# Family Shelter Entry and Re-entry over the Recession in Hennepin County, MN:

## The Role of Family Income, Earnings and Residential Location

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**INTRODUCTION**

This study analyzes the determinants of the increase in family shelter use in Hennepin County, Minnesota over the recent recession. The number of families in Hennepin County funded shelters has increased by 66% from 2006 to 2012. While this increase is larger than national estimates (HUD, 2013), this may reflect Hennepin County's commitment to 'shelter all' families who need shelter, rather than placing a cap on the number of shelter beds. Estimates which use a definition that includes both homeless and doubled up children have found a 70% increase in the number of homeless and highly mobile children from 2006-7 to 2011-12 (National Center for Homelessness Education, 2013).

The increase in family homelessness over the recession increases the risk of maternal stress and poor maternal health outcomes (Park, Fertig, & Metraux, 2011) and it places children at risk of lower academic achievement (Obrodavic et al., 2009; Cutuli et al., 2013). Increases in family shelter use also place high financial burdens on the County. The median cost of each shelter spell for a family of three entering shelter in 2010 was $2700, which is five times the amount the State spends on monthly MFIP payments for a family of three.[1]

To understand why family shelter use has increased so markedly, this study analyzes the determinants of entry and re-entry into shelters. The entry analysis follows two cohorts of families who entered the Food Support program in Hennepin County in 2004-6 and 2008-11 to determine how demographic and economic factors affect the length of time until they enter shelter. The analysis of shelter re-entry follows a sample of families who exited a county shelter in 2005 to 2011 to examine the determinants of time until shelter re-entry.

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[1] This assumes the family stays for the median length of stay per spell in 2010 of 30 days, and that the cost per day is $92.

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The analysis documents that there has been an increase both in the probability of entering and re-entering shelter which has been concentrated among African Americans and Native Americans. Controlling for demographic characteristics, geographic location and prior service use, the monthly hazard rate for entering from Food Support to shelter increased by 34% for African Americans from 2004-6 to 2008-11, while it did not increase significantly for majority race families. The monthly hazard rate for shelter re-entry increased for all families by 18% for families exiting shelter in 2007-8, by 42% for families exiting in 2009, and by 73% for families exiting in 2010-11 relative to families who exited in 2005-6.

Although this study finds that the share of families with earnings declined over the recession, and that family earnings are highly correlated with both shelter entry and re-entry, it finds that controlling for family earnings or income explains very little of the increase in shelter entry from Food Support, while it explains between 20% and 50% of the increase in shelter re-entry over the recession. This may in part be a result of an increase in transfers which offset the decline in family earnings. In addition, it may due suggest that a large part of the increase in shelter use is attributable to unmeasured factors such as the deterioration in the housing market.

This analysis confirms previous research that has documented that shelter entry and shelter re-entry are correlated with personal characteristics, such as race, age of mother, and age of children, as well as with the number of previous shelter spells (Barnett et al., 2011; Connell, McCullough, Pina, & Stocking, 2012). In addition, it finds that families who live outside Minneapolis but within Hennepin County and outside Hennepin County but within Minnesota are 40% less likely to enter shelter and 20% less likely to reenter shelter than families living inside Minneapolis. This may reflect both greater resources and greater barriers to accessing shelter for families living outside Minneapolis.

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**LITERATURE REVIEW**

A growing literature has documented the risk factors associated with family homelessness and family shelter use. This literature has documented that personal characteristics are associated with homelessness, including race, age of mother, age of children, and maternal education (Fertig & Reingold, 2008; Shinn, Weitzman, Stojanovic & Knickman, 2013; Weinreb, Rog, & Henderson, 2010; Culhane, Metraux, Park, Schretzman & Valente, 2007; Bassuk et al., 1997; Shinn et al., 1998).

This literature also has found that use of family shelter use is associated with intensive use of supportive services such as mental health and substance abuse services (Weinreb et al., 2010; Culhane et al., 2007). While this literature has documented that personal characteristics affect shelter entry, it does not always reach the same conclusions regarding the impacts of individual factors. For example, while Shinn et al. (1998) and Bassuk et al. (1997) find that African-Americans were more likely to enter shelter than other families on welfare, more recent studies have not found race to be significantly related to shelter entry (Shinn et al., 2013).

Most of this literature has not focused on the role of family earnings as an explanatory factor. Some studies have included indicators for employment status or work history, but they have not included earnings levels; nor have they tracked the impacts of changes in earnings over time. The studies which do measure the impacts of employment have found mixed results. (Shinn et al., 2013) finds that current employment status predicts shelter entry, while both Fertig and Reingold (2008) and Shinn et al. (1998) do not find employment or work history to be associated with shelter use.

This literature has also examined the impact of housing market factors. For example, Shinn et al. (2013) and Bassuk et al. (1997) have found that evictions increase the probability of shelter use, while Weinreb et al. (2010) found that housing debt is associated with an increase in the duration of shelter spells. This research has also emphasized the importance of access to subsidized housing in preventing entry or re-entry into shelter (Bassuk & Geller, 2006; Wood, Turnham & Mills, 2008).

Most of the recent studies that investigate the impact of individual risk factors for family homelessness have not focused on the role of area-level factors such as the aggregate unemployment rate, the aggregate poverty rate, or changes in the availability of affordable housing. One exception to this is Fertig and Reingold (2008), which examines the determinants of shelter using the Fragile Family Survey. This survey follows a birth cohort of children born in 1998-2000 who parents were unwed at the time of their birth. Because the survey is completed in 20 different cities, it allows for cross-sectional variation in housing market and economic circumstances. This study found relatively weak impacts of both housing market and economic circumstances. The area level unemployment rate and the area level poverty rate are insignificant or have the 'wrong' sign in predicting homelessness or doubling up. The role of housing variables are somewhat stronger: the share of apartments with rents below 30% of median family income is associated with lower homelessness rates, and the rental vacancy rate is associated with decreases in doubling up.

One reason for why this study may have found weak impacts of economic and housing characteristics may be that the sample size is not large enough. Although the national sample is relatively large, only 128 mothers are homeless in the first year of the survey and 97 in the third year of the survey; while 343 are doubled up in year one and 223 are doubled up in year three.

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In addition, the changes in housing market and unemployment characteristics measured during the early 2000's may not be as large as those under the current recession.

Earlier research that has used aggregate data to measure the association between area level housing conditions and homelessness has found stronger impacts of housing market conditions on homelessness. For example, Quigley and Raphael (2001) use data from the 1990 Census and the Urban Institute of shelter providers to estimate the determinants of individual and family homelessness. They find evidence that homelessness is related to area level vacancy rates and median gross rents. In addition, per capita income is negatively related to homelessness.

This study adds to previous research in several ways. First, it is one of the first studies to investigate the impacts of the recent upheavals in the Great Recession on family homelessness. While Minneapolis is not necessarily representative of all areas in the country, it does offer a useful test case, because Minneapolis experience both relatively large increases in foreclosures and increases in unemployment. In addition, because Minneapolis has adopted a 'shelter all' policy, it is more likely that changes in shelter counts will reflect increases in need for shelter across the community.

Second, this study is one of the first studies to add detailed information from unemployment earnings records on family earnings. This makes it feasible to trace out the impact of both the level and the trend in earnings over time on shelter entry and re-entry. It also makes it possible to directly capture the impacts of changes in earnings before and after the recession hits.

**METHODOLOGY**

**Data Sources**

This study uses administrative data on two cohorts of families with children. The Food Support cohort includes all households with children who were approved to use Food Support in Hennepin County at some time during from January 1, 2004 to September 1, 2011. The shelter cohort includes all families who entered a Hennepin County family shelter from January 1, 2004 to September 30, 2011.

For purposes of this analysis, the person listed as the applicant for Food Support or shelter in the first month the family received assistance in 2004 to 2011 was considered to be the household head. To restrict the sample to nuclear families, information was collected on all individuals in the household, except for the applicant's aunt, uncle, cousin, sibling, live-in attendant, or those with an unknown relationship to the applicant.

Information on family shelter use, income sources, demographic characteristics, and residential addresses was collected from the State's MAXIS data system, which is the data system used to determine eligibility and benefits for Food Support, cash assistance, and medical care in Minnesota. This system contains a unique id for each individual and each case, which makes it feasible to match information.

Following are the key data elements collected from the MAXIS system for both the Food Support and the shelter cohorts.

- Demographic characteristics of the head of the household, including age, race, immigrant status, gender, and education were measured as of the first date that information was

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available from 2004-8, and as of the first date the information was available in 2008-2011.

- The number and age of children in the household was collected for each month from January 2004 to August 2012. Children were included in the household as long as they were listed as being a child, step-child, grand-child, legal guardian, or other relative of the head of the household.

- The date of entry and exit from public shelters was collected for all months from January 2000 to August 2012.

- Data on family income sources (Food Support, MFIP, General Assistance, SSI and SSDI) was collected for all months from January 2000 to August 2012 using MAXIS data.

- Information on the applicant's addresses was collected from January 2000 to August 2012. Hennepin County staff used this information to generate an indicator for the geocoded census tract of the address, and an indicator for whether the address is a public or private shelter or a Post Office box.

To obtain information on family use of medical services, the analysis drew on data from the State's Medicaid Management Information System (MMIS). Information was collected on use of outpatient chemical dependency, outpatient mental health services, and personal care attendant services for all members of the family from January 2000 to August 2012. The MMIS system includes a case and person identifier that is common to the MAXIS data system, which facilitates matching across these two systems.

Finally, information was collected on the quarterly earnings and quarterly hours for all quarters from the first quarter of 2003 to the second quarter of 2012 reported in payroll records collected by the state Department of Employment and Economic Development (DEED). Information was collected on adults in the household who were coded as the household head, the spouse of the household head, or an unrelated individual who is related to one of the children in the household.

To perform the match, Hennepin County provided DEED with the social security number, name, and date of birth of individuals in the sample. DEED reported earnings for sample individuals that matched their records on social security number, name and date of birth.   In cases where social security numbers matched, but the name and date of birth did not, they reported an error message and did not report earnings information.

**Analytical Techniques: Modelling Shelter Entry**

The first part of this analysis uses the Food Support cohort data to analyze the determinants of entry into public shelters.   It restricts the sample to include families who received Food Support during 2004-2006 (the pre-recession period) or during 2008-2011 (the recession period).  It also excludes cases where a family enters shelter in the same month they enter Food Support to avoid cases where a family is enrolled in Food Support after they apply for shelter.

The analysis considers a family to be at risk of entering shelter from the first time they receive Food Support in 2004-6 or 2008-11.   Thus, it defines a shelter entry spell to begin the first month a family receives Food Support in 2004-6 or in 2008-2011 and to end when the family first enters shelter.   This definition of shelter entry includes families with ongoing Food Support cases in January 2004 or January 2008.  To control for unmeasured differences in the propensity

to enter shelter, the analysis includes an indicator for families with ongoing Food Support cases in January 2004 or January 2008.   The analysis follows families for up to 36 months or to the month they first enter shelter.  Families who have not yet entered shelter within 36 months are considered to be censored, which implies that the duration of time to shelter entry is unknown.

The entry analysis estimates Cox proportional hazard models that estimate determinants of the hazard rate for shelter entry, or the probability that a family enters shelter in each month, given that they have not yet entered shelter.  The monthly hazard rate for entering shelter is modeled based on the following equation, where i indexes family and t indexes month:

$$h_{it} = B_1 \, Recession \; Cohort_t + B_2 Black \; or \; Native \; American_i * Recession_t + B_3 Black_i$$
$$+ \, B_4 \, Native \; American_i + B_2 D_{it} + B_3 \, S_{it} + B_4 \, E_{it-1} + B_5 \, X_i$$

The first term is an indicator that equals one if the family entered Food Support in 2008-11.  The second term is an interaction term between the whether the household head is black or Native American and Recession Cohort. It tests for whether blacks were more affected by the economic recession than other family on Food Support.  The third and fourth terms are indicators for whether the household head is black or Native American. They test for whether blacks and Native Americans are more likely to enter shelter in 2004-6.

The $D_{it}$ term captures household demographic characteristics, including the age, race, education, and immigration status of the head, as well as the number of children of different ages in the family.  The $S_{it}$ captures prior service, such as the number of outpatient mental health services, the number of chemical dependency services, and the number of personal care attendant services received by the family in the last year.  It also includes of the number of shelter visits in the last three years.

The $E_{it-1}$ term captures the amounts of family earnings and family income in the prior quarter or in the prior year. The model includes lagged values of family earnings or income, because family income and earnings may be endogenous to shelter entry. For example, caseworkers may provide additional assistance to enroll families in transfer programs when families enter shelter. In addition, shelter entry may change the incentive for families to work and earn income, since Hennepin County counts any family income towards the shelter grant.

Finally, $X_i$ captures information on the location of each family's first residence during the three months after they first enter Food Support. It includes indicators for whether the family lived in Minneapolis, outside Minneapolis but inside Hennepin County, or outside Hennepin County.

**Analytical Techniques: Modelling Shelter Re-entry**

The second part of this analysis analyzes the determinants of time until re-entering shelter for all families who exited a spell of shelter use in January 1, 2004 to September 30 2011. Information on the dates of shelter use were first collapsed into 'spells' of shelter use, which define the beginning of a shelter spell as the date they first enter shelter, and the ending as the first time a family leaves shelter and remains out of shelter for thirty days or more.

The analysis estimates the determinants of the 're-entry spells', or the number of months between the time a family exits a shelter spell and the time before they first enter shelter. As before each family is followed for up to 36 months. Families who have not re-entered shelter within 36 months are assumed to be censored, which means there is no information available on re-entry after 36 months.

The re-entry analysis estimates Cox proportional hazard models to analyze the determinants of the monthly hazard for shelter re-entry, or the probability that a family re-enters shelter in each

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month given that they have not yet re-entered shelter.  The hazard rate in each month for entering

shelter is modeled based on the following equation where i indexes family and t indexes the

month:

$$h_{it} = B_1 \, Year_t + B_2 D_{it} + B_3 \, S_{it} + B_4 \, E_{it-1} + B_5 \, X_i$$

In this model, $Year_t$ includes indicators for the year in which the family exited shelter, which are

intended to capture changes in the re-entry probability over time.  The model does not include

interaction terms between race and year, because initial testing suggested that these interactions

were not statistically significant.  The $D_{it}$, $S_{it}$ and $E_{it-1}$ terms capture demographic characteristics,

service use and income or earnings. They are similar to the ones defined in the entry analysis

above.  Finally, $X_i$ includes information on the location of the address that the family lived at for

the longest period in the year prior to shelter entry. This is intended to capture the impact of

initial housing location on shelter re-entry.

**Study Limitations**

There are several important limitations to this analysis. First, the analysis does not capture

changes in unsheltered family homelessness, or in the number of families who are doubled up.

In addition, since the data only includes information on use of county-funded shelters in

Hennepin County, it does not include the privately-run Sharing and Caring Hands  (Mary's

Place). This excludes 20% of families served by shelters in 2011 (Heading Home Hennepin,

2012).  It also may disproportionately exclude immigrants and families with longer average

shelter stays.

A second limitation of this study is that information on earnings is only collected for families

who have earned income within the state of Minnesota.  Thus, it is hard to determine whether a

family who is recorded with zero earnings actually has no earnings or whether they have moved out of the state.   In addition, the Minnesota Department of Human Services only collects income and address information for families who are currently receiving services. Thus, families with zero earnings and zero income may be living outside the State or they may be living within the State but have no earnings or transfer income.

A final area for concern is that because the analysis relies on administrative data which was not originally intended for research purposes, some of the variables may be measured inaccurately. For example, it is unclear how accurate the information on current address location is. Most families are required to report an address where the Department of Human Services can contact them. However, this need not be the location of their current residence.

**RESULTS**

**Trends in Earnings and Income**

To understand how the economic status of families changed over the recession, Table 1 compares the quarterly earnings of families entering Food Support or shelter in 2004-6 to those of families entering Food Support or shelter in 2008-10.  The first four rows show earnings in the quarter of program entry while the last four rows show earnings in the fourth quarter following program entry.  Figures 1a-1f and Figures 2a-2f also includes graphs of earnings over more quarters following program entry.

Not surprisingly shelter entrants have lower earnings than Food Support recipients.  Between 29% and 33% of shelter entrants had earnings in the quarter they entered shelter, compared to 41% to 44% of Food Stamp entrants.  Of those with earnings, the median quarterly earnings of

shelter entrants was between $900 -$950 during the quarter of entry, compared to $2950-$3140 for Food Support entrants.

Table 1 shows that for both shelter and Food Support entrants, earnings during the quarter of program entry were similar in 2004-6 to 2008-10. The share of Food Support entrants with earnings in the quarter of entry decreased from 44% to 41% from 2004-6 to 2008-10, while the share of shelter entrants with earnings in the quarter of entry decreased from 33% to 29%. In addition, the level of earnings of families with earnings at the 25th, the 50th and 75th percentile remained relatively constant for both groups from 2004-6 to 2008-10. This may be because entry into Food Support or shelter is precipitated by a decline in earnings, which brings family earnings below a threshold level.

While there was little change in earnings in the quarter of entry, there was a decline in earnings in the fourth quarter following program entry. For cohorts entering Food Support or shelter in 2004-6, the share of families with earnings increased over time; however, there was little improvement for families entering in 2008-10. The net result was a decline in the share of families with fourth quarter earnings from 48% to 40% for Food Support entrants and from 36% to 29% for shelter entrants. Thus, one main impact of the recession may have been to impede the ability of families to improve their economic status by moving into the labor market.

Table 2 presents information on quarterly transfer payments received by Food Support and shelter entrants during the quarter of entry, and four quarters following program entry. Transfers include payments from Food Support, Minnesota Family Investment Program, General Assistance, Social Security Disability Insurance, and Supplemental Security Income. As shown, while there was little change from 2004-6 to 2008-10 in transfer payments to Food Support and

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shelter entrants in the quarter of entry, there was a large increase in transfer receipt four quarters after shelter entry. The share of Food Support families receiving transfers during the fourth quarter following entry increased from 70% to 80% from 2004-6 to 2008-10, while it increased from 71% to 80% for shelter entrants.

This increase in transfer receipt over the recession may in part reflect families' greater need for assistance, as they are less successful in securing employment. It also may reflect expansions in transfer programs as part of the American Recovery and Reinvestment Act of 2009. This legislation expanded benefits under Food Support, Supplemental Security Income and Social Security, and they provided additional resources to state TANF programs.

Finally, it is possible that the increase in transfer receipt may be a result of other factors that caused an increase in shelter use. At the time of application for shelter, shelter case-workers screen families to determine whether they are eligible for other social assistance programs, and encourage them to apply for assistance. They have a strong incentive to do this, because they can apply county welfare payments towards the cost of the family's shelter stay. Thus, to the extent that external factors such as the declining housing market and labor market encouraged families to enter shelter; they also may have increased use of social assistance.

While this explanation may explain the increase in transfer receipt for shelter entrants, it is unlikely to explain much of the change for Food Support recipients, since the sheltered population is a small share of the Food Support population. In addition, since there was not a larger increase in use of transfers for shelter entrants than for Food Support participants, it is also possible that this explanation was not the main factor causing the increase in transfers for shelter entrants.

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Table 3 compares the combined earnings and transfer income of families entering Food Support or shelter in 2004-6 to that of families entering in 2008-10. As shown, the income of shelter entrants was stable, both in the initial quarter and four quarters following shelter entry, suggesting that the expansion in transfers largely offset the reduction in earnings over the recession. For Food Support entrants there was a moderate decrease in income, from $2700 to $2500 at the median, and from $5100 to $4600 at the 75th percentile of family income.

Taken together, these results suggest that the economic position of families entering Food Support or shelter may not have deteriorated over the recession, despite their lower earnings rates. To the extent that transfer payments are a perfect substitute for earned income, one would expect that the labor market declines during the recession may not have precipitated an increase in homelessness, since earnings declines were largely offset by increases in transfers. However, it is possible that earnings are more protective against shelter entry than transfers, since landlords may be more willing to accept tenants with a history of employment and families with earned income may have access to social networks with more connections to the housing market. On the other hand, increased access to transfers may help families to avoid homelessness, by increasing their connections to case-workers, who refer them to other resources in the community.

**Trends in Address Location**

While family earnings and income may be related entry or re-entry into shelter, it is also possible that entry is influenced by the neighborhood in which families live. Families who live close to public shelters may be more likely to enter shelter, because they face lower informational and transaction costs for entry. In addition, since Minneapolis shelters are located in neighborhoods

with a high poverty concentration, families in these neighborhoods may have less access to social capital and community networks to help them secure access to private housing.

Table 4 provides information on the address of Food Support entrants. It captures the first address recorded in the state MAXIS data system in the three months following entry into Food Support in 2004-6 or in 2008-10. Information on the census tract of each address was used to code address locations into the categories shown. The table also includes a category for addresses that were for a P.O. Box or homeless shelter and for families with no address information available.

As shown, there has been an increase in the share of Food Stamp entrants living in suburban Hennepin County and a decrease in the share living in Minneapolis. The share of families with Minneapolis addresses decreased from 49% to 43%, while the share living in greater Hennepin County increased from 30% to 35%. This is consistent with other research that has argued that there has been an increase in the suburbanization of poverty over the recession. (Allard & Roth, 2010; Kneebone,2010).

In order to compare the residential location of shelter entrants to those of other low income families on Food Support, Table 5 presents information for families who entered shelter in 2005- to 2010 on the location of their longest address in the year prior to shelter entry. This table shows that shelter entrants had prior addresses that were more concentrated in Minneapolis than did Food support entrants: 51% of shelter entrants in 2008-2010 had prior addresses in Minneapolis, compared with 43% of Food Support entrants. This is consistent with other research that has suggested that the sheltered population is more centrally concentrated than the poor housed population (Carter, 2011; Alexander-Eitzman, Polio & North, 2013).

Table 5 also suggests that between 17% and 22% of shelter entrants had no information recorded on their address prior to shelter. These families may have no information included in the system, because they had moved into the area from another state. Alternatively, they may have lived in Minnesota but they may not have received transfer income prior to shelter entry. In this case there would have been no information in the data on address prior to shelter entry.

To better understand how neighborhood location may affect shelter entry, Table 6 shows the distribution of the characteristics of the Census tracts that shelter entrants resided in, tabulated by whether the address was located inside Minneapolis, in greater Hennepin County, or outside Hennepin County but within Minnesota. Not surprisingly, this table shows that shelter entrants who were residing in Minneapolis lived much closer to shelters, with the distance for the 25th to 75th percentile ranging from 1.5 to 3.2 miles. This compares to a range of 7.3 to 11.9 miles for families in greater Hennepin County, and 11.5 to 27.3 to families living outside Hennepin County. Thus, it is plausible that distance from shelter may impede shelter access for families living outside the urban core.

In addition, Table 6 shows that shelter entrants who lived in Minneapolis lived in neighborhoods which had substantially higher poverty rates and higher rates of racially segregation than families living in greater Hennepin County or outside Hennepin County. This greater economic and racial segregation of Minneapolis shelter entrants may affect their propensity to enter or re-enter shelter, because it may affect the amount of social capital that families have to rely on in the event of an emergency.

While shelter entrants who lived in Minneapolis resided in neighborhoods that were more concentrated by race and poverty status than shelter entrants in outlying areas, Minneapolis

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shelter entrants had lived in neighborhoods with comparable shares of immigrants to those of shelter entrants from greater Hennepin County or from outside Hennepin County. This may imply that any differences found in the rates of shelter entry for Minneapolis residents compared to those from outlying areas may not reflect differences in the size of immigrant enclaves.

**DETERMINANTS OF ENTRY INTO SHELTER**

Table 8 shows the results of a Cox model that estimates the determinants of the monthly hazard rate for entry from Food Support into shelter. The first number reported for each variable is the hazard ratio. It indicates the proportionate impact of a one unit change in each variable on the monthly hazard for entering shelter. A value greater than one indicates that the variable increases the probability of entering shelter while a value less than one indicates that the variable decreases the probability of entering shelter. The second number is the standard error of the estimated impact of each variable, and is used for calculating the statistical precision of the estimates. If the estimated hazard ratio for a variable is more than two standard errors larger or smaller than 1.0, the estimated impact of that variable is likely to be statistically significant.

The first model in Table 8 includes a base set of controls for demographic characteristics, prior service use, and the location of the family's initial address. The second and third models add controls for earnings in the prior quarter, and earnings in the prior quarter and prior year. The fourth and fifth models include controls for income in the prior quarter, and income in the prior quarter and prior year. Each of these models was initially tested on detailed set of controls and then simplified to include only significant variables.

The first two variables of Model 1 show how entry into shelter has changed from 2004-6 to 2008-11. The 2008-11 Cohort variable tests for whether there was a significant change in shelter

entry for all families who entered Food Support in 2008-11, while the 2008-11

Cohort*Black/Native American interaction variable tests for whether there was a larger increase

in shelter use for Blacks and Native Americans entering in 2008-11 than for other families. As

shown, after controlling for family characteristics, there was not a significant increase in the

probability of shelter entry in 2008-11 for majority race families on food support. For Blacks

and Native Americans, the probability of entering shelter increased by 28% more in 2008-11

than it did for majority families. On net, Blacks and Native Americans had a 34% increase in the

probability of entering shelter in 2008-11 relative to 2004-6.[2]

The remaining variables in Model 1 confirm that demographic factors are highly correlated with

shelter entry. Controlling for other factors, blacks are two times more likely, Native Americans

are 40% more likely, and immigrants are 85% less likely to enter shelter than other families.

Model 1 also shows that shelter entry is much higher for young parents with young children and

it is higher for household heads with less than a high school education Shelter entry is positively

related to the number of chemical dependency outpatient visits in the last 3 years, and it is

negatively related to the number of mental health outpatient visits. Finally, shelter entry is

highly related to prior shelter use, with each additional shelter spell in the prior three years

increasing the probability of shelter entry by 2.7 times.

The next set of indicators test whether the location of the family's address in their first three

months on Food Support is correlated with entry into shelter. Controlling for other

characteristics, both families living in greater Hennepin County and families living outside

Hennepin County are 40% less likely to enter shelter than families living in Minneapolis. As

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[2] This was calculated by adding the coefficient on the 2008-11 Cohort variable to the coefficient on the 2008-11 Cohort*Black/Native American interaction term.

discussed above, this reduced use of shelter by families living outside Minneapolis may reflect both the barriers induced by their restricted proximity to shelter, and well as greater access to social supports that facilitate their access private housing.

The first two variables of Models 2 to 5 test whether the estimated increase in shelter entry in 2008-11 for African Americans and Native Americans is sensitive to the inclusion of controls for family earnings or family income. As shown, all of these models yield similar estimates which suggest that there was a 34%-35% increase in entry into shelter for African Americans and Native Americans. Given that these results hold even after adding controls for family earnings and family income, they imply that the increased risk of shelter entry for African Americans and Native Americans on Food Support over the recession is not a result of declines in their earnings or income.

Although adding controls for earnings and income does little to explain the trends in shelter entry over the recession, these factors are highly correlated with entry into shelter. For example, Model 2 suggests that families with less than $1000 in earnings last quarter are 5.5 times more likely to enter shelter, families with quarterly earnings between $1000 and $2000 are 4.4 times more likely, families with earnings of $2000-$4000 are 3.1 times more likely, and families with $4000-$6000 are 1.9 times more likely to enter shelter than families with higher earnings. Model 3 suggests that in addition to earnings in the prior quarter, higher earnings in the prior year are also negatively associated with shelter entry. Finally, Models 4 and 5 find similar results for the impact of family income on shelter entry.

**DETERMINANTS OF RE-ENTRY INTO SHELTER**

Table 10 presents estimates from a Cox proportional hazard model of the monthly hazard rate for shelter re-entry for families who exited shelter in Hennepin County between 2005 and 2011. As before, the first number reported in each cell is the hazard ratio, so that a number greater than one indicates an increase in the probability of re-entering shelter, while a number less than one indicates a decrease in the probability of re-entering shelter.

Model 1 presents estimates from a base specification that includes controls for demographic characteristics, for prior service use and for prior residential location. This model suggests that many of the same factors that affect entry into shelter are also associated with shelter re-entry, although the magnitude of the association tends to be smaller for shelter re-entry than for shelter entry. Controlling for other characteristics, African-Americans are 18% more likely to re-enter shelter, while immigrants are 66% less likely to re-enter shelter. Families with a young parent (head under age 24) are 88% more likely, and families with a young child (age 0 to 1) are 40% more likely to re-enter shelter. Shelter re-entry is positively related to prior chemical dependency visits, while it is negatively related to both mental health outpatient visits, and to use of a personal care attendant. Finally, families with high rates of prior shelter use are more likely to re-enter shelter: each shelter spell in the prior year increases the probability of re-entry by 36%.

Model 1 indicates that families who entered the Drake Hotel were 11% more likely to re-enter shelter than families who entered another county-funded shelter. The Drake hotel is an overflow facility, which has been used to accommodate the excess demand for shelter services over the

recession.  This hotel offers much less intensive social services than other county funded

shelters; thus it may not be as effective in preparing families for financial independence.

As with shelter entry, the probability of re-entry is higher for families with Minneapolis address

prior to shelter entry.  Families with an address in greater Hennepin County, outside Hennepin

County, or outside Minnesota were between 16% and 18% less likely to re-enter shelter than

families who lived in Minneapolis.  Families with no prior address information were even less

likely to return to shelter, perhaps because they have the weakest ties to the County social

support systems.

The three year indicators show that the probability of shelter re-entry increased over the

recession.  Controlling for demographic characteristics, prior service use, and prior address

location, the hazard rate for re-entering shelter was 18% higher for families exiting shelter in

2007-8, while it was 40% higher in 2009 and 71% higher in 2010-11.  Thus, it appears that there

was an increase over the recession in both the probability of shelter entry as well as the

probability of shelter re-entry.

To test for how much of the increase in shelter re-entry rates is attributable to reductions in

family earnings or family income, Models 2 and 3 add controls for family earnings in the prior

quarter, and the prior quarter and prior year, while Models 4 and 5 add controls for family

income in the prior quarter, and in the prior quarter and the prior year.  As shown, adding

controls for family earnings in both the prior quarter and the prior year (Model 3) reduces the

coefficient on the 2010-1 indicator from 1.71 to 1.58.  This suggests that changes in family

earnings may explain up to 20% of the increase in shelter re-entry in 2010-1.   Adding controls

for family income in the prior quarter and prior year (Model 5) reduces this coefficient from 1.71 to 1.32, or roughly half of the increase in 2010-1.

Taken together these estimates imply that between 20 to 50% of the increase in shelter re-entry in 2010-2011 is explained by the lower family earnings and family income during the recession. The remainder reflects unmeasured common factors that may increase shelter use, such as the decrease in the rental vacancy rate and the decrease in affordable housing over the recession.

Models 2 to 5 also confirm that families with higher earnings and higher incomes are much less likely to re-enter shelter. For example, in Model 2, families with earnings in the prior quarter below $4000 are between 1.6 and 2.0 times more likely to re-enter shelter than families with higher earnings, while in Model 4, families with quarterly incomes between $1 and $6000 are 1.5 to 2.1 times more likely to re-enter shelter than families with higher incomes.

**PREDICTING ENTRY AND RE-ENTRY INTO SHELTER**

Figures 3a and 3b use Model 2 of Table 8 to estimate the predicted monthly hazard rate for shelter entry and the predicted cumulative probability of entering shelter by month since Food Stamps entry. As shown, majority race household heads have low probabilities of entering shelter. Both before and after the recession, 1.6% are predicted to enter shelter within 18 months of Food Support entry. By contrast for Blacks and Native Americans, 4.3% enter shelter within 18 months of Food Support entry in 2004-6; increasing to 5.3% in 2008-11.

Figures 4a and 4b use Model 2 of Table 10 to estimate the predicted monthly hazard rate for shelter re-entry and the predicted cumulative probability of re-entering shelter by month since

shelter exit. As shown, there is a marked increase in the probability of re-entry over the recession. The share of families predicted to re-enter shelter within 18 months increases from 13.4% for families exiting shelter in 2005-6, to 17.2% and 17.9% for families exiting in 2007 or 2008-9. Finally, 20.9% of families exiting in 2010-11 are predicted to re-enter shelter within 18 months, which represents a 55% increase over the level in 2005-6.

Table 11a presents simulations that show how accurately these models predict entry into shelter. These calculations could be used to determine how well-targeted a prevention effort might be, based on the data used in this model. These simulations are based on Model 3 of Table 8, and they predict the probability that a family entering Food Support in 2008-2011 would enter shelter within 24 months.

Table 11a shows that there is a trade-off between avoiding type 1 errors (incorrectly classifying someone as entering shelter) and type 2 errors (failing to flag someone as likely to enter shelter who did indeed enter shelter). If the prevention service was offered to 10% of the population, it could reach 44% of the families who would have entered shelter. However, of those targeted for the intervention, only 19% would have entered shelter in the absence of the intervention. This means that 4 of every 5 people getting prevention services would not need them to avoid shelter. If services were more narrowly targeted and thus offered to only 1% of the Food Support caseload, the program would 'waste' fewer resources on people who do not need assistance: in this case 43% of those offered services would have entered shelter without the intervention. However, in this case the program would also miss a large number of people potentially at risk for shelter entry: only 10% of those who entered shelter would be provided prevention assistance.

Table 11b presents simulations to show how well the re-entry models predict re-entry into shelter. They compare the predicted probability that a family who exited shelter in 2010 would reenter shelter within 18 months to the actual probability that a family does enter shelter using the coefficients from Model 3 of Table 10. These models could be used to target an intervention to prevent reentry into shelter.

As before, there is a trade-off between targeting resources only to those would otherwise re-enter shelter, and ensuring that the program would reach a large share of families likely to enter shelter, although the models do predict re-entry more accurately than the shelter entry models. If an intervention were designed to provide services to 25% of the shelter population, it could reach 42% of those likely to enter shelter; and, of those provided services, 37% would enter shelter in the absence of the intervention. If the program were provided to only 5% of the shelter population, 53% of those predicted to enter shelter would actually enter shelter, and the program would reach 12% of the at-risk population.


**CONCLUSION**

This study analyzes the determinants of use of Hennepin County shelters over the recession. It analyzes the determinants of entry into shelter from Food Support using two cohorts of families who entered Food Support in Hennepin County from 2004-6 and from 2008-11. In addition, it analyzes the determinants of shelter re-entry for all families who exited a Hennepin County shelter from 2005 to July of 2011.

This study confirms the finding of previous research that suggests that shelter entry and re-entry is highly correlated with individual characteristics. In addition, the study has several new findings, including:

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**There has been a large increase in the probability of shelter entry and re-entry over the recession**:

- Blacks and Native Americans were 34% more likely to enter shelter from Food Support in 2008-11 than in 2004-6, with no change in the probability for other families. For Blacks and Native Americans, the cumulative probability of entering shelter within 18 months increased from 4.3% in 2004-6 to 5.3% in 2008-11. For majority race Food Support recipients, 1.6% were predicted to enter shelter in both periods.

- The probability of re-entering shelter was 18% higher for families exiting shelter in 2007-8, while it was 40% higher in 2009 and 71% higher in 2010-11 than in 2005-6. These estimates imply that the cumulative probability of re-entering shelter within 18 months increased from 13% for families exiting shelter in 2005-6, to 17%-18% in 2007 and 2008/9, and to 21% in 2010-11.

- Changes in family earnings or income do not explain the increase in shelter entry in 2008-11, while they explain between 20% and 50% of the increase in re-entry in 2010-11. This implies that a large share of recent increases in the use of shelters may reflect other factors, such as the deteriorating housing market. In particular, the marked increase in re-entry coincided with the decrease in housing market vacancies in 2010-11.

- One reason that the declines in family earnings did not increase shelter entry and re-entry more may be that they were offset by increases in transfers. While the share of families with earnings four quarters after program entry decreased by 7 to 8 percentage points for both shelter and Food Support entrants from 2004-6 to 2008-10, this decrease was offset by a 10 percentage point increase in transfer receipt for both groups. If transfers had not increased as much, it is possible the increase in shelter use would have been more severe.

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**Second, there are large gaps in shelter use by geographic area**.

- Controlling for family demographic characteristics, prior service use, and family income or earnings, Food Support recipients are 40% less likely to enter shelter if they live outside Minneapolis in greater Hennepin County, or if they live outside Hennepin County but within Minnesota.

- Families who had lived in greater Hennepin County, outside Hennepin County or who lived outside Minnesota prior to entering shelter are 16-18% less likely to return to shelter than families who lived in Minneapolis, even after controlling for family demographic characteristics, prior service use, and family earnings.

- The lower rates of shelter use for families living outside Minneapolis may be associated with both larger distances to shelter, and higher neighborhood concentrations by race and poverty. By contrast, there is no evidence that shelter residents who had residences in the outlying areas lived in neighborhoods with a higher concentration of immigrants.

**Finally there is evidence that more intensive social services may reduce shelter re-entry.**

- Families who entered the Drake overflow shelter in 2005-2011 were 10% more likely to re-enter shelter than families who entered another shelter. It is possible that this is attributable to the lower level of services offered in this shelter.


**POLICY IMPLICATIONS**

This research highlights the importance of broader social and economic systems in determining homelessness, including labor markets, housing markets and public assistance. These three systems form the foundation which ensures that families can sustain stable housing. When these

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systems are not operating effectively, it will be difficult for the shelter system to offset the growing needs for shelter.

Second, this research also demonstrates that it is possible to identify families who are most likely to enter shelter and to re-enter shelter, based on their personal characteristics and their income. While the models are not precise enough to accurately predict who would enter shelter for a large share of the population who would enter shelter, they may be more effective for a more narrowly targeted population. For example, if services were provided to 10% of those who would ultimately enter or re-enter shelter, then they could be correctly targeted to 43% of Food Support and 53% of shelter entrants.

This research suggests that it may be worthwhile to open a conversation with service providers who operate prevention services through the Family Homeless Prevention and Assistance Program to determine the appropriate targeting of prevention services. Currently providers use a range of criteria to determine whether a family should get assistance, including whether the family income is 'too low' to avoid homelessness, or 'too high' to need assistance. This research could aid in a conversation about what the appropriate thresholds should be since it provides information on how different income cutoffs are correlated with shelter entry.

Third, the research also suggests that families entering the Drake Hotel may be less successful in terms of avoiding re-entry into shelter. This is encouraging, as it indicates that more service-intensive shelters may be more effective in reducing homelessness. However, it also suggests that there is a need for further monitoring of families entering shelter though this venue.

Finally, this research suggests that families living outside Minneapolis are much less likely to access shelters. At this point, it is not known whether this reflects greater barriers to accessing

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shelter or greater neighborhood resources to avoid homelessness in outlying areas.  It is also not known how these differentials in shelter access might affect family and child well-being. Miller (2013) has found that there has been an increase in the dispersion of homeless and highly mobile children outside of the urban core during the current recession, and he has argued that this may limit children's access to services. Further research is warranted to determine why families in outlying areas are less likely to use shelter, and whether there are other gaps in access to services for vulnerable families living in outlying areas.

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**Table 1**
**Quarterly Earnings of Shelter and Food Support Entrants**

| | Food Stamp Entrants | | Shelter Entrants | |
|---|---|---|---|---|
| | **2004-6** | **2008-10** | **2004-6** | **2008-10** |
| **Quarter of Entry** | | | | |
| Any Earnings in Quarter | 0.442 | 0.411 | 0.327 | 0.292 |
| Earnings of Families with Earnings | | | | |
| 25$^{th}$ percentile | 1,125 | 1,335 | 288 | 331 |
| 50$^{th}$ percentile | 2,951 | 3,144 | 898 | 950 |
| 75$^{th}$ percentile | 5,357 | 5,454 | 2254 | 2184 |
| **Four Quarters After Entry** | | | | |
| Any Earnings in Quarter | 0.475 | 0.399 | 0.364 | 0.289 |
| Earnings of Families with Earnings | | | | |
| 25$^{th}$ percentile | 1,744 | 1,753 | 775 | 762 |
| 50$^{th}$ percentile | 4,065 | 3,848 | 2,150 | 1,948 |
| 75$^{th}$ percentile | 6,736 | 6,389 | 4,662 | 3,900 |

Notes: Earnings include earnings recorded in DEED earnings records.

**Table 2**
**Quarterly Transfers of Food Stamp and Shelter Entrants**

| | Food Stamp Entrants | | Shelter Entrants | |
|---|---|---|---|---|
| | **2004-6** | **2008-10** | **2004-6** | **2008-10** |
| **Quarter of Entry** | | | | |
| Any Transfers | 1.000 | 1.000 | 0.862 | 0.899 |
| Quarterly Transfers (Families with Transfers) | | | | |
| 25$^{th}$ percentile | $557 | $605 | $706 | $919 |
| 50$^{th}$ percentile | $1,324 | $1,290 | $1503 | $1766 |
| 75$^{th}$ percentile | $2,351 | $2,328 | $2374 | $2483 |
| **Four Quarters After Entry** | | | | |
| Any Transfers | 0.699 | 0.802 | 0.707 | 0.798 |
| Quarterly Transfers (Families with Transfers) | | | | |
| 25$^{th}$ percentile | $960 | $1,011 | $1,179 | $1,496 |
| 50$^{th}$ percentile | $1,853 | $1,780 | $2,152 | $2,347 |
| 75$^{th}$ percentile | $2,606 | $2,620 | $2,928 | $3,134 |
| N | 100,873 | 124,757 | 2724 | 3744 |

Notes: Transfers include Food Support, MFIP, General Assistance, SSDI and SSI.

**Table 3**
**Quarterly Income of Food Stamp and Shelter Entrants**

| | Food Stamp Entrants | | Shelter Entrants | |
|---|---|---|---|---|
| | **2004-6** | **2008-10** | **2004-6** | **2008-10** |
| **Quarter of Entry** | | | | |
| 25$^{th}$ percentile | $1,272 | $1,201 | $616 | $899 |
| 50$^{th}$ percentile | $2,436 | $2,421 | $1700 | $1989 |
| 75$^{th}$ percentile | $4,286 | $4,243 | $2832 | 2972 |
| **Four Quarters After Entry** | | | | |
| 25$^{th}$ percentile | $1,256 | $1,241 | $507 | $1,139 |
| 50$^{th}$ percentile | $2,732 | $2,540 | $2,306 | $2,461 |
| 75$^{th}$ percentile | $5,066 | $4,608 | $3,820 | $3,815 |
| N | 100,873 | 124,757 | 2724 | 3744 |

Notes: Income includes earnings recorded in DEED quarterly earnings records plus Food Support, MFIP, General Assistance, SSI, and SSDI.

**Table 4**
**Location of First Address of Food Stamp Entrants in**
**Three Months Following Food Stamp Entry, By Cohort**

| Cohort | Inside Minneapolis | Greater Hennepin County | Outside Hennepin County | Homeless/ PO Box | Unknown |
|---|---|---|---|---|---|
| 2004-6 | 0.489 | 0.302 | 0.168 | 0.026 | 0.016 |
| 2008-10 | 0.426 | 0.351 | 0.180 | 0.028 | 0.015 |

Notes: Greater Hennepin County includes Hennepin County addresses outside of Minneapolis. Outside Hennepin County includes addresses in Minnesota that are outside Hennepin County.

**Table 5**
**Location of Longest Non-Shelter Address of Shelter Entrants in Year Prior to Shelter**
**Entry, By Year of Entry into Shelter**

| Year | Inside Minneapolis | Greater Hennepin County | Outside Hennepin County | Outside Minnesota | Unknown |
|---|---|---|---|---|---|
| 2005 | 0.518 | 0.136 | 0.105 | 0.036 | 0.204 |
| 2006 | 0.488 | 0.135 | 0.112 | 0.040 | 0.225 |
| 2007 | 0.461 | 0.194 | 0.093 | 0.032 | 0.219 |
| 2008 | 0.508 | 0.181 | 0.095 | 0.042 | 0.175 |
| 2009 | 0.508 | 0.191 | 0.101 | 0.028 | 0.172 |
| 2010 | 0.508 | 0.187 | 0.086 | 0.048 | 0.170 |

Notes: Greater Hennepin County includes Hennepin County addresses outside of Minneapolis. Outside Hennepin County includes addresses in Minnesota that are outside Hennepin County.

**Table 6**
**Characteristics of Census Tract of Shelter Entrants,**
**by Location**

| Year | Inside Minneapolis | Greater Hennepin County | Outside Hennepin County |
|---|---|---|---|
| Miles  from Shelter | | | |
| 25$^{th}$ percentile | 1.5 | 7.3 | 11.5 |
| 50$^{th}$ percentile | 2.2 | 9.2 | 17.1 |
| 75$^{th}$ percentile | 3.2 | 11.9 | 27.3 |
| Poverty Rate | | | |
| 25$^{th}$ percentile | 24.8 | 8.9 | 8.5 |
| 50$^{th}$ percentile | 31.3 | 13.2 | 14.8 |
| 75$^{th}$ percentile | 40.0 | 19.4 | 28.9 |
| Percent Non-White | | | |
| 25$^{th}$ percentile | 28.3 | 16.1 | 10.3 |
| 50$^{th}$ percentile | 55.1 | 28.3 | 20.6 |
| 75$^{th}$ percentile | 71.0 | 48.9 | 43.8 |
| Percent Immigrant | | | |
| 25$^{th}$ percentile | 10.8 | 9.9 | 6.3 |
| 50$^{th}$ percentile | 14.5 | 16.1 | 12.8 |
| 75$^{th}$ percentile | 24.4 | 26.1 | 21.1 |
| Number Observations | 3881 | 1370 | 761 |

Notes: Includes information from the American Community Survey on the characteristics of the census tract of the longest non-shelter address in the year prior to shelter entry.

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**Table 7**
**Means and Standard Errors of Shelter Entry Data Set**

| Variable | Mean | Standard Error of Mean |
|---|---|---|
| Post 2008 Cohort | 0.5453 | 0.0003 |
| 2008 Cohort *Black/Native American | 0.3063 | 0.0002 |
| Black | 0.5291 | 0.0003 |
| Native American | 0.0510 | 0.0001 |
| Immigrant | 0.2469 | 0.0002 |
| Age 24 | 0.2600 | 0.0002 |
| Age 25-44 | 0.5115 | 0.0003 |
| Education < 12 Years | 0.4343 | 0.0003 |
| Education 12 Years | 0.4577 | 0.0003 |
| Female | 0.8971 | 0.0002 |
| # Kids Age 0-1 Years | 0.2410 | 0.0002 |
| # Kids Age 2-5 Years | 0.5302 | 0.0004 |
| # Kids Age 6-18 Years | 1.1675 | 0.0007 |
| Ongoing Food Stamp Spell in 2004/2008 | 0.3680 | 0.0003 |
| # Mental Health Outpatient Visits Last Year | 1.4920 | 0.0017 |
| # Chemical Dependency Visits Last Year | 0.6449 | 0.0009 |
| # Shelter Visits Last 3 Years | 0.0214 | 0.0001 |
| Initial Address P.O. Box/Homeless | 0.0258 | 0.0001 |
| No Initial Address Information | 0.0151 | 0.0001 |
| Initial Address Outside Minneapolis | 0.3286 | 0.0002 |
| Initial Address Outside Hennepin County | 0.1798 | 0.0002 |
| Earnings Last Quarter > 0 & <=$1000 | 0.6156 | 0.0003 |
| Earnings Last Quarter > $1000 & <=$2000 | 0.0515 | 0.0001 |
| Earnings Last Quarter > $2000 & <=$4000 | 0.0958 | 0.0002 |
| Earnings Last Quarter > $4000 & <=$6000 | 0.0852 | 0.0001 |
| Quarterly Earnings Last Year >=$0 & <=$3000 | 0.7197 | 0.0002 |
| Quarterly Earnings Last Year >$3000 & <=$6000 | 0.1460 | 0.0002 |
| No Income Last Quarter | 0.1350 | 0.0002 |
| Income Last Quarter > 0 & <=$3000 | 0.4317 | 0.0003 |
| Income Last Quarter > $3000 & <=$4000 | 0.1081 | 0.0002 |
| Income Last Quarter > $4000 & <=$5000 | 0.0742 | 0.0001 |
| Income Last Quarter > $5000 & <=$6000 | 0.0592 | 0.0001 |
| Income Last Quarter > $6000 & <=$8000 | 0.0858 | 0.0001 |
| No Income Last Year | 0.1331 | 0.0002 |
| Quarterly Income Last Year >$0 & <=6000 | 0.6937 | 0.0002 |
| Number Observations | 3,665,856 | 3,665,856 |

**Table 8**
**Estimates of Monthly Hazard Model for Shelter Entry**
**(Hazard Ratios and Standard Errors Reported)**

|  | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| 2008-11 Cohort | 1.064 | 1.061 | 1.065 | 1.063 | 1.068 |
|  | 0.069 | 0.068 | 0.069 | 0.068 | 0.069 |
| 2008-11 Cohort* | 1.283 | 1.287 | 1.287 | 1.286 | 1.294 |
| Black/Native American | 0.092 | 0.092 | 0.092 | 0.092 | 0.093 |
| Black | 2.046 | 1.894 | 1.885 | 1.929 | 1.904 |
|  | 0.114 | 0.106 | 0.105 | 0.108 | 0.107 |
| Native American | 1.399 | 1.253 | 1.247 | 1.257 | 1.258 |
|  | 0.105 | 0.094 | 0.093 | 0.094 | 0.094 |
| Immigrant | 0.148 | 0.156 | 0.156 | 0.155 | 0.155 |
|  | 0.012 | 0.012 | 0.013 | 0.012 | 0.012 |
| Age <=24 | 2.526 | 2.696 | 2.683 | 2.610 | 2.591 |
|  | 0.174 | 0.186 | 0.185 | 0.180 | 0.179 |
| Age 25-44 | 1.546 | 1.683 | 1.686 | 1.607 | 1.605 |
|  | 0.101 | 0.110 | 0.110 | 0.105 | 0.105 |
| Education < 12 years | 1.505 | 1.294 | 1.280 | 1.344 | 1.335 |
|  | 0.088 | 0.076 | 0.075 | 0.079 | 0.078 |
| Education 12 years | 1.279 | 1.213 | 1.207 | 1.227 | 1.223 |
|  | 0.073 | 0.069 | 0.069 | 0.070 | 0.070 |
| Female | 1.145 | 1.254 | 1.260 | 1.250 | 1.233 |
|  | 0.062 | 0.068 | 0.068 | 0.067 | 0.067 |
| Kids Age 0-1 | 1.471 | 1.462 | 1.463 | 1.525 | 1.526 |
|  | 0.038 | 0.038 | 0.038 | 0.039 | 0.039 |
| Kids Age 2-5 | 1.183 | 1.221 | 1.223 | 1.257 | 1.258 |
|  | 0.022 | 0.023 | 0.023 | 0.024 | 0.024 |
| Kids Age 6-18 | 1.054 | 1.087 | 1.089 | 1.125 | 1.123 |
|  | 0.013 | 0.013 | 0.013 | 0.014 | 0.014 |
| Ongoing Food Stamp Spell | 0.737 | 0.668 | 0.661 | 0.771 | 0.786 |
|  | 0.023 | 0.021 | 0.020 | 0.026 | 0.027 |
| Mental Health Outpatient | 0.985 | 0.975 | 0.975 | 0.982 | 0.984 |
| Visits Last Year | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |
| Chemical Dependency | 1.094 | 1.082 | 1.082 | 1.087 | 1.089 |
| Outpatient Visits Last Year | 0.008 | 0.008 | 0.008 | 0.008 | 0.008 |
| Shelter Spells Last 3 Years | 2.671 | 2.586 | 2.577 | 2.598 | 2.620 |
|  | 0.064 | 0.062 | 0.062 | 0.062 | 0.064 |

**Table 8 Continued**

|  | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| P.O. Box / Homeless | 1.422 | 1.269 | 1.257 | 1.281 | 1.246 |
|  | 0.082 | 0.073 | 0.072 | 0.074 | 0.072 |
| No Address Information | 1.232 | 1.243 | 1.244 | 1.246 | 1.251 |
|  | 0.116 | 0.117 | 0.117 | 0.117 | 0.117 |
| Outside Minneapolis | 0.579 | 0.626 | 0.629 | 0.619 | 0.621 |
|  | 0.021 | 0.023 | 0.023 | 0.023 | 0.023 |
| Outside Hennepin County | 0.615 | 0.624 | 0.625 | 0.624 | 0.629 |
|  | 0.026 | 0.026 | 0.026 | 0.026 | 0.027 |
| Earnings  Last Quarter >=$0  & <= $1000 |  | 5.493 | 3.851 |  |  |
|  |  | 0.431 | 0.419 |  |  |
| Earnings Last Quarter > $1000 & <=$2000 |  | 4.436 | 3.199 |  |  |
|  |  | 0.416 | 0.377 |  |  |
| Earnings Last Quarter > $2000  & <=$4000 |  | 3.103 | 2.347 |  |  |
|  |  | 0.283 | 0.264 |  |  |
| Earnings Last Quarter > $4000 & <=$6000 |  | 1.956 | 1.636 |  |  |
|  |  | 0.201 | 0.191 |  |  |
| Quarterly Earnings Last Year > $0  &<=$3000 |  |  | 1.586 |  |  |
|  |  |  | 0.171 |  |  |
| Quarterly Earnings Last Year > $3000 & <= $6000 |  |  | 1.284 |  |  |
|  |  |  | 0.137 |  |  |
| No Income Last Quarter |  |  |  | 5.476 | 3.433 |
|  |  |  |  | 0.505 | 0.312 |
| Income Last Quarter > $0 & <=$3000 |  |  |  | 4.557 | 3.417 |
|  |  |  |  | 0.406 | 0.280 |
| Income Last Quarter > $3000 & <=$4000 |  |  |  | 3.747 | 2.857 |
|  |  |  |  | 0.357 | 0.250 |
| Income Last Quarter > $4000 & <=$5000 |  |  |  | 2.631 | 2.033 |
|  |  |  |  | 0.271 | 0.193 |
| Income Last Quarter >$5000 & <=$6000 |  |  |  | 1.992 | 1.582 |
|  |  |  |  | 0.227 | 0.163 |
| Income Last Quarter >$6000 & <=8000 |  |  |  | 1.248 |  |
|  |  |  |  | 0.147 |  |
| No Income Last Year |  |  |  |  | 1.690 |
|  |  |  |  |  | 0.150 |
| Quarterly Income Last Year > $0  & <= $6000 |  |  |  |  | 1.245 |
|  |  |  |  |  | 0.100 |
| Number Observations | 3,665,856 | 3,665,856 | 3,665,856 | 3,665,856 | 3,665,856 |
| Log Likelihood | -57,111 | -56,613 | -56,600 | -56,640 | -56,614 |

**Table 9**
**Means and Standard Errors of Variables Used in Shelter Re-entry Analysis**

| Variable | Mean | Standard Error |
|---|---|---|
| Black/ Native American Head | 0.8156 | 0.0008 |
| Immigrant Head | 0.0332 | 0.0004 |
| Head Age <= 24 | 0.2810 | 0.0010 |
| Head Age 25-45 | 0.6253 | 0.0011 |
| Head's Education < 12 Years | 0.4132 | 0.0011 |
| Missing Head's Education | 0.0326 | 0.0004 |
| Number of Children Age 0-1 | 0.2784 | 0.0011 |
| Number of Children Age 2-5 | 0.7570 | 0.0017 |
| Number of Children Age 6-18 | 1.2612 | 0.0029 |
| Mental Health Outpatient Visits Last Year | 1.9501 | 0.0075 |
| Chemical Dependency Visits Last Year | 1.1067 | 0.0048 |
| Personal Care Attendant Services Last Year | 0.2739 | 0.0036 |
| Shelter Spells Last 3 Years | 0.2840 | 0.0013 |
| Drake Shelter | 0.1983 | 0.0009 |
| No Information on Longest Address Last Year | 0.1970 | 0.0009 |
| Address Located Outside Minnesota | 0.0369 | 0.0004 |
| Address Outside Hennepin County, in Minnesota | 0.1013 | 0.0007 |
| Address Outside Minneapolis, in Hennepin County | 0.1770 | 0.0008 |
| Last Shelter Spell started in 2007-8 | 0.3188 | 0.0010 |
| Last Shelter Spell started in 2009 | 0.1867 | 0.0008 |
| Last Shelter Spell started in 2010 | 0.2198 | 0.0009 |
| No Income Last Quarter | 0.2027 | 0.0009 |
| $1-$2000 Income Last Quarter | 0.2235 | 0.0009 |
| $2001-$4000 Income Last Quarter | 0.3694 | 0.0011 |
| $4001-$6000 Income Last Quarter | 0.1312 | 0.0007 |
| rincome1yq_0 | 0.1163 | 0.0007 |
| No Earnings Last Quarter | 0.6832 | 0.0010 |
| $1-$2000 Earnings Last Quarter | 0.1565 | 0.0008 |
| $2001-$4000 Earnings Last Quarter | 0.0737 | 0.0006 |
| No Earnings Last Year | 0.5106 | 0.0011 |
| $1-$2000 Average Quarterly Earnings Last Year | 0.3412 | 0.0010 |
| $2001-$4000 Average Quarterly Earnings Last Year | 0.0824 | 0.0006 |
| Number of Observations | 210454 | |

## Table 10
## Estimates of Monthly Hazard Model for Shelter Re-entry
(Hazard Ratios and Standard Errors Reported)

|  | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| Black/Native | 1.178 | 1.165 | 1.163 | 1.162 | 1.161 |
| American | 0.081 | 0.080 | 0.080 | 0.080 | 0.080 |
| Immigrant | 0.338 | 0.337 | 0.340 | 0.331 | 0.330 |
|  | 0.085 | 0.085 | 0.086 | 0.084 | 0.083 |
| Head age < 24 | 1.878 | 1.832 | 1.772 | 1.859 | 1.850 |
|  | 0.212 | 0.207 | 0.201 | 0.210 | 0.209 |
| Head age 25-34 | 1.338 | 1.332 | 1.302 | 1.356 | 1.353 |
|  | 0.139 | 0.138 | 0.135 | 0.140 | 0.140 |
| Education < 12 | 1.144 | 1.130 | 1.143 | 1.132 | 1.134 |
|  | 0.054 | 0.054 | 0.054 | 0.054 | 0.054 |
| # Children age 0-1 | 1.404 | 1.396 | 1.396 | 1.365 | 1.359 |
|  | 0.057 | 0.056 | 0.056 | 0.056 | 0.055 |
| # Children age 2-5 | 1.116 | 1.117 | 1.117 | 1.143 | 1.141 |
|  | 0.032 | 0.032 | 0.032 | 0.033 | 0.033 |
| # Children age 6-18 | 1.072 | 1.075 | 1.076 | 1.097 | 1.097 |
|  | 0.022 | 0.022 | 0.022 | 0.023 | 0.023 |
| Mental Health | 0.983 | 0.981 | 0.981 | 0.973 | 0.972 |
| Visits Last Year | 0.008 | 0.008 | 0.008 | 0.008 | 0.008 |
| Chemical Dependency | 1.042 | 1.040 | 1.039 | 1.030 | 1.029 |
| Visits Last Year | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 |
| Personal Care Attendant | 0.958 | 0.958 | 0.960 | 0.959 | 0.959 |
| Visits Last Year | 0.018 | 0.018 | 0.018 | 0.018 | 0.018 |
| Shelter Visits | 1.358 | 1.346 | 1.340 | 1.350 | 1.349 |
| Last 3 years | 0.042 | 0.042 | 0.042 | 0.042 | 0.042 |
| Drake Hotel | 1.107 | 1.104 | 1.101 | 1.102 | 1.097 |
|  | 0.063 | 0.063 | 0.063 | 0.063 | 0.063 |
| Address Outside | 0.842 | 0.843 | 0.837 | 0.847 | 0.847 |
| Minneapolis | 0.053 | 0.053 | 0.053 | 0.053 | 0.054 |
| Address Outside | 0.818 | 0.819 | 0.812 | 0.831 | 0.831 |
| Hennepin County | 0.066 | 0.066 | 0.066 | 0.067 | 0.067 |
| Address Outside | 0.823 | 0.817 | 0.833 | 0.893 | 0.903 |
| Minnesota | 0.101 | 0.101 | 0.103 | 0.110 | 0.112 |
| No Address Information | 0.664 | 0.661 | 0.676 | 0.741 | 0.764 |
|  | 0.048 | 0.048 | 0.049 | 0.055 | 0.056 |

**Table 10 Continued**

| | | | | | |
|---|---|---|---|---|---|
| Entered 2007-8 | 1.175 | 1.144 | 1.130 | 1.067 | 1.045 |
| | 0.104 | 0.102 | 0.101 | 0.095 | 0.094 |
| Entered 2009 | 1.398 | 1.342 | 1.320 | 1.196 | 1.157 |
| | 0.164 | 0.158 | 0.155 | 0.141 | 0.137 |
| Entered 2010-1 | 1.710 | 1.616 | 1.575 | 1.382 | 1.319 |
| | 0.219 | 0.207 | 0.202 | 0.179 | 0.171 |
| $0 Earnings | | 1.709 | 1.859 | | |
| Last Quarter | | 0.190 | 0.278 | | |
| $1-$2000 Earnings | | 2.003 | 1.842 | | |
| Last Quarter | | 0.238 | 0.274 | | |
| $2001-$4000 Earnings | | 1.646 | 1.475 | | |
| Last Quarter | | 0.224 | 0.226 | | |
| $0 Earnings Last Year | | | 0.987 | | |
| | | | 0.169 | | |
| $1 - $2000 Average | | | 1.253 | | |
| Earn/Quarter Last Year | | | 0.206 | | |
| $2001-$4000 Average | | | 1.419 | | |
| Earn/Quarter Last Year | | | 0.231 | | |
| No Income Last | | | | 1.072 | 1.445 |
| Quarter | | | | 0.141 | 0.203 |
| $1 - $2000 Income | | | | 2.106 | 2.116 |
| Last Quarter | | | | 0.255 | 0.256 |
| $2001-4000 Income | | | | 1.903 | 1.915 |
| Last Quarter | | | | 0.224 | 0.226 |
| $4001-$6000 Income | | | | 1.543 | 1.548 |
| Last Quarter | | | | 0.197 | 0.198 |
| No Income Last | | | | | 0.507 |
| Year | | | | | 0.071 |
| Number of Observations | 210,454 | 210,454 | 210,454 | 210,454 | 210,454 |
| Log Likelihood | -15,418 | -15,398 | -15,387 | -15,366 | -15,354 |

### TABLE 11a
### Predicted vs Actual 24-Month Shelter Entry Rates

| Share of Food Support Entrants | Share Entering Shelter Given Entry Predicted | Share Predicted Given Entered Shelter |
|---|---|---|
| 1.00% | 43.49% | 10.02% |
| 5.00% | 25.05% | 28.90% |
| 10.00% | 18.93% | 43.66% |

Note: Predictions based on parameters from Model 3 of Table 8.

### Table 11b
### Predicted vs Actual 18-Month Shelter Re-entry Rates

| Share of Shelter Entrants | Share Re-entered Shelter Given Reentry Predicted | Share Predicted to Re-enter Given Re-entered Shelter |
|---|---|---|
| 4.94% | 53.23% | 11.96% |
| 9.95% | 44.80% | 20.29% |
| 25.00% | 37.26% | 42.39% |

Note: Predictions based on parameters from Model 3 of Table 10.

**Figure 1a**
**Share of Food Support Entrants with Earnings in Quarter**



**Figure 1b**
**Median Earnings of Food Supprt Entrants**
**With Earnings in Quarter**

**Figure 1c**
**Share of Food Support Entrants**
**With Transfers in Quarter**



**Figure 1d**
**Median Transfers of Food Support Entrants**
**With Transfer Income in Quarter**

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**Figure 1e**
**Share of Food Support Recipients**
**With Income in Quarter**



**Figure 1f**
**Median Income of Food Support Recipients**
**With Income in Quarter**

**Figure 2a**
**Share of Shelter Entrants with Earnings in Quarter by Quarter Since Shelter Entry**



**Figure 2b**
**Median Earnings of Shelter Entrants with Earnings in Quarter by Quarter since Shelter Entry**

**Figure 2c**
**Share of Families with Transfers in Quarter**
**by Quarter Since Shelter Entry**



**Figure 2d**
**Median Transfers for Shelter Entrants with Transfers in**
**Quarter by Quarter Since Shelter Entry**

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**Figure 2e**
**Share of Shelter Residents with Income in Quarter**
**by Quarter since Shelter Entry**



**Figure 2f**
**Median Income of Families with Income in Quarter**
**by Quarter Since Shelter Entry**

**Figure 3a**
**Probability of Shelter Entry by Race, Cohort & Months Since Cohort Entry**



**Figure 3b**
**Monthly Hazard for Shelter Entry**

**Figure 4a**
**Cumulative Probability of Shelter Reentry**
**by Months since Shelter Exit & Year of Last Shelter Spell**



**Figure 4b**
**Monthly Hazard Rate for Shelter Re-entry**
**by Months Since Shelter Exit and Year of Shelter Entry**

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