5-3-2017

A Mixed-Methods Feasibility and Acceptability Trial of Mindfulness-Based Wellness and Resilience among Interdisciplinary Primary Care Teams

Dana D. Colgan

Pacific University, colg1118@pacificu.edu

Recommended Citation
A Mixed-Methods Feasibility and Acceptability Trial of Mindfulness-Based Wellness and Resilience among Interdisciplinary Primary Care Teams

Abstract
The purpose of this mixed-methods study was to assess the feasibility, acceptability, and preliminary efficacy of Mindfulness-Based Wellness and Resilience (MBWR), an 8-week training delivered onsite during paid, protected time to interdisciplinary primary care teams. Thirty-eight health care providers were allocated to MBWR (n = 20; two teams) or a wait-list control group (n = 18; two teams). Both groups completed baseline, post-MBWR, and 3-month follow-up measures of resilience, mindfulness, self-compassion, team cohesion, and burnout. Adherence to formal and informal mindfulness practices were assessed. Qualitative data was collected from MBWR participants through post-training focus groups and on-line surveys. Participants in MBWR showed significantly greater improvement in resilience, self-compassion, and mindfulness than participants in the wait-list control. Physicians in the MBWR group reported significant reductions in emotional exhaustion and improved team cohesion, evidencing medium to large effect sizes. Frequency of reported informal mindfulness practice, but not formal mindfulness practice, was significantly correlated with multiple outcomes at post-MBWR and 3-month follow-up. Qualitative analysis revealed themes suggesting that MBWR participants benefited from enhanced awareness, improved team cohesion, increased adaptive coping, improved quality of life, and enhanced quality of patient care. Results demonstrate the feasibility, acceptability, and preliminary efficacy of MBWR for interdisciplinary primary care teams in promoting resilience and reducing burnout, as well as the highlight the associations among informal mindfulness practice and post-training outcomes.

Degree Type
Dissertation

Rights
Terms of use for work posted in CommonKnowledge.

This dissertation is available at CommonKnowledge: https://commons.pacificu.edu/spp/1399
Copyright and terms of use

If you have downloaded this document directly from the web or from CommonKnowledge, see the “Rights” section on the previous page for the terms of use.

If you have received this document through an interlibrary loan/document delivery service, the following terms of use apply:

Copyright in this work is held by the author(s). You may download or print any portion of this document for personal use only, or for any use that is allowed by fair use (Title 17, §107 U.S.C.). Except for personal or fair use, you or your borrowing library may not reproduce, remix, republish, post, transmit, or distribute this document, or any portion thereof, without the permission of the copyright owner. [Note: If this document is licensed under a Creative Commons license (see “Rights” on the previous page) which allows broader usage rights, your use is governed by the terms of that license.]

Inquiries regarding further use of these materials should be addressed to: CommonKnowledge Rights, Pacific University Library, 2043 College Way, Forest Grove, OR 97116, (503) 352-7209. Email inquiries may be directed to: copyright@pacificu.edu

This dissertation is available at CommonKnowledge: https://commons.pacificu.edu/spp/1399
MINDFULNESS-BASED WELLNESS AND RESILIENCE

A MIXED-METHODS
FEASIBILITY AND ACCEPTABILITY TRIAL
OF
MINDFULNESS-BASED WELLNESS AND RESILIENCE
AMONG INTERDISCIPLINARY PRIMARY CARE TEAMS

A DISSERTATION
SUBMITTED TO THE FACULTY
OF
PACIFIC UNIVERSITY
SCHOOL OF GRADUATE PSYCHOLOGY
HILLSBORO, OREGON

BY
DANA DHARMAKAYA COLGAN, MS, MA, CYI-500

IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
MAY 3, 2017
Foremost, I express my deepest appreciation and gratitude for my committee chair, Dr. Michael Christopher. He continually and convincingly conveyed a fervor and passion for research and scholarship that has been matched by none and is contagious to all. During periods of fatigue and doubt, his genuine enthusiasm, selfless availability, keen intellect, and kind humor inspired my growth and sustained my commitment. His foresight, guidance and unwavering faith have been extraordinary and will have long-lasting effects. Furthermore, his remarkable attention to detail has forever rewired by brain, making publishing, and so much more, possible!

I share my profound gratitude to Dean Christiane Brems. Her steadfast commitment to lead from an authentic heart has been a rare and remarkable exemplar. She has been a trusting guide as I walk within two worlds, and she has provided and inspired many unique learning opportunities. Her confidence in me has watered seeds that will flourish for many, many years to come.

Debts of gratitude are owed to: Dr. Sarah Bowen, whose generous mentorship in grant writing, facilitation of mindfulness interventions, and professional development has been instrumental to my growth; Dr. Brian Tucker, whose genuine interest in my development, both as a psychologist and a person, was essential to my success; Dr. Matthew Hunsinger, whose assistance with multilevel linear modeling used for this project was indispensable; Dr. James Lane, who has been a committed mentor in the process and development of the MBWR protocol; And my dear friend, Carole Londerée, whose dedication to keep me on track is incalculable.
My sincere appreciation goes to Eric Oslund, Gil Muñoz, and to all the staff at Virginia Garcia Memorial Health Center, who ardently serve those most in need. Thank you for allowing me to bear witness to your valiant and courageous journeys.

To my cohort, the risk takers and trail blazers! I am forever humbled to walk beside you. Thank you for your constant encouragement, 80’s costume parties, and ping-pong potlucks!

I express my deep gratitude to Babaji, to His Holiness the Karmapa Lama, and all my teachers in their various forms. First and foremost, my parents, John and Susan, who have tirelessly supported my unorthodox journey and encouraged me to continually seek my dreams.

And to my partner and best friend, Don, whose bountiful grace, quiet patience, and endless support never cease to amaze me. You tether me to truth, challenge me to grow, and teach me about love. Again, and again, you sang back the melody of my heart when I had forgotten the words. I cannot repay you for the sacrifices you have made nor the gifts you have given. Thank you. You, my love, are the reason.
ABSTRACT

The purpose of this mixed-methods study was to assess the feasibility, acceptability, and preliminary efficacy of Mindfulness-Based Wellness and Resilience (MBWR), an 8-week training delivered onsite during paid, protected time to interdisciplinary primary care teams. Thirty-eight health care providers were allocated to MBWR (n = 20; two teams) or a wait-list control group (n = 18; two teams). Both groups completed baseline, post-MBWR, and 3-month follow-up measures of resilience, mindfulness, self-compassion, team cohesion, and burnout. Adherence to formal and informal mindfulness practices were assessed. Qualitative data was collected from MBWR participants through post-training focus groups and on-line surveys. Participants in MBWR showed significantly greater improvement in resilience, self-compassion, and mindfulness than participants in the wait-list control. Physicians in the MBWR group reported significant reductions in emotional exhaustion and improved team cohesion, evidencing medium to large effect sizes. Frequency of reported informal mindfulness practice, but not formal mindfulness practice, was significantly correlated with multiple outcomes at post-MBWR and 3-month follow-up. Qualitative analysis revealed themes suggesting that MBWR participants benefited from enhanced awareness, improved team cohesion, increased adaptive coping, improved quality of life, and enhanced quality of patient care. Results demonstrate the feasibility, acceptability, and preliminary efficacy of MBWR for interdisciplinary primary care teams in promoting resilience and reducing burnout, as well as the highlight the associations among informal mindfulness practice and post-training outcomes.

Keywords: resilience, mindfulness, primary care, physicians, burnout
# Table of Contents

<table>
<thead>
<tr>
<th>Acknowledgments</th>
<th>ii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>iv</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>v</td>
</tr>
<tr>
<td>List of Tables and Charts</td>
<td>vii</td>
</tr>
<tr>
<td>Lists of Figures</td>
<td>viii</td>
</tr>
<tr>
<td>Chapter One: Manuscript prepared for the Journal of General Internal Medicine</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>Methods</td>
<td>5</td>
</tr>
<tr>
<td>Results</td>
<td>11</td>
</tr>
<tr>
<td>Discussion</td>
<td>15</td>
</tr>
<tr>
<td>References</td>
<td>19</td>
</tr>
<tr>
<td>Chapter Two: Letter to Editor</td>
<td>26</td>
</tr>
<tr>
<td>Chapter Three: Supplemental Results and Additional Information</td>
<td>28</td>
</tr>
<tr>
<td>Supplemental Qualitative Methods</td>
<td>32</td>
</tr>
<tr>
<td>Supplemental Qualitative Results</td>
<td>33</td>
</tr>
<tr>
<td>Practice Preference and Support and Obstacles to Practice</td>
<td>37</td>
</tr>
<tr>
<td>Chapter Four: Literature Review</td>
<td>38</td>
</tr>
<tr>
<td>The Primary Care Model</td>
<td>39</td>
</tr>
<tr>
<td>Physician Burnout</td>
<td>43</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>44</td>
</tr>
<tr>
<td>Costs</td>
<td>45</td>
</tr>
<tr>
<td>Mindfully Meeting the Challenge</td>
<td>46</td>
</tr>
<tr>
<td>The Construct of Mindfulness</td>
<td>46</td>
</tr>
<tr>
<td>Mindfulness and Western Science</td>
<td>51</td>
</tr>
<tr>
<td>Mindfulness and Healthcare Providers</td>
<td>53</td>
</tr>
<tr>
<td>Mindfulness and Primary Care Providers</td>
<td>54</td>
</tr>
<tr>
<td>Attrition and Adherence</td>
<td>55</td>
</tr>
<tr>
<td>Mechanisms of Mindfulness</td>
<td>57</td>
</tr>
<tr>
<td>Self-Compassion</td>
<td>58</td>
</tr>
<tr>
<td>Team Cohesion</td>
<td>60</td>
</tr>
</tbody>
</table>
Implementing Team-Based Training.................................................................63
Promoting Resilience.........................................................................................63
Summary...............................................................................................................65
Chapter Five: Proposed Methodology .................................................................67
    Procedure .........................................................................................................68
    Participants .......................................................................................................69
    Measures ..........................................................................................................70
    Quantitative ......................................................................................................70
    Qualitative .......................................................................................................73
    Intervention ......................................................................................................73
    Data Analysis ...................................................................................................75
Chapter Six: IRB Approval Letter .......................................................................102
List of Tables and Charts

Table 1: Means, Standard Deviations, and Changes in Outcome Variables for MBWR and Wait-list Control Groups ............................................22

Table 2: Means, Standard Deviations, and Changes in Outcome Variables for Physicians, Nurses and Nurse Practitioners, and Medical Assistants in MBWR ........................................................................................................23

Table 3: Final Qualitative Coding Schema .................................................................................................................................24

Table 4: Informal Practice Questionnaire .................................................................................................................................29

Table 5: Focus Group Questions .....................................................................................................................................................30

Table 6: Means, Standard Deviations, and Changes in Outcome Variables for MBWR and Wait-list Control Groups with Commitment to Organization .................................................................31

Table 7: Table 2: Means, Standard Deviations, and Changes in Outcome Variables for Physicians, Nurses and Nurse Practitioners, and Medical Assistants in MBWR with Commitment to Organization .........................................................32
List of Figures

Figure 1: Participant Flow ........................................................................................................... 27
Chapter One:

Manuscript prepared for the Journal of General Internal Medicine
Introduction

The Triple Aim of Health Care—enhancing patient experience, improving population health, and reducing costs—is dependent on high-performing primary care (Berwick, Nolan, & Whittington, 2008). Waning job satisfaction and increasing rates of burnout among primary care providers, however, pose a serious threat to the health care system. Physician burnout rates range from 30%–65% across medical specialties, with the highest rates experienced by those at the frontline of care, including emergency medicine and primary care (Shanafelt et al., 2015). Burnout is caused by a chronic stressful work environment and progressively develops as a result of ineffective coping strategies (Maslach, Schaufeli, & Leiter, 2001). Burnout can lead to diminished patient satisfaction, longer patient recovery time, and increased medical errors (Ratanawongsa et al., 2008). It is also linked to lower productivity, higher rates of turnover, and early retirement (Dewa, Loong, Bonato, Thanh, & Jacobs, 2014; Thorne, Bultz, Baile, & Team, 2005), and is associated with higher rates of provider depression, anxiety, substance abuse, and suicide (Shanafelt et al., 2009).

In response, Bodenheimer & Sinsky (2014) recommended expanding the Triple Aim of Health Care to a Quadruple Aim, adding the goal of improving the work life of health care providers, including clinicians and staff. While structural interventions within the work environment, such as modifications to clinical work processes, can lead to more effective healthcare and improved work life of health care providers (West, Dyrbye, Erwin, & Shanafelt, 2016), transformations may be incomplete without deeper changes. Changes must also address medical providers’ sense of meaning and job satisfaction to promote resilience in the work place (Beckman et al., 2012; Sinsky et al., 2013).
Resilience has been characterized as a dynamic and flexible process of adaptation to life changes. It is the capacity to respond to stress in a healthy way such that goals are achieved at minimal psychological and physical cost (Epstein & Krasner, 2013). Considered both an interpersonal and intrapersonal process, resilience is postulated to increase medical providers’ ability to respond more skillfully and successfully to the dynamically changing primary care environment. Three essential aims of resilience promoting programs within the medical system include: (a) enhance self-awareness, (b) improve self-regulation, and (c) establish communities of care within health care institutions (Epstein & Krasner, 2013). Mindfulness, a form of mental training that enhances one’s ability to nonjudgmentally attend to the present moment (Kabat-Zinn et al., 1998), has been shown to enhance self-awareness, self-regulation, intrapersonal skills, and team effectiveness (Cameron & Fredrickson, 2015; Eberth & Sedlmeier, 2012; Haimerl & Valentine, 2001; Singh, Singh, Sabaawi, Myers, & Wahler, 2006; Singh et al., 2002). In addition, mindfulness-based interventions (MBIs) have been successful in reducing burnout and improving quality of life among primary care physicians and nurses (Asuero et al., 2014; Fortney, Luchterhand, Zakletskaia, Zgierska, & Rakel, 2013; Krasner et al., 2009; Schroeder, Stephens, Colgan, Hunsigner, Rubin, & Christopher, 2016).

A number of medical centers are now attempting to integrate training in mindfulness, resilience, and teamwork building to reduce burnout (Linzer et al., 2014; West et al., 2016). It has been suggested that the promotion of mindfulness and resilience should not be restricted to the individual level, but must also be considered within group-level (e.g., community and cultural) factors and interactions (Linzer et al., 2014). These recommendations are steeped within a large body of evidence that postulates interpersonal relationships and supportive social environments are important compensatory mechanisms for a stressful work life, contribute to
health care providers’ job satisfaction (DiMeglio et al., 2005; Kluger, Townend, & Laidlaw, 2003), and reduce the well-documented sense of isolation among physicians (Epstein & Krasner, 2013). Specifically among interdisciplinary primary care teams (IPCTs), perceptions of greater team culture have been associated with less emotional exhaustion, a core element of burnout, among medical providers and staff (Willard-Grace et al., 2014).

However, most of the existing mindfulness and resilience-promoting training models are provided during participants’ personal time and among medical providers from multiple medical settings or departments, and, therefore, do not intentionally facilitate community within the work setting (West et al., 2014). Furthermore, a significant limitation repeatedly noted in the MBI literature is high attrition rates due the extensive training required by many MBIs (Shapiro, Astin, Bishop, & Cordova, 2005). While research suggests that the more people practice mindfulness, the better outcomes they experience, including improved mindfulness (Pradhan et al., 2007; Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003) and sleep (Shapiro et al., 2003), and decreased stress (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008), depression (Pradhan et al., 2007), and psychological distress (Shapiro et al., 2003; Shapiro et al., 2008), the extensive time commitments are a significant obstacle for health care providers, given their scarcity of time. Therefore, understanding the differential effects of formal and informal practices on post-training outcomes may provide more information regarding the frequency and intensity of mindfulness practice required to create and sustain effects.

Few published studies have documented successful efforts to promote resilience among primary care providers (West et al., 2016). To the best of the authors’ knowledge, to date no published study has reported the effects of an MBI enhanced with resilience training that is delivered onsite and during the workday to intact IPCTs (West et al., 2016). Furthermore, scant
attention has been paid to the differential impact of formal and informal mindfulness practice outside the training sessions on post-treatment outcomes. Therefore, the objectives of this mixed-method, wait-list control trial were to a) assess the feasibility, acceptability, and preliminary efficacy of Mindfulness-Based Wellness and Resilience (MBWR), an 8-week intervention designed to increase resilience and reduce burnout among IPCTs, and b) investigate the relationships between formal and informal mindfulness practice and post-training outcomes.

Method

Participants

The study was conducted at a safety-net primary care medical center in a medium-sized city in the Pacific Northwest that serves predominately poor, uninsured, and underserved populations, including undocumented immigrants and refugees. Inclusion criteria were: a) employed by the medical center; b) a member of an IPCT, including medical doctor, nurse, nurse practitioner, behavioral health consultant, physician assistant, medical assistant, or team assistant; c) willingness to attend five of the eight sessions; d) consent to complete baseline, post, and 3-month follow-up MBWR measures; and e) speaks English. Individuals were excluded if they endorsed active suicidality or psychosis, or attended a previous pilot study of MBWR. All participants provided a written informed consent that was approved by the Pacific University Institutional Review Board.

Procedures

Recruitment and data collection occurred in Virginia Memorial Health Center Primary Care and Obstetrics (VGMHC) from January 2015 to July 2016. During initial presentations at team meetings, 45 individuals were recruited. Eligible and consenting participants received an email directing them to the study’s website, which was housed on Qualtrics, a secure web-based
survey system. Baseline assessments were collected within two weeks prior to the start date of the training. Because the study was conducted onsite and during paid protected time, preexisting IPCTs were assigned to the MBWR group or a control group in a 1:1 ratio (two MBWR and two wait-list control teams) based on scheduling. Participants were not blind to the groups. Participants completed the same online assessment measures within three weeks of finishing the MBWR training and at 3-month follow-up. Wait-list control groups completed baseline, post, and 3-month follow-up measures at the same time as the MBWR groups and were offered the MBWR training after completing the 3-month follow-up assessments. Qualitative data were gathered from MBWR training participants via focus groups and anonymous on-line surveys that were conducted one week after the completion of the training.

**Intervention**

Mindfulness-Based Wellness and Resilience (MBWR), grounded in the evidence-based mindfulness practices of Mindfulness-Based Stress Reduction (MBWR; Kabat-Zinn, Lipworth, & Burney, 1985) and the Mindful Practice (Epstein, Quill, Krasner, & McDonald, 1999) curriculum, was designed to increase resilience and reduce burnout among IPCTs. Eight, 60-minute weekly sessions delivered at VGMHC included formal mindfulness practices such as body scan, mindful breathing, sitting meditation, loving-kindness, and mindful-movement. Informal mindfulness practices were developed for the primary care setting and were used prior to entering an exam room, or during patient-provider communication, professional consultation, or team meetings. Discussions explored how to integrate informal practices into the workday, utilizing workflow and team member support to create the structure and consistency needed to develop and maintain new skillful responses to stress and adversity in the workplace. Brief didactics and relevant research were also integrated into the weekly classes. The primary
interventionist (DDC) has extensive experience facilitating MBIs training in primary care settings.

**Outcome Measures**

**Feasibility and Acceptability.** Feasibility was assessed by number of participants recruited, MBWR class attendance, and attrition rate. Recruitment of at least 80% of the potential participant pool was used to indicate feasibility. Similar to previous MBSR studies (Moss et al., 2014), treatment completer was defined as attending at least five out of eight sessions. An attrition rate equivalent or smaller than those reported in past MBI studies with health care providers (20%) was used to indicate MBWR feasibility (Shapiro et al., 2005). Acceptability was measured by four items on a Likert-type scale (0 to 6): a) How much did you enjoy this course?; b) How important was this course?; c) Would you recommend this course to a colleague?; and d) Would you participate in follow-up mindfulness sessions? Adherence to informal and formal mindfulness practice was assessed by the measures described below.

**Adherence to Mindfulness Practice.** Formal mindfulness practice was assessed using iMindr (Wahbeh, Zwickey, & Oken, 2011). Participants assigned to the MBWR condition were given an iPod touch device to use for the duration of the training. All devices had the software application, iMINDr (Wahbeh et al., 2011), which was developed to accurately track formal mindfulness practice adherence. Information on time, date, and length of listening for each meditation was collected until post-MBWR. Informal mindfulness practice was assessed weekly using a brief questionnaire developed for this study (Informal Practice Questionnaire; IPQ) that asked which informal mindfulness practices participants were employing throughout the week and how frequently they engaged in the practices.

**Quantitative Measures.** The following self-report outcome measures were collected at
baseline, post, and 3-month follow-up MBWR.

**The Brief Resilience Scale** (Smith et al., 2008) is a 6-item measure designed to assess the ability to bounce back or recover from stress. Higher scores indicate greater resilience. At baseline, the BRS demonstrated good internal consistency ($\alpha = .83$).

**The Five Facet Mindfulness Questionnaire-Short Form** (Bohlmeijer, Peter, Fledderus, Veehof, & Baer, 2011) is a 25-item measure of dispositional or trait mindfulness based on the 39-item Five Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Higher scores for each facet indicate more of the trait. Due to previous reports of poor psychometrics, the Describing and Observing Facets were not assessed (Baer et al., 2008; Christopher, Woodrich, & Tiernan, 2014). At baseline, the three facets of the FFMQ-SF (Acting with Awareness, Nonjudging of Inner Experience, and Nonreactivity to Inner Experience) demonstrated good internal consistency ($\alpha$ ranging from .75-.91).

**The Self-Compassion Scale-Short Form** (Raes, Pommier, Neff, & Van Gucht, 2011) is a 12-item measure that assesses three facets of self-compassion (Self-Kindness, Mindfulness, Common Humanity) and their respective opposites (Self-Judgment, Over-identification, Isolation). Higher scores indicate greater self-compassion. At baseline, the SCS-SF demonstrated good internal consistency ($\alpha = .86$).

**The Team Climate Inventory** (Anderson & West, 1998) is a 37-item, five-factor measure designed to assess effective collaboration in teams. To reduce assessment burden, only the Safety of Participation factor was used. This 12-item factor evaluates the perception of a non-threatening, trusting, and supportive team atmosphere and was used to measure team cohesion.
Higher scores indicate greater team cohesion. At baseline, the Safety of Participation factor of the TCI demonstrated good internal consistency ($\alpha = .95$).

**The Maslach Burnout Inventory** (Maslach, Jackson, & Leiter, 1996) is a 22-item measure designed to assess burnout and job satisfaction. The MASL consists of three subscales: emotional exhaustion, depersonalization, and personal accomplishment. Higher scores on each subscale indicate more of the construct. At baseline, each of the three subscales had adequate internal consistency ($\alpha$ ranging from .75-.90).

An adapted version of the **Expectancy/Credibility Questionnaire** (Devilly & Borkovec, 2000; Hicks, Hanes, & Wahbeh, 2016) is a 2-item questionnaire designed to assess the expected effectiveness of the program, by how much participants think and feel that MBWR will improve their quality of life.

**Qualitative Measures.** Focus groups were conducted one week after the completion of the MBWR trainings. To reduce the threat of social desirability bias among focus groups, electronic anonymous surveys with open-ended questions were also sent to participants after the completion of the MBWR training. Audio recordings of the interviews were transcribed verbatim and combined with written responses from surveys.

**Planned Analyses**

All statistical analyses were performed using IBM SPSS Version 22 (SPSS, 2013). Primary analyses of between-group effects were tested using a multilevel linear modeling (MLM) approach with restricted maximum likelihood estimation (REML). MLM is particularly appropriate for research designs where data for participants are organized at more than one level (i.e., nested data) and allows all subjects to be included in the models, even those with partially
missing data. REML has been suggested to provide more accurate results when the sample size is small (Hox, Moerbeek, & van de Schoot, 2010); therefore, mixed-effects models were consistent with intent-to-treat principles without requiring imputations (Enders, 2010). Group assignment, time (pre, post, and 3-month follow-up), and the interaction between group and time were treated as fixed effects; primary care teams were treated as random effects. Past meditation experience and expectancy of treatment effectiveness were included as covariates in the model. When baseline differences existed for outcomes variables, we examined differences between the MBWR and WL groups at post-training and 3-month follow-up using baseline responses as a covariate to assess training efficacy. When no baseline difference existed, we assessed efficacy by examining the difference between MBWR and WL at post-training and 3-month follow-up when the Group by Time interaction was significant. When the Group by Time interaction was not significant in the omnibus analysis, we continued to follow-up analyses because of the smaller sample size and to report any significant or trend level main effects of group. Statistical significance for all parameter estimates were set at \( p < .05 \), two tailed. Effect sizes were calculated using Cohen’s \( d \) (Cohen, 1992). Reliable Change (Jacobson & Truax, 1991) was examined to explore the differential effects of the training for physicians, nurses and nurse practitioners, and medical assistants. Reliable change (RCI > 1.96) is indicated by change in an outcome score that exceeds measurement error. Zero-order Pearson’s correlations were used to examine the relationship among formal mindfulness practice, informal mindfulness practice, and outcomes post-MBWR and at 3-month follow-up. Lastly, qualitative data were analyzed by employing a conventional content analysis, in which coding categories were derived directly from the text data (Hsieh & Shannon, 2005).
Results

Preliminary Analyses

Of the thirty-one participants, 84% identified as female; 71% identified as Mexican, Latino, or Puerto Rican, 20% as White, 6% as Asian, and 3% as Black. Medical assistants comprised 29% of the sample, primary care physicians comprised 23%, nurse or nurse practitioners 23%, team assistants 6%, physician’s assistants 3%, resident pharmacists 3%, social workers 3%, and other 10% (community resource officers, interns). Compared with published studies of healthcare providers, one-sample t-tests suggested that the current sample had higher emotional exhaustion (Fortney, Luchterhand, Zakletskaya, Zgierska, & Rakel, 2013; Maslach, Jackson, & Leiter, 1996; Schroeder et al., 2016), lower self-compassion (Raes, Pommier, Neff, & Van Gucht, 2011), and resilience, (Schroeder et al., 2016; Smith et al., 2008) and similar levels of trait mindfulness (Tran, Glück, & Nader, 2013).

Feasibility, Acceptability, and Adherence

Results suggest that MBWR was feasible to implement in an interdisciplinary primary care setting among a predominately Latino sample, as evidenced by number of participants recruited, class attendance, and attrition rate. Of the 45-screened primary care team members, six individuals did not meet study eligibility because they were unable to attend at least five of the eight classes. This was due to maternal leave (n = 1), scheduling conflicts due to clinical rotations (n = 4), or pending resignation (n = 1). One individual declined to participate due to a religious conflict with meditation and mindfulness. Thirty-eight individuals enrolled in the study and completed baseline assessments, which meets the 80% enrollment rate benchmark (84%). Due to the shifting nature of IPCTs at VGMHC, seven participants were required to switch teams during the study, moving from the control group to the intervention group (or vice versa). Their
data were not included in the analyses; therefore, the eligible study sample numbered 31 participants. All 31 participants were completers (i.e., attended at least five out of eight sessions) and total class attendance was 88%: Six participants attended all eight sessions, eight participants attended seven sessions, one participant attended six sessions, and two participants attended five sessions. Three MBWR participants and four waitlist participants did not complete the 3-month follow-up assessments. Figure I shows the participant flow.

Participant ratings of the MBWR course suggest acceptability: 87% reported Extremely or Very Much enjoying the course, 82% rated the course as Extremely or Very Important, 100% would recommend the course to a colleague, 100% reported they would attend follow-up or booster sessions, and 100% reported the instructor was Extremely or Very Knowledgeable.

iMINDr (Wahbeh, Zwickey, & Oken, 2011), used to assess adherence to formal mindfulness practice over the 8-week course, revealed that average listening time for the entire 8-week training was 37 minutes, ranging from 1 minute to 94 minutes. Formal mindfulness practices did not significantly correlate with any post-MBWR or 3-month follow-up outcomes (all p’s > .05). Sixty percent of participants reported engaging in one or more informal practice daily (e.g., just this breath, mindful listening, mindful walking), and 100% reported using informal practices several times a week. Frequency of informal practice during the training was significantly positively correlated with post-MBWR resilience ($r = .55; p = .03$), nonjudgmental awareness ($r = .54; p = .04$), team cohesion ($r = .52; p = .05$), and with 3-month follow-up resilience ($r = .57; p = .03$). Finally, attendance was not significant correlated with formal or informal mindfulness practice or training outcomes.
Quantitative Findings

At baseline, there were significant differences between MBWR and waitlist control group in resilience ($p = .006$), nonreactive awareness ($p = .02$), team cohesion ($p = .03$), and personal achievement ($p = .001$). To account for these differences, for each of these dependent variables, the pre-MBWR variable was entered into the respective model as a covariate, and MLM ANCOVAs were performed (Tabachnick & Fidell, 2007).

Analyses revealed a significant Group by Time interaction effect for resilience $F(1,23) = 9.50, p = .005$. Follow-up analyses revealed that after controlling for baseline scores, MBWR participants reported higher levels of resilience at post-MBWR ($M = 23.06, SD = 2.08$) compared to WL participants ($M = 19.21, SD = 2.75$), Cohen’s $d = 1.51$, $F(1,26) = 9.25$, $p < .001$; and at 3-month follow-up ($M_{MBWR} = 24.14$, $SD_{MBWR} = 2.48$; $M_{WL} = 18.10$, $SD_{WL} = 2.88$), Cohen’s $d = 2.23$, $F(1,21) = 20.62$, $p < .001$.

The omnibus analysis also revealed a significant Group by Time interaction effect for self-compassion, $F(1,27) = 8.05$, $p = .008$. Follow-up analyses revealed MBWR participants reported higher levels of self-compassion at post-MBWR ($M = 45.46$, $SD = 7.13$) compared to WL participants ($M = 36.66$, $SD = 8.70$), Cohen’s $d = 1.94$, $F(1,25) = 8.35$, $p < .008$; and at 3-month follow-up ($M_{MBWR} = 46.13$, $SD_{MBWR} = 8.48$; $M_{WL} = 38.20$, $SD_{WL} = 7.13$), Cohen’s $d = 2.23$, $F(1,21) = 20.62$, $p < .001$.

Analyses revealed a nonsignificant Group by Time interaction effect for total mindfulness, $F(1,63) = 3.63; p = .06$; however, follow-up analyses revealed that MBWR participants reported higher levels of total mindfulness at post-3-month follow-up ($M = 55.36$, $SD = 8.55$) compared to WL participants ($M = 49.50$, $SD = 5.83$), Cohen’s $d = 1.31$, $F(1,21) =$
MINDFULNESS-BASED WELLNESS AND RESILIENCE

5.16, \( p < .03 \). The omnibus analysis also revealed a nonsignificant interaction effect for non-judgmental awareness \( F(1,67) = 2.80; p = .09 \); however, follow-up analyses revealed that MBWR participants reported greater nonjudgmental awareness at 3-month follow-up (\( M = 18.07, SD = 4.29 \)) than WL participants (\( M = 16.30, SD = 3.68 \)), Cohen’s \( d = .53, F(1,21) = 4.16, p = .05 \). No significant Group by Time interaction was found for nonreactivity, \( F(1,74) = .78, p = .38 \); however, follow-up analyses revealed that MBWR participants reported higher levels of nonreactivity at post-MBWR (\( M = 17.86, SD = 3.39 \)) compared to WL participants (\( M = 13.16, SD = 2.55 \)), Cohen’s \( d = 1.67, F(1,24) = 9.95, p < .004 \); and a trending difference at 3-month follow-up (\( M_{\text{MBWR}} = 18.57, SD_{\text{MBWR}} = 4.14; M_{\text{WL}} = 14.40, SD_{\text{WL}} = 2.98 \)) Cohen’s \( d = 1.33, F(1,21) = 3.6, p < .07 \).

No statistically significant Group by Time interaction effect or main effects emerged for emotional exhaustion, depersonalization, personal achievement, acting with awareness, and team cohesion (see Table 1).

**Reliable and Statistically Significant Change**

Differential magnitude of change for the largest three professions represented in the MBWR condition was also explored (i.e., physicians, nurses and nurse practitioners, and medical assistants). Separating the sample by job title, pre-to post-MBWR scores of primary care physicians who attended MBWR showed a 3.4-point reduction in emotional exhaustion, indicating a reliable and statistically significant decrease (RCI = 2.32). At post-MBWR, physicians reported reliable and statistically significant increase in team cohesion (RCI = 5.31). At 3-month follow-up, physicians reported sustained, in fact improved, perception of team cohesion (RCI = 10.50). Change in emotional exhaustion (RCI = .44) was not sustained at 3-month follow-up. In comparison, nurses and nurse practitioners who attended MBWR reported a
7.5-point post-MBWR reduction in emotional exhaustion, indicating a reliable and statistically significant decrease (RCI = 5.08). At 3-month follow-up, reported scores of emotional exhaustion increased slightly, but stayed below 29, the cut off score for “High Burnout.” (Maslach et al., 1996) Medical assistants endorsed a 7.5-point reduction in emotional exhaustion at 3-month follow-up (RCI = 1.54; See Table 2).

**Qualitative Analysis**

Analysis of the focus group interviews and open-ended survey questions among MBWR participants ($n = 17$) revealed a number of benefits congruent with quantitative findings including a) increased nonreactive awareness, b) enhanced team cohesion, c) improved adaptive coping and d) increased quality of life. An additional benefit revealed in the content analysis included enhanced quality of patient care. The results also revealed a rich discussion regarding the importance of integrating informal mindfulness practices into the workday. The most commonly reported suggestion for improving the course was that it should be longer and more frequent. Many participants also suggested offering booster sessions to assist in sustaining the practices after the 8-week course. Each of the themes and subthemes, with illustrative participant quotes, are displayed in Table 3.

**Discussion**

The primary aim of this study was to assess the feasibility, acceptability, and preliminary efficacy of an 8-week mindfulness and resilience training delivered during the workday for intact IPCTs. Results indicated that MBWR training was feasible, acceptable, and successfully implemented in a safety-net primary care center among primary care team members who predominately identified as Latina. Safety-net medical centers are designed to reduce health disparities that disproportionately affect racial and ethnic minority groups, the poor, and the
uninsured; these centers also report higher rates of burnout and turnover among healthcare workers than in non-safety-net centers (Hayashi, Selia, & McDonnell, 2009). This small pilot study suggests that MBWR may be a viable and impactful method to integrate mindfulness, resilience, and teamwork training into the primary care setting.

Results also suggest that the MBWR training significantly enhanced resilience, self-compassion, and mindfulness when compared to the participants in the wait-list control group, and changes were sustained at three-month follow-up. Contrary to our hypotheses, statistically significant differences in burnout and team cohesion were not found between the trial arms. Post-hoc analyses, however, revealed 3.4 to 7.5 point reductions in emotional exhaustion among physicians, nurses and nurse practitioners, and medical assistants. Previous research has demonstrated that reducing physician burnout, even by one-point, is linked with meaningful differences in self-perceived major medical errors (West et al., 2016) reduction in work hours (Shanafelt et al., 2015), and suicidal ideation (Shanafelt et al., 2012), suggesting that while not statistically significant, MBWR evidenced meaningful reductions in emotional exhaustion. Similarly, team cohesion improved by 2.5 to 3.6 points, which has been shown to be a protective factor against burnout among physicians. Physicians appeared to have the greatest impact relative to other healthcare providers, evidencing a large effect size. Qualitative analyses provided corroborating data revealing themes of improved mindfulness, enhanced team cohesion, increased employment of skillful coping skills, and improved quality of life and patient care following MBWR.

Two factors of burnout, personal achievement and depersonalization, did not show improvements after MBWR, and physician emotional exhaustion was not sustained at 3-month follow-up. Consistent with participant qualitative feedback, additional training sessions may
MINDFULNESS-BASED WELLNESS AND RESILIENCE

have sustained or maximized the effect of the training. In addition to preventive resilience training offered during medical school, interventions that are designed to more specifically address other elements of distress, such as structural transformation and clinical work flow processes are also likely required to fully address the nation’s epidemic of burnout among primary care providers (West et al., 2016).

Finally, this study provides unique findings related to the relationships among adherence to formal and informal mindfulness practice and post-training outcomes among medical providers. There were significant correlations between frequency of informal mindfulness practice, but not formal mindfulness practice, and post-MBWR resilience, mindfulness, and team cohesion, and 3-month follow-up resilience. These results support efforts to integrate and emphasize informal mindfulness practices into the workday. Fundamental to these efforts is the creation of a “container” within which the culture of mindfulness can be cultivated and sustained. This container is deliberate and consistent practice: We become skilled at what we habitually do (Epstein, 2017). Providing opportunities for the IPCTs to train together and create their own authentic workflows that incorporate informal mindfulness practices, may reduce sympathetic activation, improve emotion regulation, and enhance coping with psychological challenges (Duchemin, Steinberg, Marks, Vanover, & Klatt, 2015; Hölzel et al., 2013; Westphal et al., 2015). These brief, yet frequent informal mindfulness practices, may bolster mental immunity in the individual, as well as develop and sustain a culture of mindfulness-based resilience within the primary care work environment.

The results of this study illustrate the potential benefits of an institutional commitment to provider well-being, offering at least a partial solution to the current crisis of physician burnout. In this feasibility trial, MBWR was successful at significantly enhancing resilience, mindfulness,
and self-compassion among IPCTs. Frequency of informal mindfulness practice, but not formal mindfulness practice, was positively associated with post-MBWR resilience, mindfulness, and team cohesion, providing evidence in support of efforts to integrate training in mindfulness, resilience, and teamwork building to reduce burnout (Linzer et al., 2014; West et al., 2016). Findings suggest that individual and team mindfulness-based resilience-promoting trainings, such as MBWR, may assist the cultivation and sustention a thriving and flourishing primary care community.

The results of this study must be interpreted with caution. The small sample size reduced the statistical power. Additionally, all of the measures were self-report questionnaires. Although all of the measures have demonstrated acceptable reliability, they are nonetheless vulnerable to possible distortions and response bias. Future larger clinical trials are needed to explore the effects of MBWR on providers’ health and physiological functioning, patient-provider communication and relationship, while also exploring potential mechanisms of actions of MBWR.
References


MINDFULNESS-BASED WELLNESS AND RESILIENCE


and professionalism: a randomized clinical trial. *JAMA Internal Medicine, 174*(4), 527-533.


Figure 1. Participant Flow

Assessed for eligibility \((n = 45)\)  

Excluded for not meeting inclusion criteria \((n = 6)\)  
Declined due to religious orientation \((n = 1)\)

Allocated \((n = 38)\)

Allocated to MBWR and received training  
\(\text{(n = 20)}\)

Allocated to wait-list control  
\(\text{(n = 18)}\)

Allocated to MBWR and received training

Analyzed \(\text{(n = 17)}\)

Analyzed \(\text{(n = 14)}\)

Analyzed \(\text{(n = 14)}\)

Analyzed \(\text{(n = 10)}\)
Table 1. Means, Standard Deviations, and Changes in Outcome Variables for MBWR and Wait-list Control Groups at Baseline, Post-MBWR, and 3-Month Follow-Up

<table>
<thead>
<tr>
<th>Outcome Variables</th>
<th>MBWR</th>
<th>Control</th>
<th>MLM (Group X Time)</th>
<th>Effect Size (d)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>3FU M (SD)</td>
<td>Post</td>
<td>3FU M (SD)</td>
</tr>
<tr>
<td>BRS</td>
<td>18.23</td>
<td>23.06</td>
<td>(2.77)</td>
<td>15.64</td>
<td>19.21</td>
</tr>
<tr>
<td></td>
<td>24.14</td>
<td>(2.48)</td>
<td>18.10</td>
<td>(2.88)</td>
<td></td>
</tr>
<tr>
<td>Total FFMQ</td>
<td>51.76</td>
<td>51.86</td>
<td>(6.56)</td>
<td>49.50</td>
<td>48.08</td>
</tr>
<tr>
<td></td>
<td>55.36</td>
<td>(8.55)</td>
<td>49.50</td>
<td>(5.83)</td>
<td></td>
</tr>
<tr>
<td>NR</td>
<td>17.23</td>
<td>17.86</td>
<td>(3.03)</td>
<td>14.35</td>
<td>13.16</td>
</tr>
<tr>
<td></td>
<td>18.57</td>
<td>(4.13)</td>
<td>14.40</td>
<td>(2.98)</td>
<td></td>
</tr>
<tr>
<td>AWA</td>
<td>18.30</td>
<td>17.40</td>
<td>(3.67)</td>
<td>18.50</td>
<td>18.66</td>
</tr>
<tr>
<td></td>
<td>18.71</td>
<td>(3.45)</td>
<td>18.80</td>
<td>(3.52)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.07</td>
<td>(4.13)</td>
<td>16.30</td>
<td>(3.68)</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>16.23</td>
<td>16.60</td>
<td>(4.66)</td>
<td>16.64</td>
<td>16.20</td>
</tr>
<tr>
<td></td>
<td>18.07</td>
<td>(4.29)</td>
<td>16.30</td>
<td>(3.68)</td>
<td></td>
</tr>
<tr>
<td>SCS</td>
<td>42.64</td>
<td>45.46</td>
<td>(8.20)</td>
<td>37.71</td>
<td>36.66</td>
</tr>
<tr>
<td></td>
<td>46.13</td>
<td>(8.48)</td>
<td>38.20</td>
<td>(7.13)</td>
<td></td>
</tr>
<tr>
<td>TCI</td>
<td>36.70</td>
<td>38.13</td>
<td>(6.02)</td>
<td>40.42</td>
<td>39.58</td>
</tr>
<tr>
<td></td>
<td>38.93</td>
<td>(4.48)</td>
<td>40.60</td>
<td>(5.10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38.93</td>
<td>(4.63)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masl-EE</td>
<td>32.41</td>
<td>30.40</td>
<td>(10.03)</td>
<td>29.78</td>
<td>29.16</td>
</tr>
<tr>
<td></td>
<td>29.00</td>
<td>(10.05)</td>
<td>30.60</td>
<td>(11.61)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>29.00</td>
<td>(10.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masl-PA</td>
<td>50.11</td>
<td>49.93</td>
<td>(3.67)</td>
<td>44.35</td>
<td>44.25</td>
</tr>
<tr>
<td></td>
<td>48.69</td>
<td>(4.55)</td>
<td>43.90</td>
<td>(8.54)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48.69</td>
<td>(6.51)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masl-DP</td>
<td>8.94</td>
<td>9.26</td>
<td>(3.79)</td>
<td>10.93</td>
<td>9.50</td>
</tr>
<tr>
<td></td>
<td>10.23</td>
<td>(4.50)</td>
<td>10.00</td>
<td>(3.86)</td>
<td></td>
</tr>
</tbody>
</table>

Note: 3FU = 3-Month Follow-Up; BRS = Brief Resilience Scale; Total FFMQ = Three Facets (Act with Awareness, Non-Judgmental Awareness, and Nonreactivity) of Five Facets Mindfulness Questionnaire; NR = Nonreactivity of Inner Experiences Facet of FFMQ; AWA = Act With Awareness Facet of the FFMQ; NJ= Nonjudgmental Awareness Facet of the FFMQ; SCS = Self Compassion Scale- Short Form; TCI = Safety of Participation Factor of Team Climate Inventory; Masl-EE = Emotional Exhaustion Factor of Maslach Burnout Inventory; Masl-PA = Personal Achievement Factor of Maslach Burnout Inventory; Masl-DP = Depersonalization Factor of Maslach Burnout Inventory.
MINDFULNESS-BASED WELLNESS AND RESILIENCE

Table 2.

Means, Standard Deviations, and Changes in Outcome Variables for Physicians, Nurses and Nurse Practitioners, and Medical Assistants in MBWR at Baseline, Post-MBWR and 3-month Follow-Up

<table>
<thead>
<tr>
<th>Outcome Variables</th>
<th>Physicians (n = 5)</th>
<th>Nurses and Nurse Practitioners (n = 4)</th>
<th>Medical Assistants (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>3FU</td>
</tr>
<tr>
<td></td>
<td>RI &amp; d Pre-</td>
<td>RI &amp; d Pre-</td>
<td>RCI &amp; d Pre-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre-</td>
<td>3FU</td>
</tr>
<tr>
<td>BRS</td>
<td>24.00</td>
<td>24.60</td>
<td>25.80</td>
</tr>
<tr>
<td></td>
<td>(2.80)</td>
<td>(2.19)</td>
<td>(2.59)</td>
</tr>
<tr>
<td>Total FFMQ</td>
<td>55.00</td>
<td>56.00</td>
<td>57.60</td>
</tr>
<tr>
<td></td>
<td>(6.74)</td>
<td>(4.63)</td>
<td>(8.67)</td>
</tr>
<tr>
<td>NR</td>
<td>17.20</td>
<td>18.60</td>
<td>20.60</td>
</tr>
<tr>
<td></td>
<td>(2.58)</td>
<td>(2.70)</td>
<td>(2.70)</td>
</tr>
<tr>
<td>AWA</td>
<td>18.00</td>
<td>16.20</td>
<td>16.80</td>
</tr>
<tr>
<td></td>
<td>(4.00)</td>
<td>(3.03)</td>
<td>(3.49)</td>
</tr>
<tr>
<td>NJ</td>
<td>19.80</td>
<td>21.20</td>
<td>20.20</td>
</tr>
<tr>
<td></td>
<td>(3.70)</td>
<td>(1.92)</td>
<td>(3.63)</td>
</tr>
<tr>
<td>SCS</td>
<td>46.20</td>
<td>45.20</td>
<td>47.20</td>
</tr>
<tr>
<td></td>
<td>(9.83)</td>
<td>(6.97)</td>
<td>(7.66)</td>
</tr>
<tr>
<td>TCI</td>
<td>40.40</td>
<td>43.00</td>
<td>44.00</td>
</tr>
<tr>
<td></td>
<td>(4.27)</td>
<td>(1.41)</td>
<td>(1.41)</td>
</tr>
<tr>
<td>Masl-EE</td>
<td>30.00</td>
<td>26.60</td>
<td>29.20</td>
</tr>
<tr>
<td></td>
<td>(4.52)</td>
<td>(3.28)</td>
<td>(6.64)</td>
</tr>
<tr>
<td>Masl-PA</td>
<td>50.40</td>
<td>52.40</td>
<td>52.60</td>
</tr>
<tr>
<td></td>
<td>(4.45)</td>
<td>(4.82)</td>
<td>(2.60)</td>
</tr>
<tr>
<td>Masl-DP</td>
<td>9.40</td>
<td>9.40</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>(3.28)</td>
<td>(3.13)</td>
<td>(4.77)</td>
</tr>
</tbody>
</table>

Note: 3FU= 3-Month Follow-Up; RCI = BRS = Brief Resilience Scale; Total FFMQ = Three Facets (Act with Awareness, Non-Judgmental Awareness, and Nonreactivity) of Five Facets Mindfulness Questionnaire; NR = Nonreactivity of Inner Experiences Facet of FFMQ; AWA = Act With Awareness Facet of the FFMQ; NJ= Nonjudgmental Awareness Facet of the FFMQ; SCS = Self-Compassion Scale-Short Form; Factor of Maslach Burnout Inventory; Masl-DP = Depersonalization Factor of Maslach Burnout Inventory. * = Reliable and clinically significant change.
Table 3.

**Final Qualitative Coding Scheme**

<table>
<thead>
<tr>
<th>Themes &amp; Subthemes</th>
<th>Quotes Illustrating the Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increased Nonreactive Awareness</td>
<td>I am much more aware of my emotions. I recognize my stress sooner.</td>
</tr>
<tr>
<td>2. Increased Adaptive Coping</td>
<td>I have learned to do a very quick re-centering which I can use in the middle of a very busy day to get back to balance quickly.</td>
</tr>
<tr>
<td></td>
<td>[It has helped] being able to take a simple moment to step back and regroup when we have an emotionally difficult situation with a patient or each other.</td>
</tr>
<tr>
<td>3. Enhanced Team Cohesion</td>
<td>If just feels better, and cohesive. Kind of like of knowing that we are in this together and we can do this. Like team spirit. There is more “team-ness.”</td>
</tr>
<tr>
<td>3a. Communication</td>
<td>[The training] has helped us to have better communication with each other, listen to each other, and work as a team.</td>
</tr>
<tr>
<td>3b. Social Support</td>
<td>We have more trust among each other. I am more comfortable with my teammates.</td>
</tr>
<tr>
<td>3c. Common Humanity</td>
<td>It is helpful to know that you are not the only one dealing with stressful situations.</td>
</tr>
<tr>
<td>4. Enhanced Quality of Life</td>
<td>Even at home. It has been helpful to use [practices] in situations that maybe are not necessarily stressful but in situation where perhaps in the past I Would not have paid as much attention and I feel that am appreciate some of those activities maybe more than I would have before.</td>
</tr>
<tr>
<td>5. Increased Quality of Patient Care</td>
<td>I can focus my attention better and longer when [I am] with patients and colleagues.</td>
</tr>
<tr>
<td>6. Integration into the Work Day</td>
<td>Walking for 10 minutes at the end of my lunch break every day has been wonderful, but it has also made me more aware of other mindfulness activities I can slip in on an ongoing basis.</td>
</tr>
<tr>
<td></td>
<td>I like the star on the door. That star I saw every time I went into a room. Something that I see all the time [was helpful].</td>
</tr>
<tr>
<td></td>
<td>I've really enjoyed adding mindfulness to our team meetings and also knowing I can count on my team members to remind me to be mindful.</td>
</tr>
</tbody>
</table>
Chapter Two:

Letter to the Editor
May 13, 2017

Richard L. Kravitz, MD MPSH and Mitchell D. Feldman, MD MPHil
Co-Editors in Chief
Journal of General Internal Medicine

Dear Dr. Kravitz and Dr. Feldman,

We are pleased to submit our manuscript entitled: A Mixed-Methods Feasibility and Acceptability Trial to Assess Mindfulness-Based Wellness and Resilience among Interdisciplinary Primary Care Teams. This study was a wait-list control trial to assess the feasibility, acceptability, and preliminary efficacy of Mindfulness-Based Wellness and Resilience (MBWR), an 8-week training delivered onsite during paid, protected time to interdisciplinary primary care teams. We found participants in MBWR showed significantly greater improvement in resilience, self-compassion, and mindfulness than participants in the wait-list control. Physicians in the MBWR group reported significant reductions in emotional exhaustion and improved team cohesion. Frequency of reported informal mindfulness practice, but not formal mindfulness practice, was significantly correlated with multiple outcomes at post-MBWR and 3-month follow-up.

This manuscript has not been previously published and is not under consideration in the same or substantially similar form in any other peer-reviewed media. We presented a preliminary version of the manuscript as oral presentation at the International Congress on Integrative Medicine in Las Vegas, Nevada in 2016.

All authors listed have contributed sufficiently to the project to be included as authors, and all those who are qualified to be authors are listed in the author byline. To the best of our knowledge, no conflict of interest, financial or other, exists. We have included acknowledgements, conflicts of interest, and funding sources after the discussion. I will be serving as corresponding author for this manuscript. We thank you in advance for taking the time to review our work.

Sincerely,

Dana Dharmakaya Colgan
PhD Candidate
School of Graduate Psychology
Pacific University
190 SE 8th Ave.
Hillsboro, OR 97123
Phone: 001-970 819 1216
Fax: 001-503-352-2623
Email: colg1118@pacificu.edu
Chapter Three:
Supplemental Results and Additional Information
Table 4.
Informal Practice Questionnaire

<table>
<thead>
<tr>
<th>How often did you practice informal mindfulness this week?</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>noticing automatic pilot</td>
<td>noticing bodily sensations</td>
<td>noticing mindfulness during a daily activity</td>
<td>mindful breathing</td>
</tr>
<tr>
<td>mindfulness during a daily activity</td>
<td>noticing mindfulness during a daily activity</td>
<td>mindful breathing</td>
<td>just this breath</td>
</tr>
<tr>
<td>mindful breathing</td>
<td>mindful breathing</td>
<td>mindful breathing</td>
<td>Stop Be, Body, Breath</td>
</tr>
<tr>
<td>mindful walking</td>
<td>mindful walking</td>
<td>mindful walking</td>
<td>pulse with presences</td>
</tr>
<tr>
<td>mindful transitions</td>
<td>mindful transitions</td>
<td>mindful transitions</td>
<td>mindful listening</td>
</tr>
<tr>
<td>loving kindness</td>
<td>loving kindness</td>
<td>loving kindness</td>
<td>three-minute breathing space</td>
</tr>
</tbody>
</table>

Others: _______________________________________________________

Insert number of times this week __________________________

What were the obstacles?
__________________________________________________________

What supports did you use?
__________________________________________________________
Table 5.
*Focus Group Questions*

<table>
<thead>
<tr>
<th>Questions</th>
<th>Follow-Up Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What was helpful about this class?</td>
<td></td>
</tr>
<tr>
<td>2. What role does mindfulness play in your work day?</td>
<td>Can you describe how your response to stress has been affected because of this class?</td>
</tr>
<tr>
<td>3. Which practices are you still using and shy?</td>
<td></td>
</tr>
<tr>
<td>4. How will you sustain the practice during the coming months/years?</td>
<td></td>
</tr>
<tr>
<td>5. How has taking this class together affected your team?</td>
<td></td>
</tr>
<tr>
<td>6. How could this class be improved?</td>
<td>What did not work? What concerns do you have about this class?</td>
</tr>
<tr>
<td>Outcome Variables</td>
<td>MBWR</td>
</tr>
<tr>
<td>-------------------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>Pre M (SD)</td>
</tr>
<tr>
<td>BRS</td>
<td>18.23 (2.77)</td>
</tr>
<tr>
<td>Total FFMQ</td>
<td>51.76 (6.56)</td>
</tr>
<tr>
<td>NR</td>
<td>17.23 (3.03)</td>
</tr>
<tr>
<td>AWA</td>
<td>18.30 (3.67)</td>
</tr>
<tr>
<td>NJ</td>
<td>16.23 (4.66)</td>
</tr>
<tr>
<td>SCS</td>
<td>42.64 (8.20)</td>
</tr>
<tr>
<td>CTO</td>
<td>22.76 (3.45)</td>
</tr>
<tr>
<td>TCI</td>
<td>36.70 (6.02)</td>
</tr>
<tr>
<td>Masl-EE</td>
<td>32.41 (10.03)</td>
</tr>
<tr>
<td>Masl-PA</td>
<td>50.11 (3.67)</td>
</tr>
<tr>
<td>Masl-DP</td>
<td>8.94 (3.79)</td>
</tr>
</tbody>
</table>

Note: 3FU= 3-Month Follow-Up; BRS = Brief Resilience Scale; Total FFMQ = Three Facets (Act with Awareness, Non-Judgmental Awareness, and Nonreactivity) of Five Facets Mindfulness Questionnaire; NR = Nonreactivity of Inner Experiences Facet of FFMQ; AWA = Act With Awareness Facet of the FFMQ; NJ= Nonjudgmental Awareness Facet of the FFMQ; SCS = Self Compassion Scale- Short Form; CTO = Commitment to Organization; TCI = Safety of Participation Factor of Team Climate Inventory; Masl-EE = Emotional Exhaustion Factor of Maslach Burnout Inventory; Masl-PA = Personal Achievement Factor of Maslach Burnout Inventory; Masl-DP = Depersonalization Factor of Maslach Burnout Inventory. *p < .05
## MINDFULNESS-BASED WELLNESS AND RESILIENCE

Table 7. Means, Standard Deviations, and Changes in Outcome Variables for Physicians, Nurses and Nurse Practitioners, and Medical Assistants in MBWR at Baseline, Post-MBWR, and 3-month Follow-Up With CTO

<table>
<thead>
<tr>
<th>Outcome Variables</th>
<th>Physicians (n = 5)</th>
<th>Nurses and Nurse Practitioners (n = 4)</th>
<th>Medical Assistants (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>3FU</td>
</tr>
<tr>
<td></td>
<td>RCI &amp; d</td>
<td>RCI &amp; d</td>
<td>Pre-Post</td>
</tr>
<tr>
<td>BRS</td>
<td>(24.00)</td>
<td>(24.60)</td>
<td>(25.80)</td>
</tr>
<tr>
<td></td>
<td>(.280)</td>
<td>(.219)</td>
<td>(.259)</td>
</tr>
<tr>
<td>Total</td>
<td>(55.00)</td>
<td>(56.00)</td>
<td>(57.60)</td>
</tr>
<tr>
<td>FFMQ</td>
<td>(6.74)</td>
<td>(4.63)</td>
<td>(8.67)</td>
</tr>
<tr>
<td>NR</td>
<td>(17.20)</td>
<td>(18.60)</td>
<td>(20.60)</td>
</tr>
<tr>
<td></td>
<td>(.258)</td>
<td>(.270)</td>
<td>(.270)</td>
</tr>
<tr>
<td>AWA</td>
<td>(18.00)</td>
<td>(16.20)</td>
<td>(16.80)</td>
</tr>
<tr>
<td></td>
<td>(4.00)</td>
<td>(3.03)</td>
<td>(3.49)</td>
</tr>
<tr>
<td>NJ</td>
<td>(19.80)</td>
<td>(21.20)</td>
<td>(20.20)</td>
</tr>
<tr>
<td></td>
<td>(.370)</td>
<td>(.192)</td>
<td>(.363)</td>
</tr>
<tr>
<td>SCS</td>
<td>(46.20)</td>
<td>(45.20)</td>
<td>(47.20)</td>
</tr>
<tr>
<td></td>
<td>(9.83)</td>
<td>(6.97)</td>
<td>(7.66)</td>
</tr>
<tr>
<td>CTO</td>
<td>(23.60)</td>
<td>(26.20)</td>
<td>(25.20)</td>
</tr>
<tr>
<td></td>
<td>(3.36)</td>
<td>(.83)</td>
<td>(3.70)</td>
</tr>
<tr>
<td>TCI</td>
<td>(40.40)</td>
<td>(43.00)</td>
<td>(44.00)</td>
</tr>
<tr>
<td></td>
<td>(4.27)</td>
<td>(1.41)</td>
<td>(1.41)</td>
</tr>
<tr>
<td>Masl- EE</td>
<td>(30.00)</td>
<td>(26.60)</td>
<td>(29.20)</td>
</tr>
<tr>
<td></td>
<td>(4.52)</td>
<td>(3.28)</td>
<td>(6.64)</td>
</tr>
<tr>
<td>Masl- PA</td>
<td>(50.40)</td>
<td>(52.40)</td>
<td>(52.60)</td>
</tr>
<tr>
<td></td>
<td>(4.45)</td>
<td>(4.82)</td>
<td>(2.60)</td>
</tr>
<tr>
<td>Masl- DP</td>
<td>(9.40)</td>
<td>(9.40)</td>
<td>(10.4)</td>
</tr>
<tr>
<td></td>
<td>(3.28)</td>
<td>(3.13)</td>
<td>(4.77)</td>
</tr>
</tbody>
</table>

**Note:** 3FU = 3-Month Follow-Up; RCI = BRS = Brief Resilience Scale; Total FFMQ = Three Facets (Act with Awareness, Non-Judgmental Awareness, and Nonreactivity) of Five Facets Mindfulness Questionnaire; NR = Nonreactivity of Inner Experiences Facet of FFMQ; AWA = Act With Awareness Facet of the FFMQ; NJ = Nonjudgmental Awareness Facet of the FFMQ; SCS = Self-Compassion Scale-Short Form; CTO = Commitment to Organization; TCI = Safety of Participation Factor of Team Climate Inventory; Masl-EE = Emotional Exhaustion Factor of Maslach Burnout Inventory; Masl-PA = Personal Achievement Factor of Maslach Burnout Inventory; Masl-DP = Depersonalization Factor of Maslach Burnout Inventory. * = Reliable and clinically significant change.
Supplemental Information Regarding Qualitative Methods

Qualitative data were gathered via focus groups and on-line surveys. Focus groups were conducted one week after the completion of the MBWR training. Mindful inquiry, recognized as a valid qualitative interview tool (Bentz & Shapiro, 1998), was employed to understand the participants’ first-person perspectives on how they experienced the training and its effects. This interview approach permitted discussion and allowed for data to enter the interview that was not directly sought, thus allowing participants to provide information they believe was important and relevant to them. To reduce the threat of social desirability bias among focus groups, electronic anonymous surveys with open-ended questions were sent to participants to gather additional qualitative data. Audio recordings of the interviews were transcribed verbatim and combined with written responses from surveys.

To analyze the current data, the first author independently reviewed the transcripts in their entirety to get an overall sense of the data. Next, each transcript was individually re-read to identify recurring words, phrases, or concept and develop preliminary codes (open coding). The final coding scheme was then applied to all the transcripts. Once all transcripts had been coded, the first author examined all data within a particular code. Codes were then sorted into categories based on how different codes are related and linked. These emergent categories were used to organize and group codes into meaningful clusters. Some codes were combined during this process, whereas others were split into subcategories. Definitions for categories were developed (Coffey & Atkinson, 1996; Hsieh & Shannon, 2005; Patton, 2005).
Supplemental Qualitative Results

Analysis of the focus group interviews and open-ended survey questions ($n = 17$) revealed a number of benefits congruent with quantitative findings including a) increased nonreactive awareness, b) enhanced team cohesion, c) increased adaptive coping in the face of stress, and d) increased quality of life. An additional benefit revealed included increased quality of patient care. The analysis also revealed a rich discussion regarding the importance of integrating mindfulness and resilience practices into the workday.

The first theme revealed was increased nonreactive awareness. Foremost of the processes of fostering mindfulness and resilience is developing a clear awareness of one’s present internal or “personal” experiences, including thoughts, emotions, sensations, and behaviors, including an individual’s stress response. This can be contrasted with “automatic” cognitive and behavioral reactions that occur without conscious awareness. Following the MBWR training, participants described enhanced present moment awareness of thoughts, emotions, and bodily sensations, as well as periods of mindlessness.

- I am much more aware of my emotions. I recognize my stress sooner.
- I have become the “watcher” of my internal experience, rather than getting overwhelmed with my emotions.
- I just focus on what emotions I’m feeling. And also kind of focusing in on how my body is reacting to the stress. When I am frustrated, I focus, and then can see [my frustration] in a completely different way, so that I am able to fix it.
- And even if I’m not mindful, I’m mindful that I’m not mindful.

**Theme 2: Increased Adaptive Coping.** A second theme that emerged from participant responses was increased adaptive coping. Coping can be viewed as a collection of purposeful effort to regulate aspects of the self and the environment when under stress. Passive coping refers
to avoidance of the stress, which may lead to increased burnout. Alternatively, active coping refers to self-regulatory mechanisms that help a person adapt to the stress through cognitive reappraisal, positive thinking, or acceptance (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000; Walker, Smith, Garber, & Van Slyke, 1997). Increased adaptive coping was described as:

- I have so many skills to use now when I face stress, breathing, taking a break, walking, pause. I use STOP Breath Body Be on very busy days.

- I have learned to do a very quick re-centering which I can use in the middle of a busy day to get back to balance quickly.

- [During lunch] if I’m feeling overwhelmed looking at the day, [I] just stop and focus on my food for a moment and then come back [to the tasks at hand].

- I breathe deeply for a few seconds before going in a room with a difficult patient and try to maintain curiosity when something is stressful or might cause me to be angry/frustrated. It has been very effective!

**Theme 3. Enhanced Team Cohesion.** A salient aim of MBWR is to increase team cohesion. Team cohesion, one factor of team effectiveness, has been defined as “the way that a workgroup functions and rests on the ability of the members to communicate and share” (Wells et al., 2002; p. 179), and is regarded as the ‘glue’ that holds a group together. Participants described three elements of team cohesion: improved communication, increased social support, and a greater sense of shared common humanity among teammates. For example, participants described improved communication:

- It helped us to have better communication with each other, listen to each other and work as team members.

- We are more mindful with other[s] and not rushing.
MINDFULNESS-BASED WELLNESS AND RESILIENCE

- I am [able] to speak to my team members more easily and more frequently. I am able to speak about my frustrations to my team.

- I feel like it’s given us sort of a language and a tool box to talk to each other about stress, and it has a positive impact when you say, “Hey just breathe, are you okay?” you know. We know what we’re talking about and have shared this.

Enhanced social support was reflected in statements such as:

- I am more comfortable with my teammates.
- Taking this course as a team has improved our team dynamic.
- We support each other when we noticed that someone is stressed or frustrated.
- We have more trust among each other.

Shared common humanity was described as:

- It is helpful to know you are not the only one dealing with stressful situations.
- We all have things that happen outside of work and this has helped me realize [I] am not the only one.
- When you experience each other’s stress, in a way, that kind of helps you. It just feels better, and cohesiveness, and kind of knowing we are in this together and we can do this, you know? Like a team spirit.
- I think it’s helpful for us to know that somebody’s stressed, and even if there’s nothing that I can do about it, that perhaps just being there as a, as a supportive person. [It] feels safe to do that then it’s okay for me to do the same thing and we’re all being supportive of each other.

Theme 4: Enhanced Quality of Life. Participants noted how the training effected their work day, as well as enhanced their overall quality of life. Participants noted:

- Even at home I think it has helped. When I do an activity, even if it’s not stressful, just being present and really trying to enjoy really simple things [like the] flowers and being aware that that’s what I’m doing.
• [I now] help my kids learn to breathe when stressed.

• It’s been helpful to use even in situations that maybe are not necessarily stressful but in situations where perhaps in the past I wouldn’t have paid as much attention and I feel that I’m appreciating some of those activities maybe more than what I would have before.

**Theme 5: Increased Quality of Care.** A fourth theme that emerged from participant responses was increased quality of care, described as enhanced focus and less reactivity.

- I don’t take things so personally. Their [patients’] emotions don’t have to control my experience.

- I can focus my attention better and longer when patients and colleagues.

**Theme 6: Integrating Mindfulness & Resilience practices into the Work Place.** The final theme revealed was how to integrate mindfulness and resilience practices into the work place. Participants noted:

• Walking for 10 minutes at the end of my lunch break every day has been wonderful, but it has also made me more aware of other mindfulness activities I can slip in on an ongoing basis. I just don't have time to do anything more than a few minutes here and there, but that has made all the difference, honestly.

• [I really enjoy] knowing I can count on my team members to remind me to be mindful.
At post-MBWR, mindful breathing, mindful eating, and the body scan were reported as the most beneficial practices. Mindful walking and mindful breathing were reported as most frequently practiced. At 3-month follow-up, mindful listening, mindful breathing, and loving-kindness were reported as the most frequent daily practices. Participants also reported mindfully eating and mindfully walking several times a week. The most commonly reported barriers to informal practice included the perception of time scarcity and forgetfulness. Perceived beneficial supports to engage in informal practice included consistency (embedded in daily routines), visual reminders, and team members reminding and supporting each other to practice.
Chapter Four:

Literature Review
The Primary Care Model

The general practitioner of the early 20th century was a solo professional. As medical practice became more complex, nonmedical tasks were subdivided and delegated to receptionists, medical assistants, and billing clerks. In 1915, Massachusetts General Hospital created a team of health educators, physicians, and social workers (Grumbach & Bodenheimer, 2004). Building upon this model, and yearning to incorporate a diverse complement of health care professionals, Montefiore Hospital developed the first primary care team in 1948. Two years later, Yale University followed this model and introduced interdisciplinary primary care teams. Despite these initial visions, primary care teams failed. The combination of disciplinary territoriality, system inertia, and lack of clearly articulated objectives of the team model proved lethal (Grumbach & Bodenheimer, 2004). In spite of the preliminary failure, however, the vision prevailed. By 1978, the Institute of Medicine had defined primary care as “the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.” One hundred years after the original conception, the primary care model is an established and integral feature of our nation’s health care system.

A fundamental principle of primary care is the focus of improving the health and relationship of the whole person within his or her life context, rather than simply managing the individual’s disease state (Fine, Peters, & Lawrence, 2007; Stange & Ferrer, 2009). Health as a relationship (Fine et al., 2007) is a developmental goal and is facilitated by the healing clinician-patient relationship (Egnew, 2005, 2009; Scott et al., 2008). Four main features of primary care services include a) first-contact access for new medical concerns; b) consistent provider-patient
focused care rather than disease-focused care; 3) comprehensive care for most health needs; and
d) coordinated care when care must be sought elsewhere (Barbara Starfield, Shi, & Macinko, 2005). As defined, primary care orientates toward family and community care and handles a
wide array of patients and diseases states. Services include preventive care, physical exams, and
management of common, acute medical conditions. They also address children's health care and
well-child visits, including developmental screenings, immunizations, parental guidance, and
family planning and regular gynecological screenings. Additionally, primary care provides care
for chronic diseases and conditions, including diabetes, cardiovascular disease, mental health,
and other long-term conditions.

In the United States, there is a strong and robust relationship between the availability of
primary care providers and better health, greater equity, and lower costs (Starfield, 2012). States
with higher ratios of primary care physicians to population have better health outcomes,
including decreased mortality from cancer, heart disease, or stroke (Macinko, Starfield, & Shi,
2007). The supply of primary care physicians is associated with an increase in life span (Shi et
al., 2005; Shi et al., 2004). Furthermore, preventative care provided by primary care has been
shown to reduce hospitalization rates. In 2000, an estimated 5 million admissions to U.S.
hospitals, with a resulting cost of more than $26.5 billion, may have been preventable with high-
quality primary care treatment (Macinko et al., 2007). At the state level, an increase of one
primary care physician per 10,000 population was associated with a rise in that state’s rank of
quality health by more than 10 places and a reduction in overall spending of $684 per Medicare
beneficiary (Bodenheimer, 2006). Clearly, a healthy primary care workforce is critical for an
accessible, high quality, and cost efficient health care system in the United States (Chen, Chen,
& Mullan, 2012).
A central institution of primary care is the 15-minute physician visit. Primary care physicians are expected to build meaningful relationships with patients, provide preventative, acute, and chronic medical care, while managing multiple diagnoses according to a host of evidence-based guidelines within a brief 15 minute appointment (Bodenheimer, 2007). However, it has been estimated that it would take 10.6 hours per working day to deliver all recommended care for patients with chronic conditions, plus 7.4 hours per day to provide evidence-based preventive care, to an average panel of 2500 patients (the mean U.S. panel size is 2300) (Bayliss et al., 2007). To address the complexity of this task, primary care depends on the contributions from multiple professionals. Physician’s assistants, nurse practitioners, registered nurses, medical assistants, social workers, behavioral health providers, dietitians, midwives, pharmacists, and receptionists work alongside physicians, often functioning in concert, to serve the physician’s patient panel. Reflective of this trend, nurse practitioners now account for 19% of the US primary care workforce, and physician assistants account for 7% (Dower & O’Neil, 2011). Sizes of primary care teams fluctuate between four to fifteen members, though research suggest that a team of six is optimal (Grumbach & Bodenheimer, 2004).

The vision of interdisciplinary primary care teams is interprofessional practice (IPP), which seeks to integrate the knowledge and expertise of members from different healthcare professions to accomplish common goals. IPP in primary care is based on collaboration, communication, and teamwork (Bajnok, Puddester, Macdonald, Archibald, & Kuhl, 2012). Effective interdisciplinary primary care teams, commonly measured by collaboration, communication, and team cohesion, are associated with better clinical outcome measures, higher patient satisfaction, improved patient care, reduced physician burnout and health care costs, and fewer medical errors (Deneckere et al., 2013; Grumbach & Bodenheimer, 2004; Hendel, Fish, &
In addition, effective interdisciplinary primary care teams increase the ability and ease of managing increased workloads. Regrettably, the future of the primary care model is at great risk. The American College of Physicians recently warned that “primary care, the backbone of the nation's health care system, is at grave risk of collapse” (Bodenheimer, 2006). Challenges weakening primary care include a decreasing medical workforce and increasing care demands. Currently, there is a significant shortage of primary care physicians: one primary care physician to every 2,500 patients seeking care (Green, Savin, & Lu, 2013). The Institute of Medicine reports that it would take 16,261 additional primary care physicians to meet the current need in underserved areas (Green et al., 2013). Furthermore, a constellation of social and political factors have set the stage for increased use of primary care in the US. The Patient Protection and Affordable Care Act of 2010 provided health care services to 17.6 million previously uninsured individuals by 2015 (Center, Woods, Urbana-Champaign, Manchikanti, & Purdue Pharma, 2017; Hofer, Abraham, & Moscovice, 2011). The growing aging population and the diminishing numbers of US medical students who are choosing to enter the primary care field are also contributing factors to the imbalance. It is estimated that the nation will experience far greater shortages by 2025. These shortages will have substantial adverse implications for access, quality, and cost of care in the United States and jeopardize public health. These shortages and their associated stressors, have profound implications for the health and well-being among primary care providers. As job satisfaction among primary care physicians wanes amid the increasing demands of office-based practice (Green et al., 2013), there is a growing concern that current models of primary care are not sustainable (Jackson et al., 2013). Primary care physicians experience the highest rates of
burnout among health care providers (Shanafelt et al., 2012), making burnout a significant threat to national health care.

**Physician Burnout: A Significant Threat to our Nation’s Health Care**

In psychology, the term burnout was coined by Herbert Freudenberger in 1974 and has been defined as a state of physical, emotional, and mental exhaustion caused by a depletion of ability to cope with one's everyday environment. Burnout differs from stress in that those who suffer from burnout have experienced prolonged symptoms. Furthermore, in a health care environment, burnout results from stress acquired through the social relationship between a provider or helper and a help recipient, usually found in asymmetrical professional relationships, whereas the victim is the helper (Maslach et al., 1996). In contrast to depression, which tends to pervade every domain of a person’s life (Bakker, Demerouti, & Verbeke, 2004; Glass & McKnight, 1996), burnout is a problem that is specific to the work context; however, individuals who are more depression-prone are more vulnerable to burnout. According to the Conservation of Resources Theory (Hobfoll, Tracy, & Galea, 2006), burnout is a continuous process caused by ongoing, usually low-level, resource depletion resulting from either actual loss of resources or the failure to acquire fresh resources after significant resource investment. Social psychologists Christina Maslach and Susan Jackson developed the most widely used instrument for assessing burnout, the Maslach Burnout Inventory (MBI; Maslach et al., 1996). The MBI operationalizes burnout as a three-dimensional syndrome: losing enthusiasm for work (emotional exhaustion), treating people as if they were objects (depersonalization of patients), and having a sense that work is no longer meaningful (Maslach et al., 1996; McCray, Cronholm, Bogner, Gallo, & Neill, 2008).
Risk Factors for Burnout. Factors reported to contribute to the experience of burnout among primary care providers are complex and multifaceted. Burnout is thought to begin during medical training (Nedrow, Steckler, & Hardman, 2013). In a recent large study conducted by the Mayo Clinic, 53% of medical students had symptoms of burnout (Buchbinder, Wilson, Melick, & Powe, 2001). As careers progress, excessive and intense workloads (e.g., long hours, on-call responsibilities, high panel numbers of complex patients), difficulties balancing personal and professional life, deterioration in work control, and lack of meaning in work contribute to the continuation of symptoms (Campbell, Sonnad, Eckhauser, Campbell, & Greenfield, 2001; Dyrbye & Shanafelt, 2011; Shanafelt et al., 2009). Additional risk factors for the development of burnout include an imbalance between job demands and job skills, effort/reward imbalance (created when there is a discrepancy that exists between resources, expectations, and job reality), and prolonged work stress (Awa, Plaumann, & Walter, 2010; Bakker et al., 2004; Schaufeli & Buunk, 2003). Furthermore, changes in infrastructure required for compliance with new regulations, such as required reporting of patient outcome data and guideline adherence for payment, will increase the physicians’ administrative burden for each patient for whom they provide care. While health care reform will provide millions with access to health care, unfortunately, it is also likely to adversely increase physicians’ workload and decrease physicians’ sense of autonomy and work-life balance—all large contributors to burnout (Dyrbye & Shanafelt, 2011).

Risk factors have also been linked to specific coping styles and attitudes toward the self, often promoted in medical training. Medical residents tend to prioritize professional accomplishment above familial, social, spiritual, mental, and financial needs (Ratanawongsa et al., 2008). Relatedly, the medical residents who reported their personal needs were
“inconsequential,” were more likely to report the highest levels of burnout (Shanafelt et al., 2005). While the residents interviewed deemed this a “temporary imbalance” for the finite residency period, the authors warned that physicians may require assistance in reestablishing balance once training is completed, and perhaps, many physicians never do.

The Costs of Burnout. Burnout among physicians has large costs to society. Burnout has been associated with diminished quality of care, increased medical errors, and decreased empathy among physicians, and poorer adherence to treatment plans, longer recovery time, and decreased satisfaction with care among patients (Ratanawongsa et al., 2008; Wallace et al., 2009). Burnout has also been related to increased rates of depression, anxiety, substance abuse, and suicide among physicians (Shanafelt et al., 2009) and linked to physical health problems including fatigue, insomnia, heart disease, obesity, hypertension, infection, diabetes, and premature aging (Miller, Stiff, & Ellis, 1988; Spickard, Gabbe, & Christensen, 2002). Furthermore, burnout is linked to lower productivity, early retirement, and higher rates of turnover, which have profound financial impacts (Dewa et al., 2014; Thorne et al., 2005): Replacement costs to the medical center are approximately $250,000 per physician (Waldman, Kelly, Aurora, & Smith, 2004).

The consequences of burnout among physicians include not only diminished quality of life and quality of care, but also a decline in the stability of the physician workforce. Concerns regarding stress, burnout, and quality of life have contributed to the significant decline of graduates entering into general medicine careers during the last twenty years (Bodenheimer, 2006; Dorsey, Jarjoura, & Rutecki, 2003; Landon, Reschovsky, Pham, & Blumenthal, 2006). In safety-net primary care centers, which are designed to reduce health disparities that affect racial and ethnic minority groups, the poor, and the uninsured, providers report higher rates of burnout.
and turnover than in non-safety-net centers, further straining an already resource-poor system (Hayashi et al., 2009).

**Mindfully Meeting the Challenge**

In response to the ample body of research examining distress and burnout in health care professionals, researchers are attempting to address these robust and disturbing trends. Structural transformations, such as alternative delivery mechanisms and acceptable reimbursement for services, are necessary, and will optimistically lead to more effective healthcare and reduced burnout; however, transformation will be incomplete without deeper changes (Beckman et al., 2012). It is imperative that changes also address medical providers’ need for meaning and satisfaction in their work and promote resilience to stress, adversity, and change. One modality aimed at promoting resilience among health care providers gaining considerable attention is mindfulness. The practice and processes of mindfulness afford physicians and health care providers the ability to respond creatively and successfully to the dynamically changing primary care environment, thus enhancing resilience and reducing burnout.

**The Construct of Mindfulness**

A form of mental training that enhances one’s ability to nonjudgmentally attend to the present moment, mindfulness is often translated as “to see with discernment” (Goldstein, 1980). Mindfulness is characterized as a moment-to-moment awareness of an individual’s perceptible mental states; a phenomenological process oriented toward a gradual understanding of an individual’s direct experience (Grossman, Niemann, Schmidt, & Walach, 2004). As a manner of consciousness, it commonly signifies presence of mind (Bodhi, 2011). Although there is still a lack of consensus regarding the conceptualization of mindfulness in the western scientific...
community, a commonly cited definition is “the awareness that emerges by way of paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience, moment by moment” (Kabat-Zinn, 2002). Two salient components of mindfulness are a) an intentional regulation of attention to and awareness of the present moment and b) a non-judgmental and a curious willingness to experience the content (thoughts, sensations, and feelings) of the present moment (Bishop et al., 2004). Though frequently cited, these definitions are deceptively simple, and miss some of the basic tenets of the historical Buddhist understanding of mindfulness (Christopher, Christopher, & Charoensuk, 2009). Therefore, it may prove beneficial to provide some historical context to the original construct of mindfulness, as well as outline several salient characteristics.

The concept of mindfulness is thought to have originated at least 2,500 years ago in early Buddhist teachings, texts, and scriptures. Though mindfulness is subject to various understandings and applications within Buddhism and its various schools, most Buddhist scholars agree that mindfulness or sati (smṛti in Sanskrit) is derived from the verb, “to remember” or the act of “calling to mind” (Anālayo, 2012; Nanamoli; Ģānissaro, 2012). A wide range of meanings have been associated with sati such as recollection (anussati), recall (patissati), remembrance (saranata), keeping in mind (dharanata), absence of floating (apilapamata), and absence of forgetfulness (Gethin, 2011; Purser & Milillo, 2015). These early definitions reflect the philosophy that sati is not the equivalent of the function of memory, but instead, an active, purposeful, and particular way of attending and remembering (Gethin, 2011; Purser & Milillo, 2015; Ģānissaro, 2012). Thus, the historical understanding of mindfulness is not merely a passive and nonjudgmental attentiveness or awareness exclusively to the present moment, but an actively engaged and discerning awareness that is capable of remembering and
knowing skillful, as well as unskillful, phenomena and behaviors of the past and in the present, with the intended purpose of abandoning those which lead to suffering and distress.

Within the context of Buddhism, the ultimate goal of mindfulness is to eliminate the root cause of suffering—ignorance, attachment, and aversion—for all sentient beings. This in-depth mind development is purported to alleviate, and ultimately eliminate, suffering by fostering sustainable changes in one’s cognitive and emotional states that, subsequently, lead to changes in more permanent and stable behavioral and psychological traits. Mindfulness is taught within the context of the Noble Eightfold Path: an 8-factor method to achieve liberation and cease suffering. The first path factor, right view, serves as an ethical foundation which 1) establishes a motivation and desire for liberation and freedom, 2) provides a framework for viewing experiences in terms of the continuation of suffering, and 3) discerns appropriate and wholesome behaviors in light of this framework of suffering (Dhargyey, 1974; Purser & Milillo, 2015). Right view is an ethical compass for the other seven, interdependent factors of right thought, right speech, right livelihood, right effort, right mindfulness, and right concentration or complete absorption (Anālayo, 2012). The eight parts of the path to liberation can be grouped into three essential elements of Buddhist practice: 1) moral conduct (Right Speech, Right Action, Right Livelihood); 2) mental discipline (Right Effort, Right Mindfulness, Right Concentration); and 3) wisdom (Right View, Right Thought).

Mindfulness is conceptualized as an interactive and multifaceted practice involving the dynamic interplay of several cognitive, mutually reinforcing, processes (Christopher et al., 2009). First and foremost, of these cognitive processes is the deliberate focus of attention and a clear awareness of one’s inner and outer worlds, including thoughts, emotions, sensations, behaviors, or surroundings as they exist at any given moment. For this reason, some have defined
mindfulness as “bare attention,” (Purser & Milillo, 2015) and “pure” or “lucid” awareness (Dass & Goleman, 1990; Rinpoche, 1992). These terms suggest that mindfulness reveals what is occurring, before or beyond ideas, judgements, or analyses. A Zen metaphor likens this state to that of a polished mirror, wherein the mind simply reflects what passes before it, unbiased by conceptual thought about what is taking place. Attention and awareness are important processes of mindfulness; however, they may be better understood as preconditions to mindfulness, rather than a complete definition of mindfulness. Furthermore, for most individuals, attention can never be completely free of conditioning, valence, and evaluation.

Therefore, a second important process of mindfulness includes a receptive, nonreactive awareness that allows for the de-automatization of habitual reactions to the present moment and the associated secondary appraisals, predictions, analyses, critics, or judgements about what has or is taking place. This process can be understood as the further development and temporal extension of bare attention, thereby adding clarity and depth to the usually short fraction of time occupied by bare attention (Dyrbye & Shanafelt, 2011). This watchful, nonreactive receptivity forms the foundation for satipatthana, usually translated as clear comprehension: a middle path which neither suppressed the content of the present moment experience, nor habitually reacts. Instead, through the development of clear comprehension, one first develops a basic knowing of what is happening in the present moment, which subsequently, may lead to a discriminative ability to discern wholesome from unwholesome thoughts and behaviors within the present moment (Analayo, 2004; Purser & Milillo, 2015).

A third process taking place during the practice of mindfulness includes the development of the four immeasurable: loving kindness, compassion, empathic joy, and equanimity. The four immeasurables are often practiced by applying each of the emotions to oneself, then to family
and friends, extending the emotions to acquaintances and enemies, and finally to all sentient beings. These emotional states are highly regarded as powerful antidotes to negative mental states such as greed, anger, and pride, they assist in the removal of these root forms of suffering, and reflect the complex and interdependent biopsychosocial context of mindfulness (Hanh, 1999).

Explicit instructions on how to develop mindfulness are found in the Satipattana Sutta, a highly revered discourse of the Buddha (Analayo, 2004). In this teaching, the practice of mindfulness is divided into mindfulness and contemplation of 1) bodily sensations, 2) neutral, pleasant, or unpleasant feelings, 3) mind and mental processes of anger, lust, and delusion, and 4) mind objects or phenomena. The four foundations are frames of reference, and usually taught sequentially, until the individual becomes skilled enough to expand his/her awareness to encompass the entirety of the constantly changing present moment. While practicing mindfulness of the four foundations, one is to become aware and contemplate the arising and dissolving of phenomena in the stream of present moment experience. The practice develops from a refining attention and awareness to a deep analytical probing and insight. With effort and dedication, mindfulness states become more frequent and continuous. Steadiness of awareness and attention and a firmly established right view assists to diminish opportunities for concepts, ideas, and associated emotions to be blindly or automatically tacked onto bare facts (Philip & Smith, 2004). Such steadiness also facilitates the recognition of being caught up in conceptual thoughts or emotions rooted in past experience or anticipated futures, and the return to an awareness of what is currently taking place in the present moment.

In summary, cultivating mindfulness helps keep the mind grounded in the present moment, decreases reactivity and judgement to what is experienced, and changes the relationship
to the internal landscape, as a means to reduce suffering and increase well-being. Behavioral, cognitive, affective, and biological experiences can be influenced through the practice of mental training, as mindfulness cultivates learning and fosters the possibility of change and the adoption of new perspectives.

**Mindfulness and Western Science**

Interest in the use of meditative techniques in western psychotherapy began to grow among clinicians in the early 1960s (Keng, Smoski, & Robins, 2011). Beginning in the early 1970s, there was a surge of interest in and research on transcendental meditation (TM), a concentrative meditation technique popularized by Maharishi Mahesh Yogi (Wallace, 1970). The practice of TM was found to be associated with reductions in indicators of physiological arousal such as oxygen consumption, carbon dioxide elimination, and respiratory rate (Benson, Marzetta, Rosner, & Klemchuk, 1974; Wallace, 1970). Application of mindfulness meditation as a treatment intervention for complex medical conditions began with the work of Jon Kabat-Zinn, in which he explored the use of mindfulness meditation in treating patients with chronic pain, now popularly known as Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn et al., 1985))

MBSR is theoretically grounded in secularized Buddhist meditation practices, mind-body medicine, and the transactional model of stress, which suggests that people can be taught to manage their stress by adjusting their cognitive perspective and increasing their coping skills to build self-efficacy in handling external, stressful situations. A typical course consists of eight weekly 2.5 hour sessions and an all-day retreat session (approximately 30 hours of training) plus 45 minutes of daily mindfulness practice. The primary aims are to enhance attentional control and receptive awareness by focusing internally (on bodily sensations, breath, thoughts, emotions) and externally (on sights, sounds) in the present moment. MBSR includes an assortment of
meditative techniques, including body scan and mindful breathing. In the body scan mediation, attention is directed sequentially throughout the body with the intention to cultivate a nonjudgmental awareness of physical sensations, cognitions, and emotions. Sensations in each area are carefully observed with a particular consideration to simply perceive rather than think about or evaluate them. As the mind becomes distracted, attention is gently returned to the sensations arising and dissolving within that moment. In mindful breathing, the attention rests on the physical sensations associated with breathing. When the mind wanders to something other than the breath, the focus is gently returned to the sensations of breathing. Other practices included in MBSR are: a) mindful-movements, in which individuals cultivate awareness of the body while it is moving, stretching, or holding a position, b) open-focused sitting practice in which individuals expand his/her attention to include her breathing, sounds in the environment, bodily sensations, and stream of thoughts and emotions, and c) psychoeducation regarding the science of mindfulness and tools to integrate mindfulness into daily living (Kabat-Zinn et al., 1985).

Today, there is a growing body of robust evidence from RCTs demonstrating the effectiveness of MBSR and other mindfulness-based interventions (MBIs) in improving a range of physical and psychological outcomes in comparison to control conditions. Outcome studies of MBIs have demonstrated efficacy in improving symptoms associated with a wide variety of stress-related illnesses, including depression (Hofmann, Sawyer, Witt, & Oh, 2010) and anxiety (Speca, Carlson, Goodey, & Angen, 2000). Additionally, MBIs have been shown to inhibit unhealthy adaptations or coping responses to chronic stress, such as smoking, decreased exercise, and poor sleep (Gross et al., 2011).
Mindfulness among Healthcare Providers

In a meta-analysis, Irving and colleagues found that MBIs are an effective and affordable way to reduce stress and enhance well-being among medical students and health care providers (Irving, Dobkin, & Park, 2009). Following MBSR courses, medical students and health care providers (physicians, psychologists, nurses, social workers, and physical therapists) demonstrated reduced perceived stress (Beddoe, 2004; Shapiro et al., 2005), and increased self-compassion (Shapiro et al., 2005), relaxation, and life satisfaction (Jain et al., 2007). A more recent meta-analysis examined the effectiveness of interventions aimed at addressing stress and burnout in physicians and medical students (Regehr, Glancy, Pitts, & LeBlanc, 2014). Cognitive, behavioral, and mindfulness interventions were associated with decreased symptoms of anxiety and stress in physicians (Finkelstein, Brownstein, Scott, & Lan, 2007; Rosenzweig, Reibel, Greeson, Brainard, & Hojat, 2003; Shapiro, Schwartz, & Bonner, 1998), while interventions incorporating psycho-education and mindfulness meditation were associated with decreased burnout in physicians (Goodman & Schorling, 2012; Krasner et al., 2009).

Employing a grounded theory analysis among health care providers who completed an MBSR course, researchers found a model derived from the data demonstrated that health care provider participants repeated themes similar to those described by clinical populations engaged in MBSR, such as the salience of the group experience and support, discovery of acceptance, as well as the realization that some degree of frustration and/or distress is part of learning and establishing a mindfulness practice (Irving et al., 2012). Unique themes highlighted included becoming aware of perfectionism and the automaticity of “other focus” and the “helping or fixing mode.” Participants in this study spoke at length about their experience of enhanced
attention and awareness which was brought about through mindfulness practice, as well as the cultivation of an increasingly open and self-compassionate attitude towards themselves.

**Mindfulness among Primary Care Providers**

Preliminary MBIs outcome studies specifically targeting frontline physicians have demonstrated enhanced well-being and reduced burnout and perceived stress (Asuero et al., 2014; Fortney et al., 2013; Krasner et al., 2009). Krasner et al. developed a 12-month continuing education program in self-awareness and mindful communication that was based on the MBSR model (2009). In addition to the MBSR course, the educational program had 10 monthly 2.5 hour sessions that included mindfulness meditation, self-awareness exercises, and narratives about meaningful clinical experiences, appreciative interviews, didactic material, and discussions. In an uncontrolled trial, physicians who completed the mindfulness education program endorsed enhanced mood, increased mindfulness, and emotional stability, and decreased burnout. Furthermore, improvements in mindfulness were correlated with improvement in total mood disturbance, empathy, burnout, and personality factors (conscientiousness and emotional stability).

More recently, Beckman et al. (2012) conducted semi-structured interviews among primary care physicians who had completed the 52-hour mindfulness-communication program developed by Krasner et al. (2009). Qualitative data analysis revealed three main themes: (a) sharing personal experiences from medical practice with colleagues reduced professional isolation, (b) mindfulness skills improved participants’ ability to be attentive and listen deeply to patients’ concerns, respond to patients more effectively, and (c) developing greater self-awareness was positive and transformative, yet participants struggled to give themselves permission to attend to their own personal growth (Beckman et al., 2012). The authors concluded
that interventions to improve the quality of primary care practice and the physicians’ well-being should promote a sense of community, specific mindfulness skills, and permission and time devoted to personal growth.

Patients also benefit from physician MBIs. In an RCT, Beach and colleagues found that a stand-alone 8-week MBSR course enhanced mood, mindfulness, and empathy and decreased burnout among primary care providers (Beach et al., 2013). They also found that self-reported mindfulness was associated with more rapport building, enhanced communication about psychosocial issues between patient and provider, a more positive emotional atmosphere within the clinical encounter, and higher patient overall satisfaction with care (Beach et al., 2013).

Furthermore, researchers found that among family physicians who completed an MBI, reduced physician stress levels and increased self-reported resilience were associated with increased patient satisfaction (Schroeder, Stephens, Colgan, Hunsinger, Rubin, & Christopher, 2016).

**Attrition and Adherence**

Although MBIs have been linked to a number of positive outcomes among healthcare professionals, a commonly reported limitation of MBIs among primary care physicians is high attrition rates due to the intensive time requirement typically associated with MBIs. To address this barrier, Fortney et al. developed an abbreviated mindfulness-based weekend retreat for physicians. An uncontrolled trial found it was equally effective as the standard 8-week MBSR protocol at reducing burnout (Fortney et al., 2013). Schroder et al. subsequently conducted a RCT and found that physicians who completed a mindfulness-based weekend retreat evidenced significant improvements in stress, emotional exhaustion, mindfulness, and depersonalization at 3-month follow-up relative to baseline, when compared to the control group (2016). Lastly, the Mayo Clinic recently published the results of a 19-hour MBI for physicians, in which
participants evidenced improved meaning and engagement in work and reduced burnout, with sustained results at 12 months (West et al., 2014). Collectively, these findings inform future interventions that support on-the-job self-care and stress-reduction within medical settings, and suggest that time-limited initial training may be sufficient in teaching a fundamental mindfulness practice to physicians.

An important and especially salient factor influencing treatment outcomes among physicians is adherence to treatment. Participants who endorse more (duration and frequency) mindfulness practice are more likely to have better outcomes, including improved mindfulness (Pradhan et al., 2007; Shapiro et al., 2003) and sleep (Shapiro et al., 2003), and decreased stress (Shapiro et al., 2008), depression (Pradhan et al., 2007), and psychological distress (Shapiro et al., 2003; Shapiro et al., 2008). Schroder et al. (2016) found that among front-line physicians who attended an abbreviated MBI, frequency of formal meditation practice (i.e. body scan, mindful breathing, sitting practice) was inversely correlated with stress and depersonalization and positively correlated with mindfulness; frequency of informal meditation practice (i.e. acting with awareness, mindful eating, mindful listening) was inversely correlated with emotional exhaustion and positively associated with resilience, mindfulness, and personal achievement.

Furthermore, as physicians continue to practice mindfulness, they report being able to weave awareness into everyday life, further increasing their mindfulness, and potentially, the associated benefits. For example, in Krasner et al. (2009), participants endorsed improvements in depersonalization, depression, fatigue, and emotional stability at the 3-month follow-up, all of which were not apparent immediately after the class. Similarly, in an RCT of MBSR among primary care physicians, Pradhan et al (2007), found that group differences were evident only at 6 months post-MBSR.
Mechanisms of Mindfulness

Several researchers have developed theoretical models that include a range of potential mechanisms of mindfulness and MBIs. Baer identified exposure, cognitive change, self-management, relaxation, and acceptance as key mechanisms (Baer et al., 2006). Shapiro, Carlson, Astin, and Freedman proposed that mindfulness, composed of attention, intention and attitude, leads to re-perceiving and changes in the following four mechanisms: 1) self-regulation, 2) emotional, cognitive and behavioral flexibility, 3) values clarification and 4) exposure (Shapiro, Carlson, Astin, & Freedman, 2006). Brown and colleagues also described several processes underlying the therapeutic effects of mindfulness, including insight, exposure, nonattachment, enhanced mind-body functioning, and integrated functioning (Brown, Ryan, & Creswell, 2007). In a systematic review, Hölzel and colleagues integrated neuroscientific findings with self-report and experimental data to propose four mechanisms through which mindfulness works: 1) attention regulation, 2) body awareness, 3) emotion regulation, and 4) change in perspective on a ‘static’ self (Hölzel et al., 2011). In a Buddhist psychological model, Grabovac, Lau, and Willett (2011) proposed acceptance/compassion, attention regulation, ethical practices, nonattachment and nonaversion, and decreased mental proliferation as mechanisms underlying the effects of mindfulness practice on clinical symptom reduction and well-being. Vago and Silbersweig (2012) described a framework and neurobiological model of three mechanisms through which mindfulness promotes positive mental health and reduces biases related to self-processing: 1) self-awareness, 2) self-regulation, and 3) self-transcendence.

More recently, Gu, Strauss, Bond, and Cavanagh (2015) conducted a systematic review and meta-analysis of meditation studies to identify potential psychological mechanism underlying MBIs’ effects on psychological functioning and wellbeing. Using a two-stage meta-
analytic structural equation modeling procedure, they found strong consistent evidence for cognitive and emotional reactivity, moderate and consistent evidence for mindfulness, rumination, and worry, and preliminary evidence for psychological flexibility and self-compassion as mechanisms underlying MBIs. Self-compassion is pertinent to the health care provider, as it is positively associated with resilience among medical residents and inversely associated with burnout among health care providers (Feldman & Kuyken, 2011; Gilbert, 2010; Hofmann, Grossman, & Hinton, 2011; Olson, Kemper, & Mahan, 2015).

**Self-compassion**

Self-compassion involves being touched by one’s own suffering, generating the desire to alleviate one’s suffering, and treating oneself with understanding and concern (Neff, 2003). It is considered a common outcome, as well as a mechanism of mindfulness. Self-compassion may assist to nonjudgmentally witness the unfolding of the distressing experience, in order to embrace the self and the associated distressing experiences, with balance, equanimity, and kindness. Self-compassion comprises three interacting components: mindfulness when confronting painful self-relevant thoughts and emotions, self-kindness, a sense of common humanity (Neff, 2003). Mindfulness is the willingness to observe our negative thoughts and emotions with openness and clarity. Self-kindness refers to the propensity to be caring and understanding with oneself, rather than being harshly critical. The sense of common humanity involves recognizing that all humans are imperfect, that all people fail and make mistakes. When failures and disappointments are experienced as an anomaly not shared by the rest of humankind, people may feel isolated from others who are presumably leading “normal” happy lives.

Among clinical and nonclinical populations, greater self-compassion has consistently been found to predict lower levels of anxiety and depression, more so than mindfulness (Neff,
MINDFULNESS-BASED WELLNESS AND RESILIENCE

2012; Van Dam, Sheppard, Forsyth, & Earleywine, 2011). Self-compassion has been shown to decrease cortisol levels and increase heart-rate variability (Rockliff, Gilbert, McEwan, Lightman, & Glover, 2008). Greater self-compassion is also linked with less rumination, perfectionism, and fear of failure (Neff, 2003; Neff, Hsieh, & Dejitterat, 2005). Furthermore, self-compassionate people are less likely to suppress unwanted thoughts and are more willing to acknowledge their negative emotions as valid and important (Leary, Tate, Adams, Batts Allen, & Hancock, 2007; Neff, 2003). Self-compassion is associated with positive psychological strengths such as happiness, optimism, wisdom, curiosity and exploration, personal initiative, and emotional intelligence (Hollis-Walker & Colosimo, 2011; Neff, Kirkpatrick, & Rude, 2007; Neumann et al., 2011). Among health care providers, as self-compassion is inversely associated with burnout among health care providers, and positively associated with resilience among medical residents (Feldman & Kuyken, 2011; Gilbert, 2010; Hofmann et al., 2011; Olson et al., 2015). Furthermore, a brief Mindfulness with Metta Training Program (MMTP), targeting the enhancement of mindfulness and self-compassion as a means of increasing resilience in human services professionals, found significant improvements in mindfulness and self-compassion at one and four months, and at resilience at four months in participants in the intervention group (Pidgeon, Ford, & Klaassen, 2014), suggesting that increased self-compassion is promising method of increasing resilience.

Researchers have also found that priming self-compassion enhances interpersonal functioning. Self-compassionate individuals have been described as being more emotionally connected, accepting, and autonomy-supporting while being less detached, controlling, and verbally or physically aggressive than those lacking self-compassion (Neff & Pommier, 2013). Similarly, individuals with greater self-compassionate were found to provide more social support
and encouraged interpersonal trust when compared to those lacking in self-compassion (Crocker & Canevello, 2008). Therefore, a compelling body of evidence suggests that mindfulness training not only leads to greater mindfulness and self-compassion, but also contributes to enhanced interpersonal functioning and team cohesion, which is a protective factor against burnout and associated with enhanced job satisfaction among primary care physicians. Furthermore, there is growing body of evidence demonstrating that supportive work environments and interpersonal relationships are important compensatory mechanisms for a stressful work life (Kluger et al., 2003), influencing health care providers’ job satisfaction (DiMeglio et al., 2005; Goldberg, Beeson, Kuzel, Love, & Carver, 2013; Kluger et al., 2003; Wallace et al., 2009).

**Team Cohesion**

Team cohesion, one factor of team effectiveness, has been defined as team members’ perception of integration into the organizational and collegial environment (Price, 1972). Team cohesion is “the way that a workgroup functions and rests on the ability of the members to communicate and share” (Wells, Roberts, & Medlin, 2002), and is regarded as the ‘glue’ that holds a group together. Cohesive groups share common characteristics: (a) a cooperative and friendly atmosphere (b) exchange of praise for reinforcement, (c) less anxiety among group members, and (d) greater member retention (Treadwell, Reisch, Travaglini, & Kumar, 2011). Furthermore, members of highly cohesive teams are more likely to mutually accept each other’s ideas, contribute equally to problem solving, and are not as likely to be adversely affected by the power and status structures within the groups (Secord & Backman, 1964). Team cohesion contributes to increased nurse satisfaction, which effectively predicts turnover (Leveck & Jones, 1996; Lucas, Atwood, & Hagaman, 1993; Tumulty, Jernigan, & Kohut, 1994; Wells et al.,
MINDFULNESS-BASED WELLNESS AND RESILIENCE

2002), reduces burnout among health care providers (Lasalvia et al., 2009), and is a protective factor against burnout among physicians (Kluger et al., 2003).

In a large survey of 10 public and 6 university-run primary care clinics in San Francisco, Willard-Grace et al. investigated the relationship between team structure, team culture, and emotional exhaustion of clinicians and staff in primary care practices. Tight team structure was described as a physician working with the same medical assistants or other support staff on a consistent basis. Team culture was defined as a sense of team functioning among physicians and staff. Working in a tight team structure and perceptions of a greater team culture were associated with less clinician exhaustion. Team structure and team culture interacted to predict exhaustion: among clinicians reporting high team culture, tighter team structure was associated with less exhaustion. Greater team culture was associated with less exhaustion among staff. Willard-Grace and colleagues concluded that fostering team culture may be an important strategy to protect against exhaustion (2014).

Although effective and socially supportive interdisciplinary primary care teams are a pivotal component to successful primary care centers and are inversely associated with physician burnout and job satisfaction (Goldberg et al., 2013), surprisingly, there are few empirically-supported interventions designed to enhance team cohesion (Buljac-Samardzic, Dekker-van Doorn, van Wijngaarden, & van Wijk, 2010). A systemic review on interventions to improve team effectiveness found most findings presented low or very low levels of evidence. The few articles that reported moderate or high quality of evidence found negative associations between burnout and positive team behavior, positive attitudes towards teamwork, self-efficacy, individual effectiveness; however, the studies provided little information about the context in which the interventions were tested, making it difficult to determine if the interventions would
also be effective in other settings. Buljac-Samardzic and colleagues recommended that more research is needed to investigate team cohesion in outcome measures, as well as, replicate same-intervention studies to enable synthesis of findings across different studies (Buljac-Samardzic et al., 2010).

Mindfulness training has demonstrated significant and positive influences on team functioning in medical and nonmedical work environments (Glomb, Duffy, Bono, & Yang, 2011; Singh et al., 2006). For example, an RCT among a nonclinical sample resulted in increases in altruistic orientation in the mindfulness intervention group (Chiesa & Serretti, 2009). The increase was significantly correlated with meditation time, decreases in perceived stress, and increases in self-compassion and mindfulness, and compared to group, participants in the intervention group reported significant increases in mindfulness and self-compassion. Similarly, a cross-sectional design found that a 7-week course in mindfulness enhanced intrapersonal relations among a nonclinical sample (Haimerl & Valentine, 2001). Singh et al. found that following a mindfulness training, treatment teams in an adult inpatient psychiatric hospital showed enhanced team performance, increased patients’ attendance at therapeutic groups, more effective individual therapy sessions, and increased patient and staff satisfaction with treatment team functioning, with patient satisfaction showing greater gains than staff satisfaction. Results were sustained at 4-month follow-up. Mindfulness training also enhances prosocial behaviors and intrapersonal skills. Following an MBI, admission treatment teams at a psychiatric inpatient hospital increased skills related to family friendliness, and results were sustained at the 6-month follow-up (Singh et al., 2002).

The Implementation of Team-based Training
Mindfulness training has been shown to increase mindfulness, self-compassion, as well as promote team cohesion, which may result in enhanced resilience and reduced burnout among interdisciplinary primary care providers. Recently, there has been increased interest in how health care team trainings are implemented. In a meta-analysis, Weaver and colleagues found that providing training as a team can have meaningful effects on important team processes and outcomes (Weaver et al., 2010). Relatedly, Salas et al. found participating in team training was a significant predictor of team processes (Salas et al., 2008). Furthermore, current and effective trends in team training implementation were discussed and included: (a) team trainings are designed and delivered as an interdisciplinary endeavor and integrated in the care context to offer opportunities to practice team work skills in a realistic setting; (b) health care organizations are investing in team training and provide space and resources and are making an effort to bring team training to the workplace; (c) teamwork competencies such as communication and situational awareness are valued and considered critically important, and (d) team trainings are incorporating opportunities to practice new skills. These recommendations are congruent with Beckman, Epstein, and others who suggested interventions aimed to improve the quality of primary care practice and the enhance resilience and physicians’ well-being should promote a sense of community and provide protected time to devoted to personal growth (Beckman et al., 2012; Chittenden & Ritchie, 2011; Epstein, 2014; Miller, Crabtree, Nutting, Stange, & Jaén, 2010).

Promoting Resilience

Though the development of resilience is key to enhancing quality of care and sustainability of the health care workforce, and primary care specifically (Epstein & Krasner, 2013; Nedrow et al., 2013; Zwack & Schweitzer, 2013) few outcome studies have documented
MINDFULNESS-BASED WELLNESS AND RESILIENCE

effective promotion of enhanced resilience. Resilience, the capacity to respond to stress in a healthy way such that goals are achieved at minimal psychological and physical cost, is understood as both intrapersonal, how a person relates to her own thoughts and feelings, and interpersonal, how a person relates to others (Epstein & Krasner, 2013). Epstein and Krasner recommend three essential components for resilience promoting programs for physicians: (a) enhance self-awareness, (b) increase self-regulation skills, and (c) develop communities of care within health care institutions. First, in order to enhance resilience in the face of stressful and adverse work conditions, physicians must be able to recognize when they are adversely affected by stress and understand the difference between their own adaptive and maladaptive responses to stress. Often, physicians ignore the early warning signs of stress—fatigue, irritability, and feeling outside their comfort zone—in the hope that the situation will self-correct or that their baseline adaptive skills will carry them (Zwack & Schweitzer, 2013). However, it is not enough to recognize that stressors exist. Second, physicians also need to realize the degree to which they have choices about how to respond to those stressors and self-regulate their own cognitive, emotional, somatic, and behavioral reactions to the stress. Based on the Conservation of Resources Theory (Hobfoll, 2001), programs designed to reduce burnout and enhance physician resilience should sensitize physicians to defensive negative spirals resulting from strain, retreat, and a shrinking resource pool, and instead, physicians should learn to reflect on the extent to which physical, mental, and social resources are readily available (Zwack & Schweitzer, 2013). Third, Epstein and Krasner (2013) suggested that resilience-promoting programs should strive to build community among clinicians and other members of the health care workforce. They suggested that it is in the self-interest of health care institutions to support the efforts of all members of the health care workforce to enhance their capacity for resilience.
Mindfulness successfully addresses the three critical components of reliance among physicians and health care providers. Mindfulness practices increase awareness and non-reactivity of inner thoughts, emotions, and bodily sensations (Shapiro et al., 2006). Enhanced awareness and non-reactivity then allow for the interruption of the automatic, conditioned reactions and cognitive activities that trigger emotions such as anxiety, depression, or stress (Kuyken et al., 2010), and consequently, increase self-regulation and afford an expanded behavioral repertoire in response to stress or adverse condition. Mindfulness also enhances self-compassion which has been positively associated with resilience, inversely associated with burnout among medical providers (Olson et al., 2015; Pidgeon et al., 2014), and may assist in curbing the negative spiral associated with symptoms of burnout (Garland, Geschwind, Peeters, & Wichers, 2015). Mindfulness training has shown to predict helping behaviors, increase intrapersonal skills, and enhance team effectiveness (Cameron & Fredrickson, 2015; Singh, Singh, Sabaawi, Myers, & Wahler, 2006; Singh et al., 2002), potentially fostering community among clinicians and other members of the health care workforce. Lastly, providing mindfulness training to intact primary care teams may enhance the outcomes (Weaver et al., 2010). Therefore, empirical evidence suggests that fostering and promoting resilient, mindful, and supportive environments and individuals within the primary care system is a promising approach to reduce the negative outcomes of stress and enhance meaning, satisfaction, and human flourishing.

**Summary**

As the Patient Protection and Affordable Care Act provides medical insurance to an additional 20 million previously uninsured, demands for primary care will increase within a system already struggling with the demand for care outpacing the supply of physicians and nurses, resulting in profound negative implications for our health care providers and the patients
they serve (Beckman et al., 2012). Brief, replicable, evidence-based, and cost effective interventions to enhance resilience and reduce burnout among primary care providers are critically necessary. Based on empirical and theoretical evidence, I propose a conceptual model to promote resilience and reduce burnout among interdisciplinary primary care teams. This model postulates that a brief mindfulness-based intervention, Mindfulness-Based Wellness and Resilience (MBWR), designed specifically for intact primary care teams and aimed to increase mindfulness, self-compassion, and team cohesion, thus enhancing resilience and reducing burnout. When completed, this research will provide valuable insight into effective and affordable ways to increase resilience and reduce burnout among primary care providers, ultimately, achieving the triple aim of our nation’s health care reform: better health, improved patient experience, and affordable costs.
Chapter Five:

Proposed Methodology
Methods

Procedure

The primary objective of this proposal is to establish the feasibility of recruitment, retention, adherence to the intervention, and completeness of the assessments. Secondary objectives are to determine the impact of MBWR on well-being, team cohesion, resilience, and burnout among interdisciplinary primary care teams. To achieve these aims, I will employ a quasi-experiential, waitlist controlled trial design. This research was approved by the Pacific University Institutional Review Board in August of 2015.

Participants will be recruited from Virginia Garcia Memorial Health Center (VGMHC) Primary Care in Hillsboro, Oregon. Administration and team management at VGMHC will assist in recruiting participants through emails, announcements at departmental meetings, and word of mouth. Fliers and emails will include information about the training and the research team contact information. I will attend team meetings to inform employees of VGMHC of the purpose of the study, the eligibility requirements and exclusion criteria, and receive written informed consent from interested and eligible individuals. Baseline assessments will be collected within two weeks prior to the start date of the training. Because the study will be conducted onsite and during paid protected time, preexisting IPCTs will be assigned to the MBWR group or a control group in a 1:1 ratio (two MBWR and two wait-list control teams) based on scheduling. Participants will not be blind to the groups. Participants will complete the same online assessment measures within three weeks of finishing the MBWR training and at 3-month follow-up. Wait-list control groups will complete baseline, post, and 3-month follow-up measures at the same time as the MBWR groups and will be offered the MBWR training after completing the 3-month follow-up assessments. Qualitative data will be gathered from MBWR training.
participants via focus groups and anonymous on-line surveys that will be conducted one week after the completion of the training. Participants will be given a $10 gift card at each wave of data collection (baseline, post-MBWR, and 3-month follow-up).

Because the study is being conducted onsite and during paid protected time, teams have been assigned to the MBWR or a control group in a 1:1 ratio (MBWR two teams; \( n = 29 \); waitlist control two teams; \( n = 29 \)) based on scheduling. Using a waitlist control group will serve as a control for any practice effects on outcomes and any events that occur during the course of the training. Due to the nature of the intervention and control groups, participants will know whether they are assigned to the MBWR training or waitlist control group.

**Participants**

Health care providers who are employed by VGMHC and work on an interdisciplinary team will be recruited, with the exception of individuals who attended the pilot study. The approximate potential sample size of the center is 70 health care providers who work on one of five interdisciplinary primary care teams. Teams consist of 10-15 individuals and include physicians, naturopathic doctors, or doctor of osteopathy, physician’s assistants, nurse practitioners, registered nurses, medical assistants, receptionists, and may include a social worker, a behavioral health provider, and a dietitian. Inclusion criteria are 1) employed or contracted by VGMHC; 2) a member of an interdisciplinary team as a medical doctor, naturopathic doctor, doctor of osteopathy, nurse practitioner, resident physician, behavioral health consultant, physician assistant, medical assistant, technical assistant, social worker, dietitian, or receptionist; 3) willing to attend all or most of the interventions; 4) agree to complete pre, post, and follow-up surveys; and 5) speak English. Participants will be excluded if they...
endorse active suicidality, a significant mental illness, or have attended the pilot study. The informed consent will screen for inclusion and exclusion criteria.

Based on past research with MBIs among health care providers\textsuperscript{12,15} and a power analysis using a two-sided $\alpha = .05$, medium to large effect sizes across outcomes, pre-post correlation $= 0.50$, and a power level of .80, a total of 44 participants is required to find statistically significant mean differences between groups. We plan to recruit 58 total participants (29 MBWR and 29 controls). The intended sample size assumes an overall 20% attrition or refusal rate, based on our pilot study and past research examining MBSR using RCT designs with health care providers\textsuperscript{12,157}, which would result in a final sample size of 47. In our previous research on MBWR, we recruited 9 (out of a possible 11) health care providers from a single interdisciplinary primary care team. Of the 9 participants who attended, 100% were retained.

**Quantitative Measures**

All self-report data will be collected via Qualtrics. To ensure confidentiality, survey answers will be in no way tied to participants’ identity. At baseline, participants will create unique identification codes based on responses to two innocuous questions to allow for tracking of responses over time. All scales will be administered at pre-, post-intervention, and 3-month follow-up.

The **Maslach Burnout Inventory** (MASL\textsuperscript{29}) is a 22-item self-report measure designed to assess burnout and job satisfaction. The MASL consists of three subscales: emotional exhaustion (measures feelings of being emotionally overextended and exhausted by one's work), depersonalization (measures an unfeeling and impersonal response toward recipients of one's service, care treatment, or instruction), and personal accomplishment (measures feelings of
competence and successful achievement in one's work). Items are rated on a 7-point Likert-type scale ranging from 0 (never) to 6 (everyday). Higher scores on each subscale indicate more of the construct. Sample items include “I feel emotionally drained from my work” (Emotionally Exhaustion); “I’ve become more callous toward people since I took this job” (Depersonalization); “I deal very effectively with the problems of my patients.” (Personal Accomplishment). Each of the three subscales has adequate internal consistency: emotional exhaustion ($\alpha = .90$), depersonalization ($\alpha = .76$), and personal achievement ($\alpha = .76$). The MASL is significantly corrected with work demands, negative work-home interference, and alternative burnout measures.

The Brief Resilience Scale (BRS$^{158}$) a 6-item self-reported measure designed to assess the ability to bounce back or recover from stress. Items are rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), and three of the items are reverse scored. All items are summed to create a total score, and higher scores indicate greater resilience. Sample items include “I tend to bounce back quickly after hard times”; “I tend to take a long time to get over set-backs in my life.” The BRS has demonstrated good internal consistency ($\alpha = .83$), a single factor structure, and expected correlations with a variety of constructs, including perceived stress, depression, and active coping.$^{158}$

The Five Facet Mindfulness Questionnaire (FFMQ$^{121}$) is a measure of dispositional or trait mindfulness based on a factor analysis of five independently developed mindfulness questionnaires. The 39 items are rated on a 5-point Likert-type scale (1 = never or very rarely true to 5 = very often or always true) and load onto five facets of mindfulness: Observing, Describing, Acting with Awareness, Non-judging of Inner Experience, and Non-reactivity to Inner Experience. Higher scores for each facet indicate more of the trait. Sample items include
“When I am walking, I deliberately notice the sensations of my body moving” (Observing); “I’m good at finding words to describe my feelings” (Describing); “When I do things, my mind wanders off and I’m easily distracted” (Acting with Awareness); “I criticize myself for having irrational or inappropriate emotions” (Non-judging); and, “I perceive my feelings and emotions without having to react to them” (Non-reactivity). The FFMQ demonstrated good internal consistency on all five factors (α ranging from 0.75-0.91). The FFMQ total score or facet scores can be used.

The **Self-Compassion Scale-Short Form** (SCS-SF\(^{159}\)) is derived from the Self-Compassion Scale (SCS\(^{127}\)), a 26-item self-report measure that assesses three facets of self-compassion (Self-Kindness, Mindfulness, Common Humanity) and their respective opposites (Self-Judgment, Over-identification, Isolation). Sample items include, “When I’m going through a very hard time, I give myself the caring and tenderness I need” (Self-Kindness), “When things are going badly for me, I see the difficulties as part of life that everyone goes through” (Common Humanity), and “When something upsets me I try to keep my emotions in balance” (Mindfulness). The 12-item short form was constructed and validated with two Dutch samples and then validated again with an English sample. The 12 items are rated on a 5-point Likert-type scale (1= almost never to 4 = almost always) and higher scores indicate greater self-compassion. The SCS-SF demonstrated a very high correlation with the SCS (r ≥ .97). Further, it displayed good internal consistency (α = .86)\(^{159}\).

The **Teamwork Quality Survey** (TQS; Hoegl & Gemuenden, 2001) is a 37-item self-reported measure designed to assess effective collaboration in teams. Items are rated on a 4-point Likert scale from 1 (never) to 5 (all the time). All items are summed to create a total score, and higher scores indicate greater team collaboration. Sample items include “Team members help
and support each other as best they could”; “There is frequent communication on the team.” The TQS demonstrated good internal consistency on all five factors (α ranging from 0.79-0.95). TQS is significantly associated with team performance as rated by team members, team leaders, and team-external managers.

**Intention to leave employment.** Intention to leave employment will be measured by a single binary question, “Is it likely that I will leave this place of employment in the next year?”

**Adherence to Mindfulness Practice.** Participants will be given an ipod touch device to use during the duration of the intervention. All devices will have the software application, iMINDr, which was developed to accurately track home meditation practice adherence. The iMINDr application will allow participants to listen to their home practice meditations. Information on date and time of listening, and length of listening time for each meditation will be collected. Devices will be used during the MBWR intervention only. Self-report assessment of ongoing practice will be administered at the 3-month data collection point (only in the MBWR group). If participants refuse the device, they will be provided the same materials hard-copy and CD. This software app has been successfully employed with veterans with PTSD, a project in which the current PI was involved.

**Qualitative Measures**

An adaptive version of the **Engagement Questionnaire** (EQ) will be used to gather the subjective experiences of participants attending the program. The EQ is a written questionnaire developed by Dr. Christiane Brems. After sessions three, five, and seven, participants will be asked about the aspects of the session they found most and least helpful, their plan for attempting
parts of the practice at home or at work, and barriers that got in the way of applying the practice outside the sessions. Participants will also be invited to offer any additional written comments.

I will conduct a focus group during the last session of the 8-week intervention. Approximately seven to ten questions will be asked to the group (see Appendix A). The interview approach will permit discussion and allow for data to enter the interview that is not directly sought, thus allowing participants to provide information they believe is important and relevant to them.

**Intervention**

MBWR is designed to increase mindfulness, self-compassion, team cohesion, and resilience, and reduce burnout and attrition among interdisciplinary primary care teams working in safety-net medical centers. The current protocol is based on the MBSR\textsuperscript{105} and Mindful Practice program curricula\textsuperscript{14}. Participants will meet for eight, 60-minute, weekly sessions. Hourly sessions employ experiential exercises to cultivate mindfulness. Participants will be guided to sequentially cultivate mindfulness of bodily sensations, the breath, the thoughts and associated emotions, following with self-compassion and compassion for others. Practices will include versions of the body scan, sitting meditation, walking meditation, mindful eating, and mindful movements as outlined by Kabat-Zinn\textsuperscript{105}. Practices are adapted to make them more relevant to primary care providers. Brief didactics and discussion periods explore the participants’ experiences of these exercises, how individuals integrate informal practices within the work day, as well as, how team members can support each other integrate mindfulness practices into daily work routines. Finally, a software application was developed to objectively track adherence to formal practices completed outside the sessions. I will facilitate the MBWR
Given the importance of internal validity of the interventions in pilot research, careful consideration will be given to interventionists’ adherence to the MBWR protocol. To accomplish this, we will follow the best practices and recommendations of the NIH Behavior Change Consortium and have experts in mindfulness-based interventions (Drs. Christopher and Lane, professors at Pacific University’s School of Professional Psychology) review three randomly selected video recorded sessions from each MBWR group. Drs. Christopher and Lane will use a fidelity rating checklist for all intervention components to ensure adherence to the MBWR protocol across sessions. The MBWR protocol is included in Appendix B.

In previous research, I demonstrated preliminary feasibility of MBWR with an interdisciplinary primary care team in a safety-net center. Of the eligible participants, 82% enrolled. The retention rate was 100% and the attendance rate of 88%. All participants endorsed reduced stress, enhanced self-awareness, and increased team cohesion; self-reported resilience evidenced a medium effect size. This research, however, was conducted using a small sample ($n = 9$) and an uncontrolled naturalistic design. In the proposed study, I plan to build on the existing work through a rigorous waitlist control pilot trial to thoroughly examine the feasibility and impact of MBWR.

**Data Analyses**

To evaluate the primary outcome for aim I, I will assess feasibility as a function of recruitment; a sample size that is equivalent to or higher than our sample size calculation will be used to indicate feasibility. Our potential participant pool is approximately 70, and our
expectation is to have at least 58 participants (80%) contact the research team to be screened for eligibility. In our previous MBWR research, participation rate exceeded 80%. I will compare our attrition rate to the mean 20% attrition rate in past MBSR studies with health care providers using chi-square analysis\textsuperscript{12}. I will consider an equivalent or smaller attrition rate to indicate feasibility in terms of retention/attrition. Protocol adherence will be measured with session attendance. Similar to previous MBSR studies\textsuperscript{157}, treatment completer is defined as attending at least five out of eight sessions. To assess the feasibility of measure completion, I will set our threshold at an 80% completion rate across all measure items. I will track refusal rates and reasons and acceptability to randomization. Furthermore, I will track the amount of time required by participants to complete all measures to assess for burden.

Qualitative data collection will provide information regarding the participants’ subjective experiences of the interventions, including reasons for attrition and refusal. Audio recordings of the focus group will be transcribed verbatim. Analysis will be conducted by employing a grounded theory approach\textsuperscript{167}. Grounded theory is a powerful analytic approach in that the theory is inductively generated from the researcher’s observations of the data and not deduced from previous research\textsuperscript{168}. To analyze data, the first author and a research assistant (RA) will independently review the transcripts in their entirety using content analysis to identify recurring words, phrases, or concepts and develop codes (open coding). The two researchers will then discuss their independently developed codes, resolve differences, and devise a final coding scheme. The final coding scheme will then be independently applied to the transcripts by the two coders. Integral to the grounded theory, coding will include line-by-line continuous comparison of data. Furthermore, written feedback collected using the EQ will also be analyzed and coded to reveal common themes.
To evaluate our primary outcome for aim II, reducing burnout, I will administer the Maslach Burnout Inventory. Burnout, and all other self-reported variables listed above, will be screened for distributional assumptions prior to analysis. Independent t tests will assess for differences between groups in study variables at baseline. Primary analyses of between group effects will be tested using a multilevel linear modeling approach. Multilevel models (MLM) have become a standard data analysis approach and are considered flexible, powerful models that enhance clinical research. MLM extend common univariate growth models by efficiently managing missing data and account for dependency of observations in a repeated measure design. MLM can be used to examine multivariate hypotheses involving fixed effects (e.g., does the size of the treatment effect differ across outcomes?) and/or random effects (e.g., is change in one outcome related to change in the other?). Additionally, MLM also allows one to examine changes within an individual (from pre- to post-treatment) rather than computing averages across individuals. Group assignment will be treated as a fixed effect and outcome variables will be treated as random effects that could carry within persons and across time. Restricted maximum likelihood estimations (REML) allow all subjects to be included in the models, even those with partially missing data. Therefore, mixed-effects models were consistent with Intent-To-Treat (ITT) principles without requiring imputations. I will include race, gender, professional role, and age as exploratory moderators and past meditation experience as a control variable in the model. I will examine changes in outcome variables using univariate analysis of variance (ANOVA) tests. Significant Group X Time interactions effects will indicate the effectiveness of MBWR, compared to the waitlist control group. Paired t test will be used to test hypotheses about within-group changes in pre and post interventions scores among the MBWR. Statistical
significance for all parameter estimates will be set at $p < .05$, two tailed. Effect sizes will be calculated using Cohen’s $d^{166}$.

In addition to multilevel modeling, I will assess clinically meaningful change in self-reported burnout, resilience, mindfulness, self-compassion, team cohesion, and intention to leave employment outcomes using the Reliable Change Index (RCI). RCI requires that the amount of change in a participant's outcome score exceeds measurement error, based on the reliability of the outcome scale. I assume for the purposes of this study that an SRM of .30 would be a minimally important difference in outcomes.
References


Epstein, R., Quill, T., Krasner, M., & McDonald, S. A Curriculum in Mindful Practice for Students and Residents Faculty Manual.


Hobfoll, S. E., Tracy, M., & Galea, S. (2006). The impact of resource loss and traumatic growth on probable PTSD and depression following terrorist attacks. *Journal of Trauma and Stress, 19*(6), 867-878.


MINDFULNESS-BASED WELLNESS AND RESILIENCE


Ţănişsaro, B. (2012). Right mindfulness: Memory & arden on the Buddhist path.


Chapter Six:

IRB Approval Letter
August 12, 2015

Approved: August 10, 2015
Continuing Review Due: August 10, 2016
IRB Reference Number: 077-15

Project Title: [753827-1] Pilot Study Investigating the Effects of a Mindfulness-Based Wellness and Resilience Training on Burnout and Team Effectiveness among Interdisciplinary Primary Care Teams

Investigators: Dana Dharmakaya Colgan, MA, MS
Faculty Advisors: Michael Christopher, PhD

Review Category: Expedited Review

This letter signifies that the above research project has been reviewed by the Institutional Review Board at Pacific University and has been approved for one (1) year based on the provided materials. While being mindful of participant confidentiality, keep this letter on file, along with all informed consent and release forms, for the duration of the project and for at least three (3) years after the project officially is closed.

If a research-related incident (i.e., adverse event, issue of noncompliance, unanticipated problem) occurs during the course of the study, or if you anticipate modifying the project in any way, please complete the necessary paperwork (available on the IRB website) and submit it to the IRB immediately. As a researcher, you are responsible for the well-being and safety of your participants.

As this project required expedited or full review, it must receive continued approval from the IRB for each year that it is active. Your first continuing review must be completed by August 10, 2016 to ensure compliance. It is suggested that you submit your request at least one (1) month in advance. If your research is no longer active, please submit a project closure request instead. The paperwork for both requests is available on the IRB website.

If you have any questions, please do not hesitate to contact Breanna Grove at 503-352-1478 or irb@pacificu.edu. Please include your project title and Pacific University IRB reference number 077-15 in all correspondence with this committee. We thank you again for your submission and wish you well in your research endeavors.

Sincerely,

Pacific University Institutional Review Board

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Pacific University's records.