

## AN ABSTRACT OF THE DISSERTATION OF

Kathleen P. Conte for the degree of Doctor of Philosophy in Public Health presented on April 24, 2015.

Title: Factors That Influence the Statewide Scaling-up of an Evidence-Based Arthritis Self-Management Program: Walk With Ease.

Abstract approved: \_\_\_\_\_

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Interest by public health organizations in scaling-up efficacious health interventions is increasing as the prevalence of arthritis increases and treatment becomes more costly. Although arthritis evidence-based interventions (EBIs) have been found efficacious in improving healthy behaviors and the ability to self-manage symptoms, little research has examined whether scaled-up delivery of arthritis EBIs is effective. The goal of this dissertation was to examine the experience of Oregon State University Extension in scaling-up Walk With Ease (WWE), an arthritis self-management EBI, for state-wide delivery. This dissertation had four aims: 1) examine factors that influenced the installation of WWE during Year 1 of scale-up; 2) describe program adoption and reach after two years of scaled-up delivery and examine facilitators of each; 3) explore participant retention and quality of program implementation; and 4) evaluate the effectiveness of WWE. A two-phase project was conducted.

First, I explored factors that influenced the installation of WWE during Year 1 of scale-up. I interviewed the program implementers and administrators ( $n=11$ ) to examine installation of WWE. Two categories of barriers and facilitators emerged that influenced

installation. Organization-level themes included the timing of installation, sufficient resources and time, and the relationships of the staff of the delivery system with local community partners. Program-specific themes included recruiting and training volunteer leaders, identifying suitable walking locations, and flexibility in adapting WWE to local settings. These factors impeded installation, delayed delivery and highlighted the importance of devoting sufficient time to the installation phase.

Second, guided by the RE-AIM model, I conducted a mixed-methods evaluation after two years of scale-up activities. I interviewed WWE leaders ( $n=39$ ) and collected and analyzed program forms and pre/post-program participant surveys. Results indicated that WWE was implemented by diverse organizations that successfully expanded recruitment to reach the targeted number of participants ( $n=598$ ). Most programs were delivered with high fidelity, however, adaptations and participant retention posed threats to successful implementation. Program completion was associated with a reported interest to increase physical activity (Odds Ratio [OR] = 2.6; 95% Confidence Interval [CI] = 1.0, 6.5), and incompleteness was associated with older age (OR = 0.2; CI = .7, 0.8), physician referral to the program (OR = 0.2; CI = .1, .7), and attending a WWE class in a church setting (OR = 0.1; CI = .0, .5). Despite these barriers, WWE delivery demonstrated effectiveness: participants reported significant reduction in pain and fatigue ( $\beta = -.47$ ,  $p < .01$ ,  $\beta = -.58$ ,  $p < .05$ ; respectively), and increased physical activity ( $\beta = .86$ ,  $p < .001$ ). Adjustments for missing data modestly affected these associations.

The findings from this dissertation provide the following implications for future scale-up projects: 1) the installation phase is critical and cannot be overlooked; 2) EBIs chosen for scale-up must be reputable and flexible; 2) a support system is needed to guide

scale-up and recruit and train delivery partners; and 3) fit between the program, leaders, and participants is critical to facilitating desired outcomes. Identifying strategies to scale-up EBI delivery warrants future exploration to better impact population-level health and wellbeing.

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Factors That Influence the Statewide Scaling up of an Evidence-Based Arthritis Self-  
Management Program: Walk With Ease.

by  
Kathleen P. Conte

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Kathleen P. Conte, Author

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## TABLE OF CONTENTS

	<u>Page</u>
CHAPTER 1 INTRODUCTION	1
Background and Significance .....	1
Translational Research. ....	4
Importance of the Current Study. ....	9
Scaling-up Walk With Ease Using University Extension Services .....	10
Walk With Ease. ....	10
Setting for Scale-up. ....	13
Theoretical Background.....	15
Specific Aims.....	21
Human Subjects Approvals.....	22
CHAPTER 2 FIRST MANUSCRIPT	23
Abstract .....	24
Introduction.....	25
Setting.....	29
WWE Program. ....	30
Methods.....	31
Sample.....	31
Data Collection.....	31
Analysis. ....	33
Results.....	34
Organization-Level Factors.....	34
Program-Specific Factors.....	42
Discussion .....	47
CHAPTER 3 SECOND MANUSCRIPT	58
Abstract .....	59
Introduction.....	61
Description of Walk With Ease.....	61
Scale-up Context. ....	62
Conceptual Approach for Evaluation.....	64
Methods.....	66
Sample.....	66
Data Collection, Instruments and Measures.....	66

## TABLE OF CONTENTS (Continued)

	<u>Page</u>
Analytic Strategy.....	69
Results.....	70
Adoption and Reach.....	71
Implementation.....	74
Effectiveness of WWE.....	80
Discussion.....	81
CHAPTER 4 CONCLUSION	99
Ties to Theory.....	101
Defining Scale-up Success.....	104
Future Research and Implications.....	108
Final Conclusions.....	110
BIBLIOGRAPHY	111
APPENDICES	121
Appendix A: Qualitative Interview Protocol: Key Informants.....	122
Appendix B: Instruments.....	123
Program Information Form.....	123
Fidelity Checklist.....	124
Leader Registration Form.....	129
Participant Registration Form.....	131
Participant Health Survey.....	132
Participant Satisfaction Survey.....	135
Interview Guide.....	138
Appendix C: Table 1. Program-Specific Characteristics and Demographics.....	142

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
Figure 3.1 Study Inclusion Criteria for Walk With Ease Participants .....	97
Figure 3.2 Participant Attendance by Class Number .....	98

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
Table 2.1 Walk With Ease Program Components .....	55
Table 2.2 Factors that Influenced Walk With Ease Installation .....	56
Table 2.3 Characteristics of Counties Offices and Walk With Ease Installation .....	57
Table 3.1 Walk with Ease Key Program Components .....	89
Table 3.2 Characteristics of Walk With Ease Classes (n=36) .....	90
Table 3.3 Characteristics of Leaders and Participants .....	92
Table 3.4 Adjusted Odds Ratios for Participants Completing Walk With Ease Program <sup>a</sup> 94	
Table 3.5 Participant Satisfaction .....	95
Table 3.6 Changes in participant health outcomes and physical activity .....	96

## CHAPTER 1 INTRODUCTION

### Background and Significance

Arthritis is the leading cause of disability in the United States<sup>1</sup> and affects 22% of adults nationwide.<sup>2</sup> The risk for arthritis increases with age,<sup>2</sup> and as the population of adults older than 65 years grows, projections estimate the prevalence of arthritis at 67 million people by 2030.<sup>3,4</sup> Particularly concerning is that almost 50% of adults aged 65 years and older report arthritis-attributable activity limitations.<sup>2</sup> Arthritis-related impairments like disability and pain are associated with indicators of poor health including obesity,<sup>5</sup> decreased physical activity,<sup>6</sup> and poor mental health.<sup>7</sup>

Research shows that physical activity can delay the onset of arthritis-related physical disability and decrease symptom severity. Although moderate-intensity physical activity is recommended as a self-management strategy for those with arthritis, physical inactivity is high in older adults.<sup>6,8,9</sup> Many people with arthritis hesitate to engage in physical activity due to pain, uncertainty that physical activity can improve functioning, and fear of causing injury.<sup>10</sup> In addition, research indicates that many adults believe arthritis symptoms cannot be improved and report low self-efficacy (e.g. belief in one's ability) for arthritis self-management and physical activity.<sup>11</sup>

Many self-management interventions designed to improve arthritis symptoms have shown efficacy.<sup>12</sup> In addition, arthritis evidence-based interventions (EBIs) have been shown to improve self-efficacy for arthritis self-management and exercise, and to improve symptoms and reduce disability associated with arthritis.<sup>13-16</sup> Despite that EBIs can increase physical activity and improve health outcomes for adults with arthritis, the

translation of EBIs from research settings to practice is still slow. Estimates suggest that approximately two-thirds of new implementation efforts are successful and sustainable.<sup>17</sup> Further, studies report low participation in arthritis EBIs among older adults.<sup>18</sup>

Increasing the quality and availability of arthritis interventions that improve self-management skills is a public health priority as identified by the Centers for Disease Control and Prevention (CDC) and the Arthritis Foundation.<sup>11,19</sup> In 2010, the CDC Arthritis Program and the Arthritis Foundation produced a national public health plan to address arthritis.<sup>20</sup> This plan articulated a need for expanding the reach and availability of EBIs that address arthritis through weight management, self-management education, physical activity, and injury prevention. In particular, the plan sought to move beyond simply disseminating EBIs to actively facilitating wide-spread scaling-up of arthritis programs. The goal of scaling-up an EBI is to expand the program's reach to have population-level impacts through widespread adoption by multiple delivery organizations that embed the EBI into the organizations' routine operations.<sup>21</sup>

To aid in improving the uptake of EBIs, the CDC Arthritis Program provided grant funding to states to advance the arthritis agenda. The purpose of this funding was to scale-up arthritis EBIs in community settings.<sup>21</sup> The CDC scale-up strategy involves implementing EBIs through existing delivery systems including public health agencies, coordinated care organizations, community organizations, senior living facilities, and others. Maximizing on the organizational capacity of existing systems is thought to improve sustainability and lower costs associated with implementation of EBIs. Limited evidence exists, however, on the impact and sustainability of this delivery model. Further,

guidelines for scaling-up by embedding EBIs into existing systems and ensuring quality implementation across multiple sites are lacking.

The nascent field of implementation science provides some guidance for translating EBIs from research to community settings; however, such guidelines are specific to individual settings and lack relevance in large-scale implementation efforts. Limited research exists on what constitutes the critical considerations in building capacity to facilitate successful scale-up. Building sufficient infrastructure for large-scale implementation will likely require different approaches and resources than small-scale implementation in order to accommodate the scope of the scale-up effort. For example, more stakeholders will need to be engaged to collaborate towards a common goal and infrastructure for multiple delivery sites will need to be developed, as well as a monitoring and evaluation plan that ensures quality and consistency of delivery.

The study outlined in this dissertation will address gaps in translation and implementation science by examining relevant factors to successful scaling-up of an arthritis EBI. This study used data collected during the first two years of scaling-up Walk With Ease (WWE), an arthritis self-management program, implemented by Oregon State University (OSU) Extension. The goal of this study was to examine factors that influenced the process of scaling-up WWE, and evaluate the outcomes of scaling-up. In the first manuscript, I examined the factors that influenced installation and early delivery, and in the second manuscript, I evaluated the scale-up outcomes and examined factors that influenced those outcomes. Knowledge derived from this study may help improve future efforts by identifying strategies and barriers of scaling-up EBIs. Findings may also



be applied to improving implementation quality, health outcomes, and sustainability of community-based health programs and assist with the design of future health interventions to facilitate translation from research settings to community practice.

### **Translational Research.**

Over the last decade, researchers and practitioners have identified a need to shift from developing new arthritis self-management EBIs to expanding the reach and impact of existing efficacious programs.<sup>20</sup> The National Institute of Health's (NIH) Roadmap Initiative provides a model for moving research innovations such as EBIs, policies, or medical procedures, from research settings to practice. This study focuses on the translation of EBIs. The NIH's translational model is a continuum with four stages of activities.<sup>22</sup> The goal in the first stage, type I translation ( $T_1$ ), is to evaluate an innovation for efficacy, or to determine whether it works in a controlled setting. In type II translation ( $T_2$ ), the innovation is tested in small-scale, real-world settings for effectiveness and to form evidence-based guidelines.<sup>23,24</sup> The third step in translation ( $T_3$ ) is to examine and solve problems encountered by users as they attempt to incorporate the new innovation into practice.<sup>25</sup> Type IV translation ( $T_4$ ) seeks to evaluate the wide-scale use and outcomes of implementation strategies identified in  $T_3$ , and to facilitate the widespread uptake of the innovation by end users through policies and standardized practice. This final stage,  $T_4$ , is concerned with application of the innovation at the population-level. Inherent in the continuum of translation is that the cycle is iterative, and each stage must be interconnected with the other three stages in a continuous feedback loop.<sup>25</sup> As the innovation moves from controlled research settings to practice, adaptations will likely be

made to improve the fit of the intervention to the delivery context,<sup>26</sup> and collaboration between EBI's developers and implementers is critical to ensuring the quality of these adaptations. During each stage of translation, evaluation is needed to determine whether and how outcomes are affected by adaptations or by the delivery context.<sup>27</sup>

Scaling-up an EBI is an example of T<sub>4</sub> translation in that the end goal is to expand the reach and adoption of the intervention through policy and practice, to have an impact at the population-level. An EBI is ready to be scaled up when it has completed all previous levels of translation research: the EBI has shown efficacy through rigorous evaluation in research settings (T<sub>1</sub>); the EBI has undergone translation to and evaluation in practical settings and has been shown effective (T<sub>2</sub>); and best-practices for delivery have been identified and the EBI is packaged for dissemination (T<sub>3</sub>). Before the EBI is ready for T<sub>4</sub> translation, users must evaluate whether the costs, both social and fiscal, of scaling-up the EBI are balanced by the potential impact of the EBI on public health.

Because the stages of translation are interrelated, scaling-up EBIs will be heavily informed by findings in T<sub>3</sub> translation regarding best-practices for quality implementation. The fields of dissemination and implementation sciences are generally focused on T<sub>3</sub>, with the goal of examining the activities required for the adoption and delivery of a specific EBI by an organization or end user.<sup>28</sup> Of primary concern during T<sub>3</sub> is maximizing "fidelity," defined as the extent to which the EBI is delivered as designed and as shown to be effective during stages T<sub>1</sub> and T<sub>2</sub>.<sup>29</sup> Yet scaling-up goes beyond implementation in that it requires additional considerations such as adding to or changing the innovation by offering new services or variations, and/or increasing the reach to more

recipients.<sup>30,31</sup> Systemic monitoring and evaluation plans are needed that encompass all sites and partners involved in delivery in order to assess the success of the scale-up effort and the population-level impacts.<sup>32</sup> Other considerations include having central leadership that communicates and maintains the vision or goal for the scaling-up effort, facilitates communication between stakeholders, and provides continuity through technical assistance and oversight of implementation quality. Although central leadership may not always be required for successful scale-up, evidence suggests that scale-up efforts likely fail due to lack of synergy and communication among partners.<sup>33</sup>

Definitions of scaling-up in the scientific literature are few and inconsistent. For example, a vague definition is offered by the CORE group, an international not-for-profit that advocates for and supports large-scale health programs and policies aimed at reducing child and maternal mortality. The CORE group considers scaling-up to be the “widespread achievement of impact at affordable cost”<sup>34</sup> and other authors use the term “scale-up” as a synonym for wide-scale diffusion or dissemination of an innovation.<sup>35</sup> Scaling-up, however, is a more active process than diffusion and a more complex process than dissemination. Diffusion refers to the spread of an innovation through a social network and is usually considered a passive or naturally occurring process.<sup>36</sup> Dissemination is a more active effort that seeks to increase awareness of an innovation, with the hope that awareness will lead to eventual adoption. Studies, however, have shown that dissemination alone does not result in the uptake of an innovation.<sup>37</sup>

Of the definitions of scaling-up that do exist, most include elements of expanding the reach and sustainability of programs, policies, or innovations. The International

Institute for Rural Reconstruction's widely adopted definition is as follows: *Scaling-up brings more quality benefits to more people over a wider geographical area, more quickly, more equitably, and more lastingly.*<sup>38</sup> Authors, however, argue that the elements of equity and speed in this definition are unnecessary.<sup>39,40</sup> Although ensuring equitable access to health innovations is a driving factor in some endeavors,<sup>41</sup> particularly when the goal of scaling-up is to reduce health disparities between those benefiting from health innovations, it may not and, perhaps, should not always be a central purpose of all scale-up efforts. In addition, scale-up efforts often require time to build sufficient capacity and infrastructure for wide-scale implementation and to foster political, cultural, and financial support for sustainability.

A more useful definition, and the one adopted in this study, comes from the Wolfensohn Center for Development at The Brookings Institution that defines scaling-up as: *expanding, adapting, and sustaining successful policies, programs, or projects in different places and over time to reach a greater number of people.*<sup>39</sup> What is missing from all of these definitions, however, is an emphasis on the kinds of system changes necessary for successful scaling-up. Successful scale-up will require support at multiple system levels including favorable policies, sufficient organizational capacity, and extensive networks of partnerships.<sup>42</sup>

Scaling-up can be a spontaneous or guided process.<sup>41</sup> Spontaneous scale-up refers to the uptake of an innovation by many users without oversight or a "push" from external entities such as non-governmental organizations, local or national governments, and public health agencies. Such scale-up efforts may be thought of as grass-roots or bottom-

up approaches to embedding an innovation into practice. As the name suggests, guided scaling-up is led by an entity that provides vision and oversight for the effort.

Within guided scaling-up, efforts may be applied at a vertical or horizontal scale.<sup>43</sup> Vertical scaling-up refers to expanding an innovation within a system or organization. The goal in vertical scaling-up is to enact policy to institutionalize the innovation in the functioning of an organization or system for long-term and comprehensive application. In horizontal scaling-up, the goal is to increase the breadth of coverage either by expanding the reach of the innovation to new settings, or altering or bolstering an innovation to meet needs of new beneficiaries.<sup>31,43</sup>

Menter et al. offer two potential fallacies for consideration in scale-up efforts. The ecological fallacy is that what works at one level of the system will work at another level.<sup>44</sup> Best practices for facilitating policy change at the governmental level may not be applicable to policy change at an organizational level and vice versa. Similarly, the composition fallacy states that what is good for one person, organization, or city, will be good for all. The composition fallacy may be particularly poignant in cases where large-scale implementation of a single EBI is offered as a one-size-fits-all solution to a public health issue.

Despite these conceptual definitions of scaling-up and the agreement that scaling-up includes expanding reach and impacts of EBIs, few authors have defined the scope of scaling-up. In other words, what constitutes a successfully scaled-up intervention? In general, no consensus exists and authors have suggested that the scope of successful scale-up effort will need to be defined by those doing the work<sup>45</sup> and may look different

across projects.<sup>46</sup> Indeed, in articles describing scale-up efforts, the definition of success is highly contextual and specific to the scale-up context.<sup>41,47,48</sup> In addition, limited evidence exists regarding the process of successfully scaling-up EBIs.<sup>41</sup> Some authors have offered considerations for scaling-up that include creating organizational change, shifting ownership from an external to internal locus, and developing partnerships and collaborations.<sup>45,49</sup> The most comprehensive outline of recommendations comes from a review of the scale-up literature by Simmons et al.<sup>41</sup> Simmons et al. offer ten recommendations for success that are as follows: (1) develop strong diffusion channels to facilitate the spread of the innovation; (2) provide clear messaging about the advantages of the EBI; (3) ensure an adequate technical assistance (defined as “training”) infrastructure; (4) document the process and outcomes of the scale-up project; (5) ensure sufficient time for implementation; (6) adapt the EBI to local contexts; (7) involve stakeholders early in the scale-up process; (8) include personal and informal communication with stakeholders; (9) practice participatory implementation approaches; and (10) ensure a focus on sustainability. Despite these recommendations, limited information is available about whether these activities promote successful scaling-up, or what type of infrastructure is needed.

### **Importance of the Current Study.**

Scaling-up public health programs to improve reach and availability is needed to ensure improved and equitable access to the benefits of health research.<sup>31</sup> T<sub>4</sub> research, including scaling-up, is the newest addition to the translation continuum and has received less attention and funding than previous stages of translational research.<sup>50</sup> Although

scaling-up interventions may be a cost-efficient and sustainable way to address nationwide health goals,<sup>21</sup> limited evidence exists regarding the process for successfully scaling-up EBIs. Additionally, little is known about widespread, concurrent implementation directed by a single entity.

In 2012, the Oregon State University (OSU) Extension Service received a contract through funding from the CDC arthritis program to scale-up an arthritis EBI, Walk With Ease (WWE), across the state. The contract supported implementation activities but the funding and scope of the project did not include support for research or evaluation of the success of scaling-up WWE. The project, however, provided a unique opportunity to examine and document factors that contributed to or hindered successful scaling-up of an EBI. In addition, it provided an opportunity to examine how WWE was implemented in diverse community settings, and the extent to which it was adapted. Though WWE has been proven efficacious during research evaluations,<sup>13,16,51</sup> limited evidence exists regarding barriers and facilitators to its successful implementation in real-world contexts. In order for WWE to be successfully scaled up statewide, a more thorough understanding of factors affecting implementation is needed. As such, external funding was obtained to support the evaluation presented in this dissertation.

### **Scaling-up Walk With Ease Using University Extension Services**

#### **Walk With Ease.**

WWE is a CDC-approved walking and educational program that teaches participants how to initiate an exercise routine and integrate physical activity into their everyday lives. The CDC criterion for inclusion as an approved arthritis EBI consists of

three major components: 1) the characteristics of the intervention design includes participant control over the physical activity and hands-off instruction; 2) the physical activity includes no physical contact, competition, or high joint-impact activities; and 3) the research is based on the general adult community population, dropout rates are reported, and no safety issues are raised.<sup>4</sup> An addition, the research must be published in a journal or report and include a treatment group of at least 75 participants. Pre and post-test measures must evaluate arthritis-relevant outcomes (e.g. physical activity level and health status) and follow-up studies must show consistent findings. In addition, the program must be low-cost, packaged for implementation, and be supported by technical assistance and leader-training systems. WWE met all of the CDC requirements and was added to the approved list of arthritis physical activity programs in 2010.<sup>12</sup>

Findings from the original trial indicate that WWE participants were shown to have less pain and depression and increased self-efficacy than control-group participants who received an educational seminar on arthritis pain management.<sup>16</sup> Despite the initial benefits, however, gains in walking endurance were not maintained at 4-month follow up. Following that study, a self-directed version of the program was developed and evaluated against the group-led version.<sup>51</sup> For both formats, participants reported significant improvements in strength, stamina, walking pace, balance, pain, and perceived control. Only the self-directed group, however, maintained these positive outcomes at the one-year post-program follow-up. A sub-sample of participants identified as “employed” from the group vs. self-directed study were also surveyed to determine changes in workplace activity limitations.<sup>13</sup> Researchers found that WWE was effective at reducing



workplace limitations by improving participants' concentration and mobility. Participants in each of the studies self-selected into WWE and they were not required to have an arthritis diagnosis.

Both studies were conducted by researchers in community settings and recruited participants through partnerships with community organizations and media advertising; participants were not required to have an arthritis diagnosis to participate in the studies. WWE group classes were taught by leaders recruited from local community organizations and trained by the Arthritis Foundation.<sup>13,16</sup> The fact that health improvements were shown among all participants, including those who did not have arthritis, is particularly important as WWE can be applied to meet the needs of a variety of target audiences, especially sedentary individuals and those with other mobility limitations.

Despite the fact that the research took place in real-life implementation contexts, no evidence regarding barriers and facilitators to implementation or adaptations to program design were reported. Further, in both studies it is unknown how participants and/or leaders were retained. In order for programs to be effectively reproduced and scaled up to other settings, expanded evidence related to the factors affecting implementation including cost, quality assurance, and documenting deviations from program design are needed to better prepare for translation.<sup>52</sup>

The design of WWE is not complex and program costs are relatively low. Of the six CDC-approved arthritis programs, WWE requires the least resources to implement: the program requires a trained leader (if implementing the group-led version), participant

workbooks, and a walking location.<sup>12</sup> Unlike other physical activity programs, neither special equipment nor facilities are required. Additionally, anyone can become a WWE leader in that no previous experience in exercise or teaching is needed. The Arthritis Foundation provides a one-time online training for leaders for certification, and requires that leaders maintain a current CPR certification. Finally, no licensing fees are charged to individuals or organizations interested in leading WWE.

The program is offered in two formats: 1) group-led classes taught by certified community leaders that meet for 18 one-hour sessions over 6 to 9 weeks and 2) self-directed programs in which participants use a workbook to guide their walking activities. In both formats, participants learn about safe walking mechanics, stretching and arthritis self-management, and are encouraged to slowly build up to walking 30 minutes on three or more days a week. The group directed version provides group support and motivation under the supervision of a trained leader.<sup>53</sup>

### **Setting for Scale-up.**

In 2012, the CDC Arthritis Program funded the Oregon Health Authority (OHA) to implement WWE statewide in partnership with the Arthritis Foundation and Oregon State University (OSU) Extension. The CDC grant awarded five years of funding to OHA to build upon existing infrastructures for the delivery of evidence-based arthritis programs. The overarching goal of this project was to enroll 38,000 Oregonians in arthritis EBIs by 2017. WWE was selected by OHA as the primary intervention for implementation due to its minimal costs, likelihood to fit multiple target populations across diverse settings, and ability to be sustained in the long term. OSU Extension

Service was identified as the primary local delivery system for state-wide implementation of WWE.

University Extension Services frequently offer health education programs and have a long history of programming such as 4-H, Master Gardeners, and the Federal Supplemental Nutrition Assistance Program – Education. Faculty in the OSU Extension Service’s Family and Community Health Program provide services in all 36 Oregon counties. This is the first time, however, that an evidence-based arthritis self-management program has been disseminated systematically through a statewide Extension Service. This project was the largest dissemination and implementation of WWE to date, and provided opportunities to examine the factors that facilitate successful implementation and sustainability of WWE in community settings and to explore the extent to which WWE must be adapted to fit different delivery contexts and target populations.

The scale-up of WWE within OSU Extension was a guided scale-up, facilitated by OSU administrators with guidelines from the funders (i.e. OHA and CDC) and the administrators of WWE (i.e. the Arthritis Foundation). The effort was an example of both a vertical and horizontal scale-up. It was vertical in that WWE was scaled up within the OSU Extension system, throughout the state via county Extension offices. One goal of the scale-up effort was to institutionalize WWE within the OSU Extension county offices by establishing systems for ongoing implementation. Scale-up was also horizontal because, in addition to institutionalizing WWE within the OSU infrastructure, a second goal of the effort was to expand the reach of the program to new settings by partnering with local community organizations around the state.

With an Extension office in almost every county across the nation, documenting and evaluating this scale-up effort may offer important lessons to other state health departments and extension services. This information is essential to identifying best practices for scaling-up programs in community settings, and developing strategies that can help improve the reach, sustainability, and health outcomes of WWE as well as similar programs in other settings.

### **Theoretical Background**

Several theoretical models and theories address the process of moving EBIs from research settings to practice<sup>36</sup> but none are specific to scaling-up. As previously discussed, Simmons, et al. outline ten recommendations for successful scaling-up that can be classified into three categories: systems-level considerations, program-specific considerations, and stakeholder involvement. Systems-level considerations include developing strong diffusion channels to facilitate the spread of the innovation with clear messaging about the advantages of the EBI, ensuring an adequate technical assistance infrastructure, and undertaking strategic planning focused on sustainability and documenting scale-up outcomes. Program-specific considerations consist of ensuring sufficient time for implementation and adapting the EBI to local contexts. Strategies for working with stakeholders include early involvement in the scale-up process, personal and informal communication with stakeholders, and participatory implementation approaches.<sup>31</sup>

The concept of Model Coherency<sup>54</sup> provides an overarching view of implementation by positing that for desired program outcomes to be achieved there must

be coherency, or good fit, between the program, the program deliverers, and the participants. To further refine this idea, I used three frameworks to inform my study and contextualize my findings. The Interactive Systems Framework (ISF)<sup>55</sup> provides a systems-level lens to help understand the infrastructure that is needed to move EBIs from research to practice. Diffusion Theory (Diffusion Theory)<sup>26</sup> provides useful considerations of the qualities of the EBI that facilitate adoption. Finally, the RE-AIM model<sup>56</sup> provides a framework to help guide the multiple dimensions of scale-up.

### **The Interactive Systems Framework**

The ISF identifies three systems that are necessary to facilitating translation: 1) the Intervention Synthesis and Translation System packages best practices into user-friendly formats for implementation; 2) the Intervention Support System supports implementation of EBIs by promoting capacity building; and 3) the Intervention Delivery Systems are the deliverers or implementers of the EBI.<sup>†</sup> Each system in the framework must work together with the other two for ultimate success. For example, uptake of programs will be better facilitated if the Intervention Synthesis System seeks input and packages the program to meet the needs of the Intervention Delivery System. Likewise, the Intervention Support System is necessary to translate best practices from research settings into sufficient capacity for implementation.

**The Intervention Synthesis and Translation System.** The Intervention Synthesis and Translation System consolidates the scientific evidence and best-practices

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<sup>†</sup>The three ISF systems in the original article were called the Prevention Synthesis and Translation System, the Prevention Support System, and the Prevention Delivery System. Given that WWE is an intervention rather than a prevention program, I have replaced the word “prevention” with “intervention” to better clarify its application to this proposal.

identified via T<sub>1</sub>-T<sub>3</sub> research into user-friendly formats. Materials produced by this system could include workbooks, manuals, online resources and guidelines for implementation. Special attention is given to clarifying and describing the core elements of the program that are thought to be responsible for the program outcomes seen in research settings.

In the context of this study, the Intervention Synthesis and Translation System is comprised of the Arthritis Foundation and the CDC Arthritis Program. The Arthritis Foundation produces the WWE leader and participant manuals, website and marketing templates, and creates these materials in collaboration with the original researchers. The CDC facilitates translation by promoting the program and publishing the evidence for WWE through their website and published compendium of evidence-based arthritis self-management programs.<sup>57</sup> A well-packaged program greatly aids translation<sup>28</sup> and is prerequisite to scale up, as the definition of scale up refers to the spread of some *thing* – whether it be a policy or EBI. As the WWE program has already been packaged for implementation, the Intervention Synthesis and Translation System will play a small role in this study.

**The Intervention Support System.** The Intervention Support System provides training, technical assistance, and capacity building to the Intervention Delivery System, i.e., the end user of the EBI. Capacity building tasks within the Intervention Support System include both general capacity and innovation-specific capacity. General capacity refers to the basic infrastructure, skills and motivation needed by an organization or implementer for overall functioning and to accomplish implementation. Such capacity could include staff and services serving the target population and established community

partnerships and presence. Innovation-specific, or in the case of this study, program-specific capacity, refers to the particular skills and resources required to implement the particular EBI selected for implementation.

The Intervention Support System operates on two levels in this study. At a macro level, the Arthritis Foundation and OHA provide capacity building to OSU Extension. The Arthritis Foundation provides program-specific capacity building through WWE leader training. OHA provides general capacity building through funding and technical assistance for general EBI implementation in the state. As such, the Arthritis Foundation and OHA are part of both the Intervention Support System and the Intervention Synthesis System. On a micro level, OSU Extension acts as an Intervention Support System to local community partners, such as civic organizations and workplace wellness programs, by providing both program-specific and general capacity building in the form of WWE program resources, technical assistance, and training in monitoring and evaluation.

**The Intervention Delivery System.** The Intervention Delivery System is comprised of organizations and individuals who are responsible for carrying out the implementation of the EBI. The role of this system is to use the capacity developed by the Intervention Support System to deliver the EBI with fidelity to the program design. Considerations that lie within the scope of this system include characteristics of individuals and organizations delivering the program, such as readiness and positive attitudes towards implementation; and fit of the EBI to the target audience.

In the case of scaling-up WWE, the Intervention Delivery System is comprised of OSU Extension and their partners who are local community organizations and volunteers. Important to the success of scaling-up a program across an Intervention Delivery System comprised of several settings are the qualities of the EBI itself. For a conceptual framework regarding the aspects of an EBI that facilitate translation, Diffusion Theory provides useful guidance by describing the characteristics of the EBI that facilitate adoption and implementation.

### **Diffusion Theory**

Diffusion Theory, widely used in the implementation literature, describes the characteristics of an innovation, in this study an EBI, and the process of adoption among by the Intervention Delivery System. The adoption of the EBI by members of a social network can be charted as an “s-curve” where the process starts with a relatively small proportion of people using the EBI, gradually builds momentum as a majority adopts the innovation, and then levels out. Characteristics of individuals adopting the EBI at various periods of time are classified into adopter categories (e.g. innovators, early adopters, early majority, late majority and laggards). The *critical mass*, or “tipping point,” is established when the EBI becomes self-sustaining because enough individuals have adopted it.

There are several characteristics of the EBI itself that can facilitate adoption. Adoption is facilitated if the EBI has a *relative advantage* over other possible EBIs to address the health issue. The EBI needs to be *compatible* with the intended target audience and implementing organization. EBIs that are relatively simple lend themselves



to easy implementation have less *complexity* to burden adoption. If an organization or implementer can *try* the program before full-scale adoption, and if effects of the EBI can be *observed* then adoption is better facilitated. In addition, the theory posits that the EBI will undergo *reinvention* in that it will be changed by those who adopt it.<sup>58</sup>

It was assumed by the OHA that WWE, having low complexity and thus a relative advantage over other EBIs for arthritis self-management, would be easily scaled-up and compatible with multiple target audiences. The process of scaling-up should follow the diffusion pattern described by Diffusion Theory in that adoption of WWE should spread from innovators to later adopters as the latter observe the benefits of the program when implemented by the innovators.

### **RE-AIM**

Finally, I used the RE-AIM model to provide an evaluation framework for examining the multi-dimensional aspects of scaling-up WWE. The RE-AIM model has been widely used to evaluate program implementation and adaptations of programs in new settings.<sup>59-61</sup> The model outlines five components for consideration in program evaluations: Adoption, Reach, Implementation, Efficacy, and Maintenance.<sup>‡ 56</sup> “Adoption” refers to the uptake and characteristics of the settings in which the program was implemented. The number and characteristics of the participants who engaged in the program, and whether these participants constitute the appropriate targeted population is known as “reach.” “Implementation” considers the quality of implementation, or fidelity, and is concerned with the extent to which the program was delivered as designed. The

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<sup>‡</sup>The original RE-AIM article outlines the components in the following order: Reach, Efficacy, Adoption, Implementation and Maintenance. In this study, the RE-AIM components are presented in the order in which they are typically implemented.

actual outcome experienced by participants is known as “efficacy,” and “maintenance” refers to whether the program becomes integrated and continues within the adopting organization and/or community, as well as to the length of time these outcomes are sustained by participants after the completion of the intervention.

### **Specific Aims**

The goals of this study were to describe how OSU Extension approached scaling-up during the program installation phase (Manuscript 1), and to evaluate scale-up outcomes and examine factors that influenced those outcomes (Manuscript 2). Each manuscript represents each year of the implementation process and allows for a deeper exploration of how scale-up occurs over time. Guided by the RE-AIM model, this dissertation used mixed methods to address the following four aims and their respective research questions:

#### **Manuscript 1**

- Specific Aim I: Examine the factors that influenced installation of WWE during Year 1 of scale-up via the OSU Extension Service.

#### **Manuscript II**

- Specific Aim II: Describe program adoption and reach and examine the facilitators of each.
  - Research Question 1: What were the characteristics of the organizations that sponsored WWE programs, and the leaders that delivered the program?

- Research Question 2: What factors facilitated organizations' and leaders' decisions to deliver WWE?
- Research Question 3: What were characteristics of the participants recruited to the program?
- Specific Aim III: Explore participant retention and the quality of program implementation.
  - Research Question 1: How much of the WWE sessions did participants attend and what factors influenced retention?
  - Research Question 2: To what extent was fidelity to the program components achieved, and what factors were associated with fidelity?
- Specific Aim IV: Examine the effectiveness of WWE.
  - Research Question 1: Did WWE participants experience changes in health and physical activity over the course of the program?

### **Human Subjects Approvals**

The original data collection procedures and this secondary data analysis were approved by the Institutional Review Board at Oregon State University. All program participants were informed that their responses would be used for program evaluation and were able to refuse to answer any questions. Consent was obtained from interviewees before interviews were conducted.

**CHAPTER 2 FIRST MANUSCRIPT**

Factors Influencing Installation of an Arthritis Self-Management Program: Walk With  
Ease

Kathleen P. Conte, MA<sup>1</sup>

**Abstract**

Arthritis is the leading cause of physical disability in the United States and affects over half of adults aged 65 years and older. The need to expand the reach of arthritis education programs is pressing. Embedding programs into established delivery systems is an important strategy to increase program availability and minimize costs. Although successful implementation of health programs is dependent on the quality of installation activities, this phase is understudied. The aim of this study was to examine the factors that influenced the installation phase of the implementation of Walk with Ease (WWE), an evidence-based arthritis self-management program, by an established delivery system. Program administrators and staff ( $N=11$ ) from seven counties participated in the installation phase and in qualitative interviews. Two categories of barriers and facilitators emerged that influenced installation: (1) organization-level themes included the timing of installation, sufficient resources and time, and the relationships of the staff of the delivery system with local community partners; and (2) program-specific themes included recruiting and training volunteer leaders, identifying suitable locations for program delivery, and flexibility in adapting WWE to local settings. These factors impeded installation and delayed delivery. The importance of the installation phase in scale-up activities cannot be overlooked. Future research is needed to better understand the impact of this phase.

## Introduction

Arthritis is the leading cause of disability in the United States<sup>1</sup> and affects 22% of adults nationwide.<sup>62</sup> Due to the rising prevalence of obesity and the growth of the population aged  $\geq 65$  years, the prevalence of arthritis is expected to dramatically increase;<sup>3</sup> projections estimate the prevalence of arthritis at 67 million people by 2030.<sup>4</sup> Particularly concerning is that arthritis is the leading cause of physical disability in older adults, with almost half of adults 65 years and older reporting arthritis-attributable activity limitations.<sup>62</sup> Disability, pain and arthritis-related impairments have been associated with indicators of poor health including obesity,<sup>63</sup> decreased physical activity,<sup>6</sup> and poor mental health.<sup>7</sup>

Research has shown that community-based interventions can mitigate the impact of arthritis by increasing physical activity and arthritis self-management skills and improving self-efficacy for physical activity and control of arthritis symptoms.<sup>13-15</sup> Many older adults, however, believe that arthritis symptoms cannot be managed, and report low self-efficacy for arthritis self-management and physical activity.<sup>11</sup> Further, studies with older adults indicate that physical inactivity is high<sup>6</sup> and participation in evidence-based arthritis interventions that could help improve symptoms is low.<sup>18</sup>

In 2010, the Centers of Disease Control and Prevention's (CDC) Arthritis Program, together with the Arthritis Foundation, produced a public health plan to address arthritis, and recommended increasing the dissemination and implementation of community-based arthritis interventions.<sup>20</sup> A key strategy involved expanding the reach of programs by embedding arthritis interventions into the routine work of established

delivery systems that have multiple service delivery sites and whose constituents are likely to have arthritis.<sup>11</sup> Examples of existing delivery systems include public health agencies, medical, community and faith-based organizations, and parks and recreation centers. A benefit of using existing delivery systems for program delivery is that they have established organization-level capacity to support their general operations. This capacity may include established external partnerships and infrastructure to manage and develop additional financial resources, recruit, train, and retain staff, and to collect and manage data. By leveraging established systems and ability to reach the target population, these organizations' additional resources and efforts can be directed towards implementing the new program rather than towards supporting operational costs.<sup>11,21</sup> In the long-term, this approach is believed to facilitate access, availability, and sustainability of programs.

The process of implementation occurs in phases that generally consist of adoption, installation, delivery, and maintenance.<sup>28,64</sup> The adoption phase involves the organization discovering the program, assessing it and making a decision to implement it. During the installation phase, the organization readies for delivery by conducting activities such as hiring and training staff, purchasing materials, locating delivery facilities, etc. The delivery phase involves conducting the actual program activities with quality and with the purpose of generating the expected outcomes. Finally, the maintenance phase is achieved when systems are established that ensure delivery continues over time. Because initial delivery of a new program is often complicated and involves problem-solving unforeseen difficulties, the delivery phase is sometimes

subdivided into two phases: early delivery and full operation. The early delivery phase may include small-scale trial runs, or pilot tests, during which the organization assesses their commitment and ability to engage in full-scale operation.

For programs to demonstrate effective outcomes and sustainability, success during the early phases of implementation is crucial. Studies of implementation efforts in other fields, such as chronic disease self-management, have emphasized the importance of planning and capacity-building in the early phases of implementation.<sup>59,65,66</sup> The activities that occur prior to full operation, such as ensuring fit between interventions and target settings, engaging stakeholders, and building capacity for delivery, are prerequisites for success in later phases.<sup>64</sup> Therefore, the installation phase and early delivery phases of implementation are crucial in determining the success of full operation and maintenance. Despite the importance of these stages, studies reporting on program outcomes rarely report activities and barriers as well as facilitators encountered during the installation and early delivery phases.<sup>52</sup> This omission is problematic because research has determined that the quality of implementation during these early phases influences program outcomes.<sup>67</sup> Evidence regarding installation and early implementation activities, therefore, is needed to ensure quality implementation.

When integrating a new program into an organization, new systems, knowledge, and resources will need to be developed during the installation phase to support the program. In the case of embedding delivery within existing organizations, existing services may need to be reevaluated or realigned as staff time and resources shift to make room for the new program. Fixsen et al<sup>28</sup> note that implementation is inherently complex



and requires change to which the organizations' established systems, culture, and staff may be resistant. Integration of a new program must therefore involve establishing effective delivery infrastructure while generating change in the organization's activities and culture, including support from staff. Given this precarious balance, these authors<sup>28</sup> caution that "attempts to implement new practices effectively may end at [initial implementation], overwhelmed by the proximal and distal influences on practice and management."

Despite a growing body of research in implementation science, studies have focused primarily on the adoption of programs,<sup>59,68</sup> program outcomes, and evaluation.<sup>16,67,69</sup> Little is known about how the installation process facilitates or impedes successful implementation. For example, although previous authors have reported that establishing an implementation plan and/or building capacity is important<sup>28,70</sup> it is unknown how these plans are executed and adapted in practice, or what types of capacity are most pertinent to facilitating delivery. Although some authors have retrospectively reported their process in installing new programs from the ground up,<sup>59</sup> little attention has been paid to the process of embedding public health programs into established delivery systems. This strategy will likely involve different approaches because program-support infrastructures will have to be both created and shifted to accommodate the new program. In order to ensure that implementation activities actually progress to full operation and, ideally, maintenance phases, more knowledge is needed about how installation works. Such knowledge could be used to tailor technical assistance, direct resources and, ultimately, to improve program delivery, outcomes, and sustainability. Thus, the aim of

this study was to examine the factors that influenced installation of an evidence-based arthritis self-management program, Walk With Ease (WWE), within an established delivery system, the Oregon State University (OSU) Extension Service.

**Setting.**

In 2012, the Oregon Health Authority (OHA) received a five-year grant from the CDC Arthritis Program to disseminate and implement arthritis interventions via existing delivery systems in Oregon. WWE was selected by OHA as the primary intervention for implementation due to its minimal costs, likelihood to increase reach across diverse settings, and ability to be sustained in the long-term. The OSU Extension Service's Family and Community Health (FCH) Program was contracted as the primary local delivery system for statewide implementation of WWE. Each of Oregon's 36 counties has at least one FCH employee who coordinates and delivers programs on topics ranging from healthy aging to managing finances to parenting. A few large, urban counties have multiple FCH employees but in rural areas, some FCH employees manage health programs across multiple counties and offices. Often, FCH staff work collaboratively with other OSU Extension employees of other Extension programs, such as 4-H or the Federal Supplemental Nutrition Assistance Program – Education program, in their local county offices. Additionally, FCH staff share offices and support staff with these and other Extension programs. Thus, the established infrastructure made OSU Extension Service a strong existing service delivery partner through which to deliver WWE.

The implementation plan involved delivering WWE in seven counties in Year 1 and then expanding to other counties in Years 2-5. OSU administrators selected the seven

counties by identifying FCH employees who were willing to add WWE to their current workload, and participate in the initial implementation during Year 1, July 1, 2012 – June 30, 2013. Of these seven counties, four were considered metropolitan statistical areas, defined by the US Census Bureau as having an urbanized area with a population of at least 50,000;<sup>71</sup> the other three counties were rural. The delivery goals for Year 1 that were established by the funding agency were to recruit and train leaders, and to deliver 28 WWE programs across the seven counties to at least 336 participants (an average of 12 per program).

### **WWE Program.**

The Arthritis Foundation's WWE program is a physical activity program that promotes participants' self-management of arthritis symptoms. WWE's goals are to promote education about successful physical activity and arthritis symptom management, reduce barriers to physical activity, and engage participants in on-going aerobic fitness based on the latest research and recommendations.<sup>72</sup> Previous evaluations have shown that WWE is effective at improving physical functioning, reducing pain, fatigue, and stiffness; increasing self-confidence and perceived control over arthritis; and improving balance, strength and walking pace.<sup>13,16,51</sup>

The 18-session program consists of one-hour sessions delivered three times a week for six weeks. One or two leaders who have undergone WWE training via an online self-paced module provided by the Arthritis Foundation teach the programs. Leaders are not required to have a medical background. Anyone can become a leader regardless of previous experience. The only requirements to be a leader are to complete the Arthritis

Foundation WWE training, have a current CPR certification, and agree to teach the program without changing the core components outlined in Table 1.

[Insert Table 1 about here]

During each program, the group leader uses scripts and materials provided in a leader manual from the Arthritis Foundation to educate and guide discussions about arthritis, basics of physical activity, setting goals and problem solving barriers. Following the discussion, the leaders guide participants through a five-step walking pattern that includes a warm up, initial stretching, a walk that lasts between 5-30 minutes, cool down, and final stretching. Over the course of the program, the duration and speed of the walking increases as participants build strength and stamina.

## **Methods**

### **Sample.**

Individuals recruited for this study included administrators and FCH staff from the seven Oregon counties involved Year 1 installation activities. I invited all administrators and FCH staff involved in Year 1 implementation to participate in qualitative interviews about their experiences with the WWE program. All invited persons participated ( $N=11$ ). The sample included Extension Service FCH staff ( $n = 8$ ), and program administrators from OHA, OSU, and the Arthritis Foundation ( $n=3$ ). All the respondents were female. Because only one or two FCH staff are employed in each county, I did not identify the counties in this manuscript to preserve the confidentiality of the respondents.

### **Data Collection.**

I developed a semi-structured interview guide based on the stages of implementation identified in the literature.<sup>28</sup> The questions related to adoption, installation, delivery of WWE core elements and sustainability. (See Appendix A for the full interview guide). The purpose of the interviews was to better understand the process of installing WWE and to identify barriers that could be addressed and factors that could be leveraged to improve full-scale delivery in subsequent implementation years.

Interviews were conducted between March and June of 2013. This period corresponded with the “installation” phase of implementation because the decision to adopt had already been made, but full-scale delivery had not yet begun. I conducted the majority of the interviews in-person ( $n = 8$ ) and three by telephone. Interviews lasted approximately 60 minutes and were audio recorded and professionally transcribed verbatim. Study respondents received \$25 gift cards for completing the interview.

In addition, I examined 16 administrative documents to verify and further explain findings from the interviews. These documents included progress reports and minutes from phone conferences that occurred between July 2012-June 2013. Twice a year, OSU Extension submitted progress reports to OHA that documented the number of leaders trained, classes delivered, participants recruited, barriers to installation and possible solutions. Also, OHA hosted calls with implementation partners (e.g. OSU and the Arthritis Foundation) and OSU hosted conference calls with the counties to guide implementation and address barriers encountered. OHA and OSU hosted the calls about every six weeks and staff from each organization recorded minutes. The progress reports

and minutes documented the installation process as it unfolded, barriers encountered, and solutions enacted.

### **Analysis.**

For this manuscript, I analyzed content from the interviews related to the installation phase. I used content analysis to identify themes related to barriers and facilitators to installation, using approaches similar to those described by Hsieh and Shannon.<sup>73</sup> Initially, all the transcripts were read in their entirety from beginning to end. Then, I read three transcripts in detail and highlighted sections of text relating to factors that influenced installation. I created short phrases and/or keywords to describe the factors identified, using the respondent's words as much as possible. After coding three transcripts, I developed preliminary codes based on these key words. Using the codebook, I coded the subsequent transcripts and added new codes when I identified new concepts. I used an iterative process in that I coded and recoded each transcript using the expanding codebook until no new codes emerged. I then used the codebook to code the progress reports and meeting minutes. Using the codebook, a graduate research assistant then read-through and coded all of the interviews. The author and research assistant met throughout the process and reviewed the codebook and the coded passages, compared codes and application of codes, discussed disagreements, and came to consensus (100% agreement). All analyses were conducted in NVIVO 10.<sup>74</sup>

Following coding, I examined the content for each code and organized, combined, and divided them as needed. In the process of reconciling the codes, I identified two major categories of factors that affected installation: (1) organization-level factors and (2)

program-specific factors. I grouped the codes by these two factors, and then subcategorized them into barriers and facilitators. I present the results in this structure, using the identified codes.

## **Results**

Findings from the interviews indicated that most respondents had not progressed past the installation phase to early delivery. Only three WWE programs with 39 total participants were delivered in Year 1. Extension staff members delivered only one of these programs; leaders from local organizations recruited by OSU staff delivered the other two. Seventeen leaders were recruited and completed WWE training during Year 1. Only four leaders, however, actually led a WWE program during this time. Two thematic categories emerged regarding factors that influenced installation: (1) organization-level factors and (2) program-specific factors. Barriers and facilitators in each category are outlined in Table 2. Despite this distinction in categorization, factors influencing installation were closely related to one another and often overlapped.

[Insert Table 2 about here]

### **Organization-Level Factors.**

Study respondents described themes related to both barriers and facilitators to installing WWE via the OSU Extension Service. These themes included the timing of installation of WWE into the Extension Service delivery system, having sufficient resources for implementation, and OSU Extension staffs' relationships within local communities.

***Timing and Planning.*** Barriers to the installation of WWE into the Extension Service included the timing of the decision to implement WWE, building WWE into Extension staff's current work plans, and unexpected organization-wide budget cuts. Facilitators included respondents having previous experience with implementing new programs.

Several study respondents stated that they had underestimated the amount of time they needed to allot to WWE in their plans of work. As one OSU respondent explained, "[the work plans] are our obligations... [WWE] isn't in anyone's [work plan] because of the time frame that it came on so, it means we're having to see how it fits in terms of time." (County D, Respondent 2) Another respondent remarked,

There is no one who has any extra [time] who's waiting around for something to do...they say 'yes' because what they're told is [WWE will] only take this of your time, which doesn't sound like much, and then you get into it and ... all of a sudden it's more time than you have allocated and you have no extra time. (County A)

Although the grant year started in July 2012, meeting minutes showed that the final contract details and implementation expectations were not finalized until October. Study respondents reported that the October start date overlapped with their deadlines for filing yearly work plans. They explained that this late date contributed to respondent being unable to allocate adequate time in their yearly goals to WWE implementation.

Another challenge for these respondents was that the first year of WWE implementation corresponded with a reduction in the overall Extension budget. One respondent remarked, "This [WWE] rollout is atypical with the sequestration and the amount of laying people off ... people are fried." (County D, Respondent 1). Due to the



Budget Control Act of 2011,<sup>75</sup> the OSU administrator estimated that the OSU Extension Service experienced an approximate 28% decrease in the overall Family and Community Health budget; study respondents reported that local county budgets were tightened, and some staff members were laid off. These budget cuts placed an additional burden on Extension Service staff that faced maintaining their current level of programming with fewer resources. This respondent discussed the impact of the budget cuts saying,

Some of the [staff] who might've concentrated quite willingly on this project were really looking at: "Do I give people termination notices?" "Do I remove myself from promises that I have made in a community that has long memory?" And so the attention that would've been devoted to figuring out the logistics for [WWE] could not be present to it. (County D, Respondent 1)

Despite these challenges and the frustration felt by some Extension Service respondents in fitting WWE into their schedules, most respondents reported that they had experience with implementing new programs and understood the accompanying challenges. One explained,

I'll tell you what I've learned, is sometimes with Extension programs in general, [during] early adoption you just muddle through things. And sometimes maybe hanging back just a little is a good strategy, because some of the things get ironed out. (County B)

A few respondents described previously seeing programs, initially difficult to implement, later become embedded and self-sustaining in their local communities. This experience translated into an understanding and tolerance for the difficulties inherent in starting new projects. As one respondent remarked,

The initial start-up is always sometimes slow getting all the kinks worked out and figuring out what's the best way to implement or what's the best

form and how's this going to look. I think that now that things are in place, it should go a little more smoothly. (County C)

Several respondents expanded on this idea by explaining that they would like to conduct a small local pilot of WWE to improve their ability to market and implement the program. By having personal experience with the program, respondents explained that they would be better able to support their volunteer leaders, problem-solve, target marketing to local audiences, and provide support to future counties. As one respondent remarked, "maybe we're just not enjoying being [the first counties to implement WWE] but in the end, we'll enjoy being the forerunners." (County D, Respondent 1)

**Resources.** A second factor that affected installation was differences across Extension Service offices with respect to available personnel and other relevant resources. As reported in meeting minutes, each county was initially provided a small budget of \$1250 each to support WWE implementation. The budget was to cover promotional activities, WWE participant incentives, and leader training fees. The counties, however, did not use the funds because the respondents reported not having enough time to conduct installation activities and thus, establish the new program. For example, although counties had monies to develop promotional items and incentives, staff requested during meetings that central administration develop and distribute the promotional items. Similarly, coordinating payments for leader training within the Extension Service was problematic, so county staff requested that central administrators facilitate registering and paying for leader trainings. Findings from both meeting minutes and participant interviews indicated that barriers to installation related more to

insufficient time to conduct implementation activities than to the availability of fiscal or program-specific resources.

I obtained the full-time equivalent (FTE) for each office from 2013 administrative records to provide an indication of office size and availability of staff time. These data are presented in Table 4, along with the number of WWE programs offered in each county. Total FTE per office, which includes all staff from all Extension programs, ranged from 4.2-19.2, with more FTE present in urban offices than rural ( $\bar{x}=16.0 \pm 3.1$  vs  $\bar{x}=6.2 \pm 2.6$  respectively,  $p<.01$ ). The FTE devoted to FCH staff by county office ranged from .77-2.85, though in most counties only one FCH staff worked on installing WWE. Some staff's FTE covered FCH programming in multiple counties. For example, staff in County E had 1.0 FTE for FCH staff (i.e., one, full-time person) but this person was responsible for FCH programming in addition to WWE, in two counties. The two counties that implemented the three programs in Year 1 (Counties C and D) were urban and had higher overall and FCH FTE. Every county except one rural county, however, trained at least two WWE leaders during Year 1.

[Insert Table 4 about here]

Some respondents, especially those in offices with high overall FTE, shared responsibility for delivering and managing programming among multiple employees. Respondents in these counties reported having flexibility to devote to installing new programs. One respondent remarked,

[Our office has] some general time [to lead the program]...but we have coworkers [in other offices] who have 5% of their peak position

description available to [WWE]. There is not enough time to do the program and figure out the program (County D, Respondent 2).

As this respondent indicated, staff in other county offices with lower FTE described more difficulty in implementing WWE. For example, this respondent from a rural county explained,

When I talk to other staff they have really helpful secretaries that do a lot of the prep work that I'm doing ... I could do so much more if I didn't have to prep for every little program (County F).

This respondent was responsible for health education programming in five counties that span a large geographical region with a total office FTE of 4.2. In comparison, a respondent from an urban county with a total office FTE of 19.2 described having ample assistance to prepare for implementation, including engaging and recruiting student interns from local universities that provided even more support for WWE.

A factor that helped alleviate the disparity in resources among county Extension offices was having a dedicated project manager at OSU to guide implementation. When asked what factors facilitated implementation, one respondent said "I think really having a point person who was willing to take care of the details to try to reduce the barriers with the county staff" (OSU Administrator) and many study respondents shared this sentiment. Meeting minutes showed that the project manager position was developed and funded by OSU several months after implementation began. The project manager's tasks included interfacing with funding partners, producing and distributing program and marketing materials, and facilitating administrative tasks.

Due to the lack of FTE available for program delivery, some respondents reported that they planned to engage community members and organizations to assist with WWE implementation. This theme is illustrated by the following quote:

I wish I had that time [to deliver the program]. I've tried this initial go-around to look for folks who are already involved in doing this kind of thing as part of their work, to see if they would integrate it. Because I figure they have the expertise and the tools to do that, and I can just coordinate with them. (County B)

Other respondents planned on working with OSU Extension staff in other counties who had already led the program for help or advice about implementation. They described relationships between OSU Extension staff from different counties to be valuable because of the efficiency of learning from others who had more experience. Two respondents suggested building time for mentoring into the work plans to facilitate the delivery of WWE. One stated,

The early adopters [should] mentor the late adopters so that they're not hung out to dry all alone to figure this out. And that [should go] in your plan of work so [your] time is protected too. (County D, Respondent 2)

*Community fit & Extension as a source of information.* Although many respondents expressed concerns about having the time to devote to WWE implementation, several indicated that WWE could be a useful program to offer in their counties. Respondents identified gaps that WWE could fill in their local communities such as reaching a new target audience, or expanding program offerings. For example, one respondent discussed the qualities of WWE that influenced her decision to agree to deliver the program in Year 1:

I thought that there was a gap in the [community for] walking programs...And the fact that [WWE] was evidenced-based was real good...so there was a need and it seemed like there was an interest...and it looked like there was a nice formatted program...So all those kind of pieces came together. (County G)

Another respondent explained that she planned to introduce WWE to a worksite where she already provided programming. She, as well as others, planned to use WWE to complement other OSU services such as nutrition and food education classes.

On the other hand, two respondents reported that their communities had more urgent priorities and questioned whether these should be prioritized over WWE. As illustrated by the following quote, these respondents thought responding to community-identified needs would have been a better approach than state-wide implementation of one program:

Anytime programs can come from within or from communities instead of above, my sense is that it's going to be more successful because either the community is asking for it or the staff's identified that it's a need. (County F)

This respondent went on to struggle, however, with balancing national and state-wide public-health priorities with community-identified needs saying:

It's a catch-22 because it's important to get that physical activity and we know with obesity continuing to increase that not enough people are exercising...but maybe I'm just not in the right place to hear those demands, I don't know. It's hard to say. (County F)

The reputation of the Extension Service was seen as a strength that could help facilitate implementation in the future. Respondents explained that the public looks to Extension staff for assistance on a range of topics and that these connections and the reputation of quality information make Extension well-suited to introduce new programs.

By highlighting the integration and accessibility of Extension Service staff to community members, one respondent noted,

We normally go out to the people, particularly in this region, people don't come to our Extension office. We go to them. So, I think that already sets us up for going into the communities and getting neighborhood walks.  
(County E)

She went on to identify the commitment of staff to communities as a strength of the Extension Service by stating,

That's one of the reasons that Extension works is because we're all passionate about [the community], we all work hard and because we see the need and we do stuff and we just keep doing it even though we're not getting paid for it and we're putting in all these hours because we see what needs to be done and we do it. (County E)

### **Program-Specific Factors.**

Program-specific factors that affected installation included recruiting and training WWE volunteer leaders, identifying suitable walking locations, and flexibility in adapting the program to local settings.

*Recruiting and training volunteers.* Respondents, administrative progress reports, and meeting minutes indicated that recruiting and training volunteers to deliver WWE was a challenge to progressing past installation to delivery in Year 1. Building personal relationships recurred as a strategy that respondents reported using to recruit and engage potential program leaders, organizations, and participants for WWE. One respondent commented that this involves

...connecting with a person that's going to have that interest and commitment...it's finding the volunteers that really enjoy helping others and enjoy and believe in walking. (County C)

Some respondents described approaching volunteer leaders from current Extension Service programs to be leaders. Yet one challenge with recruiting from established programs was that many potential WWE volunteers were already over-committed. As one respondent commented “...we’ve burnt out our volunteers...we don’t have a lot of people to choose from here and the people who volunteer, volunteer for everything” (County E). Those respondents who tried to develop new partnerships, however, experienced minimal success that they contributed to insufficient time for relationship building. As one respondent explained,

[A barrier is] finding the time to run another volunteer program because volunteers aren’t like other employees. You have to coax them along, you have to encourage them, you have to find the volunteer for the right match. (County G)

Although respondents thought it might be more difficult to recruit more than one person, a few explained that they were recruiting two trained leaders because this allowed for flexibility in leaders’ schedules and provided a support system. These themes are illustrated in the following quotes:

I think it would be good to have co-leaders for each of the classes so that no one would feel like they have to be there three times a week if they couldn’t make it for 9 weeks or 8 weeks, that there was a partner that if they couldn’t make it, someone else would be there and plus they would help to motivate each other. (County E)

I think that’s a very good idea because [to have two leaders], to get through six weeks there’s going to be days someone’s running late, someone doesn’t feel well... maybe you’ll find a pair of friends who want to do this ...and that might give some people the courage to be a leader that wouldn’t otherwise, but together we could do it. We very often have in 4H co-leaders for that exact reason, so you don’t feel like it’s all on your shoulders, if you’re shy about doing it successfully, or you’re not sure about doing it. (County D, Respondent 2)



Some respondents described difficulties in getting potential leaders to buy in to the benefits of leading the program. Despite promoting positive aspects of WWE, some respondents reported that potential leaders were concerned about the time commitment, the lack of flexibility in the program design, and the leader requirements. For example, because WWE emphasizes walking, an activity that most people do in their daily life, respondents questioned the value of requiring leaders to obtain cardiopulmonary resuscitation certification and for WWE respondents to complete several institutional liability forms. One respondent understood why the training requirements were a barrier for leaders saying,

Why would I go through [training] to lead a walking group? We walk all the time. I can just go lead a walking group by myself or walk with a group by myself and wouldn't have to do [training]. (County A)

With respect to the required liability forms, one respondent stated “At a certain point you just go walk with all my friends and, look, no piece of paper, and I'm done.” (County D, Respondent 1) This respondent, as well as others, described difficulties justifying to potential leaders the value of the program requirements, especially because she agreed with the leaders that the requirements seemed unnecessary.

The online training requirements for leaders were also identified as a barrier to preparing leaders for delivering WWE. Respondents reported that volunteer leaders experienced technical barriers in accessing and navigating the online training modules. When asked about the impact of navigating online trainings, this respondent replied:

Some [leaders] would have no problem doing an online training and others that that would be the main barrier to participation...Just navigating it, hearing the word “online.” I have people in our program that don't have a

computer, don't use the internet, don't have a cell phone and they're perfectly happy that way...(County F)

To overcome such barriers, respondents encouraged potential leaders to complete the training in county Extension offices so that they could provide assistance. This approach, however, put an additional burden on the respondents' time. Conversely, the online leader training was seen as a strength by some respondents from rural areas. A rural-county respondent explained that due to the high costs of in-person trainings, it was more difficult for her to expand her health programming options. Thus, the online training allowed her to expand her FCH programming options by offering WWE.

***Walking location.*** Identifying a suitable location to deliver WWE sessions and to walk was identified as a barrier to implementation by all OSU respondents. Specifically, the weather conditions posed barriers to program delivery. The following quotations illustrate the difficulties respondents faced:

The weather I think makes it challenging in [our county]... I think a lot of people would be willing to sign up for a walking program in spring, late spring into summer, but when the rains come back I don't think we'll get many participant so it's going to have to be season-sensitive. (County C)

It's gonna be hard to get people walking in the rainy months because they don't go out in the rain here...you really need to wait until August, September and October and that's pretty much the only months we have without rain and with the winds died down. (County E)

All respondents tried to identify indoor locations for walking in bad weather but encountered barriers. Although respondents from urban areas had more indoor walking options, they reported that transporting participants, additional facility fees for use, and availability were challenges. Leaders from these counties explained that their participants

were more likely to travel long distances to enclosed facilities, placing an additional burden on them. For one respondent, identifying appropriate locations to offer programming was a recurring problem beyond the WWE program:

I think in rural communities it can be really challenging because there are very few programs that were developed for use in rural communities... We'll get these programs handed to us and it's like "Go walk around your mall." Well, we don't have a mall, or, "walk around your high school." Well, our high school is the only high school in town and it's booked solid... we're low on the priority list for using any public space like that. (County F)

*Adaptations.* The last factor identified by the study respondents that impeded their ability to move beyond the installation phase to delivery was the flexibility of WWE program requirements. The Extension Service respondents indicated that the 1-hour, three-times-a-week meeting format was inconvenient to some participants and leaders, especially in workplace settings. Study respondents suggested offering the program twice a week over a longer period of time, or condensing the education and motivational components into one meeting a week, and encouraging WWE participants to complete the walking component on their own time or in small groups.

Most OSU respondents reported previous experience implementing federal programs in accordance with strict guidelines, took program fidelity seriously, and raised concerns about appropriate modifications during monthly meetings. Given their previous experience with evidence-based programming requirements, respondents wanted a clear understanding of immutable program requirements and the scope of allowable adaptations. One respondent suggested that "[Leadership] should just send a memo that says you're okay if you do A, B and C. You're okay if you call me to ask about D to Z.

Just [provide guidance] that gives permission for, like what the boundaries are of ‘okay’” (County D, Respondent 1). Another respondent agreed saying “as long as someone says you’re okay to fix between here and here, I’ve really enjoyed fixing things to better align with our audiences; that’s a particular fun thing for me.” (County D, Respondent 2)

Despite the need for adaptations, several respondents indicated that they thought the evidence-base was a strength of the WWE program. For example, one respondent said: “There's lots of programs out there that are great, but if they're not proven to be effective then we can use them but I think they're less likely to have the impact that we want it to have” (County G).

## **Discussion**

This study examined how installation of WWE occurred in an established delivery system. Although established organization-level capacity, including skilled staff, leadership, and a strong reputation in the community were strengths of the Extension Service, several major barriers impeded the Extension Service’s ability to move beyond installation to delivery in the Year 1 timeframe. As such, the delivery goal of 28 programs was not met. The use of qualitative interviews allowed for deeper understanding of the barriers that contributed to the failure to meet the delivery goals. For example, findings indicated that the short time-table in which respondents had to prepare for WWE delivery and integrate it into their current work plans were barriers encountered during installation. Additionally, program-specific barriers, including recruiting volunteer leaders and identifying suitable walking locations, impeded delivery.

The study respondents identified several challenges to installation that could explain why the Year 1 delivery goals were not met. Primarily, I found that insufficient time and personnel were allocated towards planning and integrating WWE delivery into the workloads of existing OSU Extension staff. First, the funding agency set the delivery goal of 28 classes with the expectation that both installation and early delivery phases could occur during a 12-month time-period. Either this period was not sufficient, or the unforeseen budget cuts and delay in establishing the contract and developing leadership contributed to 11% of the delivery goal being met.

Second, the findings from this study are consistent with previous research that reported insufficient funding and staff threaten the successful implementation of evidence-based interventions.<sup>68,76</sup> Despite the need to secure human and fiscal resources for program implementation, the funding agency in this study limited use of funds for operational costs as a way to encourage delivery organizations to build capacity for program sustainability and reduce reliance on grant funding.<sup>21,65</sup> The premise was that in existing delivery systems, current staff can take on new activities and roles to deliver programs, thus reducing the need to hire new staff. I found, however, that the absence of resources for hiring new staff for WWE delivery contributed to a lengthy installation period during which current staff attempted to incorporate the new program into their existing workloads. Although the availability of existing staff is a beneficial resource of existing delivery systems that can facilitate implementation, delivery goals during installation need to account for the time needed to change established procedures, reassign workloads, and familiarize staff with the new program.

The initial implementation approach planned for decentralizing WWE delivery by providing each county with budgets and expecting staff to conduct delivery. Similarly, previous research recommended decentralizing decision-making to encourage local ownership of programs<sup>21,36</sup> and has shown that shared decision-making leads to better implementation.<sup>67,77</sup> This study's findings, in contrast, showed that because of the lack of time available to staff, they preferred decision-making, especially around adaptations, spending of funds, and marketing, to be centralized. Despite staff's preference for centralized decision-making, it is possible that their inclusion in the decision-making process could help to facilitate their buy-in and commitment to WWE in the future, however, follow-up studies are needed.

There were also program-specific barriers encountered during installation related to the qualities of the WWE program. Recruiting and training volunteer lay leaders was a significant barrier despite established infrastructure and resources of the Extension Service for volunteer management. Using volunteer lay leaders for program delivery is often considered a strength of community-based interventions due to comparable effectiveness with health professionals in delivering program content at a substantially lower cost.<sup>78</sup> Previous research, however, supports finding in this study that recruiting and maintaining volunteer lay leaders is time-consuming and can pose a threat to successful implementation.<sup>59,79</sup> To be successful, recruiting and supporting volunteer leaders requires staff time and personal relationships that support and encourage volunteers. Even if an established delivery system, like the Extension Service, has infrastructure and resources for volunteer management, time and effort are still needed to

introduce the new program, obtain volunteer buy-in, and conduct training to ready volunteers to implement the new program.

The poor implementation outcomes evidenced in Year 1 raises questions regarding whether the Extension Service was the right entity to deliver the WWE program. The Interactive Systems Framework (ISF) for Dissemination and Implementation<sup>55</sup> identifies three systems that are necessary for effective implementation: 1) a system to package a program for implementation, 2) a system to support implementation through disseminating and providing technical assistance and 3) a system to deliver the program. A review by Flaspohler et al. provides a comprehensive list of delivery system characteristics that facilitate effective implementation.<sup>70</sup> Although it is unlikely that a delivery system will exhibit all of the characteristics identified by these authors, findings from the current study identified several characteristics that were lacking in the OSU Extension Service that may have contributed to its long installation phase. These included, for example: limited fit between the program and the organization's goals, practices and needs;<sup>26,36</sup> lack of resources from the organization for implementation<sup>80</sup> especially the lack of time for staff to deliver the program;<sup>81</sup> and limited buy-in from staff<sup>28,36,82</sup> regarding the benefits of the program's design,<sup>83</sup> beliefs that the program could be implemented,<sup>83,84</sup> and that it would result in benefits.<sup>83,85</sup> If organizations lack favorable characteristics for implementation, then additional efforts are needed to develop these qualities and capacity within the organization itself.<sup>70</sup>

Respondents from this study, however, described engaging in activities that were more aligned to those of the support system. These activities included, for example,

disseminating information about the program, recruiting community organizations for delivery, and providing assistance with training. Findings from previous studies indicated that smaller organizations with limited resources often rely on external trainers and technical assistance to build capacity for program delivery.<sup>67</sup> Although Extension may not be the system best equipped to deliver WWE, it may be more successful in supporting other organizations in delivery by disseminating information about the program and providing training. Although the number of classes delivered was too small to draw strong conclusions, volunteers from other organizations implemented two of the three classes delivered in Year 1, not OSU staff. Future studies are needed to determine whether shifting delivery to local partners is a more effective strategy for implementation in future years.

Despite the unsuccessful delivery, there are some indications that improvements in implementation can be made in the future. First, the amount of time for installation in Year 1 was insufficient, but as one respondent noted, sometimes start-up takes more time than anticipated. This study only examined Year 1 implementation, and problems identified in this period may resolve if given more time. Second, the Extension Service staff exhibited qualities supportive of implementing a new program that may facilitate future delivery. In particular, respondents' prior experience with installing and delivering evidence-based programs corresponded to an awareness of and appreciation for implementing WWE with fidelity to the program design. This quality is particularly important as program adaptations can jeopardize the quality of interventions and impact desired program outcomes.<sup>28,80</sup> Program deliverers with former implementation



experience may have greater tolerance and skills for solving problems during delivery while maximizing adherence to key program components.<sup>28</sup> Greenhalgh et al.<sup>36</sup> in a large systematic review of implementation literature noted that individual traits, including intellectual ability, tolerance for ambiguity, and absorptive capacity of new knowledge, were associated with propensity to try out new programs. Further, implementation outcomes are supported within organizations comprised of staff with these traits.<sup>86</sup> Finally, because of the Extension Service's longevity, established reputation and infrastructure to recruit and manage volunteers, the Extension Service may be well-suited to recruit, develop and retain partnerships with local organizations that are better equipped to conduct actual delivery.

The findings and implications of this study should be viewed in light of its limitations. First, the sample size was small, and although it included all individuals involved in installation, these individuals were selected by OSU administration for Year 1 installation and, therefore, their opinions may not reflect the opinions of other Extension Service staff who were not invited or chose not to participate in Year 1 installation. Triangulating data from multiple sources, however, provided a more comprehensive understanding of the factors that affected installation and allowed me to verify findings from the interviews. Findings from this study, however, may not be generalizable to other Extension Services or to other OSU Extension Service staff.

Second, this study examined factors that influenced the installation phase of WWE implementation. Longitudinal studies are needed to examine the relationship between the factors I identified and the success of later delivery and sustainability of

WWE. Finally, because of my familiarity with the interviewees, the respondents may not have disclosed their true feelings about WWE implementation. The established relationship between the interviewer and respondents, however, was based on partnership and collaboration towards the goal of improving future implementation. The quality of this relationship may have minimized socially desirable responses because identifying barriers was beneficial to respondents who were aware that their responses could directly influence changes and garner support for future delivery. Some program evaluation experts suggest that evaluations are enhanced when conducted by researchers who are internal to the implementation process because intimate knowledge of the implementation project can provide greater insight of the nuances that explain program success.<sup>32,87</sup> Further, the additional review of the codes and their application by a second researcher also reduces the potential for bias.

In summary, this study provides insights into the installation process, and identifies key considerations that necessary for successful implementation. Foremost, allocating enough time for installation activities is critical. Adequate time is essential for both meeting delivery goals established by funders, and providing existing staff with time to learn about the program's goals and conduct program activities. Secondly, centralized communication and leadership can mitigate the effects of insufficient capacity at local sites by providing additional resources and tailoring technical assistance. Finally, previously developed organizational capacity is necessary but not sufficient for successful implementation. Resources and planning must be devoted to developing program-specific capacity and infrastructure to sustain program activities within an

existing delivery system. Using qualitative data, this study has provided a better understanding of the complexities associated with large-scale implementation. These findings can inform efforts to refine and expand implementation across existing delivery systems with the goal of improving program quality and sustainability, increasing older adults' access to evidence-based interventions, and improving population-level public health outcomes.

Table 2.1 Walk With Ease Program Components

<b>Walking</b>
Hold all 18 sessions
Use 5-step basic walking pattern each session
<b>Stretching</b>
Do not add additional exercises
Do not touch participants when demonstrating or doing the exercise and tell them not to touch each other
<b>Health Education</b>
Do not add topics outside arthritis/exercise
Do not offer medical advice, promote unproven remedies, suggest practitioners
Encourage participants to speak with health care provider when they have medical questions
Use Arthritis Foundation materials to augment health information
<b>Motivational Activities</b>
Use and discuss the motivational tools in participant workbook
Address what participants can do after the program ends to encourage continued physical activity
Build self-management skills via group sharing/problem solving

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*Note.* WWE = Walk With Ease. Adapted from Altpeter M, Callahan L, Morse ML, et al. Arthritis Foundation Walk With Ease Program: Leader's Guide. Atlanta, GA: Arthritis Foundation; 2009.

Table 2.2 Factors that Influenced Walk With Ease Installation

	Barriers	Facilitators
<b>Organization-Level Capacity</b>		
Program Installation	Timing of adoption  Building WWE into staff's work plans External organization-wide budget cuts	Staff had previous experience with adoption and implementation
Resources	Staff and financial resources varied by county	Project manager to guide implementation and provide technical assistance Mentoring relationships between county staff
Community Fit & Extension as a sources of information	Staff identified more pressing health priorities Time needed to build new relationships	Staff believed that WWE was a helpful and useful program Staff's strong community relationships
<b>Program-Specific Capacity</b>		
Recruiting and Training Volunteer Leaders	Leader requirements including time commitment, online training, and liability protocols	Recruiting volunteer leaders from existing community groups and organizations
Walking Location	Poor weather conditions Identifying appropriate walking locations	
Adaptations	Core elements and appropriate adaptations were generally unclear in program guides	Staff understood and supported the importance of program fidelity

Table 2.3 Characteristics of Counties Offices and Walk With Ease Installation

	Walk With Ease								
	Total FTE	FCH FTE	FCH staff (n)	Other counties served by FCH staff (n)	FCH staff implementing (n)	Programs delivered (n)	Leaders trained (n)	Leaders delivering classes (n)	Participants enrolled (n)
Urban Counties, Mean(SD)	16.0 (3.1)	2.2 (.9)	2.3 (1.0)	1.8 (1.3)	1.3 (.5)	-	3.3 (1.9)	-	-
A	18.05	2.75	3	0	1	0	2	0	0
B	12.75	1	1	2	1	0	3	0	0
C	14.15	2	2	3	1	2	6	2	24
D	19.2	1.85	3	2	2	1	2	2	15
Rural Counties, Mean(SD)	6.2 (2.6)	.9(.1)	1 (0)	2.7 (2.1)	1 (0)	-	1.3 (1.1)	-	-
E	9.2	1	1	2	1	0	2	0	0
F	4.2	1	1	5	1	0	2	0	0
G	5.16	0.77	1	1	1	0	0	0	0
All Counties, Mean(SD)	11.8 (5.9) <sup>a</sup>	1.6(.9)	1.7 (1.0)	2.1 (1.5)	1.1 (.4)	.6 (1.0)	2.4 (1.8)	-	-

Note. FTE = Full-time equivalent; FCH = Family and community health; WWE = Walk With Ease.

<sup>a</sup> Differences in Total FTE between urban and rural counties significant at  $p < .01$

**CHAPTER 3 SECOND MANUSCRIPT**

Evaluating the State-wide Scale-up of an Evidence-based Arthritis Self-  
Management Program: Walk With Ease

Kathleen P. Conte, MA<sup>1</sup>

**Abstract**

*Introduction:* Evidence-based interventions (EBIs) must be scaled-up to have population-level impact, however, research on scale-up is lacking. This mixed-method study of scaling-up Walk With Ease (WWE), an arthritis EBI, had three aims: 1) describe program adoption and reach and examine the facilitators of each, 2) explore participant retention and quality of program implementation, and 3) examine program effectiveness.

*Methods:* I examined adoption, reach, retention and implementation using program forms, observations, and qualitative interviews with program leaders (n=39). I assessed effectiveness using pre/post-program health surveys collected from participants.

*Results:* WWE was implemented by diverse organizations that successfully expanded recruitment to reach the targeted number of participants (n=598). Most programs were delivered with high fidelity, however, adaptations and participant retention posed threats to successful implementation. Program completion was significantly associated with a reported interest to increase physical activity and incompleteness was significantly associated with older age, physician referral to the program, and attending a WWE class in a church setting. Despite barriers, findings indicated that the WWE program was effective. Participants reported significant reduction in pain and fatigue, and increased physical activity. Adjustments for missing data modestly affected these associations.

*Conclusions:* These findings indicate that 1) EBIs chosen for scale-up must have strong evidence base and a flexible design; 2) a support system is needed to guide scale-up and



recruit and train delivery partners; and 3) good fit between the program, leaders, and participants is critical to facilitate desired outcomes.

## **Introduction**

Self-management educational interventions for people who have arthritis can improve health outcomes by reducing pain and increasing mobility.<sup>12</sup> The Arthritis Foundation and the Centers for Disease Control and Prevention (CDC) Arthritis Program support scaling-up arthritis evidence-based interventions (EBIs) as a key strategy in mitigating the growing economic and health impacts of arthritis.<sup>4</sup> Scaling-up involves expanding EBI implementation to multiple sites to reach greater numbers of people.<sup>39</sup> The CDC Arthritis Program offers \$35 million dollars in competitive grant funding to state health departments to expand access to and use of arthritis EBIs.<sup>21</sup> States that receive portions of this funding are encouraged to focus efforts on delivering EBIs in partnership with organizations with established infrastructure that can assist with dissemination and implementation.

Despite evidence that arthritis EBIs are effective, and support from the CDC and other public health organizations, few arthritis EBIs have been scaled-up through systematic, widespread dissemination and implementation. In addition, limited evidence exists regarding best practices for successful scale-up and the impacts of scaled-up initiatives on health. The goal of this study was to evaluate the outcomes of scaling-up an arthritis EBI, Walk With Ease (WWE), across the state of Oregon and to explore factors that influenced those outcomes.

### **Description of Walk With Ease.**

WWE, developed by the Arthritis Foundation (AF), is a CDC-approved walking and educational program, the purpose of which is to teach participants how to initiate an

exercise routine and integrate physical activity into their everyday lives. Although it was designed for people with arthritis, WWE can be used by anyone interested in learning how to safely engage in regular exercise. In a group facilitated by a certified lay leader, WWE participants learn about safe walking mechanics, stretching and arthritis self-management, and are encouraged to slowly build up to walking 30 minutes on three or more days a week.<sup>13</sup> The key components of WWE as defined in the program materials are presented in Table 1.

[Insert Table 1 about here]

Findings from previous studies establishing WWE's efficacy reported reduced pain and depression and increased self-efficacy for exercise among participants.<sup>13,16,51</sup> Studies were conducted in community-based settings and recruited participants through partnerships with community organizations and media advertising. Despite the fact that the research took place in community contexts, no data regarding barriers and facilitators to implementation or adaptations to program design were reported. Further, in both studies it is unknown how participants and/or leaders were retained. In order for programs to be effectively reproduced and scaled-up to other settings, expanded evidence related to the factors affecting implementation are needed to better prepare for translation.<sup>52</sup> This study expands on existing WWE research by examining WWE effectiveness and factors affecting delivery during scaled-up, real-world implementation.

### **Scale-up Context.**

In 2012, the state of Oregon received a CDC Arthritis Program grant to disseminate self-management EBIs, including WWE, in Oregon. The objectives defined

by the CDC dictated that over the five-year project period and through self-management EBIs, grant recipients would reach five percent of adults with arthritis, roughly 38,000 Oregonians. During the application process, the Oregon Health Authority (OHA), Oregon's State Health Department, asked administrators at OSU Extension Service to collaborate and be the primary delivery partner for WWE. OSU Extension Service Family and Community Health staff deliver health and wellness education in each of Oregon's 36 counties and staff have strong connections with organizations in the local communities they serve. Due to OSU Extension's established infrastructure and existing marketing and communication channels, the organization was considered a strong partner to reach implementation goals. CDC funds covered WWE leader training expenses, marketing, and program materials but did not cover evaluation activities beyond documenting number of classes offered and participants enrolled. I obtained funding to support this evaluation through a grant from the John C. Erkkila Endowment at the Samaritan Foundation.

The strategy for scaling-up WWE involved OSU Extension staff drawing on partnerships in their communities to recruit organizations and leaders to deliver the program. In Year 1, implementation efforts were focused on seven counties with high arthritis prevalence and whose OSU county offices were willing to assist in implementation. In Year 2, implementation expanded to include any county in which there were interested delivery partners. The overall delivery goal was to implement 50 series of the 18-session program over the two years, with each program averaging at least 12 participants completing two-thirds of the program. The total reach goal was 600

participants by the end of Year 2. Based on this reach goal, the contract provided funds equivalent to covering service-delivery approximately \$100 per person, not inclusive of staff time.

### **Conceptual Approach for Evaluation.**

The concept of Model Coherency proposes that in order for expected program outcomes to be achieved, there needs to be coherency between the program implementers, program methods, and program participants.<sup>54</sup> Thus, I examined whether the ‘right’ leaders were recruited to work with the ‘right’ participants using the ‘right’ methods/processes in order to achieve the ‘right’ (i.e. specified) outcomes. To further refine my approach and identify specific research questions to evaluate the outcomes for scale-up, I used the RE-AIM model as a guide.

The RE-AIM model has been widely used to evaluate program implementation and adaptations of programs in new settings.<sup>59-61</sup> The model outlines five components for consideration in program evaluations<sup>§</sup>: Adoption, Reach, Implementation, Efficacy, and Maintenance.<sup>56</sup> For this study, Adoption criteria included the number of programs offered, type of delivery setting, and characteristics of the program leaders. Reach included the number and characteristics of WWE participants that were recruited into the program and that completed the program. Implementation criteria included participant attendance, or “dose” of the program they received, and adherence or “fidelity” to the program design. I examined program *Effectiveness* rather than *Efficacy* because WWE

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<sup>§</sup>The original RE-AIM article outlines the components in the following order: Reach, Efficacy, Adoption, Implementation and Maintenance. In this study, the RE-AIM components are presented in the order in which they are typically implemented.

delivery occurred in real-world settings, rather than in a research environment. Although WWE has demonstrated program efficacy in previous research studies, this study expands the evidence for WWE by examining real-world program outcomes across multiple sites. For *Effectiveness*, I examined pre- to post-program changes in participants self-reports of health and physical activity. Because this study uses data from only Year 1 and 2 (6/1/2012-6/30/2014) in a five-year effort, it was premature to examine *Maintenance* and so this element was not included.

The primary goal of this study was to evaluate the outcomes of scaling-up WWE, and explore factors that influenced those outcomes. The three specific aims and research questions for this study were as follows:

Specific Aim 1) Describe program adoption and reach, and examine the facilitators of each.

Research Question 1.1: What were the characteristics of the organizations that sponsored WWE programs, and the leaders that delivered the program?

Research Question 1.2: What factors facilitated organization's and leader's decisions to deliver WWE?

Research Question 1.3: What were characteristics of the participants recruited to the program?

Specific Aim 2) Explore participant retention and the quality of program implementation.

Research Question 2.1: How much of the WWE sessions did participants attend and what factors influenced retention?

Research Question 2.2: To what extent was fidelity to the program components achieved, and what factors were associated with fidelity?

Specific Aim 3) Examine the effectiveness of WWE.

Research Question 3.1: Did WWE participants experience changes in health and physical activity over the course of the program?

## **Methods**

### **Sample.**

The sample included WWE volunteer leaders and participants. Fifty-eight WWE leaders led or co-led programs across both years and all completed the leader surveys. A total of 598 participants participated in WWE over the two years of implementation. Although collection of program data forms was expected of volunteer leaders, 34 of the 36 programs correctly submitted data-collection forms. Two programs did not collect or return program forms due to non-compliance of leaders. Approximately 432 participants were included in the pre-survey analysis and 149 in the post-survey analysis. Figure 1 depicts WWE participant completion of program surveys and final numbers included in each level of analysis.

[Insert Figure 1 about here]

### **Data Collection, Instruments and Measures.**

*Program-level data.* Program-level data were collected using program forms and a fidelity checklist. WWE leaders completed program forms in which they documented characteristics of programs including date of delivery, the sponsoring organization, class

size, number of sessions delivered, and attendance. Leaders mailed forms in pre-stamped and pre-addressed envelopes to OSU at the completion of every WWE program. (See Appendix C for all instruments used in this study)

The author collaborated with an original developer of WWE to create a fidelity instrument to document implementation quality and provide feedback to leaders. OSU staff trained in WWE delivery or the author completed the fidelity tool during site visits to monitor quality assurance. Nineteen of the items related to the program core components (e.g. the five-step walking component: warm up, stretch, walk, cool down, and stretch) were assigned a score of 1 if correctly completed, and all items were summed to create an overall fidelity score that ranged from 0-19.

*Leader and participant-level data.* WWE leaders and participants completed surveys that included information about demographic characteristics, health, and physical activity status. All respondents were allowed to skip questions they did not want to answer. I collected surveys from WWE leaders at the time of training, and WWE leaders administered the participant surveys pre- and post-program. Leaders were given written instructions for collecting data, and pre-stamped and addressed envelopes for participants to confidentially return their satisfaction surveys to the author.

*Quantitative measures.* Age, gender, marital status, employment status and education of leaders and participants were collected at baseline by self-reports. I assessed overall health and physical activity levels of all respondents pre-program; participants' health and physical activity levels were also assessed post-program. These measures were developed using the Behavioral Risk Factor Surveillance System (2011) questionnaire.<sup>88</sup>



Respondents ranked their health status on a 5-point scale ranging from poor to excellent and reported whether they participated in physical activity in the past month. From self-reported estimates of average frequency and duration of exercise, I created a binary variable indicating whether respondents met the CDC 2008 guidelines for aerobic activity (e.g. moderate or vigorous intensity aerobic activity for >150 minutes/week).<sup>89</sup>

WWE participants received an additional set of health questions that were assessed pre- and post-program. Pain and fatigue were assessed on a scale of 0-10, with high scores indicating more pain or fatigue. A disability score from 0-20, with high scores indicating more disability, was created from questions about limitations on activities of daily living, based on the Medical Outcome Study SF-36 health survey.<sup>90</sup> Post-program, participant satisfaction was assessed using Likert-type questions regarding program components (e.g. “my leader explained topics clearly;” “I was satisfied with the program;” “I benefited from the program”). Participants also recorded how often throughout the program they engaged in specific WWE components (e.g. stretching and strengthening activities, walking, and use of program materials) and identified the most valuable program components. Finally, they ranked their confidence to walk after the end of the program (scale ranged from “not at all confident” to “extremely confident”).

*Qualitative interviews.* Upon completion of their programs, 34 leaders representing all 36 programs participated in semi-structured qualitative telephone interviews. Each interview was recorded and transcribed verbatim. Interviews averaged 45 minutes, and interviewees received a \$25 gift card. I developed the interview guide to learn more about the scale-up process, and based interview questions on the stages of

implementation identified in the literature.<sup>28,64</sup> There were three sections of open-ended questions: adoption, installation, and delivery of WWE core elements. Interviews were conducted by the author and two graduate research assistants. After each assistant had conducted two interviews, the transcripts were reviewed by all interviewers and modifications were made to the interview guide.

### **Analytic Strategy.**

*Quantitative data.* I conducted descriptive analyses (e.g. means, frequencies) to describe the WWE delivery sites, leader, and participant samples. Bivariate tests, including independent t-tests and chi-squared tests, were used to examine differences in program characteristics and differences in health and physical activity among those who did and did not complete the program. Using a clustered analysis to control for correlations between participants within each WWE class, I conducted paired t-tests to examine changes in participant's health measures from pre- to post-program, and a logistic regression to examine factors associated with the odds of completing at least 2/3rds of the program.

I examined the missingness of post-test responses on outcome variables using inverse probability impact of censoring weights (IPCW).<sup>91 91</sup> I modeled the probability of being censored by creating a logistic regression model in which the outcome variable was completion of the post-test, and selected predictor variables included program completion (e.g. attend 2/3rds of classes), the number of leaders, and age of participants. These variables were selected by starting with a full model of participant and program characteristics, and retaining variables that were significantly significant (at least  $p < .05$ ),

and did not result in a violation of the positivity assumption. I assumed that the probability of response was independent of WWE class after accounting for variables in the censoring model. A robust estimator was used to estimate standard errors. All quantitative analyses were conducted in Stata v12.<sup>92</sup>

*Qualitative data.* A directed content analysis guided by the research questions was used to examine factors that impacted implementation.<sup>73</sup> Each transcript was initially coded for factors influencing 1) adoption and reach, 2) participant retention, and 3) implementation quality. These sections were then re-read, and keywords were created to describe the factor identified, using the participant's words as much as possible. After coding three transcripts, preliminary codes were developed based on these keywords. Using the codebook, the subsequent transcripts were coded and new codes were added when new concepts were identified. An iterative process was used in that each transcript was coded and recoded using the expanding codebook until no new codes emerged. The entire transcripts were then re-read and re-coded using the full codebook to ensure that no data related to the research questions were overlooked. All transcripts were coded by three individuals: the author and two graduate research assistants. Throughout the process, the author met with the research assistants to compare codes, discuss disagreements in codes, and obtain consensus on final codes. All analyses were conducted in NVIVO 10.<sup>74</sup>

## **Results**

The results are organized by specific aim, into the following sections: 1) the adoption and reach of WWE programs over the study period, 2) implementation quality, and 3) program outcomes. In each section, qualitative data are presented with quantitative findings to provide context and, in some cases, possible explanations for findings.

### **Adoption and Reach.**

*Characteristics of WWE programs and leaders.* Of the 36 WWE programs delivered, all but three WWE classes were delivered in Year 2 of implementation (See Table 2). Organizations that primarily serve seniors, e.g. retirement communities and/or senior community centers, sponsored the largest proportion of classes (33%), followed by medical centers and community organizations (22% each), workplaces (13%), and churches (8%). Community organizations included settings where recruitment was open to the full community (e.g. not targeted at seniors or employees), and did not also provide medical services, for example, parks, community centers, and school gyms. Staff from partnering organizations (56%) or OSU Extension (25%) were primarily the program leaders. One-fifth of programs, however, were led by volunteers who partnered with local organizations. Most programs were led by at least two leaders (e.g. 53% of programs were led by two leaders, 11% were led by three to five leaders).

[Insert Table 2 about here.]

Characteristics of the 58 leaders that delivered WWE programs are presented in Table 3. The vast majority of leaders were female (90%), employed (77%), and had at least some college education (93%). Thirty-six percent of leaders had a professional clinical degree or certification in a health-related skill (e.g., registered nurse, registered

dietician, certified nursing assistant, etc.), 17% had college degrees in a health-related field (e.g. public health, health education), and 24% had certifications in other exercise or fitness programs.

[Insert Table 3 about here.]

***Facilitators to adoption.*** Several themes regarding facilitators to adoption of WWE emerged from the in-depth interviews with the leaders and were divided into two categories: a) program attributes; and b) support from OSU Extension.

*Program Attributes.* Primary themes related to program attributes included the strong evidence-base for WWE, and the program’s focus on physical activity and arthritis that fulfilled an unmet need among local constituents. Several leaders, especially at medical organizations, reported that their organization was concerned with adopting a quality and reputable program. Thus, the research supporting WWE was seen as a benefit, as well as the fact that the program was pre-packaged for easy delivery and endorsed by the CDC and the Arthritis Foundation. These themes are illustrated in the following quotes about reasons for adoption:

“[WWE] was evidence based and it was a little bit different than anything that [we] offered” -Staff leader at a medical center, Class 16.2

“I was trying to reach those who maybe weren't as fit as residents that are [already] coming to my [fitness] class. And it did bring some new people that I hadn't worked with before, so that was nice.” -Staff leader at a retirement community, Class 24.1

“It seemed really good because 1) it didn’t cost us anything to participate and/or to learn how to lead the program. And we have a lot of clients that have arthritis and need to incorporate more physical activity...it seemed like it was a perfect fit.” -Staff leader at a senior center, Class 25.1

Almost all leaders reported the structured walking activity was an important factor in their decision to adopt. Additionally, some leaders also liked the program's emphasis on slow-paced walking and arthritis self-management. Others, however, reported that the arthritis content was peripheral to their adoption decision and that the physical activity content was a more relevant factor. These leaders perceived the design of WWE to be flexible, and decided to do WWE because they could adapt it to fit their settings. Several leaders reported their organizations wanted to deliver WWE to reach new audiences and to fill unmet needs of their constituents. Physical activity programs already offered by organizations (e.g. aerobics, strength-training) were described as too difficult or intimidating for new exercisers, and WWE was seen as an entry-level program that could ease sedentary individuals into physical activity thereby allowing organizations to expand their physical activity offerings.

***Support from OSU Extension.*** Free leader trainings and materials provided by OSU Extension were other factors identified by the leaders that facilitated adoption. Because OSU Extension funded WWE training and materials, leaders explained that their organizations more readily implemented the program because they did not have to find financial support. Further, cost savings were passed along to participants because most programs were offered for free. Although a few organizations ( $n=4$ ) charged participants a small fee for participation ( $\bar{x}=\$10$ ), leaders explained that fees were instituted in an effort to recruit committed participants and not to cover implementation costs.

Several leaders voiced that assistance from the Extension Service helped them to recruit volunteer leaders. Similarly, sometimes OSU Extension helped leaders identify an

organization to sponsor the program. For one leader, working with a committed organization that provided support in recruiting and a location to host the class influenced her decision to lead the program. She explained: “If [the organization] hadn’t wanted it, I don’t know that I would’ve been too gung ho about doing it there because I really relied on them” (OSU Staff leader that partnered with a community organization, Class 18.1).

**1.3. Characteristics of WWE participants.** Most WWE participants were female (82%), Non-Hispanic white (90%), and reported being retired (65%) (Table 3). Participants ranged in age from 22 to 98 years old, with an average age of 68.8 years (SD=13.8). About 35% of participants were currently married. Over 70% of participants reported having arthritis and 26% reported using assistive devices for walking. Pre-program, most participants (77%) reported participating in physical activity in the last month, and 38% met national physical activity guidelines for aerobic activity. The most common sources by which participants learned of the WWE program was through word-of-mouth (37%), fliers (16%), health providers (13%), and newspapers (10%). Reasons for joining WWE included to increase physical activity (87%), learn new techniques to be active (49%), find a walking group (32%), and meet people (22%).

### **Implementation.**

***Participant attendance and retention.*** Class sizes averaged 12.8 (SD=7.1) participants, and generally ranged from 4-36 participants (See Table 2). As depicted in Figure 2, attendance varied greatly within and between sites. Participants attended an average of 8.5 classes (SD=4.6) which reflects less than half of the 18 sessions in the program. Some programs, however, did not deliver all 18 sessions ( $\bar{x}$ =16.6 sessions;

SD=2.5). As such, program completion was defined as attendance at two-thirds of the classes delivered. Therefore, 64% of participants successfully completed WWE. Church participants, had the highest average attendance ( $\bar{x}$ =10.7; SD=4.8). (Site-specific participant demographics and implementation variables are available in Appendix C.)

I conducted a logistic regression to examine factors associated with the odds of completing at least 2/3rds of the classes (Table 4). Participants aged 61-70 years (adjusted odds ratio (OR) = 0.3; 95% confidence interval (CI) = .1, .8) and  $\geq 80$  years (OR = 0.2; CI = .7, 0.8) were significantly less likely to complete the program than participants under 60 years old. Participants in church settings had 86% lower odds of completing the program than those in community centers (OR = 0.1; CI = .0, .5), and those who were referred to the program by medical providers had a 77% reduction in odds of completing WWE than those who were not (OR =0.2; CI = .1, .7). Participants that attended WWE to increase their physical activity had a 160% increase in odds of program completion (OR=2.6; CI =1.0, 6.5).

[Insert Table 4 about here.]

Using data from in-depth interviews I further explored barriers and facilitators to retention of participants from the perspective of the leaders. Many leaders attributed attrition to participants' busy schedules, although some reported that participants dropped out due to poor health. A few leaders questioned whether participants liked them or their style of teaching as potential barriers. The decline in attendance caused some programs to end early although other leaders continued to conduct the program with a small, but "dedicated" group of individuals. Indeed, Figure 2 illustrates that in most programs, there



were some individuals who attended almost every session even though the average attendance for the programs, overall, was much lower. This leader explained her experience leading a class that experienced 50% attrition:

Sixteen people registered, but by the time the class had ended, we only had about seven or eight people that actually went through the whole entire class. Even though I lost 50 percent of them from the registration, I feel like those who stayed on really benefitted from the class so I was really encouraged by that. - Volunteer leader at a church, Class 26.1

[Insert Figure 2 about here.]

Several leaders (n=11) reported already knowing participants before the class began, and felt that these relationships helped facilitate retention. Even if leaders did not personally know participants, it appeared that having some interaction with participants before the class started was useful in either encouraging people to come, or helping people determine whether the class was a good fit for them. As this leader explained: “People really feel comfortable coming if they know what it is and that they’re not going to be pressured to do anything they can’t do.” (Volunteer leaders at a senior center; Class 11.1) Talking to participants beforehand allowed leaders to explain the purpose of the program and to establish expectations.

All programs used incentives (e.g. water bottles provided by OSU Extension) but leaders explained that although participants appreciated incentive gifts, they were more motivated by the program itself. For example, this leader said:

The ones that did come didn’t seem to need anything. Just the program itself was enough to keep them going...They started buddying up, holding each other accountable, walking in groups, in pairs. People started bringing in their dogs, their spouses to just kind of join along...even after, they continued to walk in pairs at the same time, the same routine that we

originally had in the classroom. – Staff member at a retirement community, Class 17.1

As the leader noted, the development of social relationships between participants was an important theme related to retention. Leaders explained that social bonds helped provide motivation and encouragement to participants. Further, leaders reported that participants felt accountable to each other to continue the program and work through barriers. In retirement settings, WWE was seen as an opportunity for otherwise isolated seniors to socialize and was in a few cases, the primary reason that participants attended. In one rural community setting, the leader explained her participants refused to separate into different groups based on their walking speed. As a result, they changed the location to the local gym so participants could walk at their own pace and socialize while staying together.

Another facilitator to retention was that participants experienced improvements in health over the course of the program. Leaders reported that when participants started to experience health benefits, this motivated them to continue attending. Additionally, leaders reported that participants that observed their peers' improvements felt motivated to continue walking themselves, and felt that they too were benefiting from the program even if their improvement was not as dramatic.

**Fidelity.** Fidelity scores ranged from 4-19 and averaged 15.0 points (SD=3.3) (see Table 2). Mean fidelity scores significantly differed between settings ( $p<.01$ ). Churches had the highest overall fidelity score ( $\bar{x}=18.0$ , SD=1.7) and workplace settings ( $\bar{x} =11.8$ , SD=4.6,  $p<.05$ ) had the lowest. Fidelity scores were highest in classes with two leaders

( $\bar{x}$ =16.4; SD=2.4), and lowest in classes with more than two leaders ( $\bar{x}$ =10.3; SD=5.5;  $p>.01$ ).

Interviews with leaders and the fidelity checklists noted a variety of adaptations to the WWE program, including large deviations from the key components. The items with the lowest average fidelity score (not shown) were completing the iliotibial-band stretch and a structured cool down ( $\bar{x}$ =.62; SD=.50, each) and items with the highest score were conducting the walking activity safely, (e.g. walking in a group, monitoring slowest walkers) and stretching pre-program ( $\bar{x}$ =.97, SD=.18 each).

One common adaptation involved changing the program from the three-times-a-week, 6-week schedule to a two-times-a-week, 9-week schedule. Another common adaptation, especially in workplace settings, was eliminating or revising the education component due to lack of time for delivery. Two leaders explained they planned to adapt the educational component when they decided to adopt the program, but another leader explained:

Once I realized [participants] were a lot more interested in the walking part of it I toned down some of the longer educational stuff that, kind of, took away. Some of the weeks there was a lot of stuff to go through, but I toned that down knowing that my audience would rather be outside walking. – Volunteer leader at a workplace, Class 3.2

Conversely, other leaders reported their participants preferred the education and socialization components to walking and described difficulties in encouraging participants to walk for the recommended amount of time. The preference for socialization was more often reported in classes at retirement residences.

Many leaders noted challenges encouraging participants to adhere to program components. In particular, participants infrequently read the participant workbook (only 38% reported reading all of the chapters) and rated the diary and walking contracts as the least useful program components (See Table 5). Leaders explained that participants did not want to spend time on what they described as “homework”. For example, one leader reported: “It was a little challenging to get people to do the diaries and the goals. People were not super-engaged with that part of it and they just wanted to come and learn and do and leave.” (Staff member at a medical center, Class 27.1) Participant illiteracy was another barrier identified that prohibited participants from engaging in the reading activities.

[Insert Table 5 about here.]

Although some leaders eliminated program components to fit their participants’ interests, other leaders confronted their participants’ reluctance instilling new behaviors. Leaders, especially those with prior teaching experience, employed creative strategies to encourage participation. For example, some leaders used music to engage participants in the warm-up and stretching activities. As participants experienced health benefits over time, they became more engaged in the program components. One leader noted:

“The very beginning was probably the hardest, getting them in this routine, but as soon as they started seeing the little progressions, then they were motivating themselves really.” (Staff leader at a medical center, Class 8.1)

Many leaders indicated that the leader guide helped them adhere to the program components by providing a script and clear activities for each class session. Also, co-

leading was described as an important facilitator. Co-leadership allowed leaders to divide the class into walking groups that matched participants' ability levels. This division was particularly useful when classes had groups of "faster" and "slower" walkers. In classes with only one leader, leaders reported that participants who were slower or faster than the rest of the group either walked alone or dropped out of the program. Leaders also explained that two people presenting the education helped engage participants with different learning styles.

Classes, however, that had more than two leaders had poorer fidelity. Leaders in these classes reported having many walking groups each led by a different leader. For example, a large workplace program with a fidelity score of four conducted WWE as walking competition between multiple departments, each led by one of five leaders. They provided the program materials to participants, but did not complete the educational sessions or correctly teach all four stretches.

### **Effectiveness of WWE.**

Participants reported statistically significant reduction in pain ( $\beta = -.47$ ; 95% CI = -.81, -.14) and fatigue ( $\beta = -.58$ ; CI = -1.1, -.08) from pre-test to post-test (See Table 6). More participants reported doing physical activity post-intervention than pre ( $\beta = 2.5$ ; CI = 1.0, 3.9), and engaging in exercise more days per week ( $\beta = .86$ ; CI = .45, 1.3). Using the IPCW, I found that changes in pain and fatigue remained generally constant, and changes in pain remained significant (changes in pain score were  $\beta = -.52$ ; CI = -.85, -.19; and fatigue were  $\beta = -.32$ ; CI = -.91, .27). I found no significant differences in self-

reported health status or in the total disability score in either the adjusted or unadjusted models.

[Insert Table 6 about here]

## **Discussion**

This study examined the outcomes of scaled-up delivery of an evidence-based walking program, and explored factors that influenced those outcomes. Overall, OSU Extension Service successfully scaled-up WWE delivery to a diverse group of organizations and participants. Although the targeted number of classes was not met, WWE programs enrolled the targeted number of participants over the two years. Furthermore, WWE evidenced effective outcomes including increased physical activity and reduced pain and fatigue. The use of qualitative interviews allowed for contextual themes to emerge that provided insights into factors that influenced the scale-up process and outcomes. The research findings indicated that at least three critical elements were essential for successful program scale-up: 1) the integrity and strength of the program to be implemented 2) the approach used by the support system to recruit and support the organizations and individuals that ultimately deliver the program and 3) the coherency between the program deliverers, participants, design, and outcomes.

WWE is a proven and well-researched arthritis self-management program. The established program goals, design, materials, and outcomes allowed prospective implementers to identify and choose an effective program for their particular settings and needs. Organizations that devote staff time and energy to delivering new programs need

to be confident that the program selected will produce desirable outcomes. Because WWE was supported by research and sanctioned by notable health organizations (e.g. AF and CDC), it demonstrated credibility that influenced organizations' decisions to adopt. Additionally, the developed materials, simplicity, low-cost, and ability to address unmet needs were all desirable qualities identified by the leaders and mirrored in the literature that facilitated adoption and implementation.<sup>93</sup>

Authors have identified the importance of a support system comprised of individuals that guide implementation activities and provides technical assistance.<sup>55</sup> The OSU Extension Service acted as this support system by advocating for WWE and recruiting organizations for program delivery. Literature shows that adoption is best facilitated by targeted efforts rather than passive or natural diffusion,<sup>26 94,95</sup> and that individuals who champion new programs create buy-in that facilitates uptake and use.<sup>67</sup> <sup>64</sup> In this study, OSU Extension staff championed WWE by disseminating information about the benefits of the program, providing organizations with resources for implementation, and in some cases, partnering to deliver the program. Furthermore, this approach to recruitment ensured that the organizations that ultimately participated in delivery had maximum flexibility to choose WWE based on whether the program would fit their community, program model, and ultimately their population's needs. Because organizations were able to try WWE with relatively low commitment, they were able to evaluate whether WWE was a good fit. This finding parallels literature that reports that the opportunity to try a program, and potentially reject it, facilitates adoption and implementation.<sup>36</sup> Although the CDC funding was limited to the provision of marketing,

training, and program materials, it helped offset organizations' start-up costs and enabled organizations to try the program on a small scale. Furthermore, because funding did not directly support organizations to actually deliver the program (e.g. by funding staff time or facility costs), organizations had to provide some of their own resources. This shared approach to funding delivery activities, and the fact that organizations' decision to adopt was voluntary rather than forced, demonstrate that participating organizations had a high degree of interest and buy-in that facilitated outcomes and coherency between the program and setting.

WWE demonstrated coherency, or good fit, between target population, delivery staff, and delivery settings through the diverse organizations serving diverse target populations. As noted in other studies,<sup>26,28,67</sup> the high degree of flexibility in the WWE program design contributed to the success in scaling-up implementation and the ability to recruit from different target populations that ranged from senior centers to workplace settings to medical clinics. Most organizations in this study successfully adapted WWE to increase reach and program fit. Some studies suggest that adaptations threaten fidelity and therefore program outcomes,<sup>80</sup> however others provide evidence that adaptations improve program effectiveness.<sup>96</sup> Most authors agree that adaptations are necessary to translating programs to new settings,<sup>76</sup> yet research on what constitutes appropriate adaptations is lacking.<sup>97,98</sup> At a minimum authors recommended adhering to the key program elements identified by program developers.<sup>28</sup>

The reduction or elimination of the educational component, a key program element, by some leaders could indicate that WWE was a poor fit for those organization



or participants. In particular, workplace settings had the lowest fidelity. Because the work environment imposes restraints on time and may be more difficult to develop social relationships given these restraints, it is not surprising that the workplace settings experienced more barriers than other organizational types. In an effort to tailor the program to participant's interests, leaders from all settings reported reducing the educational component. Participant engagement is critical to achieving desired outcomes,<sup>99</sup> and the fact that WWE evidenced effective outcomes despite this adaptation suggests that reducing education did facilitate engagement. Based on themes identified from the leader interviews and literature that shows education alone is not sufficient to support behavior change,<sup>100-102</sup> the key program components that likely facilitated the measured outcomes were the walking activities and the social relationships that formed between participants. Although the educational content was identified as a key component in the WWE materials, no evidence in the initial studies linked outcomes to specific program components. Additionally, the pre-packaged materials did not include a fidelity checklist and although I created one with assistance from the original researchers, the validity of the checklist is not established and may not be an accurate measure of adherence or quality delivery. The lack of evidence regarding causes of program outcomes is a limitation of most efficacy trials;<sup>52,103</sup> and more evidence is needed to inform appropriate adaptations during real-world delivery.<sup>104</sup>

The three elements previously identified (e.g. program qualities, scale-up approach, and coherency), although interrelated, accounted for the bulk of the positive themes found in this study. For example, without the proven efficacy of WWE, program

adoption may have been adopted by fewer organizations and may have taken longer. Similarly, if participating organizations did not have the flexibility to choose and/or reject ultimate adoption of the program, WWE may have been inappropriately matched to the wrong implementing organizations that lacked the appropriate environment, staff time, and buy-in to correctly implement walking activities. Finally, without coherency between program staff, clients and methods, program adaptations may have been more severe, thus reducing effectiveness.

The results of the present study should be assessed in light of its limitations. For example, all data from participants and leaders were self-reported and subject to bias. Further, missingness due to incomplete data collection was a notable limitation. Because of the limited funds available for evaluation, I relied on WWE leaders to collect data as part of program delivery protocols. Barriers encountered, such as confusion about which forms to collect and low retention, meant that data collection was often incomplete. The IPCW-approach used to adjust for missingness has some limitations because it assumes that people who completed the post-test are representative of those who did not, conditional on the variables that were used to model missingness (e.g. age and program completion). Using IPCW, however, allowed me to include the extensive descriptive data gathered in the pre-program survey to better understand retention and program outcomes. Given the strength of the IPCW method and the dearth of literature on scale-up evaluations, this study makes important contributions by reporting scale-up outcomes. Further, the qualitative interviews provide context that helps to explain quantitative findings on effectiveness and implementation outcomes.

Although considerable improvements in adoption were seen over the course of the study, longitudinal studies are needed to determine whether the factors I identified are related to the long-term sustainability of WWE. A strength, however, is that this study took place during the first two years of a five-year scale-up effort. Many studies on scale-up are descriptive and lack outcome data,<sup>105,106</sup> and only a few have employed qualitative methods to explore factors affecting scale-up<sup>59,107</sup> Existing qualitative studies, however, are retrospective, occur after the scale-up project is completed, and rely on participants to recall to barriers and strengths over the duration of the scale-up process. By interviewing leaders after they led their first program, and by conducting an evaluation early during scale-up, I examined scale-up as it occurred. This study, therefore, provides insights into the early phases of scale-up by identifying barriers and strengths that may contribute to long-term sustainability.

Another limitation was that I did not follow-up with participants who dropped out of the program. Better understanding barriers to retention would help to identify techniques to sustain WWE delivery, reduce costs, and maximize impact. Also, leaders recruited for qualitative interviews were considered the primary WWE deliverers for their program, but their perspectives may not reflect the experience of leaders who played a supportive role. As such, this study's findings are not representative of all who participated in WWE delivery and caution should be employed in generalizing to other implementation contexts.

Despite these limitations, findings from this study coupled with previous research provide insights for future studies and scale-up efforts. First, findings suggest that it is

possible to support wide-scale adoption of a simple program with relatively little funding if a support system is available to guide scale-up activities. Other scale-up studies have evidenced wider and quicker adoption but at greater cost.<sup>108</sup> Similarly, more complex programs require more time and expense to train staff and acquire resources to support implementation.<sup>59</sup> Involving and supporting community organizations to deliver evidence-based interventions, however, can reduce costs and improve access to health programs.<sup>21</sup> Further, transferring program ownership to local organizations may facilitate long-term sustainability.<sup>109-111</sup>

Second, the WWE program demonstrated strengths that facilitated its ability to be scaled-up, but also weaknesses that resulted in adaptations. These findings raise implications for selecting and designing programs for future large-scale dissemination and delivery. O'Donnell<sup>104</sup> suggests that programs selected for scale-up should demonstrate both positive outcomes and a high fidelity; otherwise program outcomes, whether positive or negative, cannot be attributed to the program design. As previously noted, research linking program outcomes to specific program components is lacking. Such evidence is needed to inform adaptations that facilitate fit and promote desired outcomes. Increased evidence on implementation outcomes during evaluations is needed from both efficacy and effectiveness trials.<sup>27</sup> Such evidence includes, for example, documenting fidelity and adaptations, implementation costs, reach, and participant responsiveness. Several authors have called for increased emphasis on designing programs and evaluations with future dissemination and implementation in mind.<sup>112-114</sup>

Finally, scale-up goals need to be carefully selected and articulated to promote maximum impact. The goals defined by the funder for WWE scale-up related only to program reach; similarly, funding only covered implementation activities but with only limited funds for monitoring quality and no funds for evaluation. Simply expanding adoption and recruitment does not constitute quality delivery or ensure program outcomes. Documenting implementation quality and outcomes is needed to ensure that resources invested in scale-up are effecting desired health benefits.<sup>64</sup> In addition, sufficient funding is needed to conduct large-scale monitoring of program quality and outcomes.

This study provides important insights into the process of scaling-up an evidence-based program to multiple settings. As more health programs are scaled-up to extend limited resources and impact health on a broader scale, understanding and documenting scale-up outcomes will become even more critical. Findings from this study parallel the implementation literature, but using mixed methods in this study has allowed for a deeper exploration of the critical factors that impact scale-up. Although some elements may be unique to the WWE program and scale-up context, findings related to program qualities and the scale-up approach that facilitated adoption and delivery may assist in selecting future programs for successful and impactful scale-up.

Table 3.1 Walk with Ease Key Program Components

<b>Walking</b>
Hold all 18 sessions
Use 5-step basic walking pattern each session
<b>Stretching</b>
Do not add additional exercises
Do not touch participants when demonstrating or doing the exercise and tell them not to touch each other
<b>Health Education</b>
Do not add topics outside arthritis/exercise
Do not offer medical advice, promote unproven remedies, suggest practitioners
Encourage participants to speak with health care provider when they have medical questions
Use Arthritis Foundation materials to augment health information
<b>Motivational Activities</b>
Use and discuss the motivational tools in participant workbook
Address what participants can do after the program ends to encourage continued physical activity
Build self-management skills via group sharing/problem solving

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*Note:* Adapted from Altpeter M, Callahan L, Morse ML, et al. Arthritis Foundation Walk With Ease Program: Leader's Guide. Atlanta, GA: Arthritis Foundation; 2009.

Table 3.2 Characteristics of Walk With Ease Classes (n=36)

Class Characteristics	Classes n (%)	Number of sessions delivered Mean $\pm$ SD	Class size <sup>a</sup> Mean $\pm$ SD	Attendance Mean $\pm$ SD	Participants completing <sup>b</sup> %	Fidelity Score <sup>c</sup> Mean $\pm$ SD
All		16.6 $\pm$ 2.5	12.8 $\pm$ 7.1	8.5 $\pm$ 4.6	64	15.0 $\pm$ 3.3
Location						
Rural	21 (58)	16.2 $\pm$ 2.9	12.7 $\pm$ 7.2	8.7 $\pm$ 4.4	57	15.5 $\pm$ 2.9
Urban	15 (41)	17.3 $\pm$ 1.7	12.5 $\pm$ 5.8	8.1 $\pm$ 4.9	63	14.8 $\pm$ 4.1
Setting						
Retirement/senior center	12 (33)	16.8 $\pm$ 2.0	12.5 $\pm$ 4.1	8.1 $\pm$ 4.5	48	14.1 $\pm$ 2.9 <sup>e</sup>
Community	8 (22)	16.8 $\pm$ 2.3	13.9 $\pm$ 9.6	8.9 $\pm$ 4.6	68	15.4 $\pm$ 2.4
Medical	8 (22)	15.9 $\pm$ 3.5	12.6 $\pm$ 7.6	8.5 $\pm$ 5.2	68	17.1 $\pm$ 1.8
Workplace	5 (13)	16.8 $\pm$ 3.0	11.3 $\pm$ 8.2	8.5 $\pm$ 3.5	69	11.8 $\pm$ 4.6
Church	3 (8)	17.7 $\pm$ 0.6	11.0 $\pm$ 2.6	10.7 $\pm$ 4.8	42	18.0 $\pm$ 1.7
Implementation Year and Quarter						
Year 1, Apr-Jun	3 (8)	18.0 $\pm$ 0.0	14.0 $\pm$ 2.7	7.9 $\pm$ 4.8	59	14.0 $\pm$ 2.8
Year 2, Jul-Sep	6 (17)	15.0 $\pm$ 4.3	16.5 $\pm$ 11.3	7.6 $\pm$ 4.5	60	15.2 $\pm$ 2.6
Year 2, Oct-Dec	5 (14)	16.3 $\pm$ 2.9	13.7 $\pm$ 4.5	9.0 $\pm$ 4.0	51	14.0 $\pm$ 3.1
Year 2, Jan-Mar	6 (17)	18.0 $\pm$ 1.6	11.4 $\pm$ 6.5	8.5 $\pm$ 4.4	54	14.8 $\pm$ 2.9
Year 2, Apr-Jun	16 (44)	16.6 $\pm$ 2.0	10.7 $\pm$ 5.2	8.8 $\pm$ 4.8	64	15.9 $\pm$ 4.3

Characteristics of Walk With Ease Classes (n=36) (Continued)

Class Characteristics	Classes n (%)	Number of sessions delivered Mean $\pm$ SD	Class size <sup>a</sup> Mean $\pm$ SD	Attendance Mean $\pm$ SD	Participants completing <sup>b</sup> %	Fidelity Score <sup>c</sup> Mean $\pm$ SD
Number of class leaders						
1	13 (36)	17.3 $\pm$ 1.2	10.3 $\pm$ 4.5	9.1 $\pm$ 5.0	55	14.6 $\pm$ 3.2
2	19 (53)	15.8 $\pm$ 3.1	12.2 $\pm$ 5.2	8.1 $\pm$ 4.2	58	16.2 $\pm$ 2.4
>2	4 (11)	18.0 $\pm$ 0.0	25.0 $\pm$ 10.1 <sup>d</sup>	8.1 $\pm$ 5.3	69	11.3 $\pm$ 4.5 <sup>f</sup>
Primary leader type						
Staff-Partner	20 (56)	16.6 $\pm$ 2.8	12.1 $\pm$ 5.6	8.7 $\pm$ 5.1	53	14.8 $\pm$ 3.9
Staff-OSU	9 (25)	16.4 $\pm$ 2.4	13.5 $\pm$ 9.5	7.5 $\pm$ 4.1	73	16.3 $\pm$ 2.1
Volunteer	7 (19)	16.7 $\pm$ 2.3	12.5 $\pm$ 5.5	9.4 $\pm$ 4.1	52	15.0 $\pm$ 3.7

<sup>a</sup>Class of 166 participants excluded because of non-participation; <sup>b</sup>Completion was defined as attending at least 2/3rds of sessions offered;  $n=397$ ; <sup>c</sup>Scored 0-19, high scores indicate high fidelity; <sup>d</sup>ANOVA test showed significant differences between group means at  $p>.001$ . <sup>e</sup>ANOVA test showed significant differences between group means at  $p>.01$ . <sup>f</sup>ANOVA test showed significant differences between group means at  $p>.05$ .



Table 3.3 Characteristics of Leaders and Participants

	Leaders	Participants	
	( <i>n</i> =58)	<i>n</i>	
Age (Mean $\pm$ SD)	47.1 $\pm$ 15.3	356	68.8 $\pm$ 13.8
Female	90%	429	82%
Education		289	
Less than HS (1-11)	0%		7%
High-school/GED (12)	7%		25%
Some College (13-15)	33%		39%
College (13-16)	31%		13%
Post-college (+17)	29%		17%
Married	62%	292	35%
Non-Hispanic white	83%	359	90%
Employment		291	
Employed	77%		22%
Retired	11%		65%
Unable to work	0%		13%
Student	12%		0%
Health status <sup>a</sup>	3.8 $\pm$ 0.9	287	3.0 $\pm$ 0.8
Self-reported arthritis	14%	359	71%
Participated in physical activity in last month	97%	273	77%
Meets aerobic guidelines	57%	262	38%
Meets strengthening guidelines	55%	262	42%
Uses assistive device for walking	-	289	26%

Table 3.4 Characteristics of Leaders and Participants (Continued)

<b>Leaders</b>		<b>Participants</b>	
Training Type		Why participating <sup>b</sup> (n=282)	
Online	24%	Learn new techniques to be active	49%
In-person	59%	Increase physical activity	87%
Both	17%	Find a walking group	32%
Professional Background		Meet people	22%
Clinical	36%	Heard about WWE <sup>b</sup> (n=344)	
Exercise	24%	Word of mouth	37%
College degree in wellness/health	17%	Flyer	16%
Other	23%	Health Provider	13%
Heard about WWE <sup>b</sup>		Newspaper	10%
Employer	43%	Other	24%
Professional Network	35%	Completed at least 2/3rds of classes offered (n=397)	
Extension	33%		64%
School	7%		

*Note:* Variation in participant sample size is due to the variation of participants that received and completed all forms. WWE=Walk With Ease; percentages may not equal 100% due to rounding. <sup>a</sup> Scored 0-4, higher scores indicate better health; <sup>b</sup> Does not=100% due to multiple response options

Table 3.5 Adjusted Odds Ratios for Participants Completing Walk With Ease Program<sup>a</sup>

	Adjusted OR	95% CI
Married	2.0	.6, 7.1
Female	1.4	.6, 3.1
Has arthritis	0.7	.3, 1.3
Currently Employed	0.5	.2, 1.2
Age		
<60 (ref)		
61-70	<b>0.3</b>	<b>.1, .8</b>
71-79	0.5	.2, 1.5
≥80	<b>0.2</b>	<b>.7, .8</b>
Class type		
Community (ref)		
Senior Center	1.7	.7, 4.0
Workplace	0.7	.2, 2.2
Medical	1.2	.5, 3.1
Church	<b>0.1</b>	<b>.0, .5</b>
Participating to increase physical activity	<b>2.6</b>	<b>1.0, 6.5</b>
Referred to WWE by medical provider	<b>0.2</b>	<b>.1, .7</b>

Note: N=227; OR = odds ratio; CI= Confidence Interval, WWE=Walk With Ease. <sup>a</sup>Completion was defined as attending at least 2/3rds of sessions offered

Table 3.6 Participant Satisfaction

	%
Most valuable class component <sup>a</sup>	
Stretches	68.8
Arthritis Information	51.4
Walking Information	51.4
Strengthening Exercises	36.8
Starting self-test	23.6
Problem-solving strategies	22.9
Methods for walking	20.1
Accountability (written in)	16.0
Diary	15.3
Walking contracts	12.5
Amount of workbook read	
All	38.3
4-5 chapters	26.2
2-3 chapters	17.7
1 chapter	8.5
None	7.8
Confidence to continue walking on own	
Extremely	47.7
Fairly	45.6
Slightly	6.0
Not	0.7

*Note:*  $N=170$ ; <sup>a</sup> greater than 100% due to multiple response options

Table 3.7 Changes in participant health outcomes and physical activity

	Pre-Survey			<i>p</i>	Post-Survey		
	Total Mean ± SD	Missing post-test Mean ± SD	Completed post-test Mean ± SD		Mean ± SD	$\beta$	95% CI
<i>N</i>	292	143	149		149	-	-
Sessions attended	8.2 ± 5.1	6.4 ± 4.7	11.6 ± 3.9	<.001	-	-	-
Health Status <sup>a</sup>	3.0 ± 0.8	3.0 ± 0.8	3.0 ± 0.8	.50	3.0 ± 0.9	-.06	-.19, .06
Pain <sup>b</sup>	3.4 ± 2.6	3.4 ± 2.7	3.4 ± 2.6	.93	3.0 ± 2.4	-.47	-.81, -.14
Fatigue <sup>c</sup>	4.0 ± 2.8	3.8 ± 3.0	4.1 ± 2.6	.52	3.6 ± 2.6	-.58	-1.1, -.08
Reporting limitations due to arthritis (%)	53.3	52.0	55.0	.63	58.1	.35	-.39, 1.08
Disability score <sup>d</sup>	7.9 ± 4.6	7.9 ± 5.0	8.0 ± 4.2	.88	7.7 ± 4.7	-.19	-1.0, .61
Exercised in past month (%)	76.9	76.3	78.0	.79	96.0	2.5	1.0, 3.9
Days exercised in last week	3.3 ± 3.6	3.6 ± 4.4	2.9 ± 2.3	.13	3.7 ± 1.7	.86	.45, 1.3
Average duration of exercise (minutes)	48.0 ± 64.5	55.0 ± 75.7	39.6 ± 46.7	>.05	46.6 ± 45.3	2.8	-5.4, 10.9
Meets activity guidelines (%) <sup>e</sup>	37.8	43.8	30.5	<.05	39.2	.41	-.19, 1.0

<sup>a</sup> Scored 1-4, high scores indicate better health; <sup>b</sup> Scored 0-10, high scores indicate more pain; <sup>c</sup> Scored 0-10, high scores indicate more fatigue; <sup>d</sup> Scored 0-20, high scores indicate greater disability; <sup>e</sup> Moderate activity for >150 minutes/week

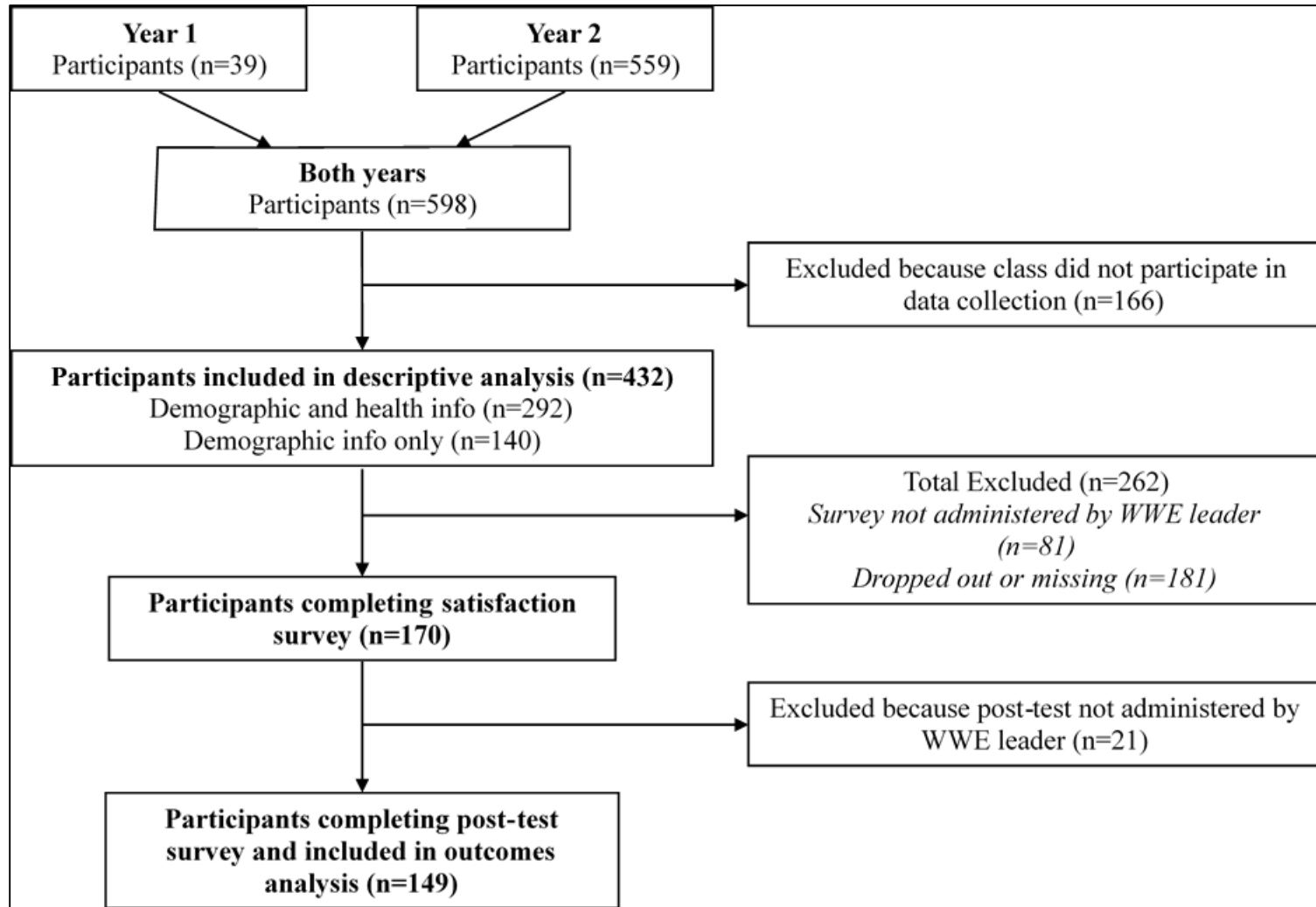


Figure 3.1 Study Inclusion Criteria for Walk With Ease Participants

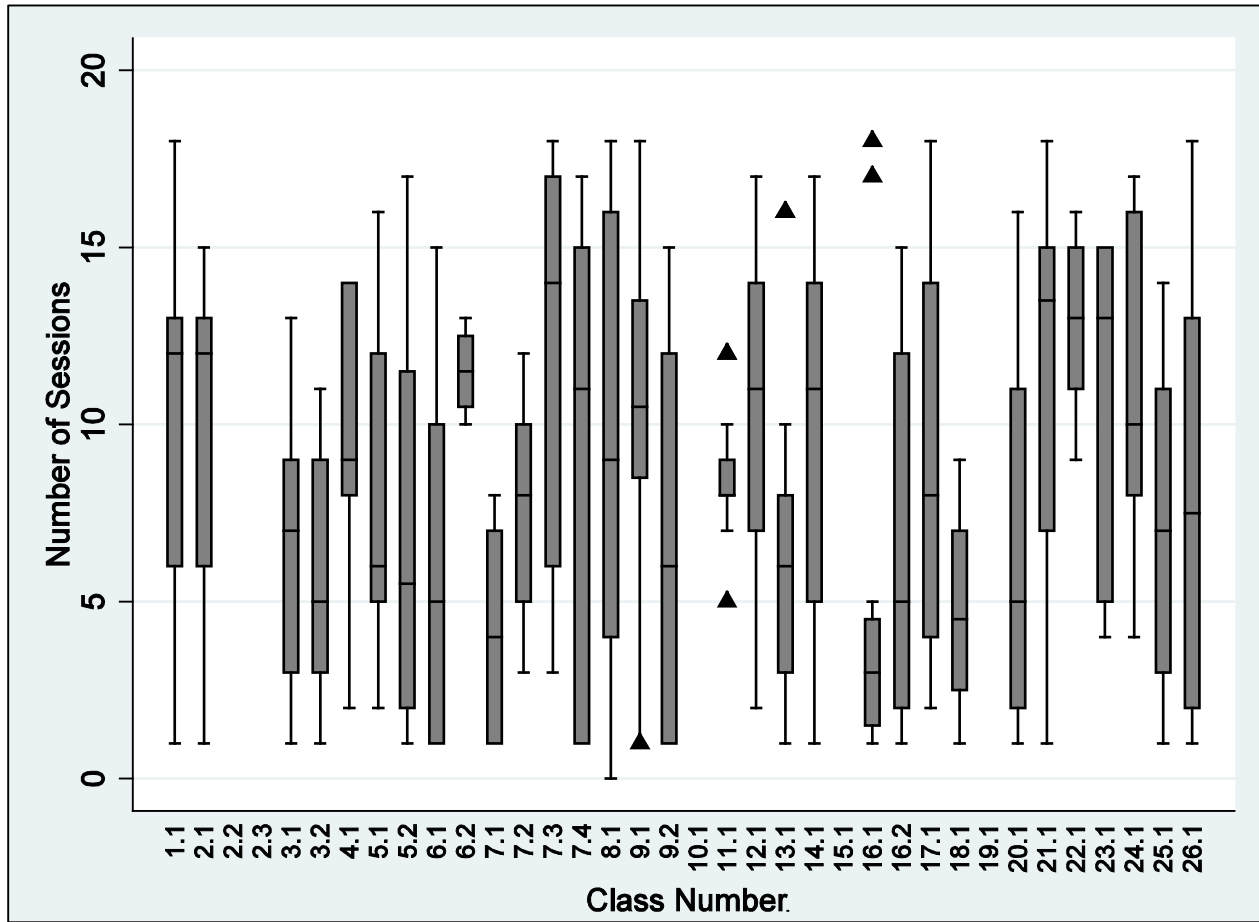


Figure 3.2 Participant Attendance by Class Number

## CHAPTER 4 CONCLUSION

The interest in scaling-up efficacious health interventions is increasing as the management and treatment of chronic health conditions, including arthritis, become more costly.<sup>21</sup> Although EBIs have been found effective in improving healthy behaviors and the ability to self-manage symptoms,<sup>4</sup> little research has examined whether scaled-up delivery of arthritis EBIs produces the desired outcomes. Further, little is known about what strategies are most successful to facilitating scale-up. The overall purpose of this dissertation was, therefore, to examine the factors that influenced the scale-up of WWE, and evaluate the scale-up outcomes. Studying scale-up over time allowed for an exploration of the factors that impacted the scale-up process during early installation, and the outcomes seen at the end of two years.

This project was designed as a mixed-methods study to evaluate the WWE scale-up, and to provide context to these findings. Overall, the results of the quantitative analysis show that the WWE program demonstrated effectiveness when implemented in a real-world context. Particularly, I found that WWE was effective at increasing physical activity. Furthermore, I was able to identify a significant association between participants who joined the program to improve physical activity and their likelihood of completing the program.

In addition to the evaluation, I conducted two qualitative analyses to examine 1) the factors that influenced installation and early delivery in Year 1 of scaling-up, and 2) the factors that influenced the evaluation outcomes observed in Year 2. Using in-depth



qualitative interviews allowed for a more comprehensive understanding of the relevant factors influencing scale-up.

Barriers to delivery during the installation phase delayed large-scale delivery until Year 2 of the scale-up project. Findings from Manuscript I indicated that target goals were not met during Year 1 due to poor timing of installation, lack of leadership, and lack of program-specific capacity within the OSU Extension Service. These findings raised concerns that the WWE scale-up project might fail. In Year 2, however, the number of classes delivered and the scope of adoption increased substantially. Collectively, the findings from both years suggest that the increase in adoption may have been a result of increased time for information about WWE to disseminate, and for training, marketing, and communications systems to be established. OSU staff in Year 1 reported engaging in activities related to relationship-building and disseminating information about WWE that appears to have “caught on” in Year 2.

Findings indicated that strategies employed by OSU Extension staff to increase adoption appeared to be effective at scaling-up WWE delivery. For example, broadening the scope from recruitment targeted in only seven counties in Year 1 to any organization interested in leading the program in Year 2 resulted in meeting the delivery goals in Year 2. In Year 1, the programs that were delivered were led by volunteers that OSU staff recruited directly. Leaders in Year 2 reported hearing of the program primarily through their employers or work networks. This finding suggests that as dissemination through word-of-mouth and email communications occurred, interested and ready organizations came forward. Although targeted recruitment in Year 1 may have initiated the

dissemination process, not restricting participation to these counties likely facilitated increased adoption by organizations with which WWE was a better fit. More specifically, allowing organizations to self-select to deliver WWE likely resulted in organizations with better established capacity or readiness to adopt. Further, this approach may contribute to the sustainability of WWE over time as it was adopted by organizations with more buy-in.<sup>80</sup>

### **Ties to Theory**

The Interactive Systems Framework (ISF)<sup>55</sup> provides a systems-level lens to help explain the overall findings from this dissertation. All of the ISF systems, the Intervention Synthesis and Translation System, the Intervention Support System, and the Intervention Delivery Systems, were represented in this study.

The WWE program materials that were produced and approved by the Arthritis Foundation (e.g. the Intervention Synthesis and Translation System) were facilitators to organizations adopting and delivering WWE with fidelity. Other studies have similarly shown that a well-packaged program greatly aids translation.<sup>28</sup> OSU Extension acted as the Intervention Support System by providing technical assistance and guiding scale-up activities. This finding is complemented by studies that show that dissemination alone isn't sufficient to facilitating adoption of new programs.<sup>94,95</sup> In addition to dissemination, adequate technical assistance and support to problem-solving barriers and making appropriate adaptations, are required to improve program fit.

The Intervention Delivery System in this study was comprised of diverse local organizations. This diversity shows that WWE was used to fill a variety of needs. For

example, WWE was used as a wellness program in workplace settings, an opportunity for socialization and relationship-building in retirement communities, and as an introductory physical activity program in medical centers. The diverse settings in which WWE was delivered contributed to different adaptations depending on the setting (e.g., eliminating educational content or extending time for socialization).

The relationship between the three ISF systems was synergistic in contributing to the scale-up outcomes. First, the flexibility of the WWE program design and the relevancy of the material contributed to its wide application and adoption by the Intervention Delivery System. Second, The Intervention Support System, OSU, acted as a facilitator between the Intervention Synthesis and Delivery Systems by disseminating the WWE program, recruiting sponsoring organizations, guiding scale-up activities, and providing technical assistance and training.

Diffusion Theory,<sup>26</sup> provides insights as to why the initial scale-up process was initially slow, and why the WWE program in particular was a good program to scale-up. I found that momentum for implementation grew over Year 1 and into Year 2 as more organizations adopted WWE. Previous research found that targeting dissemination at innovators or early adopters can quicken the adoption process.<sup>58</sup> Although it was assumed by OSU administrators that the counties selected for Year 1 implementation were the most ready or interested and, therefore, represented early adopters, it may be that adoption lagged because these individuals did not have the characteristics of innovators or early adopters. Better identification and targeting early adopters may facilitate and accelerate the adoption process.

This study only included data from two of the five years of implementation activities. Because implementation spiked in the last quarter of the second year, it is likely that adoption has not yet reached the “tipping point” in the s-curve. Following WWE delivery over the next few years and beyond the grant-funding period is needed to better understand the s-curve for WWE adoption in Oregon, and to determine whether WWE delivery will be self-sustaining, or maintained, over time.

In addition to explaining rates, Diffusion Theory also describes characteristics of the EBI itself that are relevant to adoption,<sup>58</sup> and the WWE program exhibited all of them to some degree. First, WWE demonstrated a *relative advantage* over other possible arthritis EBIs. In my study, leaders reported during interviews that there was a lack of programs targeting sedentary and new exercisers and WWE was seen to fill this need. WWE had a relative advantage over current exercise programs that were perceived as too advanced for new exercisers.

Second, WWE was seen as *compatible* with both the intended target audience and implementing organization. Two reasons WWE leader reported for adopting WWE was that the arthritis and walking content was relevant to their participants, and they had staff and/or volunteers that could implement the program. Third, WWE was not *complex* to implement. Several leaders reported that the design and content of WWE was simple, and easy for them to deliver. Fourth, organizations were able to *try* the program with relatively little commitment because the program materials were provided for free, and the leaders only had to lead one class in exchange for free training.

Fifth, leaders reported *observing* participants benefit and improve during the course of the program, and one leader explicitly stated that hearing of other organizations' success with the program led to his decision to adopt. Finally, the WWE program did experience some *reinvention* during delivery; changes to the WWE program were made by the organizations that delivered it in order to improve the fit between the program, the deliverers, and the participants.

Although program adaptation can threaten program outcomes, not all adaptations are negative and some may actually improve adoption and delivery.<sup>97,98,115</sup> Despite adaptations, participants in this study experienced increased physical activity and decreased pain and fatigue over the course of the program. That WWE demonstrated effectiveness suggests that either the adaptations were too insignificant to negatively affect outcomes, or that the adaptations facilitated outcomes. Notably, the original WWE studies did not measure changes in physical activity as an outcome variable. Based on the findings from this study, I suggest that increasing physical activity is an additional benefit of the WWE program when implemented in real-world settings. To this point, eliminating the arthritis education content to better facilitate participant's walking behaviors is not necessarily a negative adaptation. Although the primary reason for scaling-up WWE was to increase self-management of arthritis symptoms and reduce disability, increasing physical activity is an important and necessary first step in that direction.<sup>116</sup>

### **Defining Scale-up Success**

Although program reach improved over Year 2, the findings from this study identified important barriers to quality implementation including a high rate of participant

drop-out, and significant adaptations to the program design. These findings require a more in-depth consideration of whether the scale-up effort was indeed successful. The contract between OSU and OHA in Years 1 and 2 defined success of scale-up in terms of program reach: the number of programs delivered (e.g. 50 programs) and the participants enrolled (e.g. 600 people). Additionally, the grant application narrative submitted to the CDC emphasized OHA's overarching plan to build a "scalable statewide WWE delivery infrastructure" that would reach 400 participants per year through OSU.<sup>117</sup> Milestones identified in this plan were also based on reach and included training leaders and delivering the program.

In terms of the goals defined by the funders, WWE was successfully scaled-up to reach the targeted number of participants. Further, data not included in this study from Year 3 of implementation shows that WWE scale-up continues to increase. For example, at the time of writing, three months prior to the end of Year 3, the Year 3 delivery goal of 75 classes has been surpassed by the delivery of 81 classes. These data suggest that the dissemination strategies and technical assistance employed by OSU were successful at building interest in the program, and recruiting organizations for delivery.

Research that examines dissemination and adoption during scale-up is a worthy endeavor in and of itself. Successfully growing a program in two years from virtually no instances of delivery to reaching over 600 participants representing 16 of 36 counties constitutes measurable growth. It is also an accomplishment when considering the funding provided, a total of \$59,028, and the fact that the program was meant to be delivered by volunteers who require significant staff time and support to manage.

Furthermore, several of the organizations continue to deliver WWE classes on an ongoing basis suggesting that the program has potential to be sustained. These accomplishments in addition to insights provided by this study regarding the process of scaling-up, the qualities of the program, and the settings in which WWE was adapted for delivery help further our understanding of how to disseminate programs for large-scale delivery despite relatively little resources.

The stages of implementation and the RE-AIM model, however, identify other critical components of implementation beyond dissemination and reach. What is lacking from the funder's definition of success, and made apparent by this study, is the oversight of *implementation* and *evaluation* components in defining scale-up successes. Although expanding implementation is an area of study all of its own, it is not sufficient to expect that simply expanding the reach of a program, even if it is evidence-based, will result in the population-level impacts that are the ultimate goals of scaling-up.

As identified in this study, in addition to recruiting participants to programs participants must be engaged and attend in order to receive the maximum dosage of the program that will contribute to desired outcomes. Programs that experience a low degree of retention are not likely to result in population-level impacts. Process evaluations early in scale-up are needed to determine reasons for poor retention. One driver of poor retention could be aspects of implementation such as inconvenient delivery locations, aversion to the program leaders, or poor communication of the program goals and design. If drop-outs are due to such implementation issues, these can and should be addressed early in the scale-up process. If drop-outs are due to poor coherency between the

participants and the program, then administrators need to determine whether the program is suitable for scaling-up. Reasons the program may have poor coherency with participants could include inconvenient scheduling, the emphasis on education and homework activities, and/or poor fit with participant's current health status, literacy, or readiness to change. If poor fit between the program and participants are identified then the program either needs to be adapted or abandoned in lieu of another approach to achieving the desired health outcomes.

The issue of adaptation is important in that significant adaptations can negatively impact program fidelity, implementation quality and outcomes. Many evidence-based programs include fidelity instruments and protocols to monitor implementation quality. Fidelity and implementation quality monitoring tools, however, were not available in the WWE materials and were developed for the purposes of this study. Programs packaged for implementation must include clear guidelines for fidelity to help users adapt the program appropriately, and/or determine whether the program is a good fit for their setting. As seen in a few settings in this study, without implementation and fidelity guidelines, adaptations may be drastic and indicates poor fit between the program and either the deliverers or the participants.

Finally, the lack of funding for thorough evaluation constituted a major barrier to monitoring implementation quality and outcomes and identifying and addressing barriers. Because of the lack of funding, the development of a monitoring system for implementation was outside of the scope of the implementation contract. In addition, no evaluations were planned. The study conducted for this dissertation provides important



insights into the scale-up process, but it was conducted tangentially to implementation instead of a planned part of the scale-up protocol. As such, I relied heavily on the willingness of volunteer leaders to participate in data collection. This resulted in poor delivery of post-program surveys, and the refusal by some organizations to participate in evaluation entirely. If evaluation had been a goal specified in the contract, it likely would have received more resources and technical assistance from OHA, buy-in from program deliverers, and attention in designing early implementation protocols.

In sum, WWE scale-up evidenced success on only two of five dimensions of implementation. Large-scale adoption and reach goals were met, but evidence from this study identifies concerns regarding the quality of implementation, evaluation, and long-term sustainability. When defining success in future scale-up efforts, goals related to each stage of implementation need to be carefully identified and articulated at the beginning of the project. Furthermore, sufficient resources must be dedicated to ensuring that progress towards identified goals can be monitored and evaluated. Failing to monitor and evaluate scale-up could result in an incomplete picture of implementation outcomes, and/or inability to meet overall population-level impacts.

### **Future Research and Implications**

Longitudinal studies are needed to examine whether organizations that were recruited during scale-up sustain WWE delivery over time and after funding ends. Furthermore, longitudinal studies on WWE are needed to determine whether on-going delivery is sustainable. For example, participants who complete the education portion of the program may not be interested in receiving it a second time. As such, organizations

offering WWE on an ongoing basis may need to recruit new participants for every new class cycle. In settings serving few clients or small communities, it may not be feasible to expand recruitment past one or two program iterations. Programs funded for scale-up should be carefully selected to ensure that resources directed towards capacity building for program delivery result in multiple iterations of the program. Ideally, the scaled-up program will maintain its utility to the organization and/or the target audience over time.

Findings from this study also provide implications for future evaluations on scaled-up projects. Because of the lack of funding provided by the implementation contract, and the scope and the expense of collecting data from multiple sites, I was reliant on the skills, motivation, and support of volunteer leaders to correctly distribute and collect pre- and post-survey data. As such, I was not able to follow-up with participants that dropped out of the program or to collect enough data to conduct cross-site comparisons of implementation variables. Future studies on both topics are needed to better understand and inform successful scale-up. Understanding reasons for participant non-completion is needed to better understand qualities of programs that lend themselves to scale-up and identify strategies to improve program fit. Likewise, establishing what characteristics of delivery settings influence program outcomes is needed to focus resources on compatible delivery settings.

Finally, findings from this dissertation provide directions for developing future interventions that may be more conducive to scaling-up. Researchers who create new programs should consider the context of future scale-up efforts during the design and initial efficacy and/or effectiveness trials. No matter how effective, programs that are too

difficult to implement or are not conducive to participants' lives are likely to fail during T<sub>3</sub> and T<sub>4</sub> implementation stages. Future studies also need to include an examination of the impact of adaptations on program outcomes to determine what degree of adaptation is possible. Similarly, future research that examines the link between key program components and program outcomes would provide better indications of what adaptations are appropriate.

### **Final Conclusions**

Scaling-up EBIs will continue to be an important approach to addressing growing health concerns in the face of shrinking resources. The need for collaborative partnerships that share and extend resources to provide EBIs is becoming more apparent. This study provides evidence that scaling-up by maximizing on partnerships can be an effective strategy for promoting the adoption and delivery of EBIs. The OSU Extension Service was able to effectively draw on and create relationships with diverse local organizations that adopted and successfully delivered the WWE program to their constituents. This study adds to the growing scale-up literature by providing evidence of program effectiveness during large-scale implementation, and qualitative explanations and context for these findings. Understanding strategies to promote evidence-based programs warrants future exploration to better impact population-level health and wellbeing.

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**APPENDICES**

## Appendix A: Qualitative Interview Protocol: Key Informants

### Section A: Extension Service Position

1. What counties are assigned to you?
2. What is your position at the OSU Extension Service?
3. How long have you worked in this position?
4. Please describe your job, the kinds of projects that you oversee, and your general duties

### Section B: *WWE* Selection

5. Please tell me about how it was decided to implement *Walk With Ease (WWE)* in your counties this year?
6. What do you think about using evidence-based programs versus developing your own interventions? What are the benefits/disadvantages? Which do you prefer and why?
7. Do you think *WWE* is a good fit for your community? Why or Why not?

### Section C: *WWE* Pre-Implementation Preparation

8. Tell me about the steps you took to prepare to implement *WWE*  
Prompts:
  - a. Recruiting Leaders
  - b. Training Leaders
  - c. Identifying a walking site
  - d. Marketing/Recruiting participants
  - e. Developing additional resources e.g. marketing, incentives, etc.
9. Please describe any barriers and/or challenges you encountered during preparation for implementation.
10. Please describe anything that helped or enabled you to prepare/plan for implementing *WWE*.
11. Please describe any adaptations that you made to *WWE* to better fit your setting.
12. What role do you expect to play facilitating/supervising *WWE*? (i.e. do you plan to lead *WWE* sessions? Will you be involved with marketing/recruiting?)
13. How do you anticipate (or how are you) supporting *WWE* Leaders?

### Section D: Implementation

14. How many sessions of *WWE* did/will you offer this spring?
15. What are your plans to offer *WWE* after the first year?
16. What would help you to be able to offer more *WWE* programs?

### Section E: Sustainability

17. If and how do you plans to continue this program after the grant funding ends?
18. What would help you continue to offer *WWE* after the grant support ends?





### Fidelity Checklist

Date:	Session attended:
Leader:	Observer:
Class location:	Number of Participants:

<b>Class Preparation and Set-up (complete prior to session)</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Leader has completed Arthritis Foundation's <i>Walk With Ease</i> online leader training.			
2. Arrives on time, preferably 10-15 minutes early.			
3. Meeting space is practical and safe for participants' needs-level (e.g. handicapped parking, restrooms, seating if necessary):			
4. Safety: leader has a cell phone or way to call for help			
5. (As available) uses motivational incentives such as water-bottles, shirts, and visors.			
6. Leader distributes and collects all appropriate forms (e.g. registration, attendance, assessments, program evaluation.)			

<b>Delivery of Program</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
7. Refers participants to health care providers regarding health issues			
8. Refrains from touching participants when doing exercises			
9. Instructor uses appropriate safety strategies when walking (e.g. uses buddy system, walks with slowest walkers).			
10. Session #10, week 4: Accurately explains and demonstrates strengthening exercises (when applicable)			

11. Approx Session #6, 11, 17: Implements protocol for walking assessments (when applicable).

**Notes:**

**Delivery of Program**

12. Is prepared with all materials/charts (e.g. release forms, participant handbooks).

Not prepared

Somewhat prepared

Fully Prepared

13. Accurately paraphrases sections without changing content.

Never followed content, made changes

Made some changes

Very accurate, doesn't change content

14. Adheres to timelines (uses stopwatches, etc.)

Didn't follow at all

Followed some of the time

Fully followed

**Motivational Tools**

15. Leader encourages use of motivational tools, including:

a) Self-tests

b) Action planning

c) Goal-setting

d) Rewards

Yes

No

Yes

No

Yes

No

Yes

No

16. Checks-in with participants regarding motivational tools and workbook.

Doesn't check-in

Checks-in

Emphasizes importance

17. Checks-in with participants regarding goals and progress.

Doesn't check-in

Checks-in

Emphasizes importance

### Physical Activity

18. Guides participants through appropriate warm up (walking in place, walking slowly for 5 minutes.)

Doesn't do warm up

Warm-up time or activities are insufficient/appropriate

Warm-up is completed appropriately

19. Keeps directions simple and direct.

Directions are confusing

Directions are mostly okay, some confusion

Directions are simple and clear

20. Leader safely instructs the essential stretches:

a) Straight -leg calf stretch		b) Hamstring stretch		c) Hip flexor/quadricep		d) Iliotibial band	
Yes	No	Yes	No	Yes	No	Yes	No

Notes

21. If using chairs for exercise, rungs or arms don't impede participants' ability to stretch; modifications are made as needed

Yes      No

Notes:

22. Leads an effective 5-30 minute walk

a) Encourages participants to walk at own pace		b) Monitors/walks with slowest walkers		c) Demonstrates how and encourages participants to monitor for walking intensity.	
Yes	No	Yes	No	Yes	No

Notes:

23. Walking route is safe and appropriate

a) Path or surface is even and level		b) Can accommodate walking aids such as walkers and canes		c) Outdoor routes is safe (e.g. away from heavy car traffic, is well-lit)	
Yes	No	Yes	No	Yes	No

Notes:

24. Guides an effective cool-down (approx. 5 minute cool down.)

Yes      No

25. Finishes physical program with 3-5 minutes of stretching.

a) Straight -leg calf		b) Hamstring stretch		c) Hip flexor/quadricep		d) Iliotibial band	
Yes	No	Yes	No	Yes	No	Yes	No

Notes:

26. Describe how walking activity was shared with co-leader (when applicable):

### Leader Qualities

27. Presentation style is appropriate for WWE. Leader:

a) Is articulate		b) Makes eye contact		c) Has good tone inflection.	
Yes	No	Yes	No	Yes	No

Notes:

28. Leader provides/encourages opportunities for:

a) Pre-class socializing	b) Group sharing and problem-solving activities	c) Clarification and questions
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Yes	No	Yes	No	Yes	No	
Notes						
				Yes	No	N/A
29. Uses positive reinforcement (complimentary of all participants' efforts, if criticism is necessary it is constructive.)						
30. Handles group conflict effectively.						
31. Is sensitive when speaking about arthritis, and when engaged with participants.						
Notes						

Additional Comments:
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**Leader Registration Form****CONTACT INFORMATION**

First Name:	MI:	Last Name:	
Job Title:			
Organization:			
Work Address:			
City:	State:	Zip:	
Home Address:			
City:	State:	Zip:	
Home Phone:	Work Phone:	Cell Phone:	
Email:			
For Arthritis Foundation correspondence, please contact me at: <input type="checkbox"/> My worksite (if applicable) <input type="checkbox"/> My home			

**FACILITY INFORMATION**

Please provide information about the host facility where you plan to conduct the Arthritis Foundation Walk with Ease Program classes (if different from your job location):

Facility Name:		
Address:		
City:	State:	Zip:
Administrator/ Contact Person Name:		
Phone number	Email address:	

**Does the location where you plan to teach have a signed Program Co-sponsorship Agreement with the AF?**  YES  NO

**QUALIFICATIONS** \*Attach copy of card or other documentation

Do you have current ADULT CPR certification? (Required)	<input type="checkbox"/> YES* <input type="checkbox"/> NO
Do you have current First Aid certification (Recommended)	<input type="checkbox"/> YES <input type="checkbox"/> NO

List other relevant certifications and their expiration date:

### **EXPERIENCE**

What professional or volunteer experience have you had leading exercise classes, conducting workshops or speaking in public?

What is your profession and/or background in health, fitness or education? List any relevant degrees or course work.

What other experience do you have that you feel would be beneficial in leading AF programs (such as work with people with disabilities, older adults, people with special needs)?

What is your experience with arthritis (personal or family member diagnosis, or work with people with arthritis)?

Why do you want to teach the Arthritis Foundation Walk with Ease Program? What benefits would you like to gain from leading this program?

How did you become aware of the Arthritis Foundation Walk with Ease Program?

Have you been a participant or leader/ instructor in any other Arthritis Foundation program and if so, please list:

**Participant Registration Form**

First Name \_\_\_\_\_ Last Name \_\_\_\_\_

Phone \_\_\_\_\_  Home  Cell  WorkDate of Birth: Month \_\_\_\_\_, Day \_\_\_\_\_, Year \_\_\_\_\_ Sex:  Male  Female

---

**1. Are you currently (please check one):**

- |  |                                       |
|--|---------------------------------------|
| <input type="checkbox"/> Never married | <input type="checkbox"/> Married      |
| <input type="checkbox"/> Separated     | <input type="checkbox"/> Life partner |
| <input type="checkbox"/> Divorced      | <input type="checkbox"/> Widowed      |
- 

**2. Are you currently (please check one):**

- |   |   |
|---|---|
| <input type="checkbox"/> Employed for wages | <input type="checkbox"/> Out of work for more than 1 year |
| <input type="checkbox"/> A homemaker        | <input type="checkbox"/> Out of work for less than 1 year |
| <input type="checkbox"/> Self-employed      | <input type="checkbox"/> Retired                          |
| <input type="checkbox"/> A student          | <input type="checkbox"/> Unable to work                   |
- 

**3. What is the highest level of education you completed?**

- 1-11 years (less than a high school degree)
  - 12 years (high school graduate or GED)
  - 13-15 years (some college or associates degree)
  - 16 years (college graduate)
  - 17+ years (post-college)
- 

**4. Why do you want to participate in this program? (Select all that apply)**

- |  |   |
|--|---|
| <input type="checkbox"/> Learn new techniques for managing arthritis | <input type="checkbox"/> Meet people          |
| <input type="checkbox"/> Increase my physical activity               | <input type="checkbox"/> Find a walking group |
| <input type="checkbox"/> Other (please explain):                     |   |



### Participant Health Survey

Date \_\_\_\_\_

First Name \_\_\_\_\_ Last Name \_\_\_\_\_

1. In general, would you say your health is:

Poor       Fair       Good       Very good       Excellent

**Physical Activity:** The next few questions are about exercise, recreation, or physical activities other than your regular job duties.

2. During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?

Yes       No

3. What type of physical activity or exercise did you spend the most time doing during the past month?

\_\_\_\_\_

4. How many times per week did you take part in this activity during the past month?

\_\_\_\_\_ Times per week

5. And when you took part in this activity, for how many minutes or hours did you usually keep at it?

\_\_\_\_\_ Hours    \_\_\_\_\_ Minutes

6. During the past month, how many times per week did you do physical activities or exercises to **STRENGTHEN** your muscles? Do **NOT** count aerobic activities like walking, running, or bicycling. Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights, or elastic bands.

\_\_\_\_\_ Times per week

**Arthritis Symptoms-** Arthritis can cause symptoms like pain, aching, or stiffness in or around a joint.

7. Are you now limited in any way in any of your usual activities because of arthritis or joint symptoms?

Yes

No

8. During the past 30 days, to what extent has your arthritis or joint symptoms interfered with your normal social activities, such as going shopping, to the movies, or to religious or social gatherings?

A lot

A little

Not at all

9. Please circle the number that describes how much physical pain your arthritis has caused during the past week

0      1      2      3      4      5      6      7      8      9      10

No pain

As bad as it

can be

10. Please circle the number that describes how much of a problem fatigue has been for you during the past week.

0      1      2      3      4      5      6      7      8      9      10

No problem

A major

problem

---

The following items are about activities you might do on a typical day. Does your health now *limit* you in these activities? If so, how much? (Circle one number on each line)

	<b>Not at all</b>	<b>Yes, a little</b>	<b>Yes, a lot</b>
11. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
12. <i>Moderate activities</i> , such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
13. Lifting or carrying groceries	1	2	3
14. Climbing several flights of stairs	1	2	3
15. Climbing one flight of stairs	1	2	3
16. Bending, kneeling, or stooping	1	2	3
17. Walking more than a mile	1	2	3
18. Walking several hundred yards	1	2	3
19. Walking one hundred yards	1	2	3
20. Bathing or dressing yourself	1	2	3

**Participant Satisfaction Survey**

1) Did you complete the *Walk With Ease* program?

- No
- Began but did not complete the program due to physical or health-related issues
- Could not find a suitable time in my schedule to begin walking
- Yes
- Other, briefly describe:  
\_\_\_\_\_

2) How much of the *Walk With Ease* workbook did you read?

- None
- A little (1 chapter or less)
- Some (2-3 chapters)
- Most (4-5 chapters)
- All (all 6 chapters)

3) Which, if any, of the tools did you use? (Check all that apply)

- I did not use any of the tools
- Starting point self-test (workbook page 14)
- Contract (workbook page 60)
- Walking diary (workbook page 61)
- Ending Point Self-test (workbook page 133)
- Knowledge and confidence self-check (at the end of each chapter)

4) Did you do the warm-up and cool-down stretches each time you walked over the course of the program?

- A couple times a week
- Once a week
- A couple of times throughout the duration of the program
- Not at all
- Other \_\_\_\_\_

5) Did you do the strengthening exercises at least twice a week?

- No
- Yes, a few times
- Yes, regularly
- Not sure
- Other \_\_\_\_\_

6) What method(s) did you use to measure or track your walking (Check all that apply)

- I didn't track my walking
- I kept track of the time I spent walking
- I kept track of the distance I walked
- I used a pedometer
- I used my walking diary
- Other \_\_\_\_\_

7) Did you walk at least 2-3 times a week for 30 minutes over the course of the program?

- None of the time (0 weeks)
- A little of the time (1-2 weeks)
- Some of the time (2-3 weeks)
- Most of the time (4-5 weeks)
- All of the time (6-9 weeks)

8) What parts of the *Walk With Ease* program were of most value to you?

- |   |   |
|---|---|
| <input type="checkbox"/> Starting point self-test                             | <input type="checkbox"/> Ending point self-test                     |
| <input type="checkbox"/> Contract   | <input type="checkbox"/> Knowledge and confidence self-checks       |
| <input type="checkbox"/> Walking diary  | <input type="checkbox"/> Warm up and cool down stretches            |
| <input type="checkbox"/> Strengthening exercise                               | <input type="checkbox"/> Information about arthritis                |
| <input type="checkbox"/> Problem-solving strategies                           | <input type="checkbox"/> Information about how to track my progress |
| <input type="checkbox"/> Information about how to walk safely and comfortably |   |
| <input type="checkbox"/> Other, describe: _____                               |   |

9) Please check the box in the column below that best describes your overall opinion about *Walk with Ease*.

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
My leader explained the topics clearly				
My leader encouraged the participants to learn from each other				
I gained the information I needed to walk safely				
The program motivated me to become more active				
I was satisfied with my experience doing the program				
I benefited from doing the program				
I would recommend the program to a friend or family member				

10) How confident are you that you will continue walking or being active after *Walk with Ease*?

- Not at all confident
- Slightly confident
- Fairly confident
- Extremely confident

11) If you continue to walk for exercise, what would you prefer?

- To continue walking on my own
- To join a class with a professional group leader
- To join a group without a professional group leader
- Other \_\_\_\_\_

What would you add or change about the program to make it more useful to you?

Additional comments?

## Interview Guide

*Notes to Interviewer: The purpose of these interviews is to learn what factors contributed or impeded the process of scaling up Walk With Ease to multiple sites. Thus, we are looking closely at each site to determine*

- **Why they decided to do WWE**
  - *Who made the decision? How did they learn about it? Who did they think they would target? What did they think the success would be?*
- **What barriers and facilitators they experienced in offering the classes**
  - *What worked well? What was a surprise? What did they have to change or adapt to make work? Did they offer all 18 classes? Where was the class held? Were they able to complete the paperwork? Was the content appropriate and useful for the target audience? Did they feel supported and prepared to teach?*
- **How successful the class was**
  - *How many participants did they have? Did they have feedback about the class? What parts did they like and not like? How was retention?*
- **Whether they plan to continue the program**
  - *What are the plans for the future? Why or why not continue? If continuing, what do they plan to do differently? If not continuing, is there a specific reason? What would help them or encourage them to do another class? Did they plan to do only one when they were trained?*

*What follows is a suggested interview guide with sample prompts and guidelines. As this is a qualitative interview, it is important to follow lines of questioning that relate to the research question – it is not as important to ask every question in the guide. Also, some questions may be irrelevant in some situations, and you may need to formulate new questions to learn about the particulars of a unique setting or program context. Please do not be restricted by this guide!*

**Hello. My name is \_\_\_\_\_, calling on behalf of Katie Conte at Oregon State University about the *Walk With Ease* program. Thank you so much for taking the time to speak with us today. We are doing interviews with *Walk With Ease* leaders to learn more about their experience leading the program. We want to know about challenges you might have experienced, and your thoughts about the program. The information that you provide will help us make changes to the program so that it can be more successful in future years.**

**Have you read the consent form? [If yes, continue. If no, ask respondent to read form sent.]**

**Do we have your consent to proceed? [If yes, continue.]**

**Participation in this interview is voluntary. All the information you provide will be kept confidential and nothing will be reported about you individually. I'd like to record this interview, is that alright with you? [turn on recorder] I am recording this interview with your permission, correct? [If yes, continue.]**

### *Introduction*

**In this interview, I will ask you to reflect back on your experience with the Walk With Ease program. I will ask you questions about how you decided to lead the program, how well the program fit your participants' needs, whether you made any changes so that the program worked better, and your opinions about the program in general. I would like to start by asking a few background questions.**

### **Section A: Decision to do WWE and leader background**

1. Tell me about how you decided to lead Walk With Ease? [**Prompts:** how did you/your organization hear about WWE? Why did you/your organization think it would be a good program to support? What did you think the benefits would be of offering this program?]

**[Interviewer:** If this leader is a paid staff member at an organization that is offering WWE as part of their services, please ask:]

2. Please describe how WWE fits with your job description and your other duties.

### **Section B: WWE Training**

**We are interested in your experience leading Walk With Ease. These next questions are about the steps you took to prepare to offer the program.**

3. How did you prepare to start WWE? [Prompts: Did you feel prepared to teach the class following the training? Did you partner with any other organizations or people?]

### **Section C: Barriers and Facilitators to WWE delivery**

[Key Concepts: Class management; managing class size and various ability levels]

Did you the program materials useful to you? Relevant for your participants?



4. If program is co-led, ask participant to describe how leadership is shared, and their feelings about co-leading. [**Prompt:** May ask the participant to describe each leader's role.]

[Key Concepts: Recruiting, sustaining motivation/commitment of participants]

5. Ask about the program context: location, facilities, where were walks conducted, etc. Understand how this place was selected, if it was a good fit, did it cause any barriers or facilitate participation?
6. How did you handle meeting the needs of participants with different walking abilities?
7. How did you track the participant's progression?
8. Please describe any changes that you made to *WWE* to better fit your setting or your participants.

[**Prompt:** Did you develop any additional resources (e.g. translating materials to another language, additional information on exercise/arthritis, etc), or provide incentives or motivational activities (e.g. rewards, gifts, competitions, celebrations)? ]

9. Please describe any barriers and/or challenges you encountered in leading *WWE*.

[**Prompts:** How did you market to/recruit participants? How did you encourage them to keep coming?]

10. Please describe anything that helped or enabled you to lead *WWE*.
11. Do you feel that you had all the resources and/or support you needed from Oregon State to provide *WWE*? If not, what could OSU do to better support you?

### **Class Outcomes**

12. Do you think *WWE* was a good program for your participants? Why or Why not?

[**Prompt:** How do you think your participants felt about the class?]

### **Section D: Sustainability**

[**Interviewer:** For volunteers providing *WWE*, ask:]

13. What are your plans to offer *WWE* after this class?
14. What would help or encourage you to offer more *WWE* programs?

[**Interviewer:** For organizations providing *WWE*, ask:]

15. If and how do you plan to continue this program after the grant funding ends?

16. What would help you continue to offer WWE after the grant support ends?

**Those are all the questions I have for you. Thank you so much for taking the time to talk with me today. We greatly appreciate your help with this important study. Can I please ask for your permission to call back if we need to clarify anything we discussed today?**

[Interviewer: Record if permission granted.]

**And, can I please get the best address to send you a small gift card as a token of our appreciation?**

Address: \_\_\_\_\_  
\_\_\_\_\_

[Interviewer: Record address]

**Thank you again.**

**Appendix C: Table 1. Program-Specific Characteristics and Demographics**

Setting	Community								Medical							
Class ID	1.1	4.1	5.1	5.2	9.1	12.1	18.1	23	7.1	7.2	7.3	7.4	8.1	16.1	16.2	20.1
Participants <i>n</i>	11	7	36	24	12	6	12	5	7	5	7	7	23	12	16	26
Quarter	1	2	1	2	3	3	5	5	2	5	5	5	2	4	5	5
No. of Leaders	1	1	5	5	2	1	2	1	2	2	2	2	3	1	2	2
Age	62.5	72.2	62.8	66.9	63.9	69.0	71.9	-	58.1	60.2	57.5	57.3	63.2	69.4	72.1	67.1
Mean (SD)	(6.7)	(3.9)	(14.7)	(9.8)	(10.9)	(10.3)	(11.1)	-	(10.7)	(11.4)	(4.9)	(6.4)	(12.8)	(7.1)	(10.1)	(10.2)
Female (%)	91	43	75	88	92	100	92	100	100	80	86	71	91.3	75	63	73
Employed (%)	18	0	31	13	33	0	8	-	0	60	29	29	4.35	0	13	-
Married (%)	55	57	59	13	58	50	17	-	29	80	14	29	13	58	63	-
Arthritis (%)	82	57	53	25	50	100	42	-	71	60	71	57	39	100	69	7
Health Rating	3.0	3.5	3.1	-	3.4	3.5	2.8	-	2.3	2.3	2.9	2.3	2.6	2.9	3.3	-
Mean (SD)	(1.1)	(0.5)	(.60)	-	(0.5)	(1.0)	(0.8)	-	(0.6)	(0.6)	(0.9)	(1.0)	(1.0)	(0.9)	(0.6)	-
Classes Held (n)	18	14	18	18	18	18	12	18	8	14	18	18	18	18	16	17
Attendance	10.3	9.9	7.9	6.8	10.5	10.3	4.8	10.4	4.1	7.6	11.6	8.7	9.7	5.1	6.6	6.7
Mean (SD)	(5.1)	(4.3)	(4.2)	(5.3)	(4.4)	(5.4)	(2.8)	(5.5)	(2.9)	(3.7)	(5.7)	(6.9)	(6.2)	(6.0)	(5.1)	(4.9)
Participants Completing <sup>a</sup> (%)	57	70	44	38	59	57	40	58	52	54	64	48	54	28	41	39
Fidelity Score <sup>b</sup>	12	13	14	-	17	17	18	18	18	-	16	19	13	18	18	17

*Note:* Classes ID numbers denote the organization number, and the class number. For example, ID 7.3 is the third class delivered by organization seven; <sup>a</sup>Completion defined as percent of participants attending >2/3rds of sessions delivered; <sup>b</sup> Scored 0-19, higher scores indicate greater fidelity.

Appendix C: Table 1. Program-Specific Characteristics and Demographics (continued)

Setting Type	Retirement/Senior Center											
Class ID	2.1	2.2	2.3	6.1	9.2	10.1	11.1	13.1	15.1	17.1	24.1	25.1
Participants <i>n</i>	13	11	13	15	7	9	15	21	-	7	13	14
Quarter	2	4	5	2	4	3	3	3	4	5	5	5
No. of Leaders	1	1	2	2	1	2	2	1	2	1	2	2
Age Mean (SD)	84.1 (8.0)	80 (8.2)	83.2 (8.8)	75.2 (8.0)	78.4 (6.0)	75.4 (5.7)	81.1 (17.1)	73.9 (7.5)	-	73.6 (18.2)	87 (3.8)	75.1 (11.0)
Female (%)	69	64	62	80	100	78	80	86	-	71	85	93
Employed (%)	-	0	0	7	14	11	7	0	-	14	0	14
Married (%)	-	55	31	7	49	89	47	48	-	14	31	21
Arthritis (%)	39	55	39	53	100	100	67	71	-	86	31	79
Health Rating Mean (SD)	2.7 (0.7)	3.0 (0.6)	3.2 (0.9)	3.0 (0.9)	2.2 (0.8)	3.0 (0.5)	2.9 (0.8)	3.4 (0.7)	-	2.5 (0.5)	2.9 (0.3)	3.0 (0.9)
Classes Held (n)	17	-	-	17	18	-	12	17	-	18	18	17
Attendance Mean (SD)	9.5 (4.4)	-	-	6.2 (5.1)	7.3 (5.5)	-	8.6 (1.8)	6.4 (4.2)	-	9.3 (6.1)	11.0 (4.7)	7.1 (4.3)
Participants Completing <sup>a</sup> (%)	56	-	-	37	59	-	72	38	-	52	62	42
Fidelity Score <sup>b</sup>	13	-	-	18	18	12	14	10	13	10	18	18

*Note:* Classes ID numbers denote the organization number, and the class number. For example, ID 7.3 is the third class delivered by organization seven; <sup>a</sup> Completion defined as percent of participants attending >2/3rds of sessions delivered; <sup>b</sup> Scored 0-19, higher scores indicate greater fidelity.

Appendix C: Table 1. Program-Specific Characteristics and Demographics (continued)

Setting Type	Workplace					Church		
Class ID	3.1	3.2	6.2	14.1	19.1	21.1	22.1	26.1
Participants <i>n</i>	15	5	4	21	166	10	9	14
Quarter	1	5	4	4	5	5	5	5
No. of Leaders	2	2	1	2	5	1	2	1
Age Mean (SD)	54.5 (6.8)	42.0 (14.0)	50.8 (13.0)	53.3 (10.3)	-	74.7 (8.8)	74.3 (7.3)	76.5 (7.5)
Female (%)	93	80	100	86	-	100	89	93
Employed (%)	100	-	100	100	-	0	0	0
Married (%)	27	-	75	43	-	50	67	21
Arthritis (%)	67	40	25	57	-	60	56	71
Health Rating Mean (SD)	3.1 (1.1)	-	3.5 (0.6)	3.2 (0.6)	-	3.3 (0.7)	3.6 (0.8)	3.3 (0.5)
Classes Held (n)	18	13	16	20	-	18	17	18
Attendance Mean (SD)	6.6 (4.0)	5.8 (4.2)	11.5 (1.3)	10 (4.8)	-	11.3 (5.7)	12.9 (2.3)	8 (6.3)
Participants Completing <sup>a</sup> (%)	20	0	50	38	-	63	76	44
Fidelity Score <sup>b</sup>	16	-	13	12	4	16	19	19

*Note:* Classes ID numbers denote the organization number, and the class number. For example, ID 7.3 is the third class delivered by organization seven;<sup>a</sup> Completion defined as percent of participants attending >2/3rds of sessions delivered; <sup>b</sup> Scored 0-19, higher scores indicate greater fidelity.