SPECIFIC AIMS

We seek to assess the effectiveness of an organizational-level implementation strategy for the Housing First Model (HFM). Housing First is a form of permanent supportive housing developed for chronically homeless individuals with co-occurring diagnoses of serious mental illness and substance abuse. SAMHSA has identified Housing First as an evidence-based practice (EBP) for improving a number of outcomes related to substance use and abuse. Due to its demonstrated success, the HFM has been widely diffused across the United States. However, there is evidence that implementation of the model has been less than desirable in a number of housing programs because of the model's complexity and a lack of replication guidelines.

There is currently a lack of knowledge regarding effective implementation strategies for complex interventions such as the HFM. Our primary goal is the eventual testing of an implementation strategy to effect organizational change through an R01 study, where we systematically vary the implementation approach. The current implementation strategy involves an intensive face-to-face training and technical assistance program provided by experts at a local-level. However, an alternative employing telecommunications assisted technical assistance and e-learning-based training may be more cost-effective and feasible for larger-scale dissemination and implementation activities. A necessary step we must take before the launch of that study is the adaptation of the current strategy to this new format, as well as the pilot testing of our instruments and procedures. We will accomplish these aims through the current R34 project.

The existing face-to-face training is the Heartland Center for Systems Change (hereafter known as Heartland) Housing First Technical Assistance and Training Program (HFTAT). This proposed study is an extension of Dr. Watson's previous work with HFTAT and HFM implementation. The PI, Dr. Watson, and Heartland have a 5-year working relationship, which has included partnership on two research projects related to HFM implementation. Our combined work on these previous studies and success working with national and local housing organizations in both research and training capacities demonstrate our ability to carry out this project.

We expect that the larger R01 project will demonstrate that e-learning is a feasible and effective implementation strategy for the HFM that can be applied to a range of organizational contexts. The aims of the current R34 project are:

- **AIM 1: Adapt the existing HFTAT to be delivered over a distance.** *We will utilize existing empirical knowledge regarding effective implementation practices, HFM fidelity measures, and theory and best practices from the field of education complete this task.* We will also conduct an alpha test (i.e., pre pilot) of the training component of the HFTTA with a small number of providers. Findings related to the alpha test will assist us in making refinements to the HFTAT before deploying it within a pilot study (Aim 3) to assess its utility as an implementation strategy in a "real-world" setting.
- ***AIM 2: Develop an instrument to measure structural-level factors affecting HFM implementation.*** *The need for such a measure is particularly important for complex interventions such as the HFM. We will develop this instrument through a literature review of implementation barriers. Researchers will work with Heartland staff to assure construct validity of the measure, and will utilize pilot data to begin investigating its reliability.*
- **AIM 3: Conduct a pilot to assess the feasibility for an R01 study.** We will conduct a pilot study to assess (a) the feasibility of the adapted HFTAT and (b) the research instruments and protocols for the larger R01. We will employ a mixed-methods, quasi-experimental design to collect data related to the implementation process, training, and outcomes.

The end product will be an adapted implementation strategy for HFTAT. We will also have feasibility and pilot data for assessing improvements in implementation outcomes. At the end of the R34 project, results that demonstrate improvement will poise us to rigorously test the implementation strategy in a larger R01 study. Ultimately, this line of research will not only provide knowledge, technology, and a practice model for HFM implementation, but also will provide empirical support for developing implementation theory through the testing of an implementation strategy for a complex substance abuse intervention.

A. SIGNIFICANCE

A1. Description of the Housing First Model (HFM)

The 2012 homeless count identified 99,894 chronically homeless individuals (reflecting 15.8 percent of the overall homeless population) living on the streets or in shelters in the United States.[1] Many of the these individuals have complex problems stemming from dually diagnosed mental health and substance use disorders that place significant demands on public health resources.[2–4] *The presence of dual diagnosis also makes this group particularly difficult for housing providers to serve.*[5–7] *The evidence-based practice (EBP) of interest for this study is a form of permanent supportive housing that has been demonstrated to be particularly effective in housing chronically homeless clients—the Housing First Model (HFM).*[8,9] A report published by the U.S. Department of Housing and Urban Development (HUD) points to four general features of the HFM that distinguish it from other forms of permanent housing: (1) the direct, or nearly direct placement of homeless people into permanent housing; (2) the presence of supportive services without the requirement that housing residents participate; (3) the use of assertive outreach to engage and offer housing to homeless people who are reluctant to engage in services; and (4) continuing to provide case management and hold housing for clients even if they leave for short periods of time.[6]

The HFM was developed in the early 1990s to address the inadequacies related to serving chronically homeless clients that exist in what can be referred to as "treatment first" housing. Treatment first programs require clients to obtain sobriety goals for 30-90 days before housing placement. Clients are then at risk of losing their housing should they choose to engage in substance use. The treatment first approach has been demonstrated to be particularly ineffective when it comes to housing the majority of chronically homeless clients.[7,10,11] Building on this knowledge, the HFM was designed to be low-demand in terms of requirements placed on clients, and it has also been recognized for the flexibility of its service structure.[12–14]

The HFM has been demonstrated to lead to a number of positive outcomes for clients including: higher housing stability than treatment first programming;[15–18] increased access to mental health/substance abuse providers;[19] stronger client self-reported relationships with mental health/substance abuse providers;[19] higher use of mental health treatment services;[5,8] reduced substance use and abuse;[5,20] fewer emergency room visits and hospitalizations for detox and other reasons;[21,22] higher perceived choice in services;[23,24] and reduced involvement in criminal activity.[25] It is because of these positive outcomes that the HFM has been listed in SAMHSA's National Registry of Evidence-Based Programs and Practices,[26] *and a 19.3 percent drop in chronic homelessness between 2007 and 2012 has been at least partially attributed to the spread of the Housing First approach.*[27]

A2. Barrier: Lack of an HFM Implementation Strategy.

Endorsements by national organizations have resulted in a rapid, nation-wide diffusion of the HFM since 2000.[28,29] As of September 2009, over 234 communities in the United States had developed plans to end homelessness based on HFM principles.[30] As it has spread, the HFM has proven difficult to implement for a number of reasons. First, initial diffusion of the model occurred without detailed descriptions for replication.[12,31,32] Second, contextual factors such as funding requirements, the structure of available housing, and the pervasiveness of education in abstinence-only practices (i.e., the 12-step model) among staff are all barriers to HFM implementation that organizations often face.[31–33] Finally, housing interventions for homeless populations are **highly complex and difficult to implement** because they require interaction between multiple individuals (e.g., providers, case managers, landlords), organizations (e.g., government funders, non-profit service providers, property management) and systems (e.g., housing, medical, mental health, substance abuse) to be successful.[14,34–37]

Indeed, findings from previous research have demonstrated problems related to implementation of the HFM stemming from these issues. George et al's[33] formative study of the implementation of the HFM among a housing collaborative demonstrated that prior history as a treatment first program affected the extent to which implementation was able to penetrate partner programs through policy and practice changes. Prior experience with treatment first programming also affected the extent to which staff found the HFM acceptable and appropriate, and thus the extent to which they adopted the HFM into routine practice. In a study of HFM fidelity, Watson, et al.[31] found that in a randomly selected national sample including 39 programs self-designated as "Housing Fist", 18 operated using abstinence-based policies and procedures that were against the basic philosophy of the HFM. The use of these abstinence-based policies and practices affected these programs' implementation of a number of HFM components, thus significantly lowering their fidelity scores.

A number of scholars have argued that it is necessary for organizations to make adaptations to a model based on their particular circumstances.[38–40] From this point of view, modifications to an EBP are allowable as

long as the program delivers the "essential components" that distinguish it from other models.[41] This adaptation approach is useful for measuring implementation of complex EBPs like the HFM that require modifications to be effective in contexts outside of the one in which it was originally tested. While some modifications might be necessary to adapt the HFM to a local context, those that are in direct conflict with the underlying philosophy of the model (e.g., those that blend in abstinence-based/treatment first policies and practices) seriously jeopardize program integrity. In this light, fidelity measures would be helpful in the development of an HFM implementation strategy because they could provide guidance as to what components might be adapted without affecting integrity of the model.[38,39] While no fidelity measures had been developed at the time of its initial diffusion, two instruments have been recently created, the (a) Essential Ingredients Checklist and the (b) Housing First Model Fidelity Index.[31,31,42,43] The latter of these two instruments has greater utility for organizations seeking to adapt the HFM to local conditions because it was developed using a bottom-up approach aimed at understanding the model as it was being practiced in a wide range of contexts.

The above stated issues with HFM implementation combined with the growing popularity of the model highlight the **need for an implementation strategy to assist organizations seeking to integrate or improve Housing First services**.

A3. The Housing First Technical Assistance and Training Program (HFTAT)

*The specific **implementation strategy of interest** in the proposed R34 project is the **Housing First Technical Assistance and Training Program (HFTAT)** developed by the Heartland Center for Systems Change. The HFTAT is a "blended implementation strategy" in that it employs face-to-face technical assistance and training, which are comprised of a number of additional smaller strategies including: readiness and barrier assessment, identification and training of implementation leaders, implementation plan tailoring, building buy-in, and development of quality monitoring tools and systems.[44–47] The entire HFTAT delivery lasts approximately six months to one year depending on an organization's needs. Technical assistance is provided to implementation leaders (typically administration, management, and/or key staff) through regularly scheduled meetings. These leaders are also provided with an implementation package that includes reading materials and tools for working with consumers and tracking outcomes. Technical assistance begins before training activities so that the unique needs of the organization can be recognized and addressed. Subsequent technical assistance meetings are scheduled monthly to address implementation barriers and to develop policies and quality monitoring plans. For instance, administration might make the trainers aware of problems staff are having applying a particular concept or skill in practice so that a plan can be developed to address them. While technical assistance may last up to a full year, training activities take only 6 months to complete on average. Training is provided to administration and all staff who have direct contact with clients. Additional staff are welcome to participate in training, depending on the organization's goals/needs. Some of the training topics include: housing assessment, substance use management, motivational interviewing, supervision and training skills, and policies and procedures. There is also specific training provided to administration and implementation leaders that covers such topics as: implementation monitoring and troubleshooting, policy and practice review and development, representing housing first to key stakeholders (e.g., clients, funders, landlords); and staff supervision.*

Early evaluation and quality improvement efforts in 16 organizations has demonstrated the ability of the HFTAT to improve HFM processes and/or outcomes (See Section C1).[48] However, the approach is limited as an implementation strategy because its face-to-face method of delivery requires a significant amount of coordination and resources.[49] This R34 project will result in a modified HFTAT that can be delivered over a distance. These modifications will require fewer resources and will increase the scalability and reach of the HFM. The most significant modification required for this approach to be successful is the transfer of the training component of the HFTAT to an e-learning format.

A4. E-Learning as a Promising Strategy for Addressing Training Limitations of the HFTAT

*As of 2011, the American Society of Training and Development reports that e-learning accounted for 39 percent of all formal learning hours among surveyed businesses and organizations.[50] E-learning is often preferred over face-to-face learning by management because of efficiency, flexibility, and cost effectiveness.[51] **Research has demonstrated that e-learning in organizations can be as or more effective than face-to-face learning, that employees are generally satisfied with e-learning experiences, and that e-learning leads to improvements in work behaviors**.[52,53] However, not all e-learning strategies are created equal. For maximum effectiveness, e-learning must be delivered in an interactive manner within a supportive, ongoing learning environment.[38,54] Anderson has proposed a model that is a useful guide for those seeking to*

effectively integrate e-learning within an implementation strategy, which requires balance between four attributes of effective learning:[55]

*(1) Strategies must be **learner-centered.** As such, they must take into consideration the knowledge, skills, and attitudes that learners bring with them, including preconceptions about the subject matter. This means that strategies should be designed with respect for the learners' prior experiences, culture, and work context.*[55–58] *Effective learner-centered strategies also provide the participant with greater control over the educational experience (allowing them to choose the time and place they engage in specific activities) and opportunities to flexibly build on existing knowledge and skills.*[52,53]

*(2) A **knowledge-centered** environment focuses on meaningful learning—i.e., learning that is relational, actively constructed, intentional, reflective, authentic, and contextualized.*[55–58] *As such, quality instructional design provides structured content and both individual and collaborative learning activities. Authentic activities provide practice with new skills and knowledge to make behavior change more resilient and to build connections between the content and professional practice necessary to support implementation in the organizational setting.*[53,56]

*(3) An **assessment-centered** environment provides opportunities for learners to share their thinking at various stages of the learning process and receive meaningful feedback.*[55–58] *Well-designed e-learning provides learners with both formal and informal chances for formative and summative assessment.*

*(4) Finally, overlying the other attributes, **community-centeredness** supports the social construction of knowledge, the development of a learning community, and connects the content to the learner's larger community and culture.*[57] *For example, online discussions including learner-learner and learner-facilitator interactions can support social presence, reduce psychological distance, and increase learner trust and motivation.*[57] *Continued participation in an active community of practice is key to supporting commitment to change after the formal training has been completed.*[53,55,58]

One additional benefit of e-learning to implementation strategies is that it provides a psychologically safe way for individuals to interact with new concepts and tools related to an EBP. Implementation of EBPs that challenge traditional approaches to service provision—e.g., the HFM—often contrast with the existing personal and professional values of employees, which can result in resistance to learning and change. Additionally, employees are often reluctant to openly discuss these contrasting values in face-to-face learning encounters.[59,60] *In these situations, a benefit of well-designed e-learning is that learners have the opportunity to explore the EBP at their own pace in a private setting. They are able to try on new roles, identify concerns they might have about change, build self-efficacy related to tools and practices, and build connections with others in similar situations and with similar concerns through engagement in online communities.*[55,58] *As such, we anticipate that a combination of didactic and interactive learning materials (knowledge- and assessment-centered), which recognize both the individual and structural opportunities and challenges to implementation (learner-centered) and a supportive, online, nation-wide community of practitioners (community-centered), will support participants in making a commitment to change during the HFM implementation process.*

A5. Impact on Science, Practice, and the Field

The R34 project and the subsequent R01 will result in an evidence-based implementation strategy that will increase the scalability and ultimate impact of the HFM. The development of such a strategy is in the best interest of policy makers, funders, providers, clients, and researchers, given how ubiquitous the model has become and the demonstrated problems related to its implementation. The proposed projects will also increase limited scientific knowledge regarding implementation strategies,[61,62] *lead to the development and testing of a tool to measure structural-level factors affecting implementation outcomes, as well as provide an opportunity to test the generalizability of tools originally created to measure implementation of specific EBPs.*[63,64]

B. INNOVATION

The proposed project is innovative in several ways. First, relatively little work has been carried out within the field of implementation to understand strategies aimed at putting EBPs into practice.[44,45,61,62,65] *Second, we approach the HFM as a complex intervention that is nested within a number of levels (e.g., structural, organizational, provider, client) reflected in the framework described below.*[61,66,67] *Despite their importance,*[35,36,66–69] *there are currently no established measurement tools that sufficiently take into consideration broad structural-level (i.e., external systems and organizations, community and professional norms, and local politics) factors affecting implementation.*[67,70] *(For instance, the State Mental Health Authority Yardstick [SHAY] only assesses state-level conditions associated with successful implementation.*[71]*) The proposed R34 study will develop a tool aimed at measuring the influence of such constructs. Third, a number of studies have investigated the ability of e-learning strategies to influence basic procedural change; however,*

the use of e-learning to support the high level of organizational change necessary for an intervention like the HFM to be effective has not been studied. Finally, previous research has demonstrated the importance of utilizing fidelity measures to guide implementation.[45,46,72] *As such, we will utilize the HFM Fidelity Index to guide implementation activities, a novel use of the instrument that differs from its original intent.*[31,32]

C. APPROACH

C1. Previous Work Related to this Project

The PI, Dr. Watson, has focused heavily on the HFM as a research topic. All of his work has been carried out in collaboration with Heartland, and directly informs the proposed study.[14,31,32,48] Dr. Watson developed the HFM Fidelity Index to be used in this project as part of a NIDA funded study.[31,32] The findings of this study demonstrated a wide variation in HFM implementation; most surprising were the number of HFM organizations that were engaging in abstinence-based (i.e., treatment first) practices. *The findings also demonstrated that the HFM is a highly complex intervention, the successful implementation of which is affected by factors exiting both within (e.g., service structure, culture, climate) and outside of (e.g., funders, landlords, local policies, laws, and politics) the housing organization.* These findings underscore the need for stronger HFM implementation strategies and research. Both Valery Shuman and Randi Tolliver, the key Heartland staff who will be working on the R34 project, were involved in this study as community collaborators and they are co-authors on a recently published paper stemming from it.[31]

Heartland developed the HFTAT program in 2006 with grant support from the Prince Charitable Trust. *Dr. Watson conducted a qualitative formative evaluation of the HFTAT as it was delivered in two programs. Evaluation findings demonstrated that that the approach led to a number of positive changes in the programs' practices and policies, as well as staff attitudes.*[48] *Under the direction of Ms. Shuman and Dr. Tolliver, Heartland has collected additional data for 14 programs reflecting (a) adherence to HFM philosophy and practices and (b) change in staff attitudes toward drug use at baseline and 1-year after HFTAT delivery. Adherence was measured utilizing an instrument comprised of three 5-point Likert-type items (this instrument was designed by Heartland due to the absence of an established fidelity scale at the time). Analysis of these data demonstrate average improvement in adherence ($M = 0.37$, $SD = 0.40$) for all programs, $t(14) = 3.35$, $p < 0.01$. Staff attitudes were measured with the Goddard Drug Use Policies and Attitude Scale,*[73] *which is designed to measure movement away from traditional abstinence-based thinking. Analysis provide evidence that the HFTAT was successful in improving aggregate staff attitude scores ($M = 0.15$, $SD = 0.21$) for all programs, $t(14) = 2.63$, $p < 0.05$.*

C2. Work plan

The R34 project will be conducted in three phases corresponding to the Specific Aims. For the **first aim**, we will adapt the HFTAT so that it can be delivered over a distance, thus requiring less time and resources for organizations to utilize. *Our **second aim** is to develop an instrument to measure the structural-level factors affecting implementation of the HFM.* Our **third aim** is to conduct a pilot test to assess the feasibility of the training and data collection instruments and research protocols for an R01 study. The R34 project corresponds to the "**development and testing of implementation models**" topic area of interest as described in the PA-12-130 funding opportunity.

Table 1: HFTAT R34 Work Plan and Timeline

AIM	MILESTONE/TASK	MO.	LEAD(S)
1	**Adaptation of HFTAT to online platform**	1-16	
	Digital story recruitment and recording	Pre-grant	EA, RT, TR
	Modify technical assistance protocols	1-3	VS, RT, DW
	Development of individual online modules	3-12	VS, RT, TR
	Develop online learner community forum	6-12	VS, RT
	Recruitment of alpha test participants	2-3	RT, EA
	Alpha test of modules as developed	4-12	RT, EA
	Conduct exit focus groups	12	EA
	Ongoing analysis of data	4-13	DW, EA
	Modules revised on an ongoing basis based on results	4-16	VS, RT, TR
2	**Create structural-level measurement tool**	3-15	
	Comprehensive Literature review	3-9	DW, EA
	Final development of tool	10-12	DW, EA
	Write results of literature review & submit for peer-review	12-15	DW, EA
	Present preliminary findings at national conference	13-15	DW, EA
	Assess validity and reliability of the instrument	33-36	DW, HX
3	**Pilot study for R01 feasibility**	13-36	
	Recruitment of participating organizations	13-19	DW, RT
	Provision of technical assistance*	16-33	VS, RT
	Collection of base-line data	16-20	DW, EA, HX
	Delivery of training*	17-27	VS, RT
	Ongoing collection of data	16-33	DW, EA, HX
	Collection of training 3-month follow-up data	26-30	DW, EA, HX
	Data analysis	27-34	DW, EA, HX
	Report/Article Write Ups, R01 Planning, and present findings at national conference	31-36	All

***While each organization will take 12 months to complete the HFTAT, delivery will be staggered so that all four organizations begin and end at different times.**

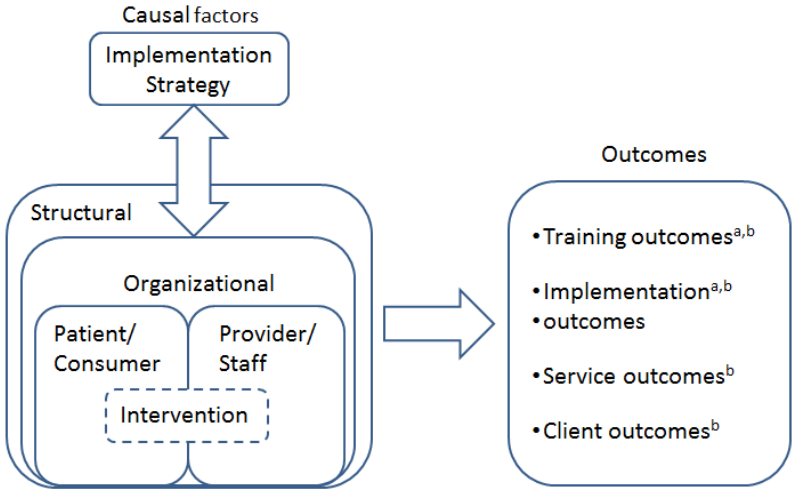
The R34 project is a necessary step toward a larger R01 study that will compare different approaches to HFM implementation. Table 1 provides project management information about the key tasks and milestones associated with each specific aim.

C3. Overview of Research and Development Approach

We approach the HFM as a complex intervention/EBP that is comprised of various parts embedded within multiple systems.[36,66,74] *The theoretical guide for this study is a combination of two conceptual frameworks: the first is a model proposed by Proctor, Landsverk, Aarons, Chambers, Glisson, and Mittman*[61] *and the second is proposed by Chaudoir, Dugan, and Barr.*[67] *We have chosen to integrate these two models for three reasons. First Proctor et al.'s model is one of the few conceptual tools in the literature that explicitly considers implementation strategies. Second, Chaudoir et al.'s model specifically highlights the importance of the structural-level within which the intervention is set, including such things as external systems (e.g., health care, housing, welfare) and the community (e.g., politics, norms). The structural-level is highly important for understanding the implementation of complex interventions such as the HFM. However, it has often been overlooked in implementation studies, which regularly restrict their analysis of intervention context to the boundaries of the organization.*[67,75,76] *Third, both models define implementation outcomes as distinct from service and client outcomes, making them highly compatible.*

Our combined framework recognizes that implementation can occur separately or simultaneously at one or more levels (e.g., system, organizational, group, or individual), and that ***appropriately targeted implementation strategies should lead to effective change.*** *As demonstrated in Figure 1 below, the framework proposes that: (a) the implementation strategy (e.g., the HFTAT) affects various constructs at multiple levels within which the intervention is located; that (b) constructs at these levels also affect the implementation strategy through barriers and facilitators that exist within them (as represented by the bi-directional arrow); (c) that an intervention often has to be adapted to fit the broader context it is situated within (represented by the dashed lines); and (d) that changes at these levels have effects on a variety of outcomes. While all types of outcomes included in this model will be investigated in the future R01, specific ones are of interest to the R34 (see Figure 1).*

Figure 1. Multi-Level Conceptual Framework for Predicting Implementation Outcomes of Complex Interventions*



*Adapted from Chaudoir et al. (2013) and Proctor et al. (2008)
[a]Outcomes of interest in proposed R34
[b]Outcomes of interest in future R01

In addition to feasibility of the research instruments and protocols, our research questions and hypotheses for the overall R34 project (which are rooted in this framework) are: (1) **Is the adapted HFTAT a feasible implementation strategy for the HFM?** We will use qualitative and quantitative data from an alpha test of the adapted HFTAT (Aim 1) and pilot study (Aim 3) to answer this question. Based on the literatures on e-learning and implementation and the results of the previous HFTAT evaluation, we expect that the adapted HFTAT will be a feasible implementation strategy. (2) **Does the adapted HFTAT lead to changes in implementation outcomes?** We will use qualitative and quantitative data from the pilot study (Aim 3) to answer this question. Based on the demonstrated effectiveness of e-learning strategies for influencing organizational change, we expect that the HFTAT will have a positive effect on implementation outcomes. (3) **How does the context of the intervention affect the implementation process?** Qualitative and quantitative data from the pilot study (Aim 3), *including data collected using the new structural-level measurement instrument (Aim 2)*, will assist us in answering this question. We expect that organizations with a strong history of delivering treatment first programming and those located in areas with multiple structural-level barriers will experience greater difficulty in implementation.

C4. Aim 1 Approach: Adaptation of the Existing HFTAT

We will adapt the HFTAT to a format that addresses limitations of the original face-to-face approach. The adapted HFTAT will comprise two types of activities. (1) ***Technical assistance*** *will be provided at the*

organizational level through initial consultation activities and through monthly check-ins with administrative staff. (2) ***Training activities*** *will happen at the staff-level, and they will consist of didactic and interactive learning activities, assessment activities with formative and summative feedback, and engagement in an active learning community. The adapted HFTAT will be designed to be* ***delivered over a 12-month period****; the technical assistance portion will last the entire year, while training activities will last 6 months.*

Adaptation of technical assistance component

The existing technical assistance component will be adapted in three ways. (1) We ***will expand the HFM implementation package*** *provided to implementation leaders to include: implementation tips based on Heartland's previous experiences administering the HFTAT, fidelity measurement instruments, copies of HFM policies and protocols from other organizations, informational materials that can be provided to clients and other key stakeholders, and an implementation manual that will explain how to utilize all the materials in the package. We will also develop and include an implementation manual that will explain how to correctly execute the implementation strategy. Previous research has demonstrated the importance of such manuals for successful implementation; however, few strategies employ them.*[46] *Previous implementation research demonstrates the utility of such packages for engaging stakeholders, making it easier for organizations to address implementation barriers, and sustaining a practice over time.*[45,46] *(2) We will use* ***video conferencing and telecommunications technologies*** *to facilitate monthly technical assistance meeting with implementation leaders, thus making the HFTAT more versatile as a training option. (3) Heartland staff will utilize the* ***HFM Fidelity Index*** *(see Appendix A) to: (a) determine what components of the HFM might already be present and the extent to which they have been implemented if they are present and (b) guide discussions with organizations about implementation (to identify barriers to implementation of specific components and discern if adaptations are necessary). Heartland staff will use the HFM Fidelity Index during initial meetings with each implementation leaders to design a plan tailored to its unique needs. The instrument will then be used in regular monthly meeting to monitor and structure discussions around implementation progress and to assist the organizations in troubleshooting any barriers. Similar strategies have been used successfully previous implementation research.*[45,69,77]

Adaptation of training component

Based on the content of the original HFTAT, the training component will consist of four modules, each including multiple learning activities. The modules are: (1) ***running a HFM program****, which will include information related to developing HFM policies and practices, providing staff supervision, interacting with outside agencies (i.e., funders, government, landlords), and implementation monitoring and outcome tracking (this module will only be delivered to administrators, managers, and implementation leaders). (2)* ***basics of the HFM****, which will include the HFM philosophy, the physical structure of housing, HFM specific policies, and low-demand services; (3)* ***housing case management****, which will include the difference between housing and clinical case management, tenant training, working with landlords, and budgeting; (4)* ***strategies for working with clients****, which will include substance use management, the stages of change, an introduction to motivational interviewing and its applicability to HFM practice, service planning, and transference. We will adapt the curriculum to an e-learning platform using Anderson's model of e-learning and other current work in e-learning and learning sciences as a guide.*[55] *The goal of training will be to support implementation as meaningful learning and commitment to change. Learners will be instructed to complete the training largely at their own pace, though there will be specified dates by which they are expected to complete individual modules. Building on the affordances of available technology we will develop a combination of didactic materials and interactive learning activities (knowledge- and assessment-centered) that recognize both the individual and structural opportunities and challenges to implementation (learner-centered) and integrate a supportive, online, nation-wide community of practitioners (community-centered) to support participants in making and keeping their commitment to change.*

Meaningful learning is actively constructed and intentional. The challenge is in taking quantities of presentational material and related face-to-face activities and developing interactive e-learning activities that provide context, challenge, activity, and feedback while following appropriate principles of multimedia learning to support higher levels of cognition.[78,79] *The diversity in the HFTAT curriculum offers opportunities to provide a mix of self-paced and asynchronously facilitated learning activities to sustain learner interest and motivation. Learner engagement and the provision of an active learning experience will be facilitated primarily through the utilization of two strategies:*

(1) We will ***integrate case-based narratives*** *that will allow learners to explore the immediate utility of HFM concepts, tools, and practices.*[78,80] *To accomplish this, we will create digital stories (videos) reflecting*

client and staff experiences living and working in HFM programs. The use of authentic narrative as an instructional strategy has been demonstrated to activate learner emotions which are critical for attention and motivation.[81–84] *We have received internal funding from our university to collect these narratives, and we are scheduled to begin recording stories of clients and staff (including administrators and managers) who live/work in HFM programs in February 2013. We will ask participants to tell us their history working/living in housing programs (not just HFM programs), their introduction and progression through the HFM, and struggles and successes with receiving/providing HFM services. We will also ask staff to specifically discuss barriers to the implementation of specific components listed in the HFM Fidelity Index. Narratives will not be presented as a whole, but will be cut into smaller segments and threaded throughout the training where they best serve to reinforce specific concepts.*

(2) We will also provide opportunities for ***learner engagement in an active community of practice*** *by providing a virtual space on an existing social networking site (e.g., Facebook, LinkedIn, or Google+) that will be open to all HFTAT participants, as well as individuals not participating in the training who are working in the field of housing (not just those working in HFM programs). Similar approaches have been demonstrated to have a positive impact on the implementation and sustainability of EBPs.*[77,85] *The community of practice will provide a virtual space for social and collaborative learning that will make information presented in the HFTAT more meaningful by embedding it within the larger HFM conversation.*[55] *It will also serve as a resource for implementation leaders to gain technical assistance beyond the end of the HFTAT, thus increasing the potential sustainability of the implementation strategy. We aim for and expect participation from a wide range of housing providers (not just those participating in the training) based on the results of an exploratory survey we distributed in August of 2013. Of the 195 respondents, 77% indicated interest in participating in just such a community and 63% indicated they would actively contribute their expertise and experience to discussion threads.*

We will also utilize the following additional strategies to facilitate a meaningful and engaging learning experience: ***cognitively effective design*** *that will break longer topics into smaller, learner-controlled segments including a mix of audio, images, text, and video;* [86] ***branched learning scenarios*** *that allow the learner to influence content based on their choice of options provided; providing learners with* ***opportunities to put skills and knowledge gained into practice*** *through authentic, performance-focused challenges, activities, and assessments, which will receive individualized feedback from training staff; and providing* ***opportunities for reflection on prior work activities*** *within an abstinence-based model and the assumptions on which they were based to support conceptual change.*[56] *The last two of these three strategies will be facilitated largely through learning activities that encourage participation in the community of practice. For instance, the trainer may direct learners to visit and/or start a discussion thread related to a case-based problem or ethical dilemma and report back on and/or provide reflection related to community member's responses. The trainer will then provide individualized feedback to the learner.*

We have chosen to use Articulate, a commercially available product, as the platform for the e-learning curriculum for four reasons. First, the development of new software for e-learning is not appropriate or possible given the scope of the R34 mechanism and resources available through it. Second, Articulate allows for rapid development of interactive learning activities that will support learner engagement and motivation. Third, it provides a variety of options for assessment and just-in-time feedback (e.g., quizzes, tests, and surveys), as well as the ability to track e-learning activity (e.g., number of times accessed, time spent in e-learning activities). Finally, Heartland will be able to integrate Articulate easily within its infrastructure.

Conduct an alpha test of the adapted HFTAT.

We will conduct an alpha test on each module of the adapted training as it is developed in order to evaluate usability and obtain suggestions for its improvement. We will also ask individuals to interact in a demonstration version of the online learning community and provide feedback. Results from the alpha test will assist us in refining the training before pilot testing begins (Aim 3).

Participants, recruitment, and setting. We will recruit front-line staff working in housing programs for participation in the alpha test using a snowball sampling approach. Participants will be recruited from programs that self-designate as Housing First and treatment first so that our data represents experiences of both HFM experts and neophytes. We plan to recruit a total of 10 participants (5 Housing First and 5 treatment first) for this phase. We will recruit an equal number of participants from both Chicago and Indianapolis (the two cities where Aim 3 activities will be carried out). To best understand the effectiveness of the training under "real world" conditions, we will ask participants to complete the modules in a setting comfortable to them using

equipment they have access to on their own. (We will request that they do not complete the trainings at work or during work time unless they have permission from their employer to do so.)

Measures. We will collect two types of data in relation to the alpha test. (1) We will request that participants keep a ***detailed log/journal*** *as they independently work through each module and engage with the online learning community, an approach often used to understand user experience of new technologies.*[87] *We will instruct them to use a form for this purpose that will provide specific spaces where they can record: questions they have on the content, presentation, assessment; technical issues they experience; and any general thoughts and affective responses to the material and activities. (2) We will also conduct* ***one focus group with users in each city*** *(2 focus groups total). This approach will allow participants to respond to each other's comments, thus eliciting a variety of views.*[88] *Exact focus group questions will depend on the product and preliminary analysis of user logs. Examples of possible focus group questions include: How useful was the training?; How engaged did you feel while carrying out activities; Did you find the online learning community to be helpful?; How compatible was the content of the online learning community with the training?; Do you have any suggestions for how to improve the training?; Do you have any suggestions for how to improve the online learning community? Participants will receive $100 for each module they complete and $30 for the focus group ($330 total per participant).*

Qualitative Analysis. Data analysis will be ongoing. We will follow a method of inductive coding whereby themes will be identified as they pertain to questions regarding the usability of the modules while still remaining open to the addition of new themes should they emerge.[89] *Findings related to the analysis of user logs and focus groups will be triangulated to strengthen their resultant validity.*[90]

Revise modules based on alpha test results

We will summarize the themes identified through the data analysis and modify the modules based on the results before pilot testing (Aim 3) begins.

C5. Aim 2 Approach. Develop a measure to assess structural-level factors affecting HFM implementation

There is currently a lack of structural-level measures to more comprehensively assess the context within which an EBP is implemented.[67,70] *The need for such measures is particularly important for complex interventions such as the HFM that require coordination of multiple parts and systems that extend beyond the boundaries of an organization.*[35,36,66,74] *We will carry out a comprehensive literature review to develop an instrument to measure the structural-level context within which HFM organizations are situated.*

Literature review

We will conduct searches for key terms within PubMed, Academic Search Premier, Web of Science, and the National Implementation Research Network database. Possible search terms include:[91–94] *Housing First; low-barrier housing; implementation barriers; evidence-based practice barriers; barriers to innovation; and implementation and complex interventions.*

Creation of the tool

We will identify important structural-level constructs affecting implementation of the HFM, which we will then operationalize for inclusion in the instrument. IUPUI researchers will work closely with Heartland staff to assess the content validity of the tool as it applies to their HFM implementation experience. We will assess the internal consistency of individual items (i.e., reliability) and instrument's potential ability to predict implementation outcomes (i.e., predictive validity) through analysis of pilot data (Aim 3). While the instrument will be specific to the EBP it was originally designed to measure (i.e., the HFM), this is not unusual for an implementation measure.[65,67,70] *This work will serve as an important reference for future studies aimed at developing more generalizable instruments.*

C6. Aim 3 Approach. Conduct a Pilot Test to Assess Feasibility for an R01 Study

We will conduct a pilot employing a quasi-experimental, mixed-methods design to test the feasibility of the adapted HFTAT and the research instruments and procedures in preparation for the future R01 study.

Subjects, setting, and recruitment

We plan to test the adapted HFTAT among 4 housing organizations purposefully selected so that that they are unique enough from each other to assure findings are related to the implementation strategy and not similarities related to structural- or organizational-level factors. We will select two organizations from Chicago and two from Indianapolis, **two cities that are extremely different in their receptiveness to the HFM**. Chicago is very receptive to the HFM, as the city has had a Plan to End Homelessness based on Housing First principles in effect since 2003. Indianapolis faces several barriers to HFM implementation, most importantly is a reliance on Medicaid funds that require treatment participation. We will also select the programs so that they

have different levels of familiarity with the HFM. We will do this by selecting one program in each city that self-designates as "abstinence-based" and one that self-designates as "Housing First" (but are seeking to improve implementation). We will identify and recruit these organizations with assistance from local housing leaders and funders (see attached letters of support). Due to the small size of some housing programs, we will only include those with 10 or more employees with direct client interaction as part of their job duties (e.g., case managers, program assistants, admissions staff, etc.). Based on our knowledge of housing programs, we do not expect organizations to have more than thirty employees that will participate in the training. We will request that members of the administrative team participate in the technical assistance portion of the HFTAT and associated data collection activities. It is not possible to tell who these individuals will be given that the management structure of each organization can differ dramatically.

Measures

Background characteristics of the staff and the agency will be collected. Staff characteristics include: demographics, job title, and type of degree, primary discipline, length of time providing housing services, and length of time in current position**.** Agency characteristics include: location, clients served, number of staff, length of time in existence, type of housing offered (single- or multiple-site), and primary source of funding.

Our measurement selection is guided by the conceptual framework depicted in Figure 1. As such, measurement will focus on three main areas: (1) putative causal factors; (2) training; and (3) implementation.

*(1) We will use the following measures to assess **causal factors** hypothesized to affect implementation that exist at multiple levels within which the intervention is imbedded:*

a. ***Structural-level factors** will be measured using the instrument developed through Aim 2 activities.*
b. ***Organizational-level** and **provider/staff-level factors** will be measured using the context assessment portion of the Organizational Readiness to Change Assessment (ORCA). The ORCA is designed to assess organizational-level variables believed to affect implementation that has tested positively for both inter-rater and convergent/discriminant validity (C. Helfrich, personal communication, August 30, 2013).[64] The context assessment portion of the instrument is comprised of 23 5-point Likert-type items. The ORCA developers have provided us with an unpublished version of the instrument that has been revised based on findings from their work (see Appendix B).*
c. ***Patient/Consumer-level factors** will be measured using items we have developed for this purpose, which we will insert at the end of the ORCA. Four questions are preceded by a stem: "In the past year, how frequently have you observed clients in your organization (a) express belief that current practice patterns can be improved; (b) encourage and support change in practice patters to improve their care; (c) demonstrate willingness to participate in new programs or services; (d) cooperate with staff and management when there are changes in services, practices, or procedures that affect them". Respondents will be asked to rate the questions using the same 5-point scale as the ORCA questions.*

(2) We will collect data for the purposes of assessing **outcomes directly related to the training and technical assistance** provided through the HFTAT:

a. **Frequency of visits to training** will be recorded electronically (by the Articulate software) at the staff-level to understand the use and access patterns of learners.
b. **Time spent in e-learning** will also be recorded electronically (by the Articulate software) at the staff-level to understand time engaged in learning activities and use patterns.
c. **Cost** will be measured at the staff-level by multiplying the number of hours providers engaged in training by staff member's hourly pay and fringe rates.
d. ***HFM Knowledge** will be measured using a summative test delivered to staff at the end of the HFTAT. Exact questions will depend on the final adapted HFTAT. The test will be an important part of the future R01 study, as it will allow us to test for differences different HFM implementation strategies.*
e. ***Satisfaction with training** will be assessed using 12 items from the Training Satisfaction Rating Scale (see Appendix C), which has demonstrated validity and reliability.[95] The 12 items selected are those that loaded highest on 3 training dimensions: objectives and content; method and training context; and usefulness and overall rating. Each question is assessed using a 5-point (1 = "totally disagree, 5 = "totally agree') Likert-type scale. The questions are general enough to be used to assess a wide array of trainings.*
f. **Overall satisfaction with HFTAT** will be assessed using data collected through semi-structured phone interviews conducted with implementation leaders. Exact questions will depend on the product of Aim 1 activities. Some likely questions include: How helpful did you find the initial implementation planning?**;**

How helpful were the monthly technical assistance meetings?**;** What suggestions do you have for how to improve the technical assistance portion of the HFTAT?; How helpful was the training at preparing your employees to work in a HFM.

(3) We will also assess the following **implementation outcomes**:

a. **Fidelity** will be measured using the HFM Fidelity Index (see Appendix A). The index comprises 29 elements. Each element is scored regarding the degree to which it has been implemented along a scale that contains 5 descriptive anchors ("1"/weakest level of implementation through "5"/strongest level of implementation), and has demonstrated construct and discriminant validity.[31] A series of interview questions are used to collect information necessary for identifying the correct anchor through a structured phone interview.

b. ***Implementation process and organizational change*** *will be measured using the Stages of Implementation Completion (SIC) instrument (see Appendix D).* [63] *The SIC is an assessment tool comprised of 31 items, which measures and monitors completion of key activities related to implementation and the length of time to complete them. While still in development, there is evidence supporting the SIC's reliability and ability to predict implementation success.*[96] *We will work closely with one of the SIC's developers, Dr. Lisa Saldana, who has agreed to provide consultation for the proposed study. She will assist us in adapting the SIC to the HFM (a task she has carried out in relation to 10 other EBPs), provide ongoing consultation during HFTAT delivery, and assist us in scoring and interpreting SIC results. Heartland staff will update the SIC through information gained through monthly technical assistance meetings.*

c. **Acceptability** of the intervention will be assessed at the staff-level using the Evidence-Based Practice Attitude Scale (see Appendix E).[97] This scale has 15 general questions that ask respondents to state the extent to which they agree with a set of questions along a 4-point Likert-type scale in order to understand their attitudes towards the adoption of a new intervention.

d. ***Focus groups*** *will be conducted with staff to assess a number of other implementation outcomes including* ***feasibility*** *(i.e., usefulness of an EBP as an implementation strategy in a particular setting);* ***appropriateness*** *(i.e., perceived fit with the organization);* ***adoption*** *(i.e., intention to employ an EBP); and* ***penetration*** *(i.e., the degree to which staff have implemented HFM practices in their daily work).*[65] *Sample items focus groups include: How do you think the move to the HFM will affect your work?; How compatible do you think the HFM is with your organization?; How interested are you in learning and applying what you will learn in the HFTAT training?; Please tell me about the ways in which you are integrating what you learned in the HFTAT into your work. Focus groups will be conducted at baseline, at the end of training, and at 3-month follow-up to understand how the HFTAT might have affected organizational change. Depending on the number of staff, we plan to complete a total of 8 focus groups (two per organization) of 5-10 staff at each data collection point.*

Service and client-level outcome measures will not be collected due to the scope of the R34, though they will be as part of the future R01. Instruments to collect these data have been tested as part of an ongoing study carried by Heartland staff, which began in July of 2008.

Data collection procedures

Table 2 below summarizes the data collection procedures for each of the measures described above. Data related to potential causal factors will be collected at baseline. Data related to training outcomes will be collected from staff and implementation leaders after the training is completed. HFM Knowledge will also be measured at 3-month post-training follow-up. Overall satisfaction with the HFTAT will be measured at 12 months. Regarding implementation outcomes, all measures except for fidelity and the SIC will be collected at baseline, mid-implementation, and 12 months (exact time points for the collection of each of these measures are listed in Table 2). Fidelity will be measured at baseline and 12 months. Due to the nature of the instrument, SIC data will be collected on a monthly basis.

Because staff will most likely be required by their administration to go through the training as part of their organization's commitment to HFM implementation, it will be important to separate training and research activities. Participation in data collection related to frequency of visits to training, e-learning activity completion time, and HFM knowledge will be required as part of participation in training activities. Participation in all other data collection activities will be voluntary. Staff participating in the collection of electronic data will be entered into a raffle for their organization to win one of two $50 gift certificates to a retailer or restaurant of their choosing at each data collection point (baseline, end of training, 3-month follow-up). A staff member's name will be entered to the raffle each time they complete an instrument so that completion of multiple instruments

will increase ones chances of obtaining the gift certificate. Staff participating in focus groups will receive a $10 Starbucks gift card for their time (focus groups will occur during work hours, so participants will also be compensated by their agency. Administrators, managers, and implementation leaders will not be invited to participate in focus groups (to assure staff feel comfortable sharing information), and they will not be compensated for their participation data collection related to technical assistance activities.

Qualitative analysis

We will follow the similar qualitative data analysis procedure described Aim 1—i.e., themes will be identified as they pertain to items in the semi-structured interview guides.[89] *We will also investigate differences and similarities in themes within and across organizations.*[98,99] *NVIVO 10, a qualitative analysis program, will be employed in the categorization and analysis of data. Because analysis will be ongoing during this phase, it will be important to test hypotheses and theories developed in earlier analyses against ongoing evidence.*[100] *As theories develop, they will be shared Heartland staff to strengthen validity based on their expertise as HFM providers and will also be checked against emerging data. The analysis will focus on understanding pre-implementation and post-implementation differences to develop a theory of how the HFTAT affects implementation processes.*

Table 2. Summary of Aim 3 data collection procedures pertaining to each level of the organization

Measure	Method of data collection	Data source	Construct type	Data collection schedule
• Structural-level • Org- & staff-level • Consumer-level	electronic	staff	Causal factor	Baseline
• Visit frequency • Completion time • Cost • Training Satisfaction	electronic	• Staff • Staff • Staff • Staff	Training outcome	After training
HFM Knowledge	electronic	Staff	Training outcome	• After training • 3-months post training
Overall satisfaction with HFTAT	Phone interview	Implement leaders	Training outcome	• 12 months
Fidelity	Phone interview	Implement leaders	Implement outcome	• Baseline • 12 month
Implementation process (SIC)	Collected ongoing through technical assistance activities	Implement leaders	Implement outcome	n/a
Acceptability	electronic	Staff	Implement outcome	• Baseline • After training • 12 month
• Feasibly • Appropriateness • Adoption • Penetration	focus group	Staff	Implement outcome	• Baseline • After training • 9 month

Quantitative Analysis

The primary outcome of interest at the organizational-level is fidelity. We will compare fidelity scores at baseline and 12 months to gauge improvement. Mean and standard deviation of the improvement will be calculated. The implementation process and organizational change, measured by the SIC at the organizational level, are collected through the monthly technical assistance activities. For each organization, we will examine its average improvement in SIC scores using a linear regression model and summarize the improvement across organizations using mean and standard deviation.

Acceptability of the intervention is measured at the staff level. The change in acceptability after training and at 12 months compared to the baseline will be calculated for each staff member and summarized using mean and standard deviation for each organization and across organizations.

At each time point, proportions will be reported for categorical variables and mean and standard deviations will be reported for continuous variables. Improvement on these outcomes is then reported by comparing the after training and 3-month follow-up measures to the baseline measures.

The focus of the larger R01 study will be to compare the effectiveness of different approaches to HFM implementation. Data from this R34 project and Dr. Watson's previously discussed HFM fidelity project (n=39 HFM programs) will be used to establish benchmarks from which to project the sample size required for the R01 study. As the number of participating organizations in the R01 will be larger, this future study will also provide an opportunity to further investigate the predictive validity of the new structural-level measure and convergent validity of the HFM Fidelity Index and the SIC.

C7. Expected Outcomes

We expect that the HFTAT will be adaptable to the proposed format, which will significantly reduce the time and resources agencies will need to invest in it as an implementation strategy. We anticipate that only minor modifications will be necessary after the alpha testing phase of the training component. Based on the previous formative evaluation of the HFTAT in its face-to-face format, we also anticipate that the adapted

version will be evaluated positively by administrators and staff. We expect that the use of the HFTAT as an implementation strategy will lead to improvements in all implementation outcomes measured. Finally, we expect that the study will provide enough suitable information regarding the feasibility of the tools and procedures for the design of a future R01 study which will be used to establish overall effectiveness of the HFTAT as a HFM implementation strategy. We also hope to provide a contribution to the literature by providing empirical support for developing implementation theory.

C8. Methodological decisions, possible limitations, and alternative strategies

The adoption of the HFTAT, development of associated instruments, and pilot test for feasibility are necessary steps that must be taken before an R01 study can be conceptualized. Implementation research is strongest when it examines the implementation of a single EBP across a sample of adopting organizations,[49] as we have proposed to do. The mixed-methods design we are employing is appropriate for this pilot study (Aim 3) given that our focus is feasibility and that the organizational-level focus of the study makes it difficult to recruit a large enough sample for a random control design. Additionally, mixed methods are commonly used in implementation research because of the complexity of implementation, the multiple levels of an organization that are often involved, and the importance of understanding process to implementation research.[72] Given the small sample size, qualitative data will assist us in understanding potential effects of the intervention where quantitative data do not. Validity will also be strengthened should quantitative and qualitative results converge.[88,90,101]

While working with a smaller sample size might have provided enough feasibility data for the R01 study, the purposeful selection of four programs based on organizational and geographical differences will help to assure feasibility of the R01 in a wide range of contexts.

Concerning recruitment, Dr. Watson has used the proposed strategy outlined in a previous HFM study and has strong relationships with all of the community organizations that will assist in this capacity (see letters of support). Based on these organizations knowledge of the system, it should not be difficult to locate and recruit four organizations that meet our proposed sampling criteria.

D. Future Directions

We plan to use findings from the pilot to inform a larger R01 study that will investigate the effectiveness of the adapted HFTAT as a strategy leading to sustainable implementation in comparison to alternative approaches. Data collection instruments and protocols will be refined if necessary based on the R34 results. We will utilize data from the R34 and the previously mentioned fidelity study to estimate effect size and sample for the larger study. Because implementation of a complex EBP like the HFM affects all levels of an organization, we are also interested in examining the effect of implementation on client and service outcomes in addition to the measures of interest in this study.

HUMAN SUBJECTS INVOLVEMENT, CHARACTERISTICS, AND DESIGN

*We will recruit **front-line staff working in housing programs** for participation in an alpha test of the HFTAT using a snowball sampling approach (Aim 1). Participants will be recruited from programs that self-designate as Housing First and treatment first so that our data represents experiences of both HFM experts and neophytes. We plan to recruit a total of 10 participants (5 Housing First and 5 treatment first) for this phase. We will attempt to recruit an equal number of participants from both Chicago and Indianapolis (the two cities where Aim 3 activities will be carried out). To best understand the effectiveness of the training under "real world" conditions, we will ask participants to complete the modules in a setting comfortable to them using equipment they have access to on their own.*

*We will collect pilot data from **staff and administrators at 4 housing organizations** (Aim 3). Organizations will be purposefully selected so that that they are unique enough from each other to assure findings are related to the implementation strategy and not similarities related to structural- or organizational-level factors. We will select two organizations from Chicago and two from Indianapolis. We will also select the programs so that they have different levels of familiarity with the HFM. We will identify and recruit these organizations with assistance from local housing leaders and funders (see attached letters of support). Due to the small size of some housing programs, we will only include those with 10 or more employees with direct client interaction as part of their job duties (e.g., case managers, program assistants, admissions staff, etc.). Based on our knowledge of housing programs, we do not expect organizations to have more than thirty employees that will participate in the training. We will request that members of the administrative team participate in the technical assistance portion of the HFTAT and associated data collection activities. It is not possible to tell who these individuals will be given that the management structure of each organization can differ dramatically. All administrative-level data will be facilitated using videoconferencing and/or telecommunications technology. Staff data will be collected electronically and through focus groups.*

SOURCES OF RESEARCH MATERIALS

<u>Alpha test log/journal (Aim 1).</u> We will request that participants keep a detailed log/journal as they independently work through each module of the training and engage with the online learning community. We will instruct them to use a form for this purpose that will provide specific spaces where they can record: questions they have on the content, presentation, assessment; technical issues they experience; and any general thoughts and affective responses to the material and activities.

<u>Alpha test focus group (Aim 1).</u> We will also conduct one focus group with users in each city (2 focus groups total). Exact focus group questions will depend on the product and preliminary analysis of user logs. Examples of possible focus group questions include: How useful was the training?; How engaged did you feel while carrying out activities; Did you find the online learning community to be helpful?; How compatible was the content of the online learning community with the training?; Do you have any suggestions for how to improve the training?; Do you have any suggestions for how to improve the online learning community?

<u>Pilot study data (Aim 3).</u> The pilot study will incorporate the following measures:

- ***Background characteristics of staff and agencies** will be collected. Staff characteristics to be collected include: demographics, job title, and type of degree, primary discipline, and length of time providing housing services, and length of time in current position. Agency characteristics to be collected include: location, clients served, number of staff, length of time in existence, type of housing offered (single- or multiple-site), and primary source of funding.*
- ***Structural-level factors** affecting implementation will be measured using the instrument we develop through Aim 2 activities.*
- ***Organizational-level** and **provider/staff-level factors affecting implementation** will be measured using the context assessment portion of the Organizational Readiness to Change Assessment (ORCA), an instrument originally designed to assess organizational-level variables believed to affect implementation. The context assessment portion of the instrument is comprised of 23 5-point Likert-type items (see Appendix C).*
- ***Patient/Consumer-level factors affecting implementation** will be measured using an item we have developed for this purpose, which will insert at the end of the ORCA. This item consists of four questions preceded by a stem: "In the past year, how frequently have you observed clients in your organization (a) express belief that current practice patterns can be improved; (b) encourage and support change in practice patters to improve their care; (c) demonstrate willingness to participate in new programs or services; (d) cooperate with staff and management when there are changes in services, practices, or procedures that affect them". Respondents will be asked to rate the question using the same 5-point scale as the ORCA questions.*

- ***Frequency of visits to training*** *will be recorded electronically (by the Articulate software) at the staff-level to understand the use and access patterns of learners.*
- ***Time spent in e-learning*** *will also be recorded electronically (by the Articulate software) at the staff-level to understand use patterns. Measuring completion time will assist in identifying material that might take learners longer to comprehend. By totaling these times we will have an idea of how much total staff time the training took to complete.*
- ***Cost*** *will be measured at the staff-level by multiplying the number of hours providers engaged in training by staff member's hourly pay and fringe rates.*
- ***HFM Knowledge*** *will be measured using a summative test delivered to staff at the end of the HFTAT. Exact questions will depend on the final adapted HFTAT. The test will be an important part of the future R01 study, as it will allow us to test for differences different HFM implementation strategies.*
- ***Satisfaction with training*** *will be assessed using the Training Satisfaction Rating Scale (see Appendix D). This is a 12-item, 5-point (1 = "totally disagree, 5 = "totally agree') scale. The questions are general enough to be used to assess a wide array of trainings.*
- ***Satisfaction with technical assistance*** *will be assessed using data collected through semi-structured phone interviews conducted with administrative staff. Exact questions will depend on the product of Aim 1 activities. Some likely questions include: How helpful did you find the initial implementation planning?; How helpful were the monthly technical assistance meetings?; What suggestions do you have for how to improve the technical assistance portion of the HFTAT?*
- ***Fidelity*** *will be measured using the HFM Fidelity Index (see Appendix A). The index comprises 29 elements. Each element is scored regarding the degree to which it has been implemented along a scale that contains 5 descriptive anchors ("1"/weakest level of implementation through "5"/strongest level of implementation). A series of interview questions are used to collect information necessary for identifying the correct anchor through a structured phone interview.*
- ***Implementation process and organizational change*** *will be measured using the Stages of Implementation Completion (SIC) instrument (see Appendix E). The SIC comprised of 31 items that measure progression through 8 stages of implementation: (1) engagement; (2) consideration of feasibility; (3) readiness planning; (4) staff hired and training; (5) adherence monitoring processes in place; (6) services and consultation begin; (7) ongoing services; consultation, fidelity monitoring; and feedback; and (8) competency. Heartland staff will update the SIC through information gained through monthly technical assistance meetings.*
- ***Acceptability*** *of the intervention will be assessed at the staff-level using the Evidence-Based Practice Attitude Scale (see Appendix F). This scale has 15 general questions that ask respondents to state the extent to which they agree with a set of questions along a 4-point Likert-type scale in order to understand their attitudes towards the adoption of a new intervention.*
- ***Focus groups*** *will be conducted with staff to assess a number of other implementation outcomes including* ***feasibility*** *(i.e., usefulness of an EBP as an implementation strategy in a particular setting);* ***appropriateness*** *(i.e., perceived fit with the organization);* ***adoption*** *(i.e., intention to employ an EBP); and* ***penetration*** *(i.e., the degree to which staff have implemented HFM practices in their daily work). Sample items focus groups include: How do you think the move to the HFM will affect your work?; How compatible do you think the HFM is with your organization?; How interested are you in learning and applying what you will learn in the HFTAT training?; Please tell me about the ways in which you are integrating what you learned in the HFTAT into your work.*

POTENTIAL RISKS TO PARTICIPANTS

Housing providers who participate in the alpha test (Aim 1) of the HFTAT is related to the significant amount of time this might take. Additionally, confidentiality related to focus group participation cannot be guaranteed because other members might discuss what is stated during these activities (Aim 1). However, we will not be collecting any sensitive information in these focus groups.

Organizations participating in the pilot (Aim 3) will be devoting a significant amount of employees work time to training activities, which might harm productivity. Regarding staff in these organizations, they might feel coerced to participate in data collection activities. Staff member's employment could be at risk should they perform poorly in the training or if they are overly critical of their organization and/or the training in focus groups. Additionally, confidentiality regarding statements made in focus groups cannot be assured because participants may reveal what others said. The collection of online data adds an extra layer of risk to the study.

However, articulate webhosting platform is a secure server, and the data being collected is not of a sensitive nature.

ADEQUACY OF PROTECTION AGAINST RISKS

All study protocols and materials will be reviewed by the Institutional Review Board of Indiana University before any data collection begins. Regarding the recruitment and consent process, all potential participants will be informed of the risks pertaining to the specific data collection activity we are requesting their participation in. Recruitment and consent forms will also include contact information for the PI, and will inform individuals that they can contact him at any time should they have questions or if they wish to remove themselves from the study.

While participating organizations might require staff to complete training activities as part of their job duties, we will make it clear to all staff members that they have the option not to participate in the research component of the project. We will not provide any form of feedback to the organization that might place a participant's employment in jeopardy. Therefore, we will not provide performance feedback on specific staff members or tell administration if an individual employee has chosen to opt out of the research component. Additionally, no administrators will be invited to participate in focus groups so that staff may feel more comfortable in expressing their opinions. To ensure safety and confidentiality of data collected electronically, all downloads from the web-based platform will be carried out by the IUPUI research team under the supervision of Dr. Watson. Any data provided to Heartland for training purposes will be de-identified.

All data will be stored on a secured network on a secure server maintained by the research staff behind a university firewall. Users will be prompted for a password whenever the computer comes out of a screensaver or any other low or reduced power mode. The computer will enter screensaver mode automatically after three minutes of inactivity. This system ensures that no one other than the research team will have access to the data.

POTENTIAL BENEFITS AND REIMBURSEMENT

Alpha test participants will receive $100 for each module they complete and $30 for the focus group ($330 total per participant). Staff participating in the collection of electronic data will be entered into a raffle for their organization to win one of two $50 gift certificates to a retailer or restaurant of their choosing at each data collection point (baseline, end of training, 3-month follow-up). A staff member's name will be entered to the raffle each time they complete an instrument so that completion of multiple instruments will increase ones chances of obtaining the gift certificate. Staff participating in focus groups will receive a $10 Starbucks gift card for their time. All data collection activities will occur during work hours, so staff will also be compensated for their time by their employers. Administrators will not be compensated for their participation data collection related to technical assistance activities.

The proposed study has several potential benefits for participants. Alpha testers and staff participating in the pilot will gain free training in the HFM, which will build skills they can employ in their daily work. Additionally, organizations will benefit from free training and technical assistance activities that have the potential to improve services. Finally, the larger society stands to benefit should the adapted HFTAT prove effective as an implementation strategy given that the HFM has been demonstrated to be an effective intervention for ending chronic homelessness.

IMPORTANCE OF KNOWLEDGE TO BE GAINED

The R34 project and the resulting R01 will improve HFM implementation and practice through the development of an evidence-based implementation strategy. The development of such a strategy is in the best interest of policy makers, funders, providers, clients, and researchers, given how ubiquitous the model has become and the demonstrated problems related to its implementation. The proposed projects will also increase limited scientific knowledge regarding implementation strategies, lead to the development and testing of a tool to measure structural-level factors affecting implementation outcomes, as well as provide an opportunity to test the generalizability of tools originally created to measure implementation of specific EBPs.

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