually exemplifies this uneven trajectory. In the area above the arrow in Figure 5 is what appears to be subtle shifts in subjective responses to Emotional Health before a flattening of change. This presents yet another opportunity to find systems that capture subtle change.

The Medical Health scores, which represented client's *perceptions* of their health status indicators, were not significant in any of the paired tests. Medical Health box plots also displayed the least decreases of outliers and an increase in extreme outliers across assessments compared with the other Health Factors. It is possible that the non-significance was the result of the fact that the average biometrics were within normal range and clients were not seeking services for these conditions. In the reported health conditions, only 12% were concerned about high blood pressure and only 8.6% were concerned about diabetes. These were two of the three variables within Medical Health and may explain the lack of significant changes in this Health Factor.

Association Between Health Conditions and Ability to Pay on Service Utilization

Knowing that the National Health Interview Survey (NHIS) of 2012 had reported that 21% of the low-income community typically used CIH services (Clarke et al., 2015), it was not a surprise that our demographic income indicator was different. In fact, it is the mission of the organization to serve the low resource communities. The pattern of increased use that emerged for those with Chronic Health Conditions is supported in the literature (Falci et al., 2016; Garrow & Egede, 2006; Hoerster et al., 2012). Of more interest is the increase in use for the lowest income with the greatest number of health conditions, and the decrease in use for clients with highest income as health conditions increase. Why are those with more Health Conditions and less income willing to spend more on CIH? This is outside the scope of this research, but may be

related to the access to medical treatment and health insurance (P. J. Johnson et al., 2016). Ward recently published information regarding individuals with two or more chronic conditions and found that as conditions increased, a delay in seeking medical treatment for cost reasons increased by 16.9% (Ward, 2017). Further, this is a thread back to the concept of Emergent Outcomes, those changes that happened that were not related to the actual health condition (Koithan et al., 2007) and reason for seeking treatment. It is possible that those individuals living with chronic health conditions are seeking physical relief and stay engaged with centers like CORE El Centro because they feel better mentally and emotionally. This is supported by the Paired Sample t-test that was completed for those clients who received four or more treatments and also reported five or more conditions. Scores changed significantly for all dependent variables, except Medical Health. The effect sizes were larger for this group, reaching moderate effect sizes for General Health ($d = .45$) and Physical Health ($d = .35$) and a large effect size for decreased number of health conditions ($d = .75$). These clients were feeling better in other aspects of their lives even though they still reported 5 or more conditions. Measuring the positive outcomes of CIH needs to include the Emergent Outcomes related to receiving acupuncture, massage therapies, or energy work such as reiki.

Limitations

This retrospective study was limited in several ways. The internal validity was compromised by measurement tools that had not been tested for reliability or validity and inconsistent methods of data collection. The heterogeneity of the sample population and the missing values in the data were significant barriers in mining this data. The sample sizes were robust but the missing data decreased sample sizes of all the variables by at least 50%.

This population self-selected to receive services, reflecting self-motivation which may

not generalize past the population at CORE El Centro. It is likely that positive response and recall bias existed in the data. About 30% of clients who received services completed the questionnaires. Only 25% of population chose to disclose the reason for wanting service.

Another limitation of this study was the lack of a comparison group of non-participants. As part of a prospective study, those clients who drop out early could serve as a comparison group. Knowing social determinants of health are challenging within these demographics, deciding not to return for services may be complex. Challenges for completing treatment plans may include transportation, inconsistent work patterns, mental and physical health, trauma recovery, and family support. This is an opportunity to study how people come to make health a priority and move past the barriers into the action and maintenance phases of the Trans-Theoretical Model. This is also an opportunity to examine how much support is needed for this process.

Finally, the inexperience of the researcher was a limitation. Data mining is a tedious, yet creative process that develops over time (Epstein, 2010). A broader knowledge of statistical procedures for large, unusual data is needed to separate out aspects of the data for deeper analysis. Beyond this study, there are more opportunities to explore relationships that may be hidden in this data set. The limitations of this research project can be a guide for future research within this community.

Future Directions

This clinic setting offers an opening for additional CIH research. As research suggests, significant limitations in data collection and analysis exist in this type of community-based setting (Linde, 2009), but the dedication of CORE El Centro to developing more sophisticated outcomes methods can decrease those limitations. Fønnebø et al. (2007) suggested a new

paradigm. The Whole Systems Research Model (C. Ritenbaugh et al., 2010) answered that call, but not as a new approach. It brings back some very old practices regarding the integration of mind, body, and spirit into our health care and the research community. In the 1800s, Claude Bernard wrote that aspects of the human should not be separated for the sake of experimentation (Cooper, 2008). Whole Systems Research seeks to understand the subtle aspects of health and well-being within this complex system.

Questions raised through this research include, 1) what is the best research design, what methodology will work, and how can the data be analyzed and 2) what methods could be combined into novel design systems? CORE El Centro is a willing partner in exploring these questions. Removing the cost barriers has created a facility that can ask bigger questions about changes in health over time, with a variety of populations. Because of this study, CORE El Centro is already asking internal questions about what is possible in that environment. An important consideration that may not exist in a controlled setting includes not burdening the staff or the clients for the sake of research.

Wholes Systems Research is a model that supports the bridge from the controlled environment of laboratory research to the community (H. J. R. Hoenders et al., 2012; C. Ritenbaugh et al., 2010; Cheryl Ritenbaugh et al., 2003; Thompson et al., 2011). Whole system refers not just to treating the whole person, but also the partnerships of local Universities, community based health centers, and the communities they serve. This is an opening for multi-directional education through cost-effective, high quality cooperative research potential. University students can experience research in the community and learn about challenges in these settings. Independent studies and practicums offer health centers para-professional services while the students learn real world research skills. Practitioners can continue to follow their

professional protocols, educate students about natural health, and engage in research through compliance with consistent documentation. The community will benefit from the attention and care. This cooperation will further the objective of the National Center for Complementary and Integrative Health in community-based research.

Besides the difficulty in collecting data at CORE El Centro, is the difficulty in finding the right instrument that will capture the emergent outcomes of CIH. It was clear that the integrative health assessment used in this study, although capturing many facets of well-being, was too long and clients were asked to fill it out too often. The background research compiled led to the discovery of the Self-Assessment of Change questionnaire (Cheryl Ritenbaugh et al., 2011; Thompson et al., 2011) developed by the proponents of Whole Systems Research. CORE El Centro committed to working with this document in 2016. Dr. Ritenbaugh, professors of Spanish, friends and family from Mexico and South America, staff and practitioners of CORE El Centro, and the local Latino community worked together in a true collaborative effort to create a Spanish version over the course of a year. It was ready for implementation in January of 2017. New tracking systems are being developed internally to capture the trajectory of change in basic indicators like pain and energy levels. Funders are recognizing and supporting the Outcomes position to begin developing formal research protocols. The bridge is open, ready to blend professional practice and research while continuing to meet the needs of the community (Epstein, 2010).

Meeting the needs of the community includes investing in the wisdom of community members by training Community Health Workers to strengthen the bridge between community and health care. To understand the motivation and the social determinants that are impacting movement toward health requires someone who walks within both environments. All prospective

designs should consider investing in para-professionals as health navigators. If nearly half the people who begin services quit, a piece of the bridge that could help them toward health is missing.

Conclusion

The low resource communities in the United States experience less health care options, have poorer health, and experience unique stressors as they struggle to find resources. This study, despite the limitations of the data, found significant health changes after use of acupuncture, massage, energy work, and cranial sacral therapy. The length of engagement confirmed that clients find the services helpful and CORE El Centro to be valuable for social support. Population heterogeneity will always exist at CORE El Centro. This is not a barrier, but an opportunity to not only to study the diverse trajectories of health that seem to be inherent in CIH, but to learn how to best study this diversity. Again, it involves looking to new ways of perceiving complexity and fresh designs for research. The first step out of a laboratory brings the uncertainties of life to any community based research. Finding methods to capture subtle changes within complex systems is the work of the CIH community based researcher, along with finding the resources to conduct the type of research that proponents of randomized controlled trials will find acceptable.

CORE El Centro is poised to step into community-based research to expand the knowledge base of CIH, especially in the underserved populations. Developing systems for tracking, monitoring, and analysis that is effective for both research and practitioners of CIH is the opportunity that awaits the ready researcher. It is true there is much work to be done, but the people are coming for treatment anyway. It's time to harness the power of people already

engaged, work together, and educate each other as we find the best methods to research complementary and integrative health. A final word of inspiration from Dr. Irwin Epstein.

But, in my opinion, a tsunami of academically driven Evidenced Based Practice and Empirically Supported Treatments and entrepreneurial activity has effectively drowned out the voices and collective experience.....of practitioners and excluded them from the knowledge production enterprise of the profession. [It's time to shift the paradigm and] promote a P2R [Practice 2 Research] return flow of practitioner ideas and practice-based evidence into knowledge generation (Epstein, 2015, p. 2).

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Appendix A

Participant name _____ ¹
Study ID _____ ²
For staff use only

Self-Assessment of Change

Today's Date ____/____/____³

<p>How long has it been since you began receiving services at Core/El Centro? ⁴</p> <p><input type="checkbox"/> Less than 3 months ¹</p> <p><input type="checkbox"/> 3 - 6 months ²</p> <p><input type="checkbox"/> 7 - 12 months ³</p> <p><input type="checkbox"/> 1 - 2 years ⁴</p> <p><input type="checkbox"/> 2 - 3 years ⁵</p> <p><input type="checkbox"/> 3 - 5 years ⁶</p> <p><input type="checkbox"/> 5 - 10 years ⁷</p> <p><input type="checkbox"/> More than 10 years ⁸</p>
--

The word pairs that you find below ask you to reflect on meaningful life changes that you have experienced since you began receiving services at Core/El Centro. Use what you know about yourself now, to respond.

Here's how to fill this out:

- Mark the line to show where you were before you began receiving services at Core/El Centro, and label this **B**.
- Mark the line for where you are now, and label it **N**.

Here are 3 examples of how to fill this out:

<p>1. I had some energy before and I've got a lot more energy now.</p> <p>No energy B ^(Before) N ^(Now) Full of energy</p> <p>_____ _____ _____</p>
<p>2. I had almost no energy before and there's been no change.</p> <p>No energy B N Full of energy</p> <p>_____ _____ _____</p>
<p>3. I've got some energy now, but I had a lot more energy before.</p> <p>No energy N B Full of energy</p> <p>_____ _____ _____</p>

Now continue to the other pairs on the next two pages.

EXAMPLE			
I had some energy before and I've got a lot more energy now.			
No energy	B ^(Before)	N ^(Now)	Full of energy

“B” is for where you were *before* you began receiving services at Core/El Centro.
 “N” is for where you are *now*.
Place a “B” and an “N” based on how you see things now.

Participant name _____
 Study ID _____

 For staff use only

Not sleeping well	_____	Sleeping well	5
Exhausted	_____	Energized	7
Dull Senses	_____	Vibrant Senses	9
Scattered	_____	Focused	11
Stuck	_____	Letting Go	13
Overwhelmed	_____	Empowered	15
Hopeless	_____	Hopeful	17
Blaming	_____	Forgiving	19
Closed-hearted	_____	Open-hearted	21

EXAMPLE			
I had some energy before and I've got a lot more energy now.			
No energy	B (Before)	N (Now)	Full of energy

“B” is for where you were *before* you began receiving services at Core/El Centro.
 “N” is for where you are *now*.
Place a “B” and an “N” based on how you see things now.

Participant name _____¹
 Study ID _____

 For staff use only

Isolated	_____	Connected	23
Depressed	_____	Joyful	25
Anxious	_____	Calm	27
My body does not recover quickly	_____	My body recovers quickly	29
Broken	_____	Whole	31
Defined by my illness or problems	_____	Not Defined by my illness or problems	33
Unbalanced	_____	Balanced	35

Is there anything you would like to tell us about your experience? ³⁸

_____ ³⁷
 For staff use only

Appendix B1

CORE/EI Centro Integrated Health Program Client Informed Consent for use of survey information



We request that you complete a pre-service survey in order for CORE/EI Centro to:

1. Learn how you heard about CORE/ EI Centro's natural health/wellness appointments and what other health programs you are involved with
2. Understand your health conditions and how they have affected important areas of your daily life
3. Develop an integrated health plan to meet your needs

You also will be asked to complete surveys once you have begun attending your natural health/wellness appointments in order to:

1. Make sure that your health is improving and that your needs are being met
2. Help us better understand the impact of our natural health/wellness services and the integrated health program in order to help us improve their effectiveness

Information from these surveys will be used in two ways. The first way is to share it at meetings, in reports and proposals for funding or to publish it. In this case, your responses will only be reported as part of a group, not as an individual, in order to protect your identity and your survey responses. The second way is to use the information during a meeting with you to develop your integrated health care plan.

By signing, you give consent for CORE/EI Centro to use the information from your surveys in these two ways. Your signature also allows CORE/EI Centro to share your integrated health care plan with other identified service providers in order to coordinate your health care and to monitor your health.

The written survey will take about 15 minutes. Please ask if you need the survey to be read out loud for you. If you do not understand a question, you may ask the person who gave you the survey.

If you consent to take the surveys and to have them used in the way described above, please sign your name and write today's date below.

Signature

Date

CORE/EI Centro Integrated Health Program PRE-SERVICE CLIENT SURVEY



Name: _____ D.O.B. _____

Date: _____

Please respond to the questions below. Thank you for giving us your helpful feedback!

1. Check (✓) how you learned about our natural health /wellness appointments:

- | | | | |
|---|----------------|--------------------------------------|-------|
| The Healing Center | _____ | CORE/EI Centro staff | _____ |
| Aurora Walker’s Point Community Clinic | _____ | Community Health Promoter | _____ |
| 16 th Street Community Health Ctr. | _____ | Proyecto Salud Staff | _____ |
| My doctor/healthcare practitioner | _____ | Counselor or therapist | _____ |
| Family | _____ | TV, Internet, radio, newspaper, etc. | _____ |
| Friends | _____ | Flyer or brochure | _____ |
| Other _____ | Explain: _____ | | |

2. Would you say in general that your health is:

- Excellent
- Very good
- Good
- Fair, or
- Poor?

3. Please circle the number of days that you exercise in an average week: **0 1 2 3 4 5 6 7**

4. Now thinking about your physical health, which includes physical illness and injury: In the past 30 days, how many days was your health not good? _____ *Or circle N/A (not applicable): N/A*

5. Now thinking about your mental health, which includes stress, depression, and problems with emotions: In the past 30 days, how many days was your mental health not good? _____ *Or circle N/A (not applicable): N/A*

6. During the past 30 days, how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation? _____ *Or circle N/A (not applicable): N/A*

7. Check (✓) all the conditions below that affect you before attending natural/health wellness appointments at CORE/El Centro:

- | | |
|-----------------------------------|--|
| Autism _____ | Attention Deficit Disorder _____ |
| Chronic Fatigue syndrome _____ | Gastrointestinal issues _____ |
| Panic Attacks _____ | Asthma _____ |
| Obesity _____ | Diabetes _____ |
| Weight concerns _____ | Allergies _____ |
| Headaches _____ | High blood pressure _____ |
| Neck Pain _____ | Bell's palsy _____ |
| Back Pain _____ | Multiple Sclerosis _____ |
| Joint Pain _____ | Fibromyalgia _____ |
| Women's Health issues _____ | Lupus _____ |
| Difficulty getting to sleep _____ | Wake up early and cannot sleep _____ |
| Cancer _____ | Undiagnosed symptoms _____ |
| | Trauma (physical or emotional) _____ |
| | {ex: car accident, domestic/sexual violence, war veteran, trauma in relation to immigration or racism, loss due to death or divorce, etc.} |

Other _____ Explain: _____

8. Before you attend natural/health wellness appointments at CORE/El Centro, rate the following areas. Please circle to show if the areas are:

(1) Very Poor ☹, (2) Poor ☺, (3) Neutral 😐, (4) Good, (5) Very Good ☺, or (N/A) Not Applicable.

	☹	☺	☺				☹	☺	☺				
Physical Strength	1	2	3	4	5	N/A	Ability to Think Positively	1	2	3	4	5	N/A
Ease of Breathing	1	2	3	4	5	N/A	Blood Pressure Level	1	2	3	4	5	N/A
Energy Level	1	2	3	4	5	N/A	Health of Relationships	1	2	3	4	5	N/A
Flexibility	1	2	3	4	5	N/A	Eating Habits	1	2	3	4	5	N/A
Medication Level	1	2	3	4	5	N/A	Ability to Cope	1	2	3	4	5	N/A
Sleep	1	2	3	4	5	N/A	Blood Sugar Level	1	2	3	4	5	N/A
Weight	1	2	3	4	5	N/A	Emotional Health	1	2	3	4	5	N/A
Self-esteem	1	2	3	4	5	N/A	Understanding my Health	1	2	3	4	5	N/A
Happiness	1	2	3	4	5	N/A	Ability to Listen to My Body	1	2	3	4	5	N/A
Social Participation (in church, school, etc.)	1	2	3	4	5	N/A	Concentration and focus in work/school	1	2	3	4	5	N/A
Spiritual well-being	1	2	3	4	5	N/A	Use of Community Resources	1	2	3	4	5	N/A
Comfort in my Body	1	2	3	4	5	N/A	Ability to Manage Finances	1	2	3	4	5	N/A

9. Before your natural/health wellness appointments, rate the intensity of the following conditions. Please circle to show if the areas are: (N/A), (1) Mild☺, to (5) Moderate☺, to (10) Severe☹.

		☺				☺					☹
Depression	N/A	1	2	3	4	5	6	7	8	9	10
Stress	N/A	1	2	3	4	5	6	7	8	9	10
Anxiety/Nervousness	N/A	1	2	3	4	5	6	7	8	9	10
Pain	N/A	1	2	3	4	5	6	7	8	9	10
Nightmares	N/A	1	2	3	4	5	6	7	8	9	10

10. I also attend (*check all that apply*):

- Community Health Promoter training
 Healing Center Services
 Aurora Walker’s Point Community Clinic appointments
 Wise Woman/Mujer Sabia
 Other: _____

Please answer the following questions about you and your family.

11. What is your birthdate (MM/DD/YYYY)? _____

12. Please self-identify your gender (i.e. female): _____

13. Check (√) your family’s yearly income:

- \$10,000 or less
 \$10,001 to \$20,000
 \$20,001 to \$30,000
 \$30,001 to \$40,000
 \$40,001 to \$50,000
 \$50,001 and more

14. How many people do you currently support financially (including yourself)? _____

15. Check (√) and write the best description of your race/ethnicity:

- American Indian/Native American What tribe(s)? _____
 Asian American What country of origin? _____
 Black/African American What country of origin? _____
 Latin@ What country of origin? _____
 White/European American What country of origin? _____
 Multiple heritages Describe: _____

Thank you for your help! Please hand in this form at the front desk.

Appendix B.2

CORE/El Centro Integrated Health Program POST-SERVICE CLIENT SURVEY



Name: _____

D.O.B: _____

Date: _____

Please respond to the questions below. Thank you for giving us your helpful feedback!

1. Would you say in general that your health is:

- a. Excellent
- b. Very good
- c. Good
- d. Fair, or
- e. Poor?

2. Please circle the number of days that you exercise in an average week: 0 1 2 3 4 5 6 7

3. Now thinking about your physical health, which includes physical illness and injury: In the past 30 days, how many days was your health not good? _____ Or circle N/A (not applicable): N/A

4. Now thinking about your mental health, which includes stress, depression, and problems with emotions: In the past 30 days, how many days was your mental health not good? _____ Or circle N/A (not applicable): N/A

5. During the past 30 days, how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation? _____ Or circle N/A (not applicable): N/A

6. Check (✓) all the conditions below that still affect you after attending natural/health wellness appointments at CORE/El Centro:

- Autism _____
- Chronic Fatigue syndrome _____
- Panic Attacks _____
- Obesity _____
- Weight concerns _____
- Headaches _____
- Neck Pain _____
- Back Pain _____
- Joint Pain _____
- Women's Health issues _____
- Difficulty getting to sleep _____
- Cancer _____

- Attention Deficit Disorder _____
- Gastrointestinal issues _____
- Asthma _____
- Diabetes _____
- Allergies _____
- High blood pressure _____
- Bell's palsy _____
- Multiple Sclerosis _____
- Fibromyalgia _____
- Lupus _____
- Wake up early and cannot sleep _____
- Undiagnosed symptoms _____
- Trauma (physical or emotional) _____
- {ex: car accident, domestic/sexual violence, war veteran, trauma in relation to immigration or racism, loss due to death or divorce, etc.}

Other _____ Explain: _____

7. After attending natural/health wellness appointments at CORE/El Centro, rate the following areas. Please circle to show if the areas are:

(1) Very Poor 😞, (2) Poor 😐 (3) Neutral 😐, (4) Good 😊, (5) Very Good 😊, or (N/A) Not Applicable.

	😞	😐	😊			😞	😐	😊							
Physical Strength	1	2	3	4	5	N/A			Ability to Think Positively	1	2	3	4	5	N/A
Ease of Breathing	1	2	3	4	5	N/A			Blood Pressure Level	1	2	3	4	5	N/A
Energy Level	1	2	3	4	5	N/A			Health of Relationships	1	2	3	4	5	N/A
Flexibility	1	2	3	4	5	N/A			Eating Habits	1	2	3	4	5	N/A
Medication Level	1	2	3	4	5	N/A			Ability to Cope	1	2	3	4	5	N/A
Sleep	1	2	3	4	5	N/A			Blood Sugar Level	1	2	3	4	5	N/A
Weight	1	2	3	4	5	N/A			Emotional Health	1	2	3	4	5	N/A
Self-esteem	1	2	3	4	5	N/A			Understanding my Health	1	2	3	4	5	N/A
Happiness	1	2	3	4	5	N/A			Ability to Listen to My Body	1	2	3	4	5	N/A
Social Participation (in church, school, etc.)	1	2	3	4	5	N/A			Concentration and focus in work/school	1	2	3	4	5	N/A
Spiritual well-being	1	2	3	4	5	N/A			Use of Community Resources	1	2	3	4	5	N/A
Comfort in my Body	1	2	3	4	5	N/A			Ability to Manage Finances	1	2	3	4	5	N/A

8. After attending natural/health wellness appointments, rate the intensity of the following conditions. Please circle to show if the areas are: (N/A), (1) Mild 😊, to (5) Moderate 😐, to (10) Severe 😞.

	😊					😐					😞	
Depression	1	2	3	4	5	6	7	8	9	10	N/A	
Stress	1	2	3	4	5	6	7	8	9	10	N/A	
Anxiety/Nervousness	1	2	3	4	5	6	7	8	9	10	N/A	
Pain	1	2	3	4	5	6	7	8	9	10	N/A	
Nightmares	1	2	3	4	5	6	7	8	9	10	N/A	

9. If you have completed your treatment plan, do you feel that you have accomplished your health goals?
 Yes No Not applicable

10. Do you have any additional comments or suggestions? _____

Thank you for your help! Please hand in this form at the front desk.

Appendix D

Integrated Treatment Plan				
Client name:		D.O.B:		
Date:				
Program referred by:				
Reason for visit:				
Pain Level: 1 2 3 4 5				
Integrated Services	Frequency	Duration	# of sessions	Expected Outcomes
Massage				
Energy work				
Reiki				
Breathwork				
Acupuncture/Com.				
Tomando [Chronic Disease Management, Spanish only]				
Nutrition				
Nia				
Yoga				
Qigong				
Zumba				
Cranial Sacral				
Practitioner Name:				
Practitioner Signature:				
Client signs below to indicate received copy of treatment plan.				
Client Signature:				
FOR OFFICE USE ONLY				Comments:
CORE Program Codes:	REFER TO:			
IH		AWPCC:		
PLD		HC:		
TH				
TC				
CW				

Appendix E

Final Variables for IRB Exemption

<u>Demographics</u>	<u>Descriptives</u>
Gender	Payment
Age	Treatment Recommendations
Income	Completion of Treatment Plan
Household	Exercise
Race/Ethnicity	
<hr/>	
<u>Independent Variable Time</u>	<u>Independent Variable Treatment</u>
Number of Treatments (24-months and Ever)	Acupuncture
Type of Treatments	Massage
Length of time Engaged (24-months and Ever)	Energy
Time Between Assessments	Cranial Sacral
	Total Types Used
	Total Types Used - Groups (24-months and Ever)
<hr/>	
<u>Dependent Variables</u>	
Health Conditions (25) and Total Number	
General Health	
Subjective Well-Being Responses (24)	
Subjective Mental Health Responses (5)	
Biometrics (blood pressure, heart rate, BMI)	

Appendix F

Missing Values of Dependent Variables

Health Factors	<i>n</i>	<i>M</i>	<i>SD</i>	Missing		No. of Extremes ^a	
				Count	Percent	Low	High
General Health 1	463	2.84	0.98	159	25.6	0	25
General Health 2	367	3.10	0.93	255	41.0	11	23
General Health 3	196	3.09	0.93	426	68.5	10	11
Total Conditions 1	483	3.83	2.99	139	22.3	0	25
Total Conditions 2	392	3.27	2.95	230	37.0	0	17
Total Conditions 3	224	3.17	2.80	398	64.0	0	12
Cognitive Health 1	367	3.56	0.79	255	41.0	9	0
Cognitive Health 2	276	3.69	0.71	346	55.6	11	0
Cognitive Health 3	161	3.63	0.77	461	74.1	7	0
CogH Change12	243	0.15	0.73	379	60.9	6	6
CogH Change13	129	0.11	0.75	493	79.3	2	5
CogH Change23	130	0.07	0.65	492	79.1	1	5
Emotional Health 1	369	6.26	2.28	253	40.7	12	0
Emotional Health 2	281	6.71	2.17	341	54.8	11	0
Emotional Health 3	165	6.72	2.21	457	73.5	8	0
EmoH Change12	251	0.53	2.63	371	59.6	8	8
EmoH Change13	137	0.45	2.58	485	78.0	6	1
EmoH Change23	135	0.03	2.12	487	78.3	4	5
Physical Health 1	358	3.34	0.85	264	42.4	7	0
Physical Health 2	273	3.53	0.76	349	56.1	13	0
Physical Health 3	156	3.56	0.81	466	74.9	2	0
PhyH Change12	235	0.22	0.84	387	62.2	7	11
PhyH Change13	122	0.12	0.90	500	80.4	5	3
PhyH Change23	122	0.12	0.90	500	80.4	5	3
Medical Health 1	314	3.58	0.99	308	49.5	12	0
Medical Health 2	236	3.55	0.97	386	62.1	7	0
Medical Health 3	128	3.50	0.97	494	79.4	5	0
MedH Change12	188	-0.04	1.05	434	69.8	8	4
MedH Change13	91	-0.09	1.13	531	85.4	3	4
MedH Change23	91	0.04	1.00	531	85.4	5	2
*PH301	617	15.06	12.94	721	53.9	0	0
*MH301	625	14.76	12.11	713	53.3	0	0
*MAct301	599	13.76	13.05	739	55.2	0	0
PH302	184	15.60	13.25	1154	86.2	0	0
MH302	184	13.21	12.61	1154	86.2	0	0
MAct302	170	14.74	13.93	1168	87.3	0	0

a. Number of cases outside the range (Mean - 2*SD, Mean + 2*SD).

Little's MCAR test: Chi-Square = 3192.919, DF = 4019, Sig. = 1.000

PH30, MH30,MAct = "in last 30 days" questions

Appendix G.1

Frequencies for Newly Created Groups from Full Sample (N=1278)

Treatment	Frequency	Percent	Valid Percent	Cumulative Percent
Total Treatment Group				
Valid	1-3	655	51.3	51.3
	4-6	254	19.9	71.1
	7-9	134	10.5	81.6
	10+	235	18.4	100.0
	Total	1278	100.0	100.0
Acupuncture Group				
Valid	0	596	46.6	46.6
	1-3	291	22.8	69.4
	4-6	187	14.6	84.0
	7-9	91	7.1	91.2
	10+	113	8.8	100.0
	Total	1278	100.0	100.0
Massage Group				
Valid	0	640	50.1	50.1
	1-3	439	34.4	84.4
	4-6	95	7.4	91.9
	7-9	30	2.3	94.2
	10+	74	5.8	100.0
	Total	1278	100.0	100.0
Energy Group				
Valid	0	899	70.3	70.3
	1-3	301	23.6	93.9
	4-6	40	3.1	97.0
	7-9	16	1.3	98.3
	10+	22	1.7	100.0
	Total	1278	100.0	100.0
Cranial Sacral Group				
Valid	0	1192	93.3	93.3
	1-3	64	5.0	98.4
	4-6	15	1.2	99.5
	7-9	4	.3	99.8
	10+	2	.2	100.0
	Total	1278	100.0	100.0
Total		1278	100.0	

Appendix G.2

Frequencies for Newly Created Groups from Full Sample (N=1278)

Time	Frequency	Percent	Valid Percent	Cumulative Percent
Groupings of Months Engaged in 24-month period				
Valid	0 - 6 mo.	961	75.2	75.2
	6.01 - 12 mo.	123	9.6	84.8
	12.01 - 18 mo	85	6.7	91.5
	18.01 - 24 mo	109	8.5	100.0
	Total	1278	100.0	
Ever Engaged < 30 month or ≥ 30.01 months				
Valid	1-30	913	71.4	71.4
	31+	365	28.6	100.0
	Total	1278	100.0	
Ever Engaged < 1 month, 1-30.99 months , 31 - 99.99, or ≥ 100 months				
Valid	0	411	32.2	32.2
	1-30	502	39.3	71.4
	31-99	358	28.0	99.5
	100+	7	.5	100.0
	Total	1278	100.0	
Financial				
Financial	Frequency	Percent	Valid Percent	Cumulative Percent
Income (estimate) in thousands				
Valid	0-9,999K	98	7.7	7.7
	10-19,999K	501	39.2	46.9
	20-29,999K	446	34.9	81.8
	30-39,999K	60	4.7	86.5
	40-49,999K	10	.8	87.2
	50-54,999K	14	1.1	88.3
	55+K	149	11.7	100.0
	Total	1278	100.0	
Payment Group				
Valid	\$0-20	546	42.6	42.7
	\$21-30	511	39.9	82.8
	\$31-65	221	17.1	100.0
	Total	1278	100.0	
Total		1278	100.0	

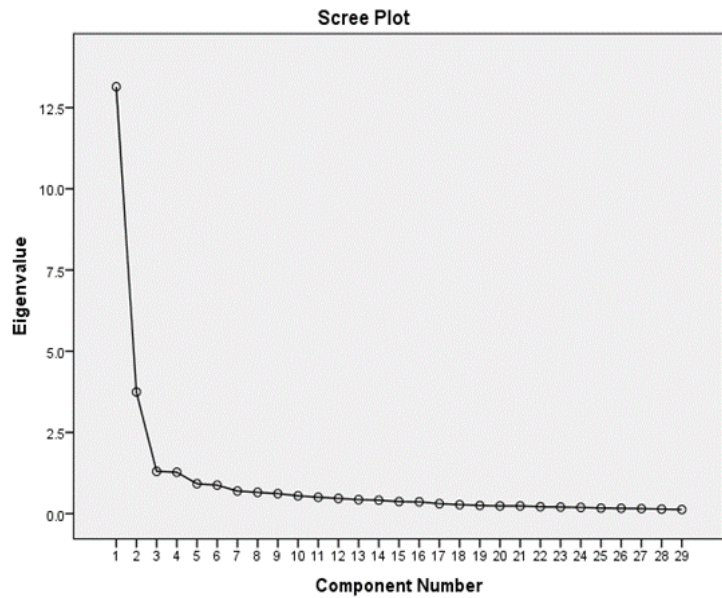
Appendix G.3

Frequencies for Newly Created Groups from Full Sample ($N=1278$)

Total Conditions	Frequency	Percent	Valid Percent	Cumulative Percent
Assessment 1				
Valid	0	150	11.7	17.9
	1-2	176	13.8	39.0
	3-4	208	16.3	63.9
	5+	302	23.6	100.0
	Total	836	65.4	100.0
Missing	System	442	34.6	
Total		1278	100.0	
Assessment 2				
Valid	0	101	7.9	19.6
	1-2	147	11.5	48.1
	3-4	120	9.4	71.3
	5+	148	11.6	100.0
	Total	516	40.4	100.0
Missing	System	762	59.6	
Total		1278	100.0	
Assessment 3				
Valid	0	49	3.8	20.9
	1-2	63	4.9	47.7
	3-4	55	4.3	71.1
	5+	68	5.3	100.0
	Total	235	18.4	100.0
Missing	System	1043	81.6	
Total		1278	100.0	
Treatment Plan Completed				
Valid	no	327	25.6	28.5
	yes	288	22.5	53.6
	no plan	491	38.4	96.3
	unknown	42	3.3	100.0
	Total	1148	89.8	100.0
Missing	System	130	10.2	
Total		1278	100.0	
Exercise Group - number of days in last week				
Valid	0-2 days	201	15.7	54.6
	3-5	124	9.7	88.3
	6-7	43	3.4	100.0
	Total	368	28.8	100.0
Missing	System	910	71.2	
Total		1278	100.0	

Appendix H:
Eigenvalues and Scree Plot from Principle Factor Analysis

Component	Initial Eigenvalues			Loadings			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.143	45.322	45.322	13.143	45.322	45.322	9.391	32.383	32.383
2	3.745	12.914	58.236	3.745	12.914	58.236	3.532	12.180	44.563
3	1.301	4.487	62.723	1.301	4.487	62.723	3.397	11.715	56.277
4	1.275	4.396	67.119	1.275	4.396	67.119	3.144	10.842	67.119
5	.920	3.172	70.291						
6	.877	3.026	73.316						
7	.696	2.400	75.717						
8	.655	2.258	77.975						
9	.616	2.126	80.101						
10	.546	1.884	81.985						
11	.504	1.739	83.724						
12	.468	1.615	85.339						
13	.430	1.483	86.823						
14	.414	1.429	88.252						
15	.371	1.281	89.533						
16	.363	1.253	90.785						
17	.307	1.058	91.844						
18	.277	.954	92.798						
19	.253	.871	93.669						
20	.238	.819	94.488						
21	.237	.817	95.305						
22	.212	.732	96.037						
23	.202	.696	96.733						
24	.192	.661	97.394						
25	.170	.587	97.982						
26	.166	.571	98.553						
27	.155	.534	99.087						
28	.138	.476	99.563						
29	.127	.437	100.000						



Extraction Method: Principal Component Analysis.

Appendix I

This table represents the transformation of treatment frequency received in each of the treatment types as well as the total types of treatments (24 months)

	Type	Frequency	Percent	Valid %	Cumulative %
Acupuncture					
Valid	0	153	24.6	24.6	24.6
	1-3	82	13.2	13.2	37.8
	4-6	186	29.9	29.9	67.7
	7-9	89	14.3	14.3	82.0
	10+	112	18.0	18.0	100.0
Massage					
Valid	0	300	48.2	48.2	48.2
	1-3	126	20.3	20.3	68.5
	4-6	93	15.0	15.0	83.4
	7-9	29	4.7	4.7	88.1
	10+	74	11.9	11.9	100.0
Cranial Sacral					
Valid	0	555	89.2	89.2	89.2
	1-3	46	7.4	7.4	96.6
	4-6	15	2.4	2.4	99.0
	7-9	4	.6	.6	99.7
	10+	2	.3	.3	100.0
Energy Work					
Valid	0	430	69.1	69.1	69.1
	1-3	114	18.3	18.3	87.5
	4-6	40	6.4	6.4	93.9
	7-9	16	2.6	2.6	96.5
	10+	22	3.5	3.5	100.0
Total Types of Treatment					
Valid	1	313	50.3	50.3	50.3
	2	205	33.0	33.0	83.3
	3	87	14.0	14.0	97.3
	4	17	2.7	2.7	100.0

*"Total types" group is unique individuals.

Appendix J

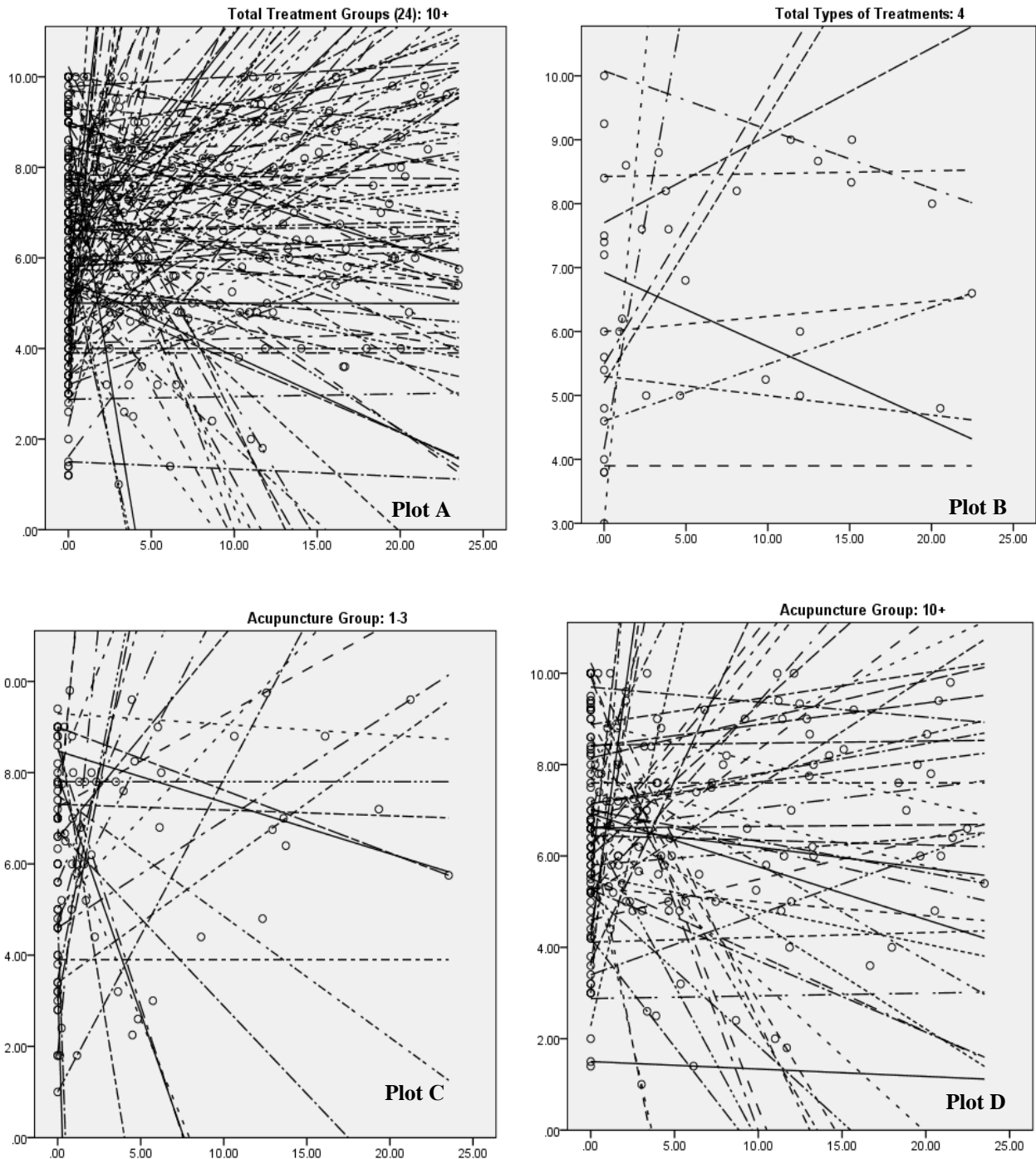


Figure 16. Plot A-B. Spaghetti Plot A (10 or more visits) and Plot B (receiving all four types of treatments) of Emotional Health over three visits in 24 months. Lines represent directions of change.

Figure 16. Plots C-D. Spaghetti Plot C (1-3 visits for acupuncture) and Plot D (10 or more visits for acupuncture) of Emotional Health over three visits in 24 months. Lines represent directions of change.

Appendix K.1

Comparison of General Health Scores Between Assessment One and Assessment Two Split by Treatment Frequency (24 months)

Total Treatment Groups				General Health 2					Total	
				1 = poor	2 = fair	3 = good	4 = very good	5 = excellent		
4-6 Tx	General Health 1 (GH1)	poor	Count	2	3	1	0	0	6	
			% within GH1	33.3%	50.0%	16.7%	0.0%	0.0%	100.0%	
		fair	Count	3	15	16	4	1	39	
			% within GH1	7.7%	38.5%	41.0%	10.3%	2.6%	100.0%	
		good	Count	0	5	23	9	1	38	
			% within GH1	0.0%	13.2%	60.5%	23.7%	2.6%	100.0%	
		very good	Count	0	1	6	21	2	30	
			% within GH1	0.0%	3.3%	20.0%	70.0%	6.7%	100.0%	
		excellent	Count	0	0	2	1	4	7	
			% within GH1	0.0%	0.0%	28.6%	14.3%	57.1%	100.0%	
			Total	Count	5	24	48	35	8	120
				% within GH1	4.2%	20.0%	40.0%	29.2%	6.7%	100.0%
7-9 Tx	General Health 1	poor	Count		5	1	1	0	7	
			% within GH1		71.4%	14.3%	14.3%	0.0%	100.0%	
		fair	Count		14	13	2	0	29	
			% within GH1		48.3%	44.8%	6.9%	0.0%	100.0%	
		good	Count		4	15	10	0	29	
			% within GH1		13.8%	51.7%	34.5%	0.0%	100.0%	
		very good	Count		0	1	9	4	14	
			% within GH1		0.0%	7.1%	64.3%	28.6%	100.0%	
		excellent	Count		1	0	1	3	5	
			% within GH1		20.0%	0.0%	20.0%	60.0%	100.0%	
			Total	Count		24	30	23	7	84
				% within GH1		28.6%	35.7%	27.4%	8.3%	100.0%
10+ Tx	General Health 1	poor	Count	4	2	1	0	1	8	
			% within GH1	50.0%	25.0%	12.5%	0.0%	12.5%	100.0%	
		fair	Count	1	21	19	6	4	51	
			% within GH1	2.0%	41.2%	37.3%	11.8%	7.8%	100.0%	
		good	Count	0	7	40	12	1	60	
			% within GH1	0.0%	11.7%	66.7%	20.0%	1.7%	100.0%	
		very good	Count	0	2	12	15	1	30	
			% within Gener	0.0%	6.7%	40.0%	50.0%	3.3%	100.0%	
		excellent	Count	1	0	1	4	1	7	
			% within GH1	14.3%	0.0%	14.3%	57.1%	14.3%	100.0%	
			Total	Count	6	32	73	37	8	156
				% within GH1	3.8%	20.5%	46.8%	23.7%	5.1%	100.0%

4 - 6 Treatments: McNemar-Bowker Test $\chi^2(8) = 10.829, p = .212$

7 - 9 Treatments: Computed for only a PxP table, where P must be greater than 1.

10+ Treatments: McNemar-Bowker Test $\chi^2(9) = 33.795, p = .100$

Appendix K.2

Comparison of General Health Scores Between Assessment One and Assessment Two Split by Length of Engagement Ever

Time Quadrants		General Health 2					Total		
		1 = poor	2 = fair	3 = good	4 = very good	5 = excellent			
<u>< 1 month</u>	General Health 1 (GH1)	<u>poor</u>	Count	1	0	0	0	1	
			% within GH1	100.0%	0.0%	0.0%	0.0%	100.0%	
		<u>fair</u>	Count	0	2	4	1	7	
			% within GH1	0.0%	28.6%	57.1%	14.3%	100.0%	
		<u>good</u>	Count	0	0	4	1	5	
			% within GH1	0.0%	0.0%	80.0%	20.0%	100.0%	
		<u>very good</u>	Count	0	0	0	3	3	
			% within GH1	0.0%	0.0%	0.0%	100.0%	100.0%	
		<u>Total</u>		Count	1	2	8	5	16
				% within GH1	6.3%	12.5%	50.0%	31.3%	100.0%
<u>1-30 mo.</u>	General Health 1	<u>poor</u>	Count	4	5	1	1	1	12
			% within GH1	33.3%	41.7%	8.3%	8.3%	8.3%	100.0%
		<u>fair</u>	Count	1	34	26	10	4	75
			% within GH1	1.3%	45.3%	34.7%	13.3%	5.3%	100.0%
		<u>good</u>	Count	0	8	52	20	2	82
			% within GH1	0.0%	9.8%	63.4%	24.4%	2.4%	100.0%
		<u>very good</u>	Count	0	1	10	23	1	35
			% within GH1	0.0%	2.9%	28.6%	65.7%	2.9%	100.0%
		<u>excellent</u>	Count	0	0	1	5	7	13
			% within GH1	0.0%	0.0%	7.7%	38.5%	53.8%	100.0%
<u>Total</u>		Count	5	48	90	59	15	217	
		% within GH1	2.3%	22.1%	41.5%	27.2%	6.9%	100.0%	
<u>31-99 mo.</u>	General Health 1	<u>poor</u>	Count	1	5	2	0	0	8
			% within GH1	12.5%	62.5%	25.0%	0.0%	0.0%	100.0%
		<u>fair</u>	Count	3	13	18	1	1	36
			% within GH1	8.3%	36.1%	50.0%	2.8%	2.8%	100.0%
		<u>good</u>	Count	0	7	22	10	0	39
			% within GH1	0.0%	17.9%	56.4%	25.6%	0.0%	100.0%
		<u>very good</u>	Count	0	2	9	18	6	35
			% within GH1	0.0%	5.7%	25.7%	51.4%	17.1%	100.0%
		<u>excellent</u>	Count	1	1	2	1	1	6
			% within GH1	16.7%	16.7%	33.3%	16.7%	16.7%	100.0%
<u>Total</u>		Count	5	28	53	30	8	124	
		% within GH1	4.0%	22.6%	42.7%	24.2%	6.5%	100.0%	

< 1 month: McNemar-Bowker Test $\chi^2(3) = 6.0, p = .112$

1 - 30 months: McNemar-Bowker Test $\chi^2(10) = 32.893, p = .001$

31 - 99 months: McNemar-Bowker Test $\chi^2(9) = 14.297, p = .112$

Appendix K.2 (con't)

Comparison of General Health Scores Between Assessment One and Assessment Two Split by Length of Engagement Ever

Time Quadrants	General Health 2					Total
	1 = poor	2 = fair	3 = good	4 = very good	5 = excellent	
100+ mo. General Health 1	fair	Count	1	0		1
		% within GH1	100.0%	0.0%		100.0%
	good	Count	1	0		1
		% within GH1	100.0%	0.0%		100.0%
	very good	Count	0	1		1
		% within GH1	0.0%	100.0%		100.0%
	Total	Count	2	1		3
		% within GH1	66.7%	33.3%		100.0%

100+ months: Cell values too low for calculation

Appendix K.3

Comparison of Total Conditions Scores Between Assessment One and Assessment Two Split by Treatment Frequency (24 months)

Total Treatment Groups (24)			Total Conditions Group 2				Total	
			0	1-2	3-4	5+		
4-6	Total Conditions Group 1 (TC1)	0	Count	11	6	5	3	25
			% within TC1	44.0%	24.0%	20.0%	12.0%	100.0%
		1-2	Count	8	8	7	1	24
		% within TC1	33.3%	33.3%	29.2%	4.2%	100.0%	
		3-4	Count	7	6	16	7	36
		% within TC1	19.4%	16.7%	44.4%	19.4%	100.0%	
		5+	Count	4	8	12	21	45
		% within TC1	8.9%	17.8%	26.7%	46.7%	100.0%	
		Total	Count	30	28	40	32	130
		% within TC1	23.1%	21.5%	30.8%	24.6%	100.0%	
7-9	Total Conditions Group 1	0	Count	6	3	1	0	10
			% within TC1	60.0%	30.0%	10.0%	0.0%	100.0%
		1-2	Count	2	11	3	2	18
		% within TC1	11.1%	61.1%	16.7%	11.1%	100.0%	
		3-4	Count	4	11	8	5	28
		% within TC1	14.3%	39.3%	28.6%	17.9%	100.0%	
		5+	Count	2	11	4	15	32
		% within TC1	6.3%	34.4%	12.5%	46.9%	100.0%	
		Total	Count	14	36	16	22	88
		% within TC1	15.9%	40.9%	18.2%	25.0%	100.0%	
10+	Total Conditions Group 1	0	Count	10	10	4	3	27
			% within TC1	37.0%	37.0%	14.8%	11.1%	100.0%
		1-2	Count	7	20	7	6	40
		% within TC1	17.5%	50.0%	17.5%	15.0%	100.0%	
		3-4	Count	8	10	12	14	44
		% within TC1	18.2%	22.7%	27.3%	31.8%	100.0%	
		5+	Count	6	9	9	39	63
		% within TC1	9.5%	14.3%	14.3%	61.9%	100.0%	
		Total	Count	31	49	32	62	174
		% within TC1	17.8%	28.2%	18.4%	35.6%	100.0%	

4 - 6 Treatments: McNemar-Bowker Test $\chi^2(6) = 7.599, p = .269$

7 - 9 Treatments: McNemar-Bowker Test $\chi^2(6) = 14.913, p = .021$

10+ Treatments: McNemar-Bowker Test $\chi^2(6) = 5.079, p = .534$

Appendix K.4

Comparison of Total Conditions Between Assessment One and Assessment Two Split by Length of Engagement Ever

Engagement Periods			Total Conditions Group 2				Total	
			0	1-2	3-4	5+		
< 1 month	Total Conditions Group 1 (TC1)	0	Count	1	3	2	0	6
			% within TC1	16.7%	50.0%	33.3%	0.0%	100.0%
	1-2	Count	1	1	1	0	3	
		% within TC1	33.3%	33.3%	33.3%	0.0%	100.0%	
	3-4	Count	0	1	2	0	3	
		% within TC1	0.0%	33.3%	66.7%	0.0%	100.0%	
	5+	Count	0	1	0	4	5	
		% within TC1	0.0%	20.0%	0.0%	80.0%	100.0%	
	Total		Count	2	6	5	4	17
			% within TC1	11.8%	35.3%	29.4%	23.5%	100.0%
1-30 mo	Total Conditions Group 1	0	Count	19	13	5	4	41
			% within TC1	46.3%	31.7%	12.2%	9.8%	100.0%
	1-2	Count	11	24	8	4	47	
		% within TC1	23.4%	51.1%	17.0%	8.5%	100.0%	
	3-4	Count	11	16	22	16	65	
		% within TC1	16.9%	24.6%	33.8%	24.6%	100.0%	
	5+	Count	7	21	15	41	84	
		% within TC1	8.3%	25.0%	17.9%	48.8%	100.0%	
	Total		Count	48	74	50	65	237
			% within TC1	20.3%	31.2%	21.1%	27.4%	100.0%
31-99 mo	Total Conditions Group 1	0	Count	6	3	3	2	14
			% within TC1	42.9%	21.4%	21.4%	14.3%	100.0%
	1-2	Count	5	14	8	5	32	
		% within TC1	15.6%	43.8%	25.0%	15.6%	100.0%	
	3-4	Count	8	10	12	10	40	
		% within TC1	20.0%	25.0%	30.0%	25.0%	100.0%	
	5+	Count	5	6	10	28	49	
		% within TC1	10.2%	12.2%	20.4%	57.1%	100.0%	
	Total		Count	24	33	33	45	135
			% within TC1	17.8%	24.4%	24.4%	33.3%	100.0%
100+ mo	Total Conditions Group 1	0	Count	1			0	1
			% within TC1	100.0%			0.0%	100.0%
	5+	Count	0			2	2	
		% within TC1	0.0%			100.0%	100.0%	
Total		Count	1			2	3	
		% within TC1	33.3%			66.7%	100.0%	

< 1 month: McNemar-Bowker Test $\chi^2(4) = 4.0, p = .406$

1 - 30 months: McNemar-Bowker Test $\chi^2(6) = 17.494, p = .008$

31 - 99 months: McNemar-Bowker Test $\chi^2(6) = 4.372, p = .627$

100+ months: Cell values too low for calculation

Appendix L

Crosstabulation of Association Between Pay Groups and Health Conditions for all Assessments

Health Assessment 1			Total Conditions				Total
			0	1-2	3-4	5+	
Pay_Grp	\$0-15	Count	25	45	53	99	222
		% within Pay Group	11.3%	20.3%	23.9%	44.6%	100.0%
	\$16-30	Count	45	44	67	69	225
		% within Pay Group	20.0%	19.6%	29.8%	30.7%	100.0%
	\$31-65	Count	11	8	8	9	36
		% within Pay Group	30.6%	22.2%	22.2%	25.0%	100.0%
Total		Count	81	97	128	177	483
			16.8%	20.1%	26.5%	36.6%	100.0%

Somer's $d = -.172, p = .001$

Health Assessment 2			Total Conditions				Total
			0	1-2	3-4	5+	
Pay_Grp	\$0-15	Count	30	57	34	69	190
		% within Pay Group	15.8%	30.0%	17.9%	36.3%	100.0%
	\$16-30	Count	39	51	46	43	179
		% within Pay Group	21.8%	28.5%	25.7%	24.0%	100.0%
	\$31-65	Count	6	5	8	4	23
		% within Pay Group	26.1%	21.7%	34.8%	17.4%	100.0%
Total		Count	75	113	88	116	392
			19.1%	28.8%	22.4%	29.6%	100.0%

Somer's $d = -.113, p = .029$

Health Assessment 3			Total Conditions				Total
			0	1-2	3-4	5+	
Pay_Grp	\$0-15	Count	13	30	24	39	106
		% within Pay Group	12.3%	28.3%	22.6%	36.8%	100.0%
	\$16-30	Count	31	27	25	24	107
		% within Pay Group	29.0%	25.2%	23.4%	22.4%	100.0%
	\$31-65	Count	2	4	3	2	11
		% within Pay Group	18.2%	36.4%	27.3%	18.2%	100.0%
Total		Count	46	61	52	65	224
			20.5%	27.2%	23.2%	29.0%	100.0%

Somer's $d = -.199, p = .003$

Appendix M

Scatter Plots for Mean Change Scores between Assessments One and Two for Cognitive, Emotional, and Physical Health

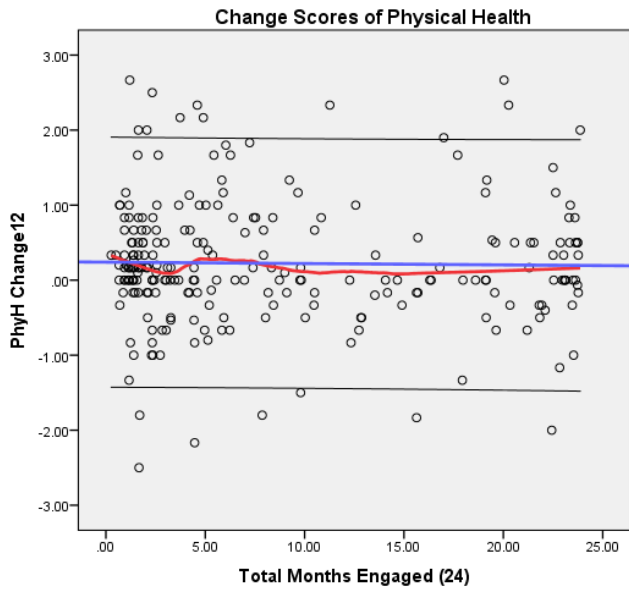


Figure 1a. Scatter Plots of Physical Health change scores

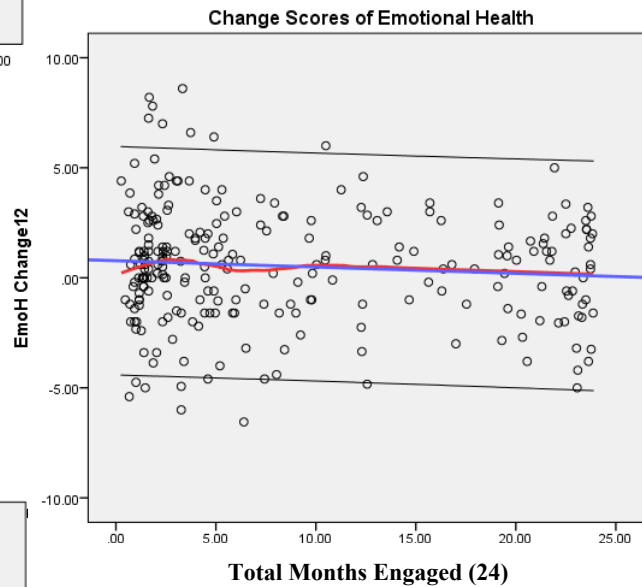


Figure 1b. Scatter Plots of Emotional Health change scores

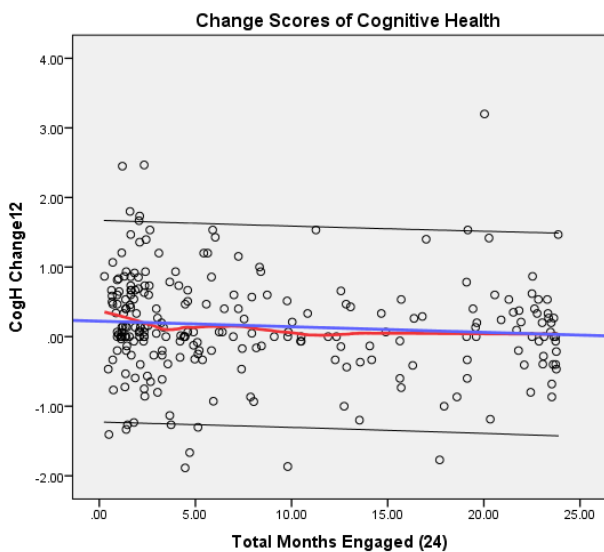


Figure 1c. Scatter Plots of Cognitive Health change scores

Figures 1a-1c. Each figure represents one of the change scores from Physical Health (1a), Emotional Health (1b), and Cognitive Health (1c). The red line indicates the Loess Line of change which presents uneven trajectories of change. The blue line is the Linear line of change and the black lines represent the confidence intervals. There appears to be a very slight trend toward decreases over time.

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