

Hearth Connection  
Supportive Housing and Managed Care Pilot  
Outcome Study

Analysis of Nine Month Outcomes

June 20, 2005

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## Executive Summary

The Supportive Housing and Managed Care pilot is a demonstration project funded by the State of Minnesota and administered by a non-profit agency, Hearth Connection. Its goal is to test an intensive, flexible, and housing-based response to long-term homelessness. The pilot provides affordable housing and other supports necessary for homeless people (both single adults and families) to help them lead healthier lives in the community.

The pilot is being evaluated by an independent evaluator, the National Center on Family Homelessness. This report presents findings from the pilot's outcome study based on data collected from pilot participants through in-person interviews when they first enroll in the pilot and nine months thereafter. Data from interviews conducted with participants eighteen-months after enrollment is forthcoming.

In sum, we find that participants' lives over the nine month period changed substantially and meaningfully. Although we cannot strictly attribute these changes to the pilot, they appear to be connected to participation in the program. These changes occurred in multiple domains: housing, behavioral health, quality of life, sense of safety, and satisfaction with services.

The pilot serves both homeless single adults and homeless families and has programs in both Ramsey and Blue Earth counties. Because we were mindful that outcomes might be different for participants in these different groups, we analyzed the data separately by these factors. In Section 4 we present the results of these analyses. As that section reports, there are not important differences in the major outcome variables by these factors. Therefore, we combine the data for these analyses we report here.

In particular we find that:

- Participants experienced very substantial and statistically significant improvements in their housing situations. At the follow-up assessments, the average participant had spent 105 more nights in their own home in the previous six months than they had at the baseline assessment. Also, participants were more residentially stable at follow-up than at baseline.
- Participants experienced a statistically significant decrease in the severity of their mental health symptoms. The average decrease was 4.6 points on a mental health measure that ranges from 0 to 60. This is roughly equivalent to changing a symptom (such as hearing voices, or feeling depressed) from occurring "at least every day" down to occurring "not at all".

- In the area of substance abuse, there was a statistically significant decrease in the number of days respondents used illegal drugs or alcohol to intoxication. The decrease was on average 4.6 use-days across participants. A larger decrease of 9.9 use-days occurred for those who reported using drugs or alcohol to intoxication at baseline.
- We found no change from baseline to follow-up in participants' health-related quality of life, that is the degree to which their physical and mental health issues limit their lives. These health outcomes may change too slowly for us to see a difference over this relatively short interval of nine months. Later analyses of the eighteen-month data may indicate changes in these outcomes.
- The percentage of participants receiving income from paid employment decreased from 36% to 24%, a statistically significant decline. Utilization of two other income sources increased significantly. The proportion of participants receiving rental support, which is provided by the pilot itself, increased from 24% to 76%, and the percentage of respondents receiving SSI increased from 28% to 39%. The median monthly income of participants increased slightly, from \$525 to \$600, which is of borderline statistical significance.
- Participants showed modest, though statistically significant improvements in both their overall quality of life, and their sense of safety.
- Participant satisfaction with services started out relatively high and stayed high across the nine month period. Satisfaction with housing was lower initially and improved significantly by follow-up.

In more detailed analyses across the three key outcome areas of housing, mental health, and substance use, we find that:

- By follow-up 62% of participants had achieved stable housing, an increase of 56%; 44% were predominantly free of mental health symptoms, a gain of 9%; and 57% were substance-use free, a gain of 13%.
- The longer a participant had been enrolled in the pilot, the more likely they were to be stably housed, have improved mental health symptoms, and to not be using drugs or alcohol to intoxication.
- As mentioned above, participants in Ramsey County and Blue Earth County experienced similar changes over time. Single adults and family members also showed similar changes over time. Single adults tended to start the pilot with more severe challenges than people in families, but both groups improved similarly.

- Participants' characteristics at baseline were by and large unrelated to their change over the nine months, indicating that participants are showing changes regardless of their situation upon entry into the pilot.
- The major exception to the above finding was in the area of trauma. Pilot participants who came into the pilot with a more extensive history of traumatic experiences had spent fewer nights in their own housing at follow-up. Pilot stakeholders may want to investigate this apparent relationship to improve services for this sub-group.
- To examine whether the results we present here could be biased due to attrition of respondents from the study, we compared those whom we were able to interview at nine months (139), to those whom we were unable to interview (36), using their baseline measures. There were no significant differences between these groups on all 16 of the variables we examined, which cover demographics, life history, and the outcome variables used in this report.

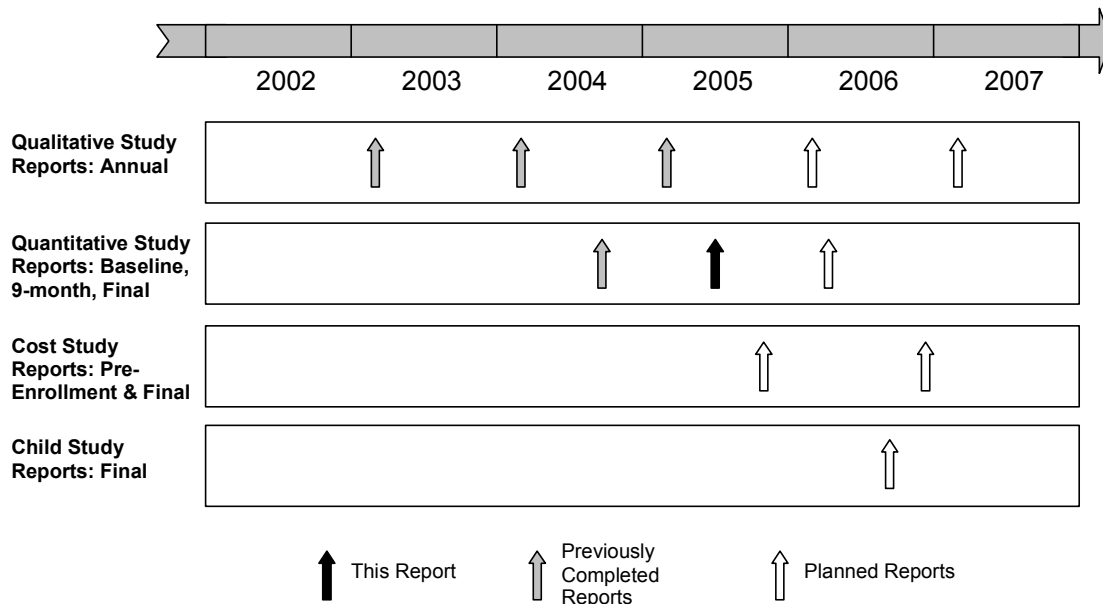
Overall, we find that the pilot participants' housing situations have improved dramatically, and their situations in other domains have improved to varying degrees as well.

## Introduction

The Supportive Housing and Managed Care pilot is a demonstration project funded by the State of Minnesota and administered by a non-profit agency, Hearth Connection, to test an intensive, flexible, and housing-based response to long-term homelessness. The pilot provides affordable housing and other supports necessary for homeless people to help them lead healthier lives in the community. The pilot targets single adults and families whose homelessness is exacerbated by other difficulties such as medical problems, mental illness, chemical dependency, and histories of trauma.

Hearth Connection contracted with the National Center on Family Homelessness (NCFH) to conduct an independent evaluation of the Pilot. In collaboration with pilot stakeholders, NCFH designed an evaluation featuring four separate but interconnected studies: 1) a qualitative study examining the pilot’s implementation and outcomes annually from the perspectives of multiple stakeholders, 2) a cost study examining service utilization and associated costs for pilot participants and a matched comparison group, 3) an outcome study utilizing in-person interviews with participants to track a range of psycho-social indicators over time, and 4) a study focusing in-depth on the children in pilot families. This is the second report from the outcome study and summarizes changes in participants’ lives from initial enrollment to nine months thereafter. The series of reports that the evaluation has and will produce is detailed in the figure below.

Figure 1-1: Evaluation Reports Timeline



## **The Pilot's Approach**

As described in the logic model (see Appendix A), the pilot intends to serve a population with long histories of homelessness who suffer from mental illness, chemical dependency, and/or HIV/AIDS. It is believed that these participants frequently utilize costly emergency and other institutional services.

The pilot is designed to demonstrate the effectiveness of flexible, participant-driven, intensive support services, coordinated with existing systems of care and with access to affordable housing, for people who have experienced long-term homelessness. Furthermore, the pilot aims to increase the availability of, and simplify access to, the financial resources needed for this intervention: in particular, funds for direct services; funds that may be used flexibly for participant-specific expenditures in tandem with direct service; and rent subsidies to ensure that participants' housing remains affordable. As a demonstration project, its goals are to both document the effectiveness of this approach, and to use this experience to enhance existing systems of care.

At the system level, the pilot focuses on aligning financial resources and sharing information within and among a broad group of stakeholders.

At the clinical level, the pilot intervention focuses on three core elements. First, five *primary provider* organizations organize and deliver services for pilot participants. Primary provider staff work intensely with participants and provide a full range of resource coordination and advocacy services, marked by flexibility, individualized approaches, high intensity (meeting weekly or more often), and informal as well as formal services. Second, primary provider staff work with each participant to develop a *support team*, a circle of friends, relatives, and professionals, that can support them in working towards their goals. Finally, *supportive housing*, the provision of subsidized permanent housing in apartments in the community, in combination with the above services, forms the third pillar of the intervention.

## **Study Methodology**

### **Sample**

The outcome study design calls for interviewing one adult from every household being served by the pilot. To date, 139 individuals have completed the baseline and nine month follow-up interviews. Of these, 63 were enrolled in the family programs and 76 in the single adults programs. In this report we analyze information from this full sample of participants as well as a smaller subset (72) of the participants, whom we term the *new enrollees*, who completed their baseline interview within 60 days of their enrollment into the pilot. This smaller group gives us a potentially more accurate view of change because

these participants had not been in the program for an extended period before their baseline interview and therefore the baseline provides an assessment of pre-enrollment status. Because the pilot started before the evaluation, this does not apply to the sample as a whole. Since the pilot started serving families before single adults, single adults are over-represented in the new enrollee sample compared to the full sample.

## **Measures**

The outcome study features three structured research interviews with participants at nine month intervals (i.e., baseline, nine months, and eighteen months). The nine-month wave of data collection is substantially complete. The eighteen month data is being collected currently. A future report will describe that data.

The interviews were designed to capture a range of potential outcomes from the pilot. Early in the evaluation design process, project stakeholders collaboratively developed a logic model -- a graphic summary of the project's components and intended outcomes (see Appendix A). The logic model outlines five primary outcomes and three secondary outcomes that stakeholders expected the pilot to have for adult participants:

### Primary Outcomes

- Increased housing stability
- Improved physical and behavioral health
- Improved safety
- Better quality of life
- Increased satisfaction with services

### Secondary Outcomes

- Increased community involvement
- Increased self-reliance
- Attainment of self-determined goals

The interview contains assessments of the five primary outcomes as well as some information on self-reliance, a secondary outcome. Considerations related to respondent burden precluded our assessing the secondary outcomes fully. In addition to the primary outcomes, the interview also captures demographics, lifetime homelessness and trauma history, service utilization, and quality of relationship with primary provider staff. Most of these domains are assessed with standardized research instruments. In some cases where suitable instruments were not available or the content warranted, NCFH researchers developed ad-hoc instruments. For details of the instruments used, see Appendix B.

Interviews were conducted by experienced research interviewers in program offices or at respondents' homes. Interviews generally lasted from 60 to 90 minutes. Participants were paid \$20 for the baseline interview session, and \$25 for the nine-month interview.

## **How to Interpret These Results**

These analyses compare respondents' baseline status with their status at the nine-month follow-up interviews. Each respondent acts as their own control, and the analyses focus on change from baseline to follow-up. In interpreting these results, three factors should be kept in mind.

First, these analyses are based on participants whom we were able to interview at baseline *and* at nine month follow-up. It is likely that the participants we were unable to contact for follow-up interviews differ non-randomly from those whom we interviewed. The final section of the report sheds some light on this issue by comparing the baseline profiles of those we could reach and those we could not. These analyses indicate that those we could not reach probably do not differ substantially from those we interviewed.

Second, the sample that many of the analyses are based on is not necessarily representative of the entire pilot population because of the distinction between *new enrollees* and the *full pilot sample* discussed above. Because the evaluation started after the pilot began providing services, we were unable to conduct baseline interviews near the time of enrollment for approximately half of the participants. The *new enrollees* (72 of the 139 participants) are those participants who completed baseline interviews within 60 days of enrollment. In this report we analyze the full sample when we can, and the smaller sample of new enrollees when examining change from baseline to nine months. The new enrollee sample provides a better estimate of possible program effects because that sample gives an accurate picture of how participants were fairing *before* they entered the pilot. Many participants in the full sample had been enrolled in the pilot for months before we were able to conduct their "baseline" interviews. Thus, those interviews do not give a valid assessment of baseline status.

Finally, we cannot determine from our data the extent to which the pilot *caused* changes in participants' lives. Because people tend to come into programs like the pilot when they are at particularly difficult periods in their lives, they tend to *naturally* show some recovery over time. Unfortunately, the evaluation's resource constraints precluded our interviewing a comparison group, that would have enabled us to somewhat disentangle these two effects. Although we cannot strictly determine the extent to which participant improvements are due to the pilot versus due to this natural recovery process, we believe it likely that the pilot played a role in helping participants improve their lives, given the complex burdens enrollees are struggling with, and demonstrated changes over a relatively short interval.

## **Contents of this Report**

This report walks through a series of questions concerning changes in participants' lives between the baseline and follow-up interview assessments. In each section we pose a question and then attempt to answer the question using data from the outcome study. Section 1 addresses whether pilot participants' lives changed between the baseline and

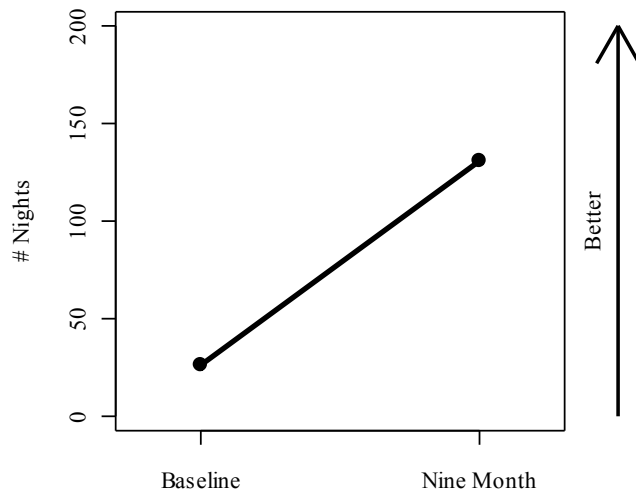
follow-up assessments in ways anticipated by the pilot's designers. Subsequent sections go into greater depth in analyzing trends described in Section 1.

## **Section 1: Did participants' lives change between the baseline and follow-up interviews in ways anticipated by the pilot's designers?**

In this section we examine whether participants' lives changed in the outcome domains that the pilot hoped to impact. This analysis provides an overview that is followed by more focused analyses in subsequent sections. For each of the five primary outcome domains: housing, physical and behavioral health, quality of life, safety, and satisfaction with services, the outcome study interviews have one or more indicators. Additionally, for the secondary domain of self-reliance we rely on data concerning participants' income and employment. In the figures that follow we show the change in these indicators from baseline to follow-up. Next to each figure we provide the corresponding quantitative results, while below the figure we provide a narrative interpretation of the findings.

Where possible each of the following figures is scaled to the natural scale for its measure. This means that the bottom of each figure represents the lowest point on the measure (the "floor" of the measure), and the top of the plot represents the highest score on the measure (the measure's "ceiling"). Thus, the plots are somewhat comparable, allowing us to see, given the range built into our measures, where the pilot population was starting in the various domains and where it ended up. Note that on some of our measures an *increase* in the measure from baseline to nine months represents an *improvement* in participants' status, while on others an *increase* represents a *decline* in participants' status. Each plot is marked with an arrow indicating the direction of improvement.

## Outcome: Average Number of Nights in the Past 6 Months that Participants Spent in their Own Housing



**Possible Range:** 0 to 180

**Baseline Avg.:** 26 nights

**Follow-up Avg.:** 131 nights

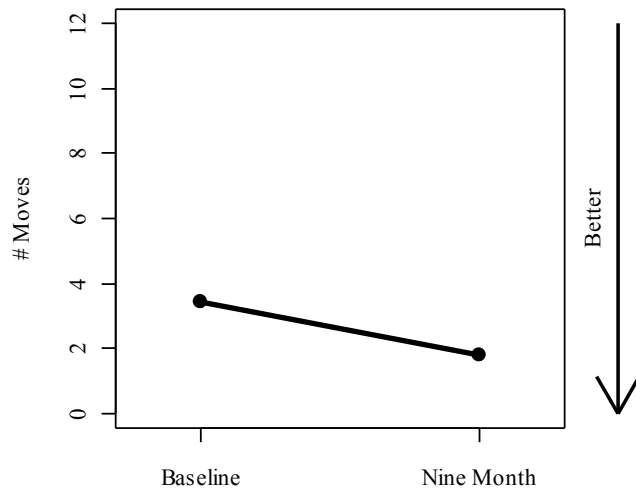
**Change:** + 105 nights

**Statistically Significant:** Yes

**Instrument:** Residential  
Follow-Back Calendar

The most dramatic change participants experienced was in the area of housing. The average number of nights out of the previous 6 months that participants spent in their own housing increased from 26 to 131. This represents a major change in participants' lives. The mean value of 131 indicates that many participants interviewed at nine months had been substantially stable in their own housing over the previous six months. Since a major goal of the pilot is to house those in need and help them maintain housing, these figures represent a significant accomplishment.

## Outcome: Average Number of Residential Moves Participants Made in the Previous 6 Months



**Possible Range:** No theoretical range; range in data is 0 to 12.

**Baseline Avg.:** 3.4 moves

**Follow-up Avg.:** 1.8 moves

**Change:** -1.6 moves

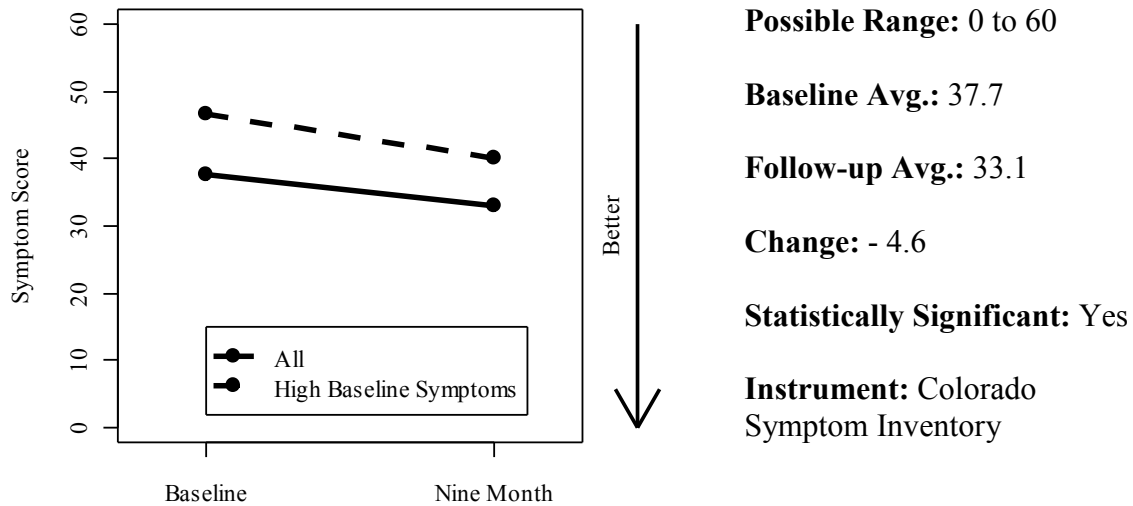
**Statistically Significant:** Yes

**Instrument:** Residential Follow-Back Calendar

A second housing-related outcome, the number of residential moves participants made in the previous six months, complements the above measure and more directly assesses stability in housing over time. The number of times the average participant moved in the preceding six month period dropped from 3.4 at baseline to 1.8 at the follow-up interview, a statistically significant decrease. This decrease indicates that participants are moving fewer times at follow-up than in the period prior to their enrollment.

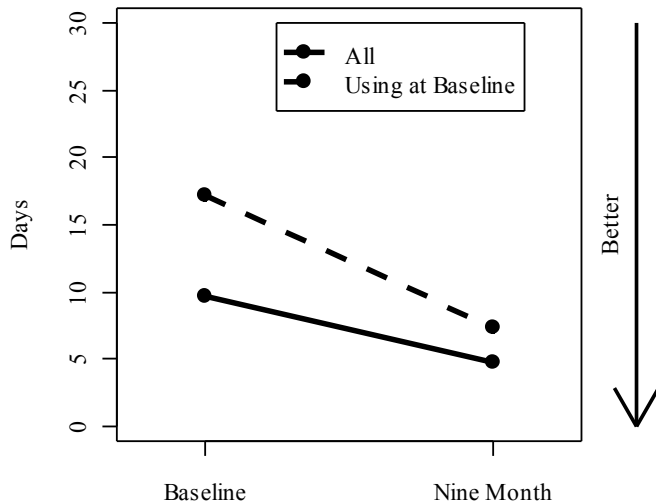
Both of the above housing outcomes show positive change. However, housing those in need is not the pilot's only goal. The pilot seeks to assist people whose homelessness is exacerbated by other issues such as mental illness and substance abuse. Therefore, it is essential that the evaluation additionally assess indicators of physical and behavioral health, which we examine in the rest of this section.

## Outcome: Average Mental Health Symptom Score



The plot above shows change in mental health symptom severity for the overall sample of new enrollees as well as a sub-sample of those who had more severe mental health symptoms at baseline. The average drop in mental health symptoms, of almost five points on a scale ranging from 0 to 60, is both statistically significant and clinically important. The Colorado Symptom Inventory asks respondents how often they experienced each of 15 common symptoms of mental illness. The items are scaled on a five point scale ranging from “Not at all” to “At least every day”. Thus, the five point drop experienced by participants is equivalent to the elimination of one daily symptom (i.e. it’s change from occurring “At least every day” to occurring “Not at all”). Of course, it is likely that participants did not experience a complete drop in the frequency of one symptom, but smaller reductions across multiple symptoms they were experiencing at baseline.

## Outcome: Average Days Using Drugs and/or Alcohol to Intoxication



**Possible Range:** 0 to 30 for each of 10 drugs

**Baseline Avg.:** 9.7 drug-days

**Follow-up Avg.:** 4.7 drug-days

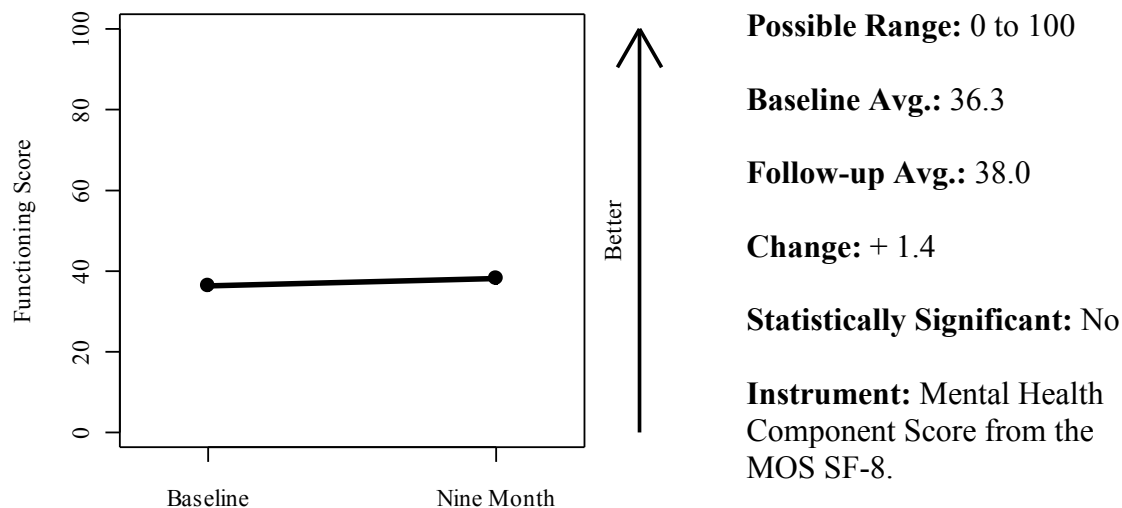
**Change:** -4.9 drug-days

**Statistically Significant:** Yes

**Instrument:** Summed number of days participant used each of 10 drugs including alcohol to intoxication over the past 30 days. It could be higher than 30 if respondent used multiple drugs.

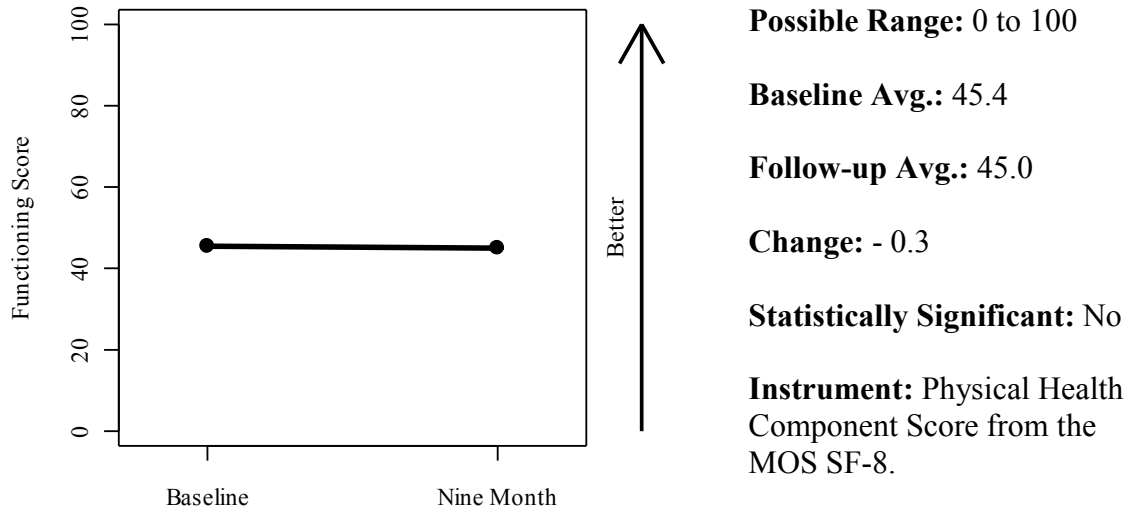
The plot shows change in drug-use days for both the entire newly enrolled sample (including those not using at all) and the sub-sample of participants that reported using at baseline. The reduction in the number of drug-use days -- the total number of days spent using each of a range of drugs, or alcohol to intoxication, in the past month -- is also important both statistically and substantively. The drop of almost five drug-use days indicates that on average participants used a single drug or drank to intoxication on five fewer days, or used two different drugs in combination for 2.5 fewer days. For participants who reported at least one drug/alcohol use day at baseline, the average decrease in drug-use days is higher, - 9.9 days.

## Outcome: Average Mental Health Functioning Score



This measure, and its companion below which assesses physical health functioning, showed no improvement from baseline to follow-up. These instruments assess health related quality of life, defined as the extent to which one's physical or mental health issues impact one's daily life. They include questions such as "How much did your physical health or emotional problems limit your usual social activities with family or friends?". The pilot population is fairly impaired on both of these measures, scoring well below the norm of 50. It is possible that access to medical and mental health services are still difficult for participants, or that participants are in fact accessing services (the 3<sup>rd</sup> Qualitative Study report indicates this may be the case) and that the nine month period is too short for improvements to manifest themselves. Examining the eighteen-month data may help settle this issue.

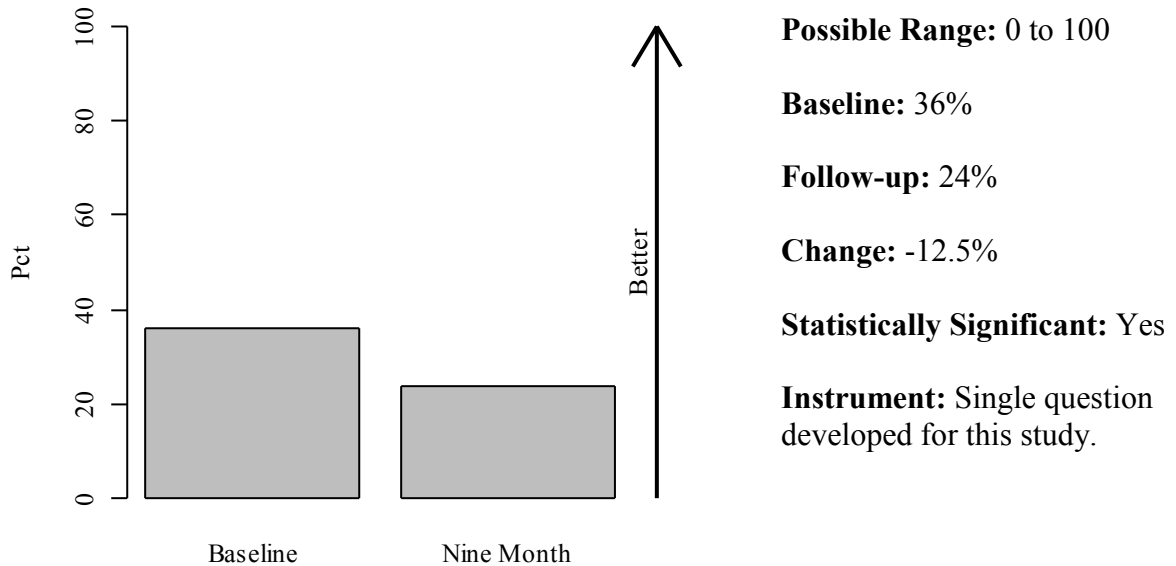
## Outcome: Average Physical Health Functioning Score



As with its companion measure above, the physical health functioning score did not show any change from baseline to follow-up. This may be due to the relatively short amount of time available for improvement between the baseline and follow-up interviews compared with the severe mental and physical health issues that participants are facing.

We turn now to indicators of self-reliance, employment and income.

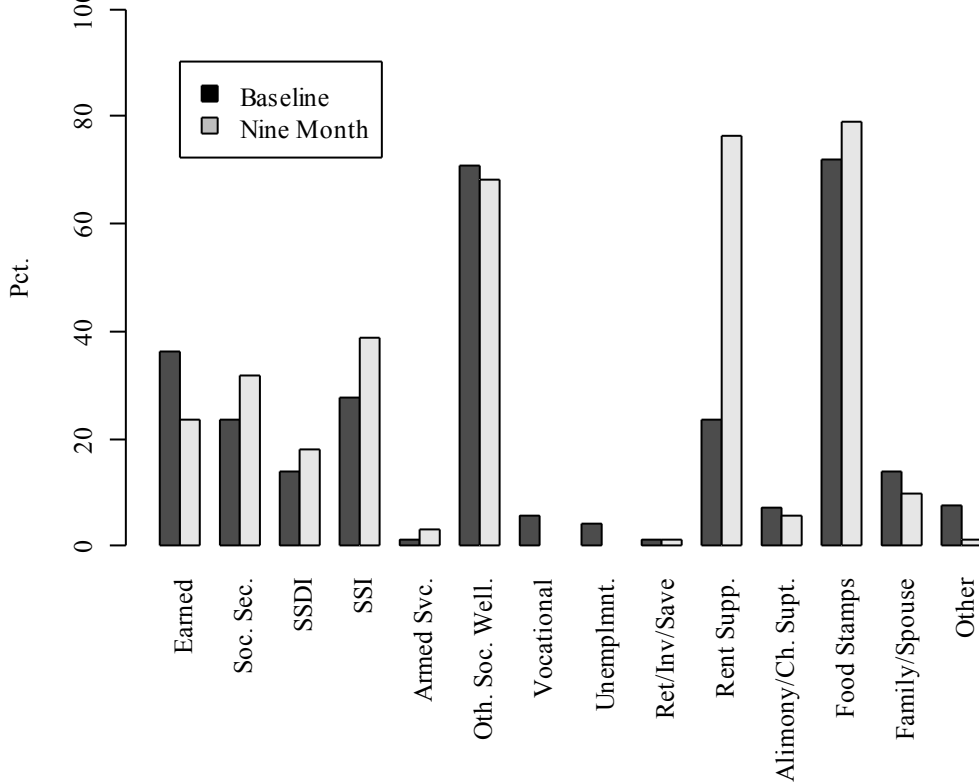
## Outcome: Percentage Receiving Income from Employment in the Previous Nine Months



One of the pilot’s secondary goals is to help participants increase their self-reliance. Although the evaluation does not include a direct assessment of self-reliance, the interview asks respondents about the sources from which they received income in the previous nine months. Employment is one potential indicator of increasing self-reliance, though in the context of participants' mental health, substance use, and trauma histories, employment may not be possible nor desirable for all participants within the relatively short time frame we are studying. The above plot shows the percentage of participants who answered “Yes” to whether they had received income from paid employment in the nine months before the baseline and follow-up interviews. At baseline 36% of the respondents reported having received employment income, while at follow-up 24% did, a decline of 12.5%, which is statistically significant.

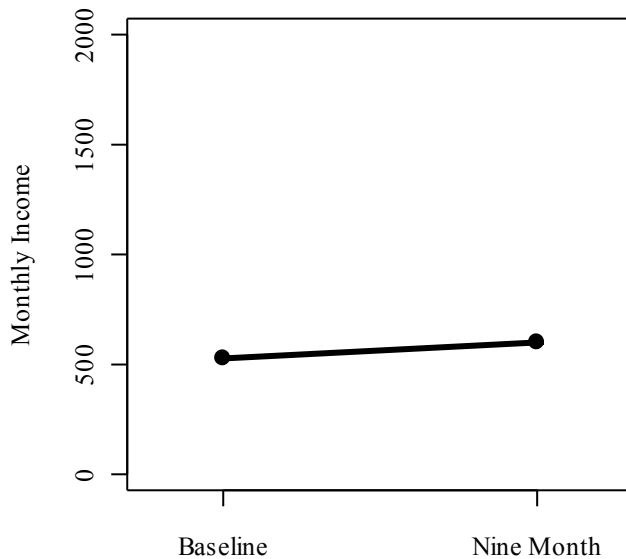
To further examine the economic situations of participants, we plotted change in other income sources from baseline to follow-up, shown in the figure below.

Fig. 1-2: Sources of Income at Baseline and Follow-Up



The majority of participants receive Food Stamps and income from the category "Other Social Welfare Programs", which represents TANF and other state-based benefits. Sizable minorities of participants also report receiving income from Social Security, SSI, and SSDI. There is a large and statistically significant increase in receipt of housing support (from 24% to 76%), which is to be expected since the pilot provides this support directly. The increase in the percentage of respondents receiving SSI (from 28% to 39%) is also statistically significant, indicating that the pilot may be helping participants access federal resources to which they are entitled. Increases also occur in Social Security, SSDI, and Food Stamps, though these do not reach statistical significance.

## Outcome: Median Total Monthly Income



**Possible Range:** No theoretical range; range in data is approximately \$0 to \$2,000 plus 2 large outliers.

**Baseline Median:** \$525

**Follow-up Median:** \$600

**Change:** +\$75

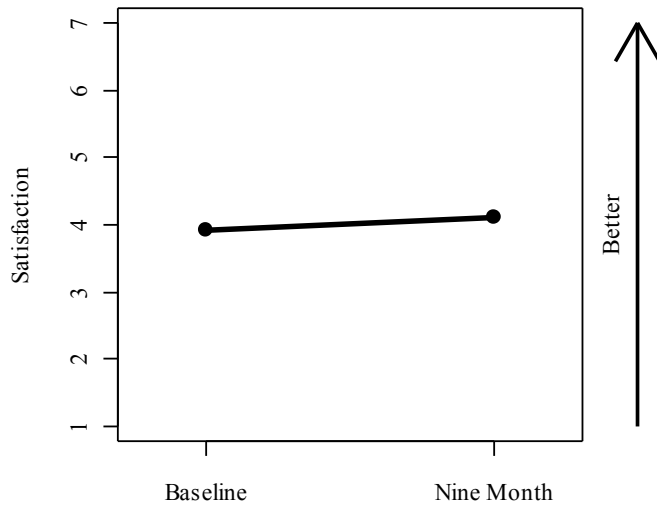
**Statistically Significant:** Marginal ( $p=.06$  for whole sample;  $p=.08$  with outliers removed)

**Instrument:** Single question developed for this study.

There is a marginally statistically significant increase in the total income participants report they are receiving, from a median of \$525 at baseline to \$600 at follow-up. As is usual with income data, the distribution of incomes in the pilot population is very skewed with many low values and a long tail to the right. Therefore, we calculated the statistical significance tests with and without the extreme outliers. These results indicate that participants may on the average be receiving more income, presumably from non-employment sources (benefits, friends, relatives, etc.), than they were before entering the pilot. This finding, in combination with the employment finding above, give us an important area to follow up on when analyzing outcomes from the eighteen month interviews. At that point we will be able to examine whether given a longer time frame in which to stabilize their situations, more participants become employed, and whether the potential gain in monthly income at nine months is sustained over the longer term.

We turn next to one of the pilot's primary goals, improving participants' quality of life.

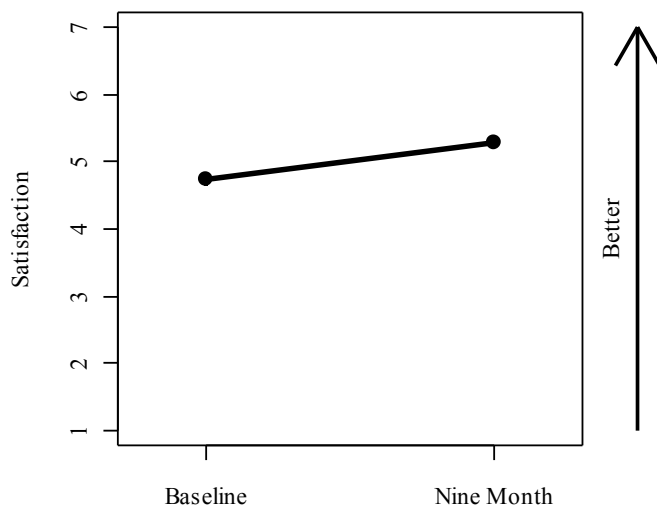
### Outcome: Average Overall Quality of Life Score



**Possible Range:** 1 to 7  
**Baseline Avg.:** 3.9  
**Follow-up Avg.:** 4.1  
**Change:** + 0.2 points  
**Statistically Significant:** Yes  
**Instrument:** Quality of Life Interview, Total Score.

This quality of life measure includes the domains of family, work (for the employed only), finances, and safety. The measure uses a 7 point scale ranging from “Terrible” to “Delighted”. The change in this scale of + 0.23 points represents a modest change but one that is significant given that improving quality of life is a goal of the pilot.

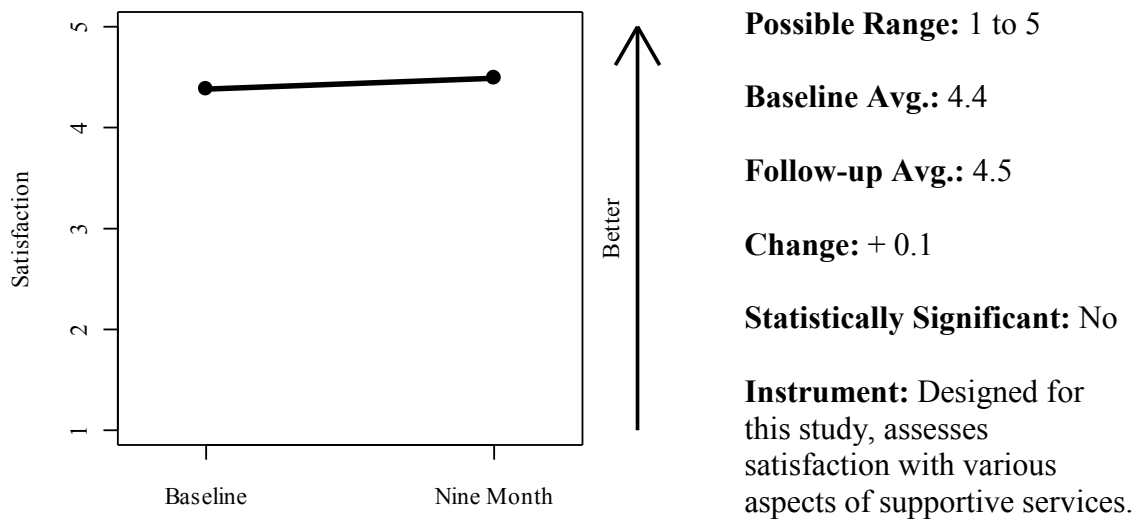
### Outcome: Average Perceived Community Safety Score



**Possible Range:** 1 to 7  
**Baseline Avg.:** 4.7  
**Follow-up Avg.:** 5.3  
**Change:** + 0.6  
**Statistically Significant:** Yes  
**Instrument:** Community Safety scale from the Quality of Life Interview.

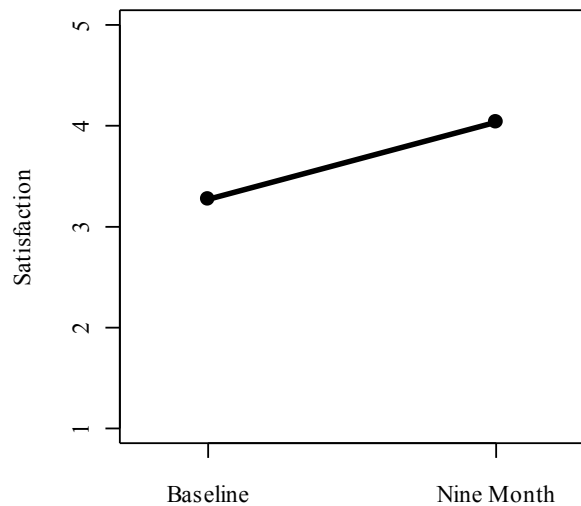
The community safety section of the Quality of Life interview asks respondents questions concerning their perceived safety on the streets, their safety in the place where they live, and their degree of protection against robbery or assault. The increase of 0.6 points on this measure represents a modest improvement in perceived safety, which was relatively high (4.7 on the 7 point scale) at baseline.

### Outcome: Average Satisfaction with Services Score



Satisfaction with services was quite high at baseline – a mean of 4.4 on a five point scale ranging from “Very Dissatisfied” to “Very Satisfied”. At baseline participants were, on the average, between “Satisfied” and “Very Satisfied” with the services they were receiving. Given this high baseline starting point, there was little room for the measure to improve. Although it did increase slightly, to 4.5, this change was not statistically significant. It is possible that, because we could not interview participants until they had enrolled, they were already receiving pilot services and were answering these questions in relation to pilot services they had already received.

## Outcome: Average Satisfaction with Housing Score



**Possible Range:** 1 to 5

**Baseline Avg.:** 3.3

**Follow-up Avg.:** 4.0

**Change:** + 0.7

**Statistically Significant:** Yes

**Instrument:** Designed for this study, assesses multiple aspects of participants' satisfaction with their housing.

The satisfaction with housing measure showed significant improvement, + 0.8 on the five-point scale. This change is consistent with the interpretation for the services satisfaction scale above. It is likely that at the time of the baseline interview many respondents had not yet been housed. The improvement we see on this measure likely represents change among the people who had been housed by the follow-up interview.

## Summary of Changes in Outcome Variables

Taken together, these indicators show a range of statistically significant and substantively important improvements in pilot participants' lives during the period of their first nine months in the pilot. While these analyses show the overall trends, they leave unanswered many questions. The remainder of this report addresses some of these questions.

## **Section 2: When examined at the individual level, did participants' lives show potentially important levels of change across domains?**

The analyses above indicate that in the population taken as a whole, there are statistically significant changes from baseline to follow-up. These overall trends, however, present only a limited picture. The significance tests in Section 1 indicate only whether the average change from baseline to follow-up for a particular measure was different from zero. These analyses, while important for setting the general picture, leave a range of other questions unanswered:

- What is the range of variation in the outcomes?
- Are outcomes different by sub-groups?
- Across domains are participants achieving stability?
- Are changes in one domain associated with changes in other areas?

Answers to these questions form the substance of this and subsequent sections of the report.

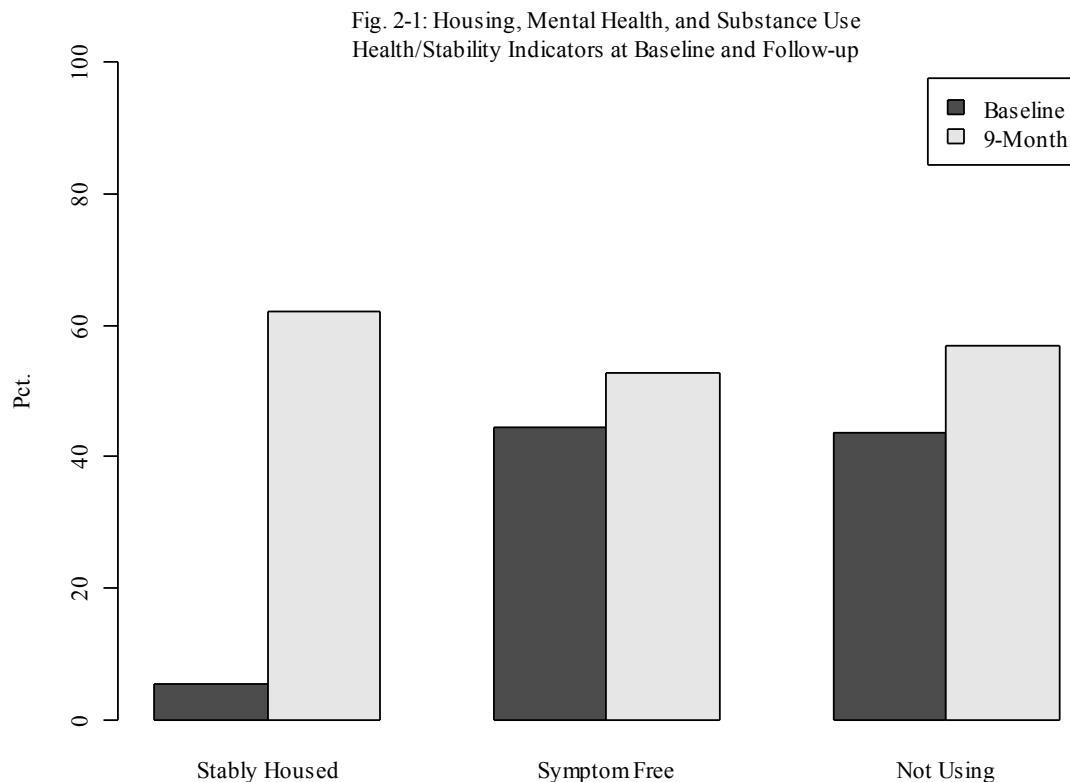
### **Section 2.1: Do participants show changes in the key domains of housing, mental health, and substance use when viewed in absolute terms?**

In this section we attempt to contextualize the results from Section 1 by converting the continuously scaled outcome indicators from that section into more easily interpretable categorical indicators. This provides an alternate, more intuitively understandable picture of changes in participants' lives. We developed indicators of a participant having achieved some measure of health, stability or wellness in the central domains of housing, mental health, and substance use. In this section we examine these categorical indicators and the change they demonstrate from baseline to follow-up. The definitions of the indicators are presented in Table 2-1 below.

Table 2-1: Definitions of Health/Stability Indicators for Housing, Mental Health, and Substance Use

<b>Domain</b>	<b>Indicator Label</b>	<b>Definition</b>
Housing	Stably Housed	Participant lived 75% or more during the past 6 months in their own apartment.
Mental Health	Symptom Free	Participant scored in the “adapted” range of the Colorado Symptom Inventory, which measures mental health symptoms.
Substance Abuse	Not Using	Participant reported no use of illegal drugs or drinking alcohol to intoxication in the past 30 days.

Setting criteria in this way is somewhat arbitrary and does not mean that participants who reached these indicators have completed their “recovery”, or that smaller changes are not important for participants. Rather, the indicators provide a simple benchmark for health and stability in a particular domain. Although they oversimplify, indicators of this kind allow us to see patterns more clearly, to present results more intuitively, and to contextualize the changes described in Section 1. When looked at this way, we can discuss percentages of people who have made meaningful progress in one or more of these areas, as defined through these indicators. Figure 2-1 shows these percentages.

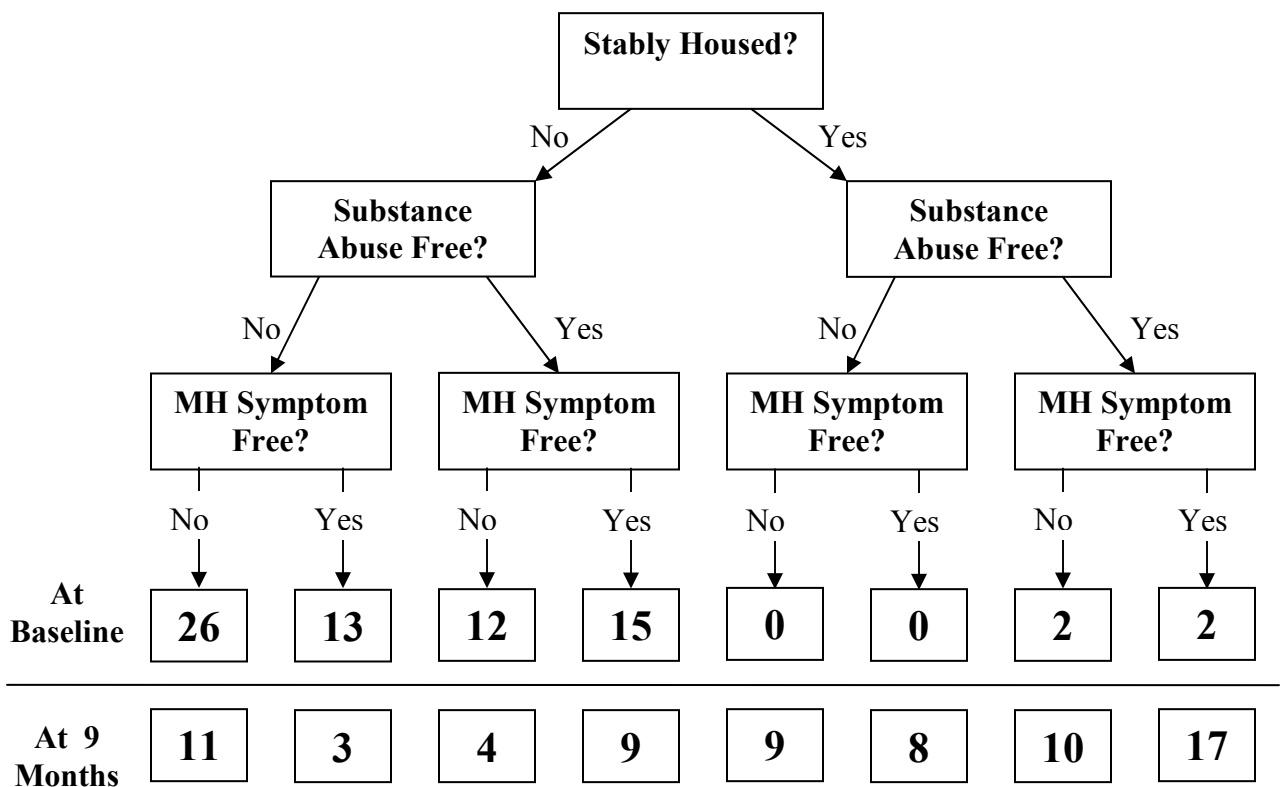


As the figure indicates, the largest gain for participants was in the area of housing. Upon entering the pilot only 6% of participants met the criteria for “stably housed” while at nine months, 62% did -- a jump of 56%. The changes in the other domains were smaller, perhaps because change in these areas is more complex and requires longer periods of time to accomplish. On the mental health measure, 44% of the participants were relatively “symptom free” at baseline, while 53% were at follow-up, a gain of 9%. In the area of substance use, 44% reported not using drugs or alcohol use to intoxication while at follow-up, this percentage had risen to 57%, a gain of 13%.

## Section 2.2: Do stable housing, symptom-free mental health, and sobriety co-occur?

The pilot was designed to serve people dealing with complex, interrelated issues. Various studies have documented statistical associations among homelessness, mental illness and substance abuse. Questions arise of whether these conditions overlap in the pilot population and whether improvements in these conditions overlap as well. Looking first at the question of whether pilot participants are dealing with multiple, overlapping issues when they enroll the pilot, we find that this is indeed the case.

Figure 2-2: Co-Occurrence of Stable Housing, Good Mental Health, and Sobriety at Baseline and at Follow-up



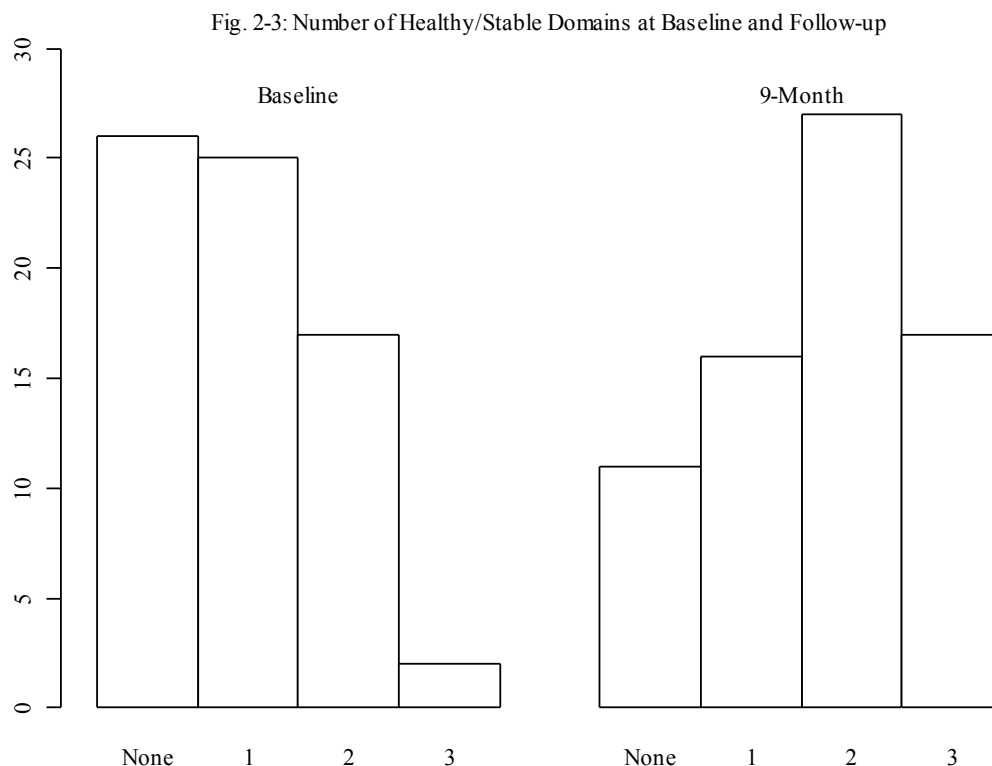
The above figure shows the breakdown of participants as they came into the pilot. The figure is read from the top down. Each pathway through the figure leads to a number at the bottom of the figure, which gives how many people came into the pilot with the characteristics indicated. Below that row of numbers is another row showing how many people were in each of the conditions at the nine-month interviews. As is immediately clear, when looking at the top row of numbers, those representing people at enrollment, the “not stably housed” branch includes almost everyone – only four participants are on the “stably housed” half of the figure (the right half). The figure indicates overlap in conditions among the people entering the pilot; almost all are unstably housed, 25 have

poor mental health or substance use besides unstable housing, and 26 have all three conditions.

The bottom row of figures presents a very different picture from the top row. Notice that the boxes with high numbers of participants at baseline have all shrunk. At nine months, many more participants are falling on the right side of the figure, indicating that they are stably housed, and in particular 17 participants have achieved good outcomes in all three domains. Another 10 are stable in housing and are not using substances, but are still dealing with mental health symptoms, which may take longer to improve.

### Section 2.3: Do participants increase the number of “healthy” domains over the nine months in the pilot?

The number of domains participants have achieved relative health and stability in provides a summary of participants’ status. Figure 2-3 shows how many domains participants scored above the “healthy” criteria for at baseline and at follow-up.



This figure shows dramatic change. As can be seen, the bulk of the curve shifts from left to right in going from baseline to follow-up. At baseline large numbers of participants have 0 or 1 healthy domains according to the criteria, while at follow-up the majority of respondents are meeting the healthy criteria in two or three domains. The test for statistical significance associated with this figure is highly significant. The average

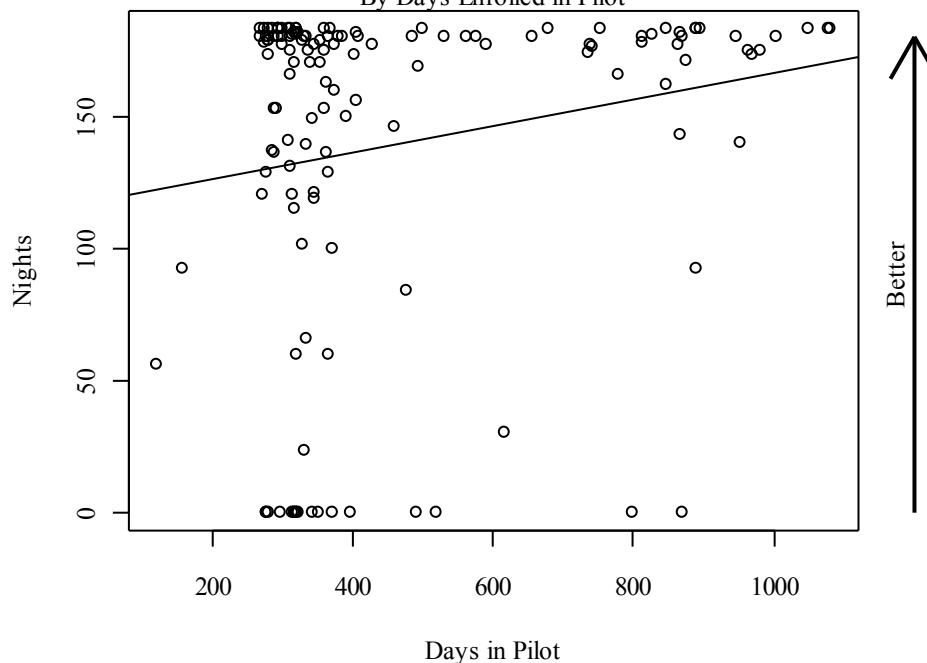
increase in the number of healthy domains across pilot participants was 0.75, indicating an improvement of “three quarters of one healthy domain”.

### Section 3: Did participants who had been enrolled in the pilot longer have different patterns of change from those who had been enrolled a shorter time?

If as may be the case, the pilot is a causal factor in helping participants make positive changes in their situations, then it is logical to assume that more “exposure” to the pilot will result in greater improvements. In this section we examine whether this is the case for the three key domains of housing, mental health, and substance use.

Figure 3-1 shows the number of nights respondents spent in their own apartment in the 6 months prior to their follow-up interview (the same outcome measure described in Section 1). In this figure that outcome is plotted against how long participants had been enrolled at the time of their interview. For this analysis we draw upon the full sample of pilot participants, not just those whom we were able to conduct timely baseline interviews with. Each dot in the plot represents a pilot participant at their particular combination of nights spent in their own home and days of enrollment in the pilot. The sloping line represents the best fitting straight line through these data, and, as can be seen, it slopes upward, indicating that the longer someone had been enrolled in the pilot the longer they had spent in their own housing.

Fig. 3-1: Plot of Number of Nights in Past 6 Months Spent in Own Housing By Days Enrolled in Pilot



The statistical test associated with this figure (regression) is significant. Similar graphs are presented below for the mental health and substance use outcomes.

Fig. 3-2: Plot of Mental Health Symptom Score  
By Days Enrolled in Pilot

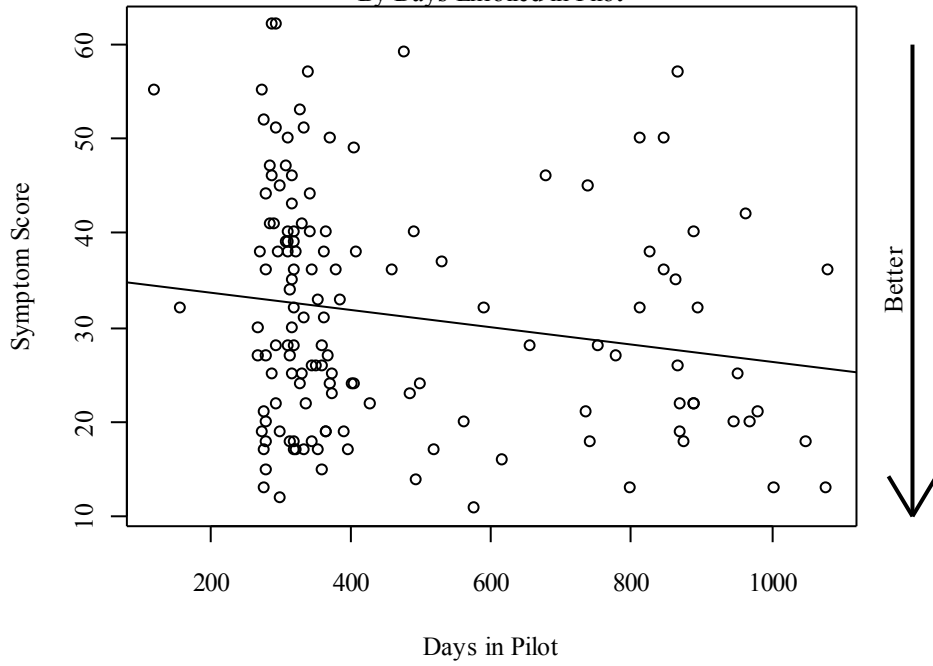
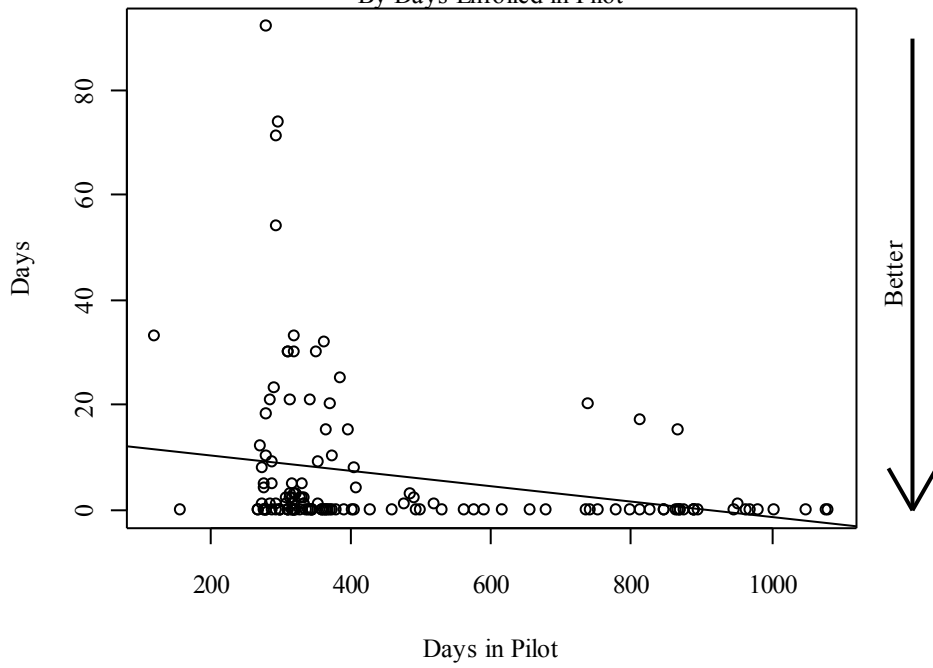


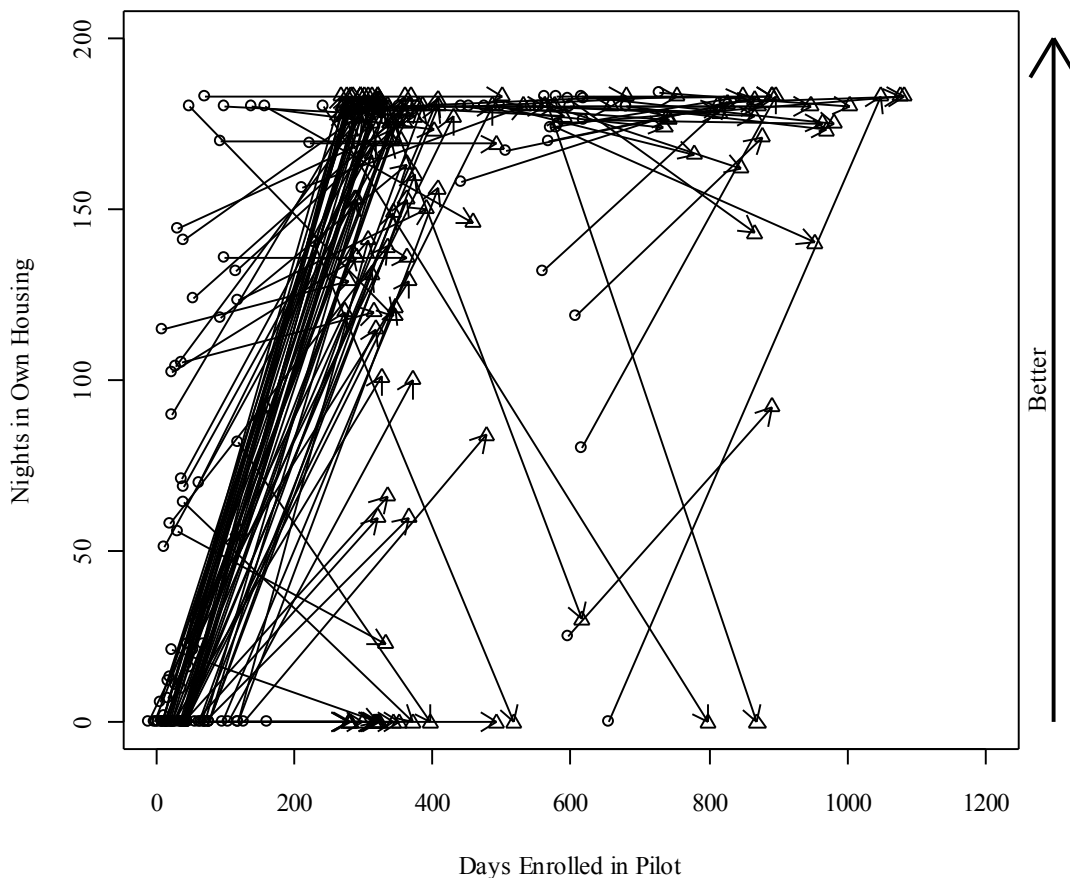
Fig. 3-3: Plot of Drug or Alcohol to Intoxication Use Days  
By Days Enrolled in Pilot



In these figures, similar relationships are observed, though for these figures positive change is indicated by a decrease in the outcome and the lines slope down with increasing days in the pilot rather than up, as with the first figure. These plots provide some evidence that people who have been in the pilot longer have more positive outcomes than those who have been in a shorter time.

We examine this issue more fully for the domain of housing. In the figure below, the vertical axis represents the number of nights the participant spent in their own apartment, while the horizontal axis represents the number of days they had been enrolled in the pilot. The information for each participant is represented by an arrow going from a circle that represents the information from their baseline interview to a triangle that represents the information from their follow-up interview. Thus, an arrow sloping upward reflects an increase in the number of nights a participant spent in their own apartment, while an arrow sloping downward represents a decline. While this plot is complex, it offers a wealth of information concerning participants' residential changes.

Fig. 3-4: Change From Baseline to Follow-up in Days In Own Housing



As is immediately apparent, there is a large “thicket” of arrows that start in the lower left of the figure and angle sharply upward to near the top of the figure. The starting points of these arrows are near the bottom of the figure, indicating that these respondents had

few or no days in their own housing during the six months leading up to their baseline interviews. Furthermore, the arrows start near the left side of the figure, indicating that these respondents completed baseline interviews relatively soon after they enrolled in the program (as desired). When their follow-up interviews were completed, however, the participants in this “thicket” had greatly improved their housing status. The triangles representing their follow-up status are near the top of the figure, around 180, indicating that they had spent all or almost all of the previous six months in their own housing.

The arrows going horizontally across the top of the figure compose another relatively dense “thicket”. These arrows represent those who had been in their own housing for all or almost all of the days before their baseline interview and remained in their own housing for all or almost all of the days before their follow-up interview. Most of these arrows start further towards the middle of the figure indicating that these individuals are mainly people whom we were unable to interview when they first enrolled in the program.

Another important cluster is those who were not in their own housing and remained unhoused. Examining the horizontal axis at the bottom of the figure, we see a cluster of approximately 8-10 individuals who started the pilot without their own housing and had still not spent any time in their own apartment by follow-up.

Finally, there is a handful of individuals, approximately ten, whose arrows stand out from the others by sloping downward. These arrows represent individuals who showed declines in the number of days they spent in their own housing. It is possible these participants entered residential substance abuse facilities or other institutional living arrangements between baseline and follow-up.

This figure makes clear that the “standard trajectory” appears to be a rapid increase in days housed followed by a leveling off near the measure’s maximum of 180 days.

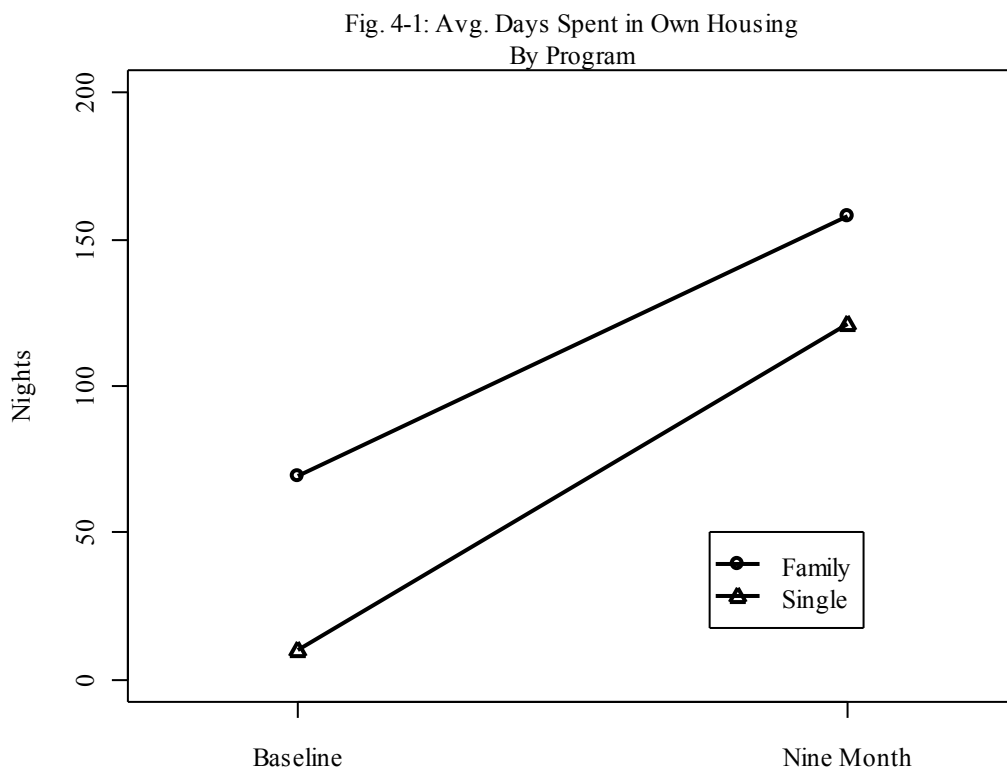
## Section 4: Did participants from different subgroups (single adult vs. family) and counties (Ramsey vs. Blue Earth) have different patterns of change?

The above sections show that a) many participants improved in the domains assessed during the nine month period, and b) there is considerable variation in how much participants improved, and in what areas. These findings naturally lead to the question “Why do some participants show different patterns of change from others?” We cannot conclusively answer this question or make causal inferences given our data. However, we can examine patterns of change and determine what factors are related to the various patterns. In this and the following section, we undertake this examination.

This section focuses on program level factors that could potentially be related to patterns of change. The factors we examine are program type (single adult vs. family) and county (Ramsey vs. Blue Earth).

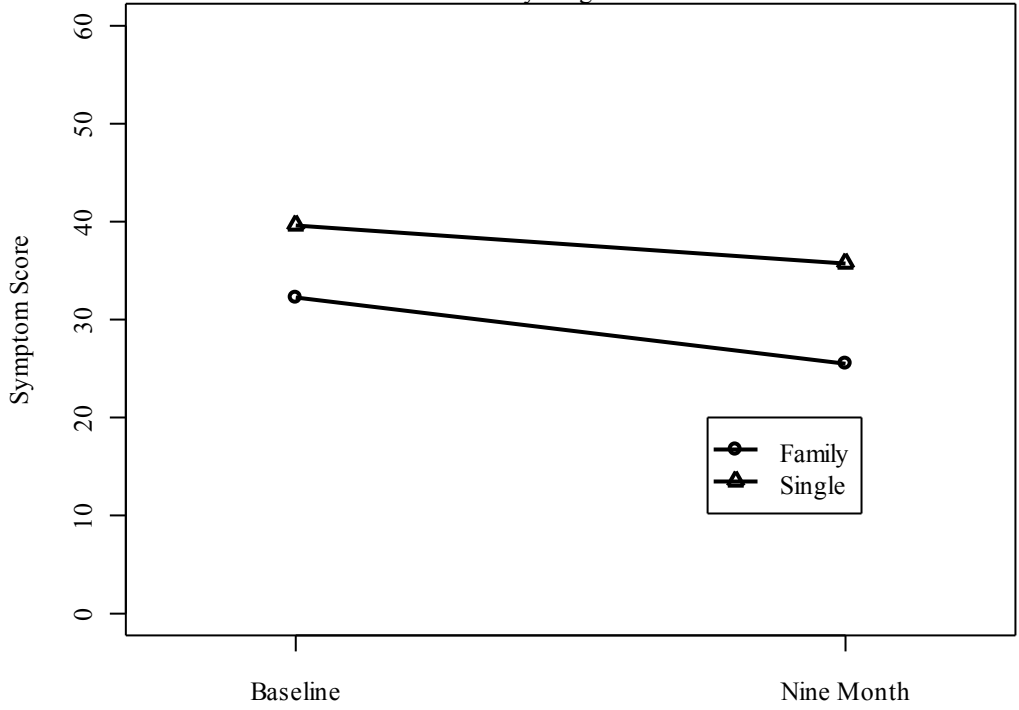
### Section 4.1: Program Type

For each of the domains of housing, mental health, and substance use, the plots below show change separately by program type (single adult vs. family).



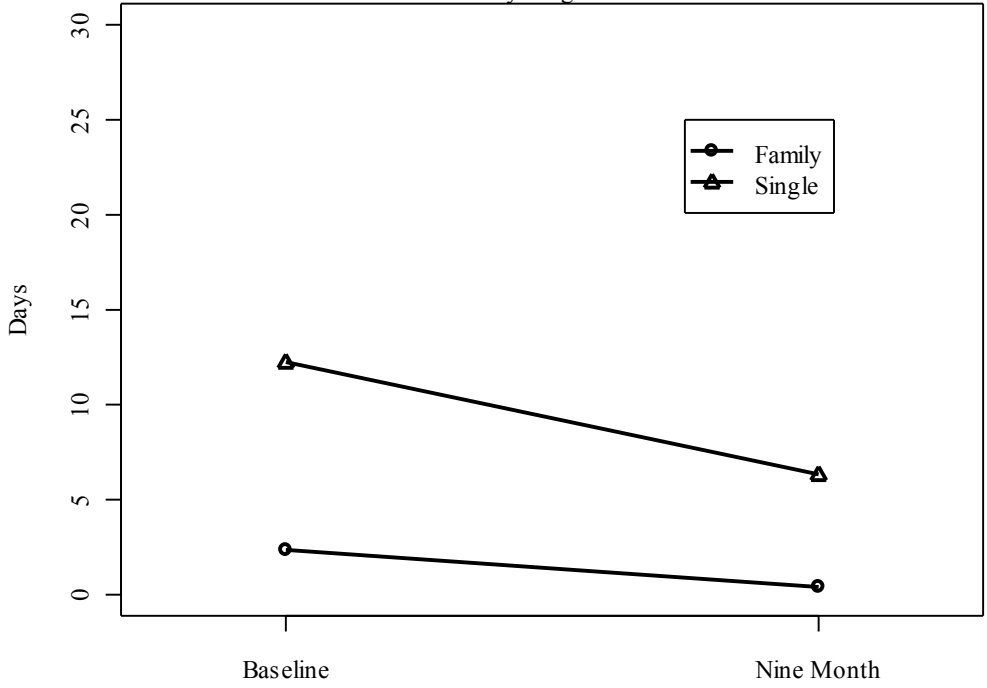
As the figure indicates, the pattern of change is similar across the two groups, both increasing roughly the same amount from their baseline status.

Fig. 4-2: Avg. Mental Health Symptom Score  
By Program



The mental health symptom score for families and singles show similar changes as well.

Fig. 4-3: Drug or Alcohol to Intoxication Days  
By Program

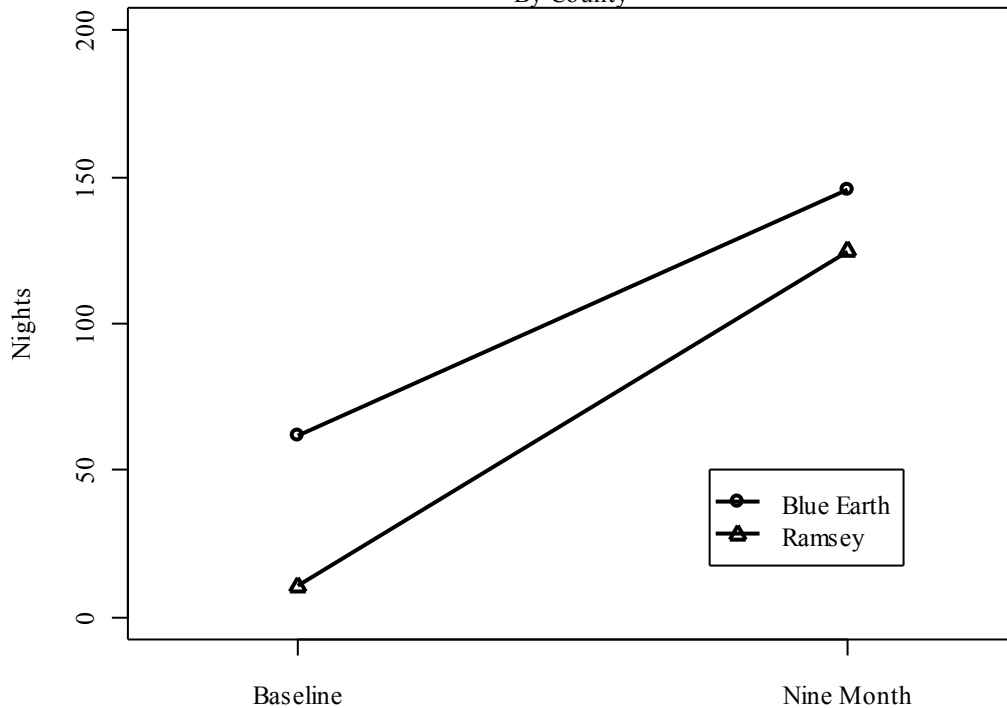


The plot for substance use shows a slightly different pattern with the singles declining more than the families; this is consistent with the higher rates of substance use in the singles population at baseline. Looking across all three plots, the single adults started the pilot with more severe housing, mental health, and substance use issues than family members, and generally both groups show similar changes over the nine months studied. For each plot the singles group is towards the more severely challenged side (lower for days housed and higher for mental health and substance use), but the lines for both groups are roughly parallel, indicating that one subgroup did not change more than the other. The corresponding statistical analyses generally support this interpretation, indicating significant level differences (one line is above or below the other), but no interactions of outcomes by program type (the slopes of the lines are not different).

### Section 4.2: County

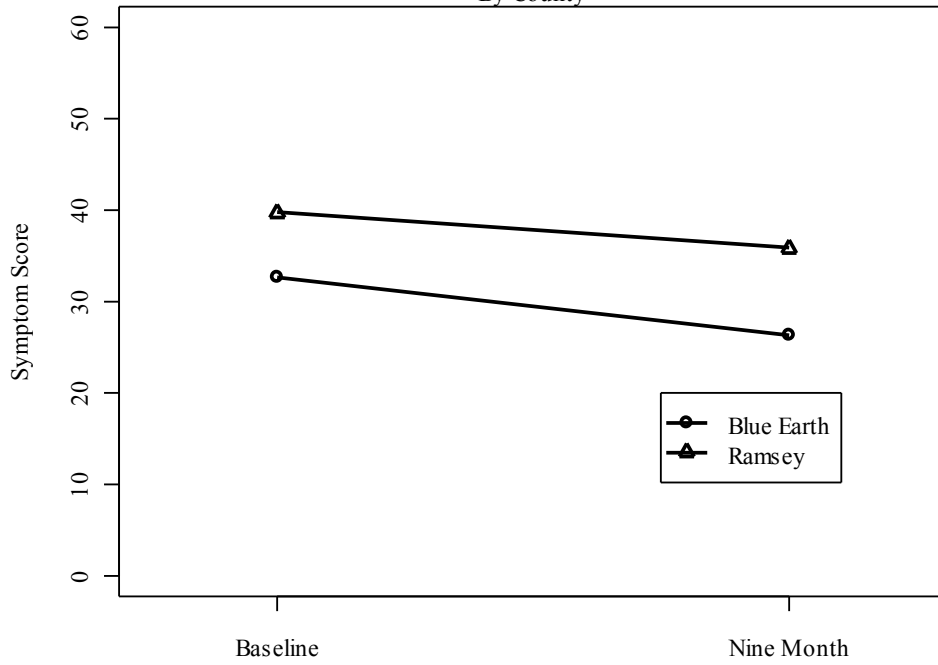
The next set of figures show change in the same three domains (housing, mental health, and substance use), but this time plotted against the county in which the participant's program is located.

Fig. 4-4: Days Spent in Own Housing  
By County



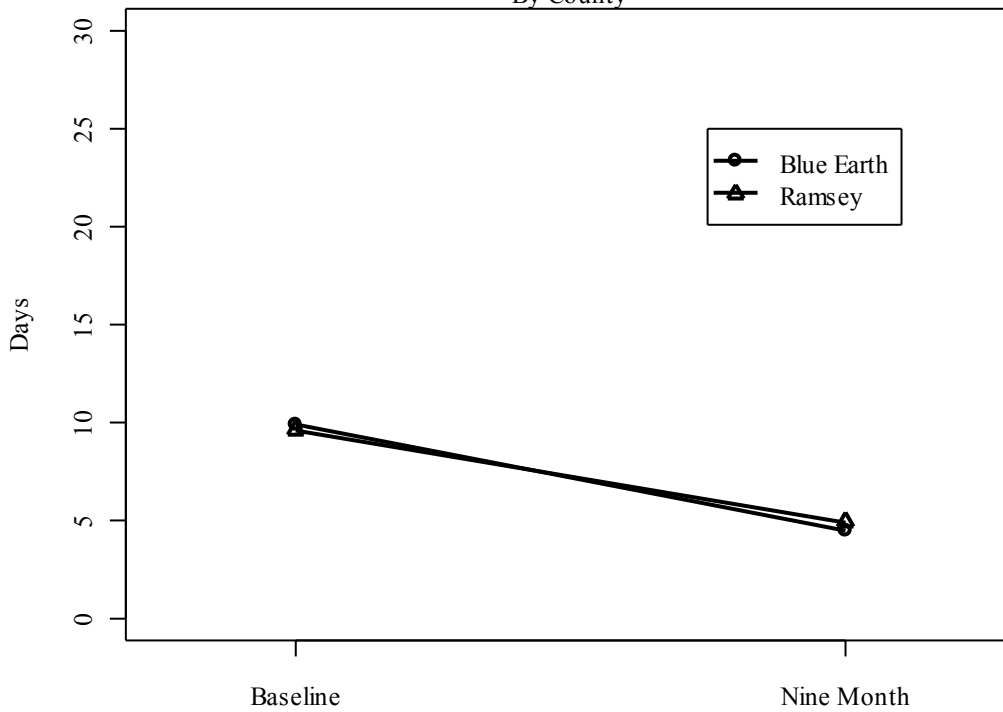
Again, this figure shows differences in level, but no strong difference in slope. This indicates that participants in Ramsey county had worse mental health status at baseline, but both groups improved roughly the same amount from baseline to follow-up.

Fig. 4-5: Avg. Mental Health Symptom Score  
By County



The mental health status of participants changed in similar ways across the two counties.

Fig. 4-6: Drug or Alcohol to Intoxication Days  
By County



In the area of substance use, there is no difference between the counties either in level of substance use at baseline or in the amount of change from baseline to follow-up.

These findings indicate that the pilot is being relatively uniform in terms of its impact across both program types and counties. These major program-level factors do not appear to be related to variation in participant outcomes.

## Section 5: Did participants with different demographic and life history characteristics have different patterns of change?

This section examines whether patterns of change for participants are related to the participants' characteristics coming into the pilot. Do some groups improve more than others? Table 5-1 below shows correlations among participants' characteristics coming into the pilot (the rows) and the three main outcome measures (the columns).

Baseline Characteristics	Days in Own Housing	Mental Health Symptoms	Drug/Alcohol Use Days
Age	-0.05	0.20	0.18
Male	0.10	0.10	0.19
Non-white	0.02	0.11	0.03
Months homeless as an adult	-0.20	0.19	-0.10
Number of mental illnesses	-0.17	<b>0.42</b>	0.21
Lifetime drug-alcohol use years	-0.03	0.17	<b>0.42</b>
Number of types of traumatic events	<b>-0.36</b>	0.04	0.17

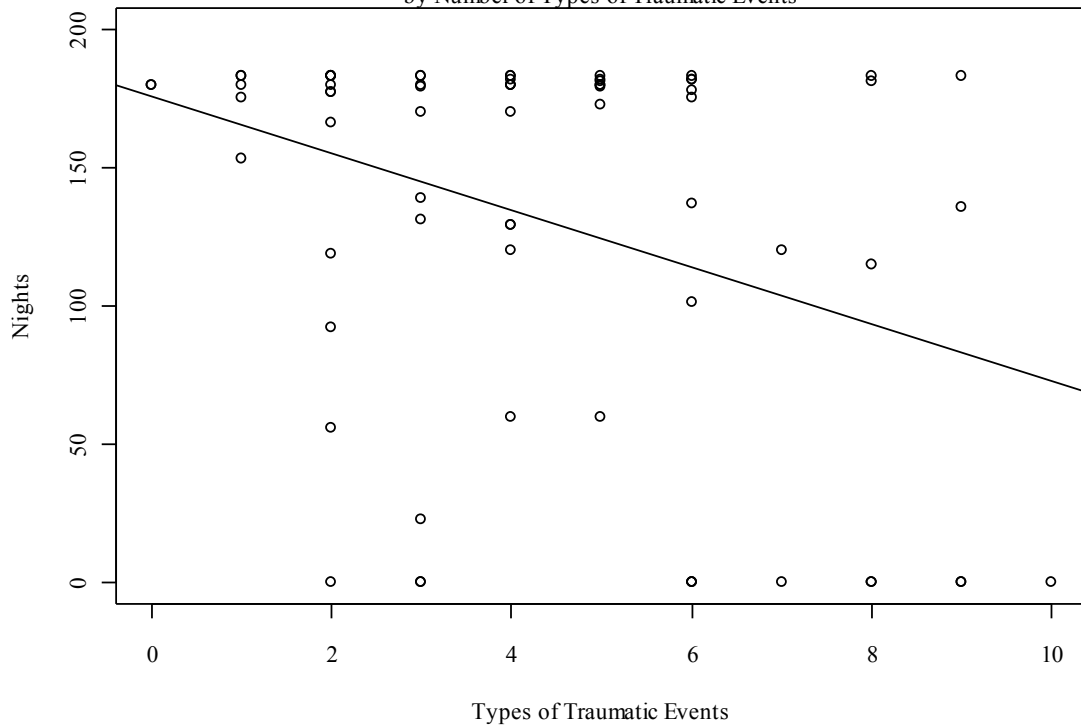
Correlations in bold are statistically significant.

Correlations are a numerical indicator of the degree of straight line relationship between two variables. They can range from -1 to +1. A correlation near -1 indicates that the two variables are negatively related; if someone is high on one variable, they are low on the other. A correlation near +1 indicates that the variables are strongly positively related; if a person is high on one measure, they are likely to be high on the other as well. Correlations near 0 indicate no linear relationship between the variables. These correlations are generally not strong, indicating that outcomes at nine months were unrelated to participants' status going into the pilot. Two exceptions were to be expected. The number of mental illnesses a participant reported upon entering the pilot was positively related to their nine month mental health symptom score (correlation = +0.42). Similarly, the number of lifetime drug/alcohol years of use a participant reported at baseline was related to their number of drug/alcohol use days at follow-up (again correlation of +0.42).

One other correlation is relatively strong (-0.36) and would not be expected simply by definition -- the correlation between the number of different types of traumatic events that a participant experienced in their life and the number of days spent in their own housing at follow-up. This correlation indicates that pilot participants who have extensive traumatic histories generally had spent fewer nights in their own homes at nine months.

Figure 5-1 below shows this relationship.

Fig. 5-1: Number of Nights in Own Housing at 9 Months  
by Number of Types of Traumatic Events



The vertical axis represents the number of nights participants spent in their own housing at follow-up, the horizontal axis shows the number of different types of traumatic events participants reported having experienced over their lives. Each dot represents a participant. The slanted line shows the straight line that best fits this data. As can be seen, it slopes significantly downward. The slope indicates that for each type of traumatic event a participant experienced, they had roughly 10 fewer nights spent in their own housing at follow-up. While we cannot infer a causal relationship between trauma experience and successful housing, this finding indicates an area that pilot stakeholders may want to investigate further.

## **Section 6: Did participants whom we were unable to interview at nine months differ from those whom we were able to interview?**

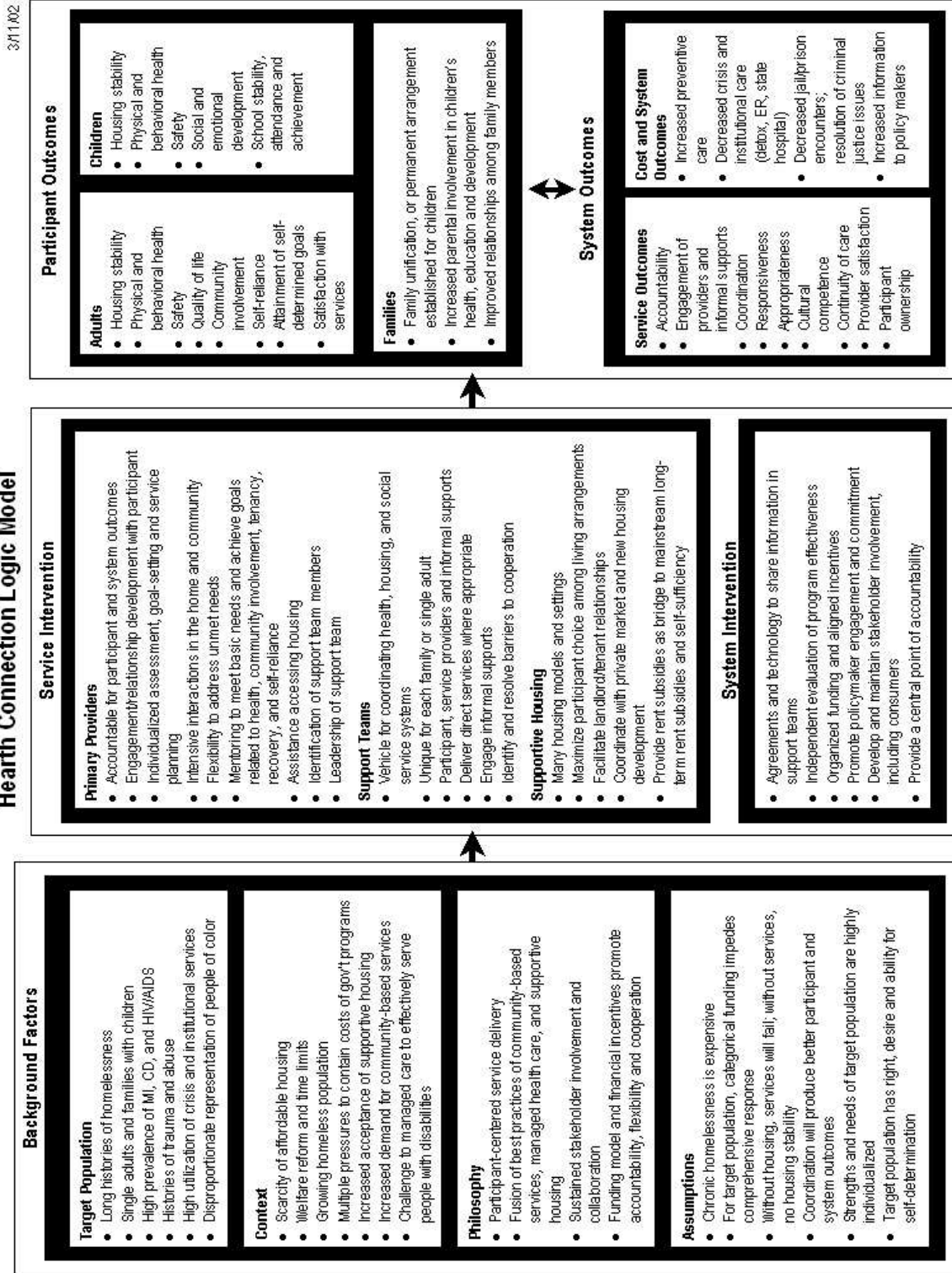
Attrition from research studies can seriously bias the results the studies produce. People who were interviewed and stay in the study can differ systematically (non-randomly) from people who the researchers are unable to locate. Over time the sample of people who remain in the study can come to differ in important ways from the sample that was initially interviewed. Drawing conclusions from the sample that remains in the study can be ill-advised as this sample may be unrepresentative of the group as a whole.

To date we have completed 139 nine-month interviews out of a baseline interview sample of 175, a follow-up rate of 79%. The entire sample of 175 has not yet entered the time window for their nine-month interviews (nine months have not yet passed for a number of the participants who have completed baseline interviews). Thus, the follow-up rate may increase.

To check whether the people whom we interviewed at nine months do not differ systematically from those with whom we have lost contact, we compared the two groups on demographics, life history variables, and the baseline values of their outcome measures. There were no significant differences between the two groups in terms of age, race, or gender. To determine whether severity of problems differed between the groups we compared the number of months they had been homeless as adults, the number of years using drugs and alcohol, the number of mental illnesses they reported, and the number of types of traumatic events they had experienced over their lifetime. There were no differences between the groups on these measures

We also compared the groups on all of the outcome measures used here: nights participants spent in own homes, days of substance use, mental health symptom score, physical and mental health functioning, quality of life, perceived community safety, satisfaction with services, and satisfaction with housing. There were no significant differences between the groups on any of these measures. Therefore, it appears that the group of participants we did not interview is not systematically different from the group that we interviewed.

# Appendix A: Logic Model



## Appendix B: Assessment Tools Used In the Interviews

The table below describes the instruments from the interview protocol that provided the data for this report. Readers interested in viewing the interview in its entirety can access it at [http://www.familyhomelessness.org/hearth\\_interview.pdf](http://www.familyhomelessness.org/hearth_interview.pdf).

Domain	Instrument	Description
Demo-graphics	--	A series of questions developed for this study, drawn largely from previous homelessness research.
Housing	Residential Follow-Back Calendar	Instrument developed for the Center for Mental Health Services / Center for Substance Abuse Treatment Homeless Families Program. Details all locations the participant spent the night over the previous six months.
Physical and Behavioral Health	Colorado Symptom Inventory	For each of a list of mental health symptoms, asks participant to rate the degree to which they are bothered by that symptom on a scale ranging from “At least every day” to “Not at all”.
	Addiction Severity Index	Asks respondents to report the number of years they have used alcohol, alcohol to intoxication, and each of 10 illegal drugs. Also asks respondents parallel questions for how many days in the past 30 they have used each substance
	Medical Outcomes Study Short Form 8 (SF-8), Physical Component Score and Mental Component Score	Questions ask respondent to rate their own health and in particular the degree to which their health limits their life.
Quality of Life	Lehman Quality of Life Interview	Asks respondents to rate their subjectively perceived quality of life in the domains of family, work, finances, and safety. Respondents use a scale ranging from “Terrible” to “Delighted”.
	Lehman Quality of Life Interview - Community Safety Scale	Three questions concerning safety in respondents’ community and in their homes.

Satisfaction with Services	Services Satisfaction Section	Series of questions developed for this study. Items drawn from several existing measures and newly created.
	Housing Satisfaction Section	Series of questions developed for this study. Items drawn from existing measures and newly created.