

# An Analysis of Reentry to Families First

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## Executive Summary

Welfare programs across the nation underwent a dramatic transformation in 1996. Tennessee was no exception, as work or training requirements and time limits replaced unrestricted cash grants. These important policy changes had the potential to affect the way welfare recipients use public assistance, possibly leading to more cycling on and off welfare as opposed to long-term continuous participation. This cycling—leaving the program for a period of time and then returning—is the focus of this report. We present what is perhaps the first in-depth analysis of welfare reentry in Tennessee since Families First was implemented.

Of the 56,334 assistance groups that left Families First between July 1997 and December 1998, 13,424 (about 24 percent) returned to the program at least once within this 18-month window. We examine the families that left the program, present a descriptive comparison of reentrants with those that stayed off public assistance, and provide a multivariate statistical analysis of the determinants of reentry.

We find that a number of characteristics are strong predictors of whether or not an assistance group will return to Families First. Specifically, assistance groups with younger, female, or black caretakers are more likely to return, as are those with more children, those with younger children, and those in urban areas. Somewhat surprisingly, those who originally left due to increased income are more likely to reenter.

## Table of Contents

<b>Introduction</b>	<b>1</b>
<b>Effects of the 1996 Reforms on Reentry Rates</b>	<b>3</b>
<b>Previous Studies of Welfare Reentry</b>	<b>4</b>
<b>Construction of Data Sample</b>	<b>6</b>
<b>Descriptive Analysis</b>	<b>7</b>
<b>Overall Reentry Rates</b>	<b>12</b>
<b>A Profile of Families First Reentrants</b>	<b>14</b>
<b>Discussion of Reentry Rates</b>	<b>19</b>
<b>Multivariate Statistical Results</b>	<b>24</b>
<b>Conclusions, Caveats, and Areas for Future Research</b>	<b>27</b>
<b>References</b>	<b>28</b>
<b>Appendix</b>	<b>29</b>

## List of Tables and Figures

Table 1: Summary of Reentry Rates	5
Table 2: Overall Reentry Trends	13
Table 3: Descriptive Statistics – Incomes at Time of Case Closure	15
Table 4: Cox Proportional Hazards Model Estimates	25
Figure 1: Ethnicity of Caretaker	8
Figure 2: Caretaker’s Age at Closure	9
Figure 3: Number of Recipients in Assistance Group	10
Figure 4: Age of the Youngest Child at Closure	11
Figure 5: Percentage of Recipients in Each District	12
Figure 6: Cumulative Reentry Rates	13
Figure 7: Monthly Hazard Rates	14
Figure 8: Changes in Income and Benefit Levels of Reentrants	16
Figure 9: Change in the Number of Recipients in the Assistance Group for Reentrants	18
Figure 10: Direction of Move for Those Reentrants Who Moved Between Counties	18
Figure 11: Reentry Rates by Age of Caretaker	20
Figure 12: Reentry Rates by Age of Youngest Child	21
Figure 13: Reentry Rates by Urban/Rural Residence	22
Figure 14: Reentry Rates by AG Size	23
Figure 15: Reentry Rates by Ethnicity	23

## **Introduction**

Public assistance programs across the nation underwent a dramatic transformation in 1996. Time limits were placed on benefit receipt, work requirements were instituted, and an array of supportive services were made available to program participants. With these changes in policy, it becomes even more important that we understand the dynamics of welfare participation. Welfare reentry, defined here as a return to public assistance rolls after leaving the program for at least one month, is of continuing concern to policy makers and researchers alike. Although the occurrence of reentry is certainly not new, the implementation of stricter policy requirements resulting from the 1996 law have once again put it at the forefront of welfare research.

One motivation for analyzing welfare reentry is to eventually be able to predict which cases are most likely to return to the program at some point in the future. If a recipient can be identified as potentially at risk of reentry upon first leaving welfare, additional support programs and assistance could be offered to the group in hopes of reducing the probability of a return. Targeting at risk individuals could prove to be an efficient way of reducing the administrative cost of a welfare program.

A complementary goal of welfare reentry analysis is to assess possible long-term effects of reentry on employment, earnings or other aspects of a recipient's wellbeing. While not the focus of this report, the effects of reentry are not clearly understood, especially since the 1996 changes. Future research will explore this side of the reentry question.

Reentry occurs for many different reasons, typically depending on the circumstances of each individual case. Possible causes of reentry include changes in household composition,

marital status, or employment status. The addition of a child, either through birth or adoption, might require higher support levels which may only be accessible through a return to the welfare program. A divorce, separation or death of a spouse can also certainly make it difficult for the surviving spouse to maintain self-sufficiency, thereby causing a return to welfare. Changes in earnings resulting from a loss of a job or a reduction in hours can also increase the attractiveness of returning to welfare. These are just a few of the possible causes of reentry. The possibilities are as numerous as the incidences of reentry.

Reentry is frequently viewed negatively by policy makers and researchers. This is evidenced by the popular use of the word “recidivism” to denote a return to reentry. As this term typically refers to repeat criminal offenders, we opt for the more optimistic “reentry.” With this, it is important to consider both the negative and positive aspects of reentry.

A return to welfare is often perceived as a signal of instability, suggesting that the recipient is unable to maintain self-sufficiency for any lengthy period of time. Families who are more reliant on public assistance have a much more difficult time trying to leave the program permanently and potentially represent a long-term burden to the welfare system. Second, a return to the welfare program may result from the inability of the household head, or caretaker, to keep a steady job. This unemployment can be detrimental to the well being of the family due to lost earnings, valuable work experience and on the job training. A loss of experience and job skills while unemployed also makes future employment more difficult for the caretaker to obtain. Finally, reentry is viewed negatively because it represents considerable administrative cost to program administrators. The importance of the costs of closing and reopening cases on a regular basis cannot be underestimated.

Despite its negative perceptions to date, reentry may not necessarily be a bad phenomenon. Viewed in a more positive light, continual reentry shows that a recipient is making a good faith effort to leave the program. The family may just need a bit more support before it can become completely self-sufficient. A temporary return to the welfare program might provide the needed help to attain permanent self-sufficiency. Finally, reentry may only represent a brief reliance on public assistance. If a household were to experience a temporary job loss or a reduction in earned income or hours worked, it may become necessary to return to the welfare program. The return spell may not last very long and may play an important role in helping the family to regain self-sufficiency.

### **Effects of the 1996 Reforms on Reentry Rates**

The implementation of time limits and other program requirements can certainly affect the rates of exit and reentry. Recognition of time limits by participants will increase the frequency of welfare exit—and reentry—as individuals attempt to maximize their current and future well being. In order to improve their own welfare, individuals may choose to use benefits only when they are needed the most, which may imply cycling on and off the welfare program.

Another important effect of the 1996 reforms is the change in the general makeup of the welfare caseload. Lifetime time limits and work requirements might remove many of the long-term recipients from the rolls, thereby leading to an observed increase in reentry rates if the remaining participants are more likely to cycle on and off the program. Alternatively, these new elements of welfare policy might remove mainly short-term recipients, leaving many of the long-

term participants on the rolls. As such, reentry rates might fall as a result, simply due to the changing nature of the caseload.

It is important to keep in mind that the American economy has performed remarkably well during the implementation of the new welfare regime. The late 1990s were times of great prosperity for most families, and the observed reduction in welfare rolls is at least partially the result of a strong economy. With that, caution should be exercised in attributing changes in reentry rates solely to policy changes.

### **Previous Studies of Welfare Reentry**

To gain a perspective on the changes in reentry rates over time, it is useful to examine previous research on the topic. Surprisingly few studies of welfare reentry have been undertaken and, to our knowledge, none have focused on Tennessee and none have used post-welfare-reform data. The latter is likely a result of difficulties in obtaining good data and the relatively short time period that the new laws have been in place. Nonetheless, the available studies are instructive and are summarized below.

As shown in Table 1, the earlier literature on reentry reports that between 20 and 62 percent of individuals who end a spell on welfare return to the rolls at some point during their lifetime (or, more typically, during the period of analysis). Table 1 also provides a summary of one-year reentry rates found in the literature, along with a brief description of the sample used in each study. Despite the wide dispersion of eventual reentry rates, one area of consensus in the literature is that reentry occurs rapidly: 11 to 33 percent return within the first year alone. These

**Table 1: Summary of Reentry Rates**

<b>Author</b>	<b>Eventual Reentry Rate</b>	<b>One Year Reentry Rate</b>	<b>Data</b>
Ellwood (1986)	40% (24 mo)	11 %	PSID 1968-1982 (annual data)
Weeks (1991)	35% (36 mo)	N/A	Washington State Family Income Study Data
Blank and Ruggles (1994)	20% (28 mo)	N/A	SIPP 1986-1987
Brandon (1995)	21% (28 mo)	N/A	SIPP 1986-1988 Four rotations groups observed for 28 mo.
Harris (1996)	42% (24 mo)	25%	PSID 1983-1988
Cao (1996)	58% (168 mo)	33%	NLSY 1979-1992
Gleason, Rangarajan, Schochet (1998)	62% (49 mo)	50%	Sample of teenage mothers in Camden and Newark, NJ and the south side of Chicago
Keng, Garasky, Jenson (1999)	25% (24 mo)	N/A	Iowa's administrative records April 1993 – March 1996

Note: PSID = Panel Study of Income Dynamics (University of Michigan)  
 SIPP = Survey of Income and Program Participation (U.S. Census Bureau)  
 NLSY = National Longitudinal Survey of Youth (Ohio State University)

results suggest that the first few months off the program seem to be the most crucial in determining which individuals will return to the rolls.

The wide variation in the percent of individuals who return can be explained almost entirely by the different sources of data used by various authors. Data that cover short time

intervals tend to produce reentry rates that are lower than those that cover longer periods of time, due to their inability to observe individuals for a sufficient period of time following their welfare experience. Yearly data (Ellwood, 1986) also tend to underestimate reentry due to a loss of variation in the month-to-month program status of individuals within a single year. The upper-end estimates of reentry rates are found using samples of inner-city teenage mothers (Gleason, et al, 1998).

Most of these studies have undertaken some form of multivariate statistical analysis of the causes of welfare reentry. Those characteristics that seem to exert the strongest influence are age, ethnic origin, education, and the number of children in the household. Women who are young, black, or less educated, and those who have more children, are more likely to reenter. Other control variables were used, and many were found to have important effects on reentry, but no clear consensus developed across the various studies.

Again, despite their national focus and pre-1996 data, these studies represent much of what is known about reentry and serve as guidelines for the present analysis. This is the first study to focus on reentry since 1996, the first to focus exclusively on Tennessee's Families First program, and only the second to use administrative data.

### **Construction of Data Sample**

The data used in this analysis were drawn from the Tennessee Department of Human Services ACCENT database. This source of administrative data contains a wealth of information on Families First recipients and their eligibility. A combination of assistance group (the concept of a recipient "household" to Families First), case, and individual information were used to

construct a monthly case history between July of 1997 and December of 1998. Although the Families First program was signed into law in August of 1996, its policies were not completely phased in until mid 1997. By beginning the observation window in July of 1997, this analysis captures some of the earliest months of the fully implemented Families First program.

We examine the population of Families First case closures that occurred between July 1997 and December 1998. In order to be included in this analysis, the assistance group (AG) had to be on the program during or after July 1997. The population is further limited to those assistance groups who experienced a closure during the observed period. Following standard practice in the welfare literature, we exclude any observed off-program spells that last only one month in order to avoid any effects of administrative churning. Our sample also excludes any child-only cases. A total of 56,334 initial case closures are included in the analysis that follows. Of these cases, 13,424 (or 23.8 percent) experienced at least one return.

It should be noted that we are not necessarily able to identify each AG's first case closure, only their first closure after July 1997. Further, of the 13,424 AGs that reenter Families First, a small number leave and reenter a second or third time within our window. Specifically, 12,697 AGs have only one reentry, while 719 reenter twice and 8 reenter three times. We focus on each AG's first reentry in the remaining analysis.

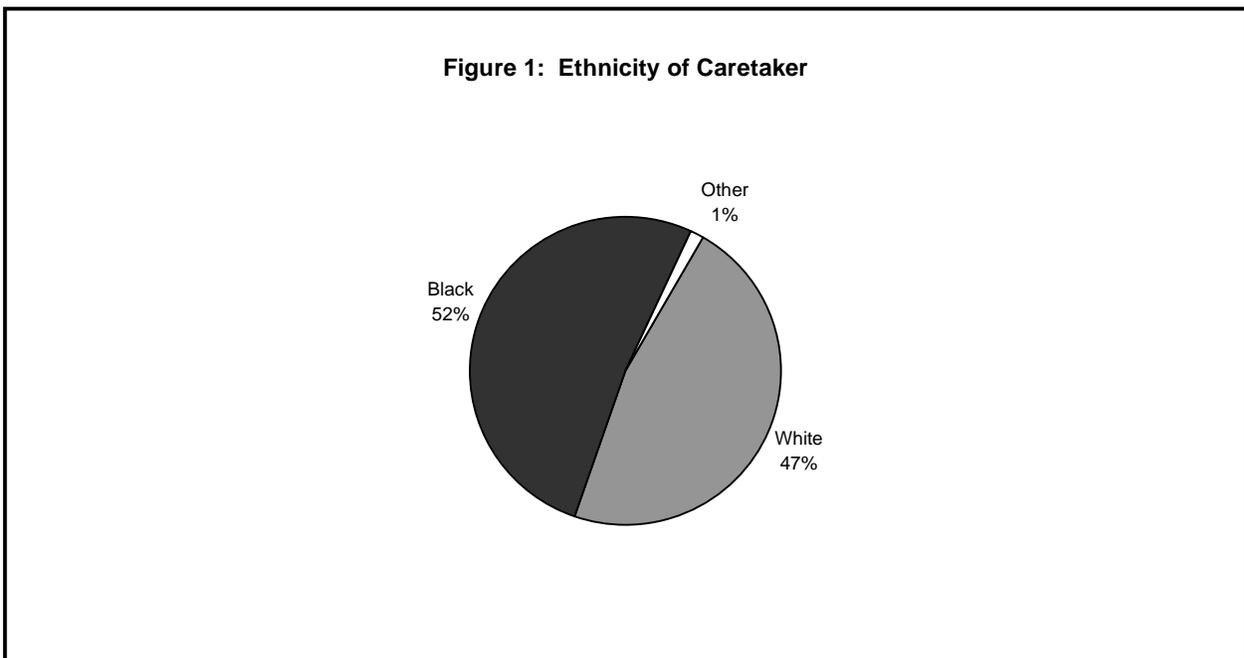
## **Descriptive Analysis**

We begin with a general description of the sample of Families First leavers used in the analysis. This section, while not indicative of the *causes* of reentry, provides some detail on the *characteristics* of those who left the program during its first 18 months. Also, wherever possible,

we compare the characteristics of this sample of leavers with the overall Families First population as summarized in the 1997 *Families First Case Characteristics Study*.

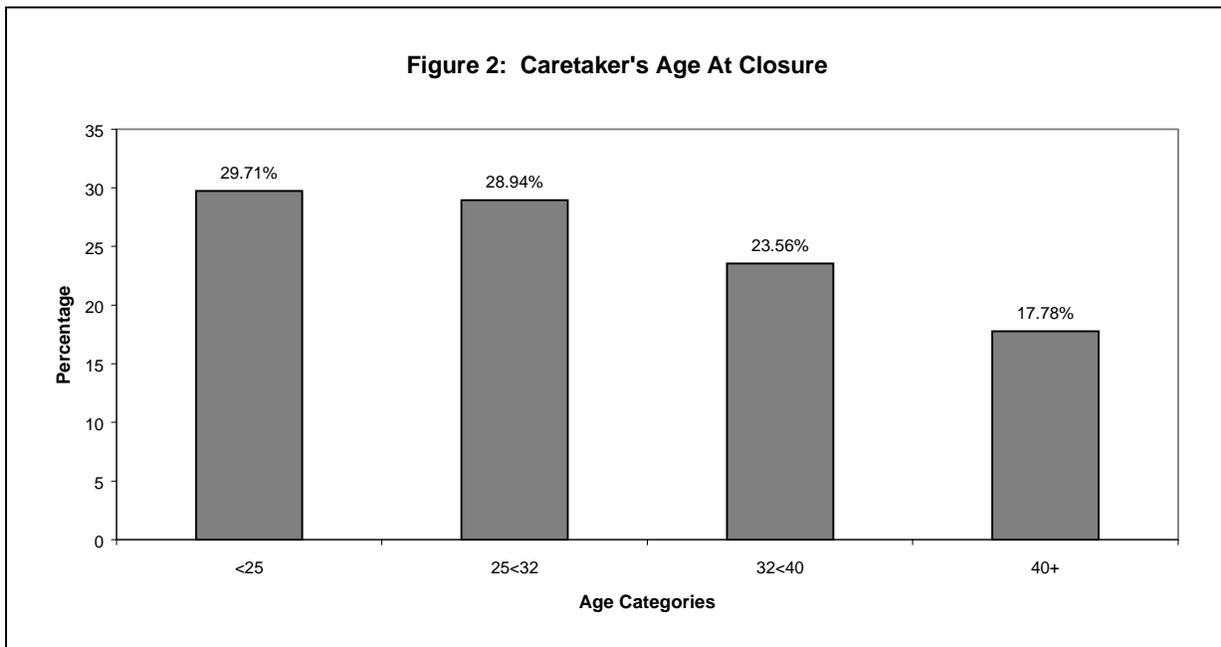
The gender breakdown of the caretakers of the assistance groups used in this sample is largely unsurprising—the number of female caretakers far exceeds the number of male caretakers. A female caretaker heads 95 percent of assistance groups while male caretakers head only five percent. This is nearly identical to the data in the 1997 *Families First Case Characteristics Study*, which reports that females head about 95.8 percent of all Families First assistance groups.

Figure 1 shows the ethnic diversity of the sample. Blacks represent the largest ethnic group in the sample, comprising 52 percent of Families First leavers. Whites make up 47 percent of all leavers, and the remaining one percent is made up of various other ethnic groups including Hispanics, Native Americans, and Asians. Sample sizes in these categories are quite small, necessitating the combination of them into one group.



It should be noted that the ethnic composition of this sample is somewhat different from the overall Families First caseload. As of 1997, blacks headed up 60.7 percent of all Families First assistance groups, while only 38.2 percent had white caretakers. All other ethnicities accounted for the remaining 1.1 percent of the 1997 caseload.

Figure 2 shows the distribution of caretakers from the sample into various age categories. Although the sample is fairly evenly split among the age categories, there are slightly more caretakers under the age of 25 in the sample than in any other category. The over-40 category has the lowest percentage of caretakers with only about 18 percent. This downward trend is certainly not surprising since younger individuals are more likely to have children and difficulties in finding a job due to a lack of experience. The age composition of this sample is slightly younger than the overall Families First caseload as measured in 1997.



The distribution of the sizes of the assistance groups in our sample is shown in Figure 3. Nearly half of our assistance groups consist of only two members, with the percentage falling as AG size increases. Only slightly more than seven percent of the AGs in our sample have more than four members. This sample is more heavily weighted by two and three person AGs than the overall 1997 Families First caseload, primarily due to our removal of child-only cases from this analysis.

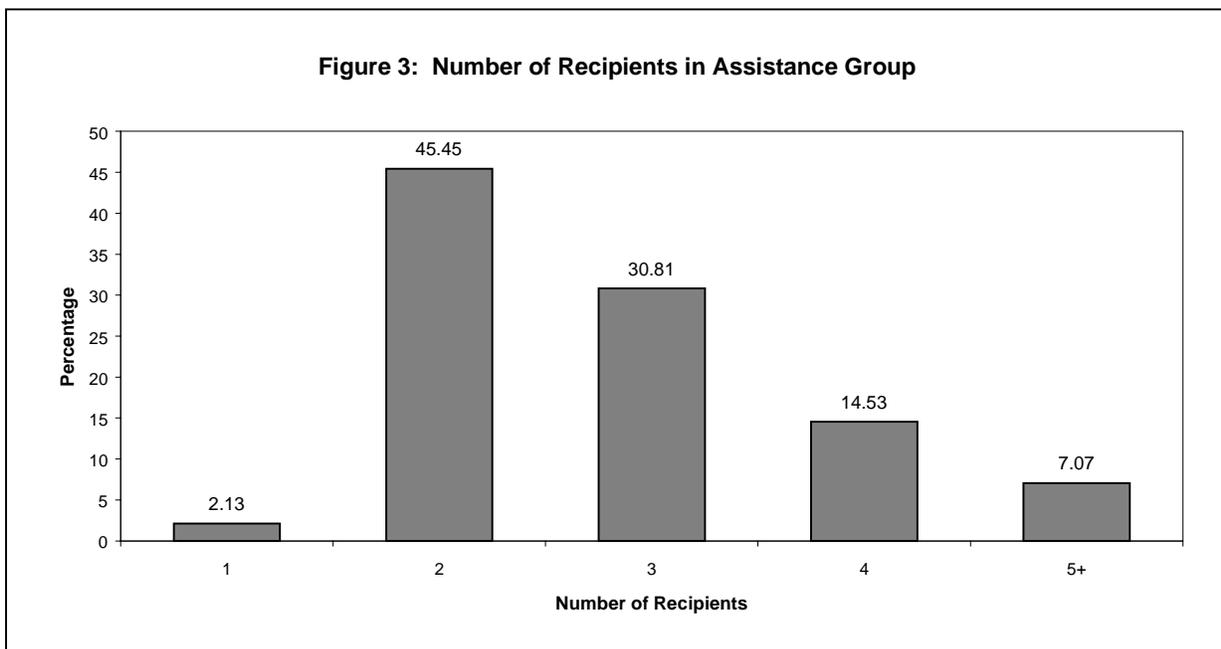
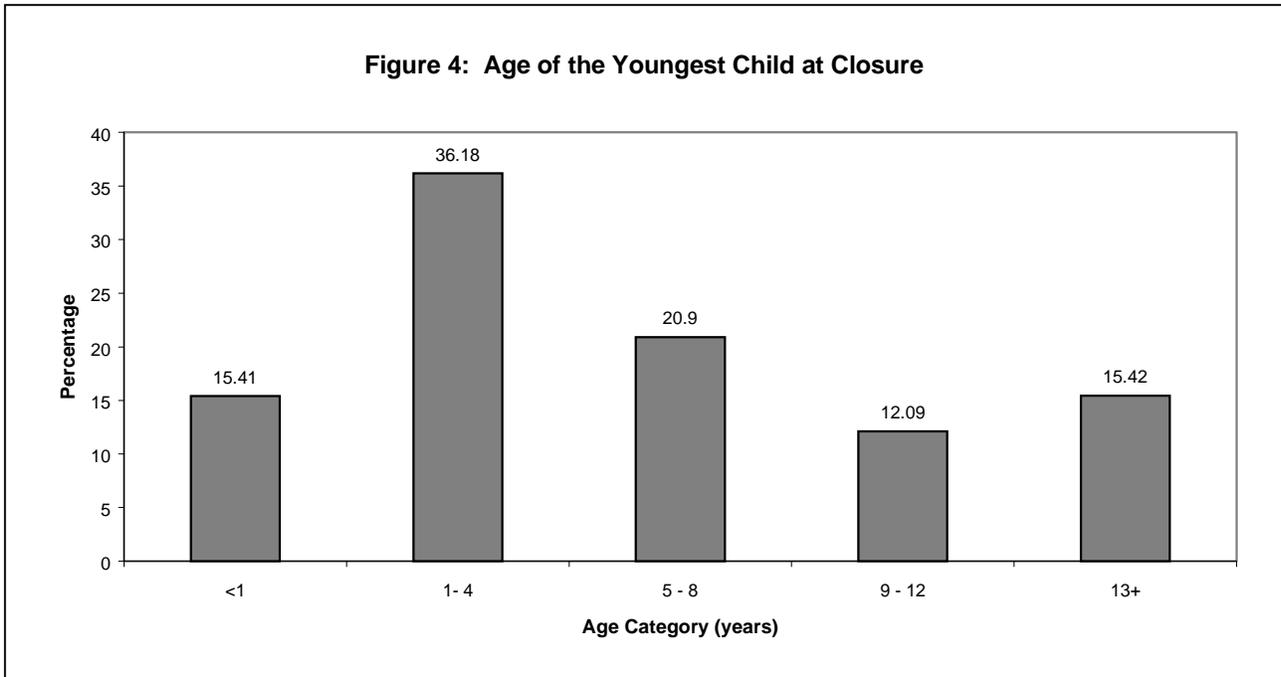
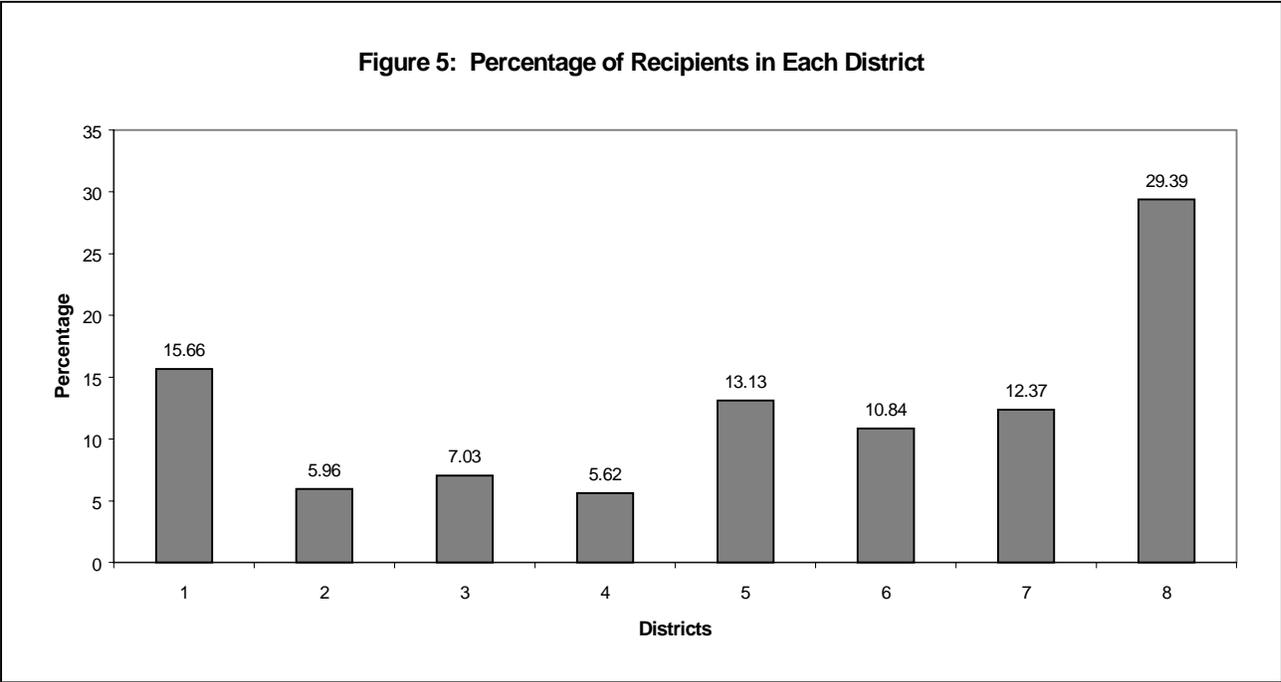


Figure 4 shows the percentage of AGs with youngest children in various age categories. Roughly thirty-six percent of the AGs that left the program have a youngest child that is between one and four years of age at the time of closure, which may provide evidence that those with younger children are in fact exiting the program more frequently than are others.



The sample is fairly evenly split between urban and rural residency. Slightly more than half, 52 percent, of the AGs reported living in an urban county (Davidson, Hamilton, Knox, or Shelby) at the time of closure while the remaining 48 percent resided in a rural county. As of 1997, 61.3 percent of all AGs in Families First lived in urban counties (with 38.7 percent in rural counties). Given that this urban-rural division in the overall caseload has remained fairly stable, our findings suggest that rural recipients are relatively more likely to exit the program.

Figure 5 further distinguishes residency of the sample by breaking it down into various districts. District 8 (Shelby County) is home to a large percentage of the AGs in the sample; nearly 30 percent of the sample resides in this district. Each of the remaining districts contains less than 16 percent of the sample. District 4 (Hamilton County) is home to the fewest number of recipients with only 5.62 percent of the sample.



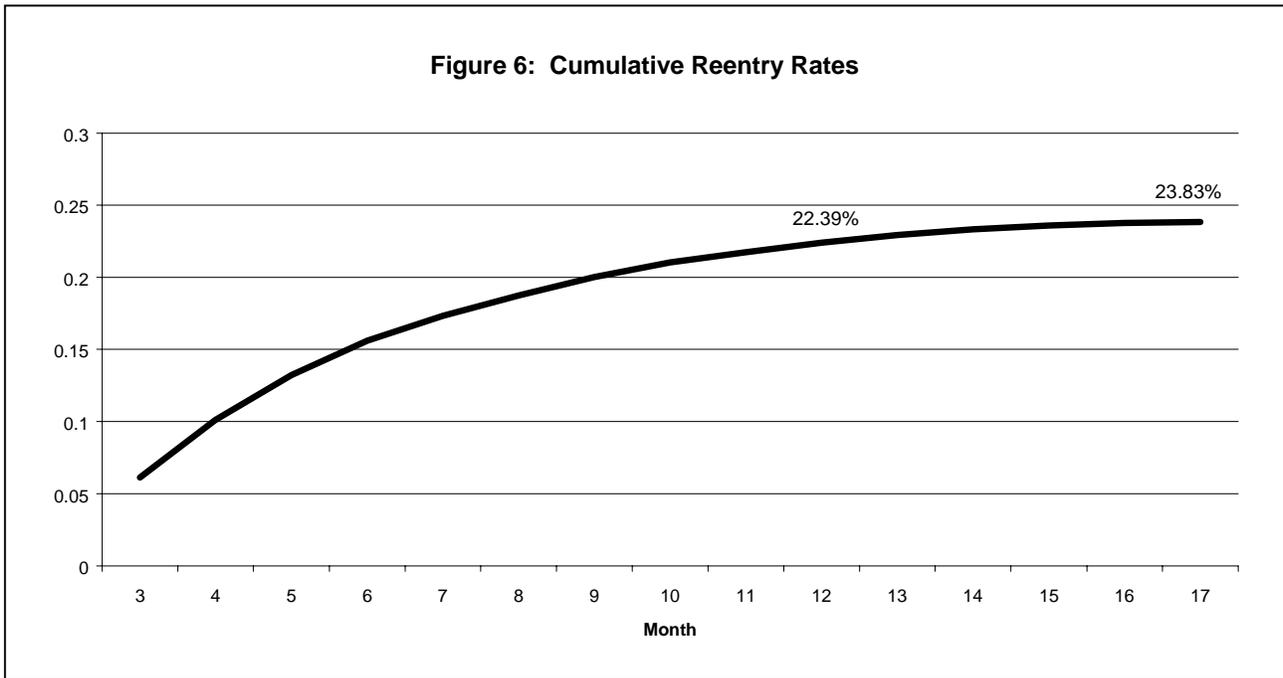
**Overall Reentry Rates**

Of the 56,334 assistance groups who left the Families First program at least once between the end of July 1997 and December 1998, 13,424 experienced at least one return. The general reentry trends for this group are presented in Table 2.

The cumulative reentry rate over 18 months, as shown graphically in Figure 6, was 23.8 percent. Reading from Table 2, 15.6 percent returned within six months and 22.4 percent returned within one year of leaving. These findings suggest that reentry occurs relatively soon after an exit. The Tennessee evidence apparently mirrors broader studies summarized above. The average length of time off the program is about six months for reentrants.

**Table 2: Overall Reentry Trends**

Months Since Exiting FF	Number At Risk Of Reentry	Number Of Reentrants	Number Right Censored	Hazard Rate	Cumulative Reentry Rate
3	56,334	3,456	2,978	6.1%	6.1%
4	49,900	2,241	2,419	4.5%	10.1%
5	45,240	1,761	2,503	3.9%	13.2%
6	40,976	1,333	2,672	3.3%	15.6%
7	36,971	971	2,572	2.6%	17.3%
8	33,428	798	2,780	2.4%	18.7%
9	29,850	710	2,473	2.4%	20.0%
10	26,667	580	2,696	2.2%	21.0%
11	23,391	398	2,561	1.7%	21.7%
12	20,432	366	1,567	1.8%	22.4%
13	18,499	299	1,966	1.6%	22.9%
14	16,234	228	2,495	1.4%	23.3%
15	13,511	155	2,944	1.1%	23.6%
16	10,412	89	3,558	0.9%	23.8%
17	6,765	39	3,595	0.6%	23.8%
18	3,131	0	3,131	-	-
<b>Total</b>		<b>13,424</b>	<b>42,910</b>		



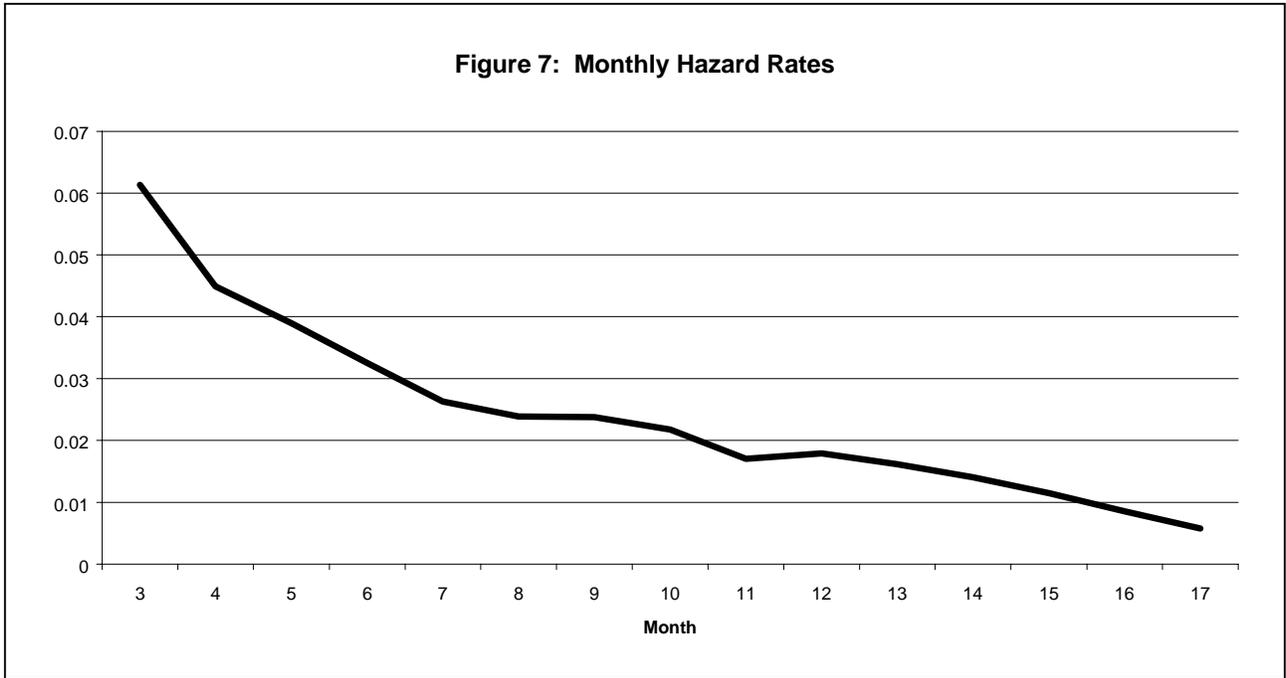


Figure 7 shows monthly hazard rates, which represent the probability that an assistance group will return to Families First given that it has not yet returned in that particular month. The graph shows, somewhat surprisingly, that the longer the assistance group is off the program, the less likely it is to return to the rolls. Those most likely to return apparently do so very soon after exiting Families First.

**A Profile of Families First Reentrants**

Changes that may have occurred in the assistance group’s size, income, or residency may provide some indication of why reentry is observed. Unlike those who leave and do not reenter, reentrants to Families First provide a complete set of information in the administrative data upon their return. Consequently, we are able to examine changes in various characteristics for those who return, but not for those who remain off the program. While this provides some useful

descriptive evidence, we have no way of comparing the effects of any changes on reentry rates without a similar set of information for leavers.

We begin the profile of reentrants with a discussion of the assistance group’s income from various sources. If an assistance group’s monthly income were to fall during an off-program spell, a return to welfare would be more likely. Table 3 provides means and standard deviations for income variables at the time of the initial case closure for the entire population, for reentrants, and for non-reentrants (leavers).

Surprisingly, the average earned income of those who eventually reenter was considerably higher than that of those who remain off the program. One possible explanation for this difference is a lack of stability in earned income for individuals who have recently departed welfare rolls. Former recipients may lack the necessary skills or job training required to obtain a good position in the work force and may be forced to settle for a short-term position or a position with fluctuating hours. With an increased possibility of unstable earnings, recipients who receive high earned incomes are not guaranteed stable monthly incomes. Therefore, it is not as unlikely that recipients with high earned incomes would return to the program as one would think.

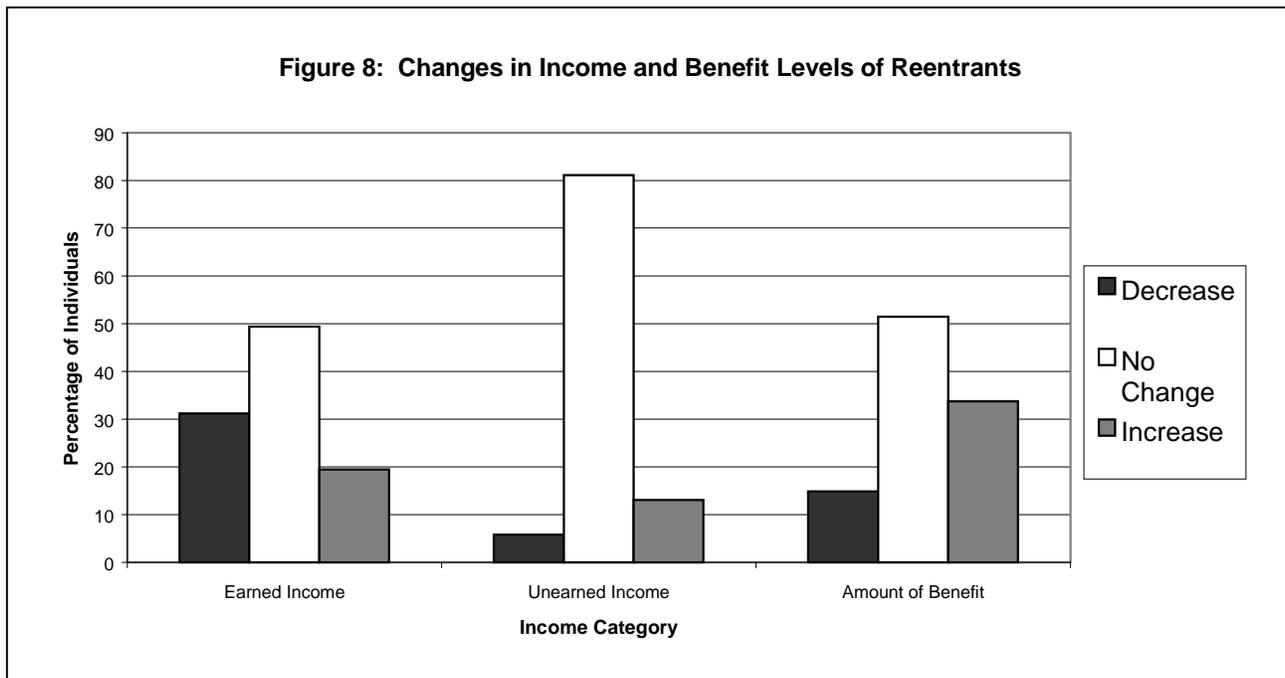
**Table 3: Descriptive Statistics – Monthly Incomes at Time of Case Closure**

<b>Variable</b>	<b>All (N=56,328)</b>	<b>Reentrants (N=13,423)</b>	<b>Leavers (N=42,905)</b>
Earned Income	233.68 (388.57)	313.44 (425.03)	208.73 (372.96)
Unearned Income	45.19 (143.19)	38.68 (135.17)	47.23 (145.55)
Benefit	128.38 (77.08)	119.97 (86.92)	131.01 (73.54)

The mean value of unearned income was slightly higher for non-reentrants (“leavers”) than it was for reentrants. This may suggest that those who left the program with higher levels of

unearned income were better able to remain off the program as a result of more stable or ongoing non-work support structures. The mean of the amount of the current benefit at closure was surprisingly higher for non-reentrants. This is somewhat unexpected since intuition might suggest that a higher benefit level would make welfare a more attractive option to potential recipients. However, this analysis is unable to project whether the recipient's benefit level would remain the same from one spell to another. It is quite possible that those who did not eventually reenter experienced growth in other income areas that limited their benefit eligibility and therefore made returning to welfare a less attractive option.

Figure 8 shows the percentage of reentrants that experienced changes in earned income, unearned income, and benefit levels between the initial closure and reentry. Half of those individuals who reentered the program during the observed time period experienced changes in

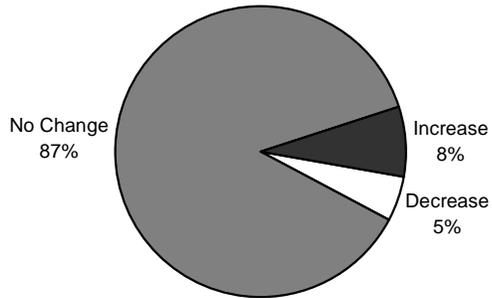


earned income levels. Earned income went down for the majority of this group, which may suggest that individuals returned to Families First in order to replace reduced monthly income. Roughly 31 percent of reentrants experienced a decrease in monthly-earned income, while the remaining 19 percent saw an increase in monthly-earned income.

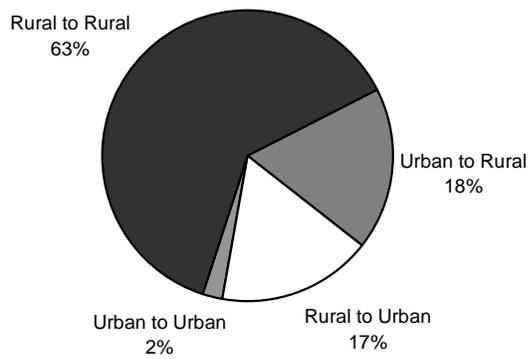
A large majority of reentrants, approximately 81 percent, as shown in Figure 8, did not experience changes in unearned income levels between first exit and reentry. Of those who did report changes, the majority reported an increase. Slightly over 30 percent of reentrants received a higher benefit level upon return to Families First. An increased benefit level certainly provides an incentive for a return the welfare rolls and indicates a decrease in monthly income for an assistance group prior to returning to the program.

Of those assistance groups who returned to the program, few experienced changes in the number of recipients during the off-program spell. As shown in Figure 9, 87 percent of the reentering assistance groups did not experience a change in the number of recipients in the group (although the identity of those individuals may have changed). The majority of those who did experience a change saw the size of their AG increase by one or more individuals. As shown in the same figure, eight percent of the returning assistance groups experienced an increase in the number of recipients in the group, while only five percent of the reentrants saw a decrease. Although these numbers tend to suggest that changes in AG size are not the driving force behind reentry, an extended analysis is necessary before any robust conclusions can be made. It is highly likely that as the observed time period is increased a larger percentage of those who return to welfare will have experienced a change in the number of recipients in the group.

**Figure 9: Change in the Number of Recipients in the Assistance Group for Reentrants**



**Figure 10: Direction of Move For Those Reentrants Who Moved Between Counties**

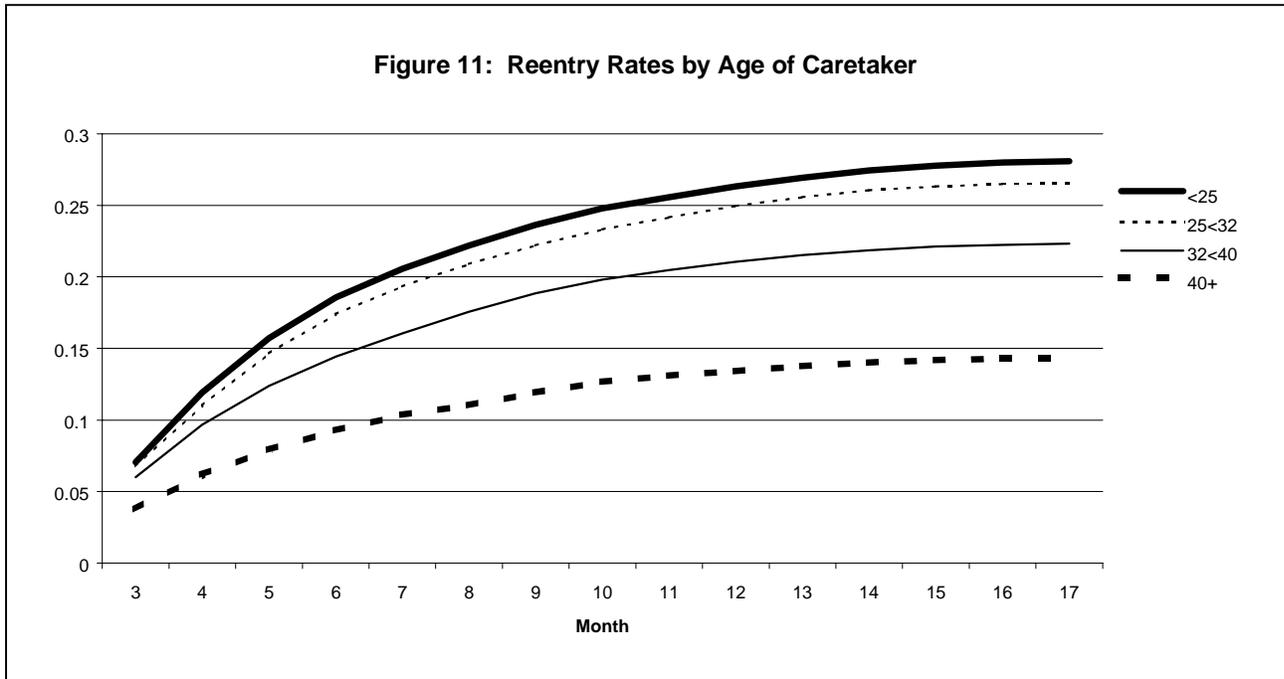


A very small percentage of reentrants changed their county of residence during the observed off spell. In fact, only 5.1 percent of the reentrants participated in a move between counties during their off-program spell. Of the reentrants that did move to a different county, the majority (63 percent) moved from one rural county to another (see Figure 10). Approximately 18 percent moved from urban to rural counties, 17 percent moved from rural to urban, and the remaining 2 percent moved from one urban county to another.

### **Discussion of Reentry Rates**

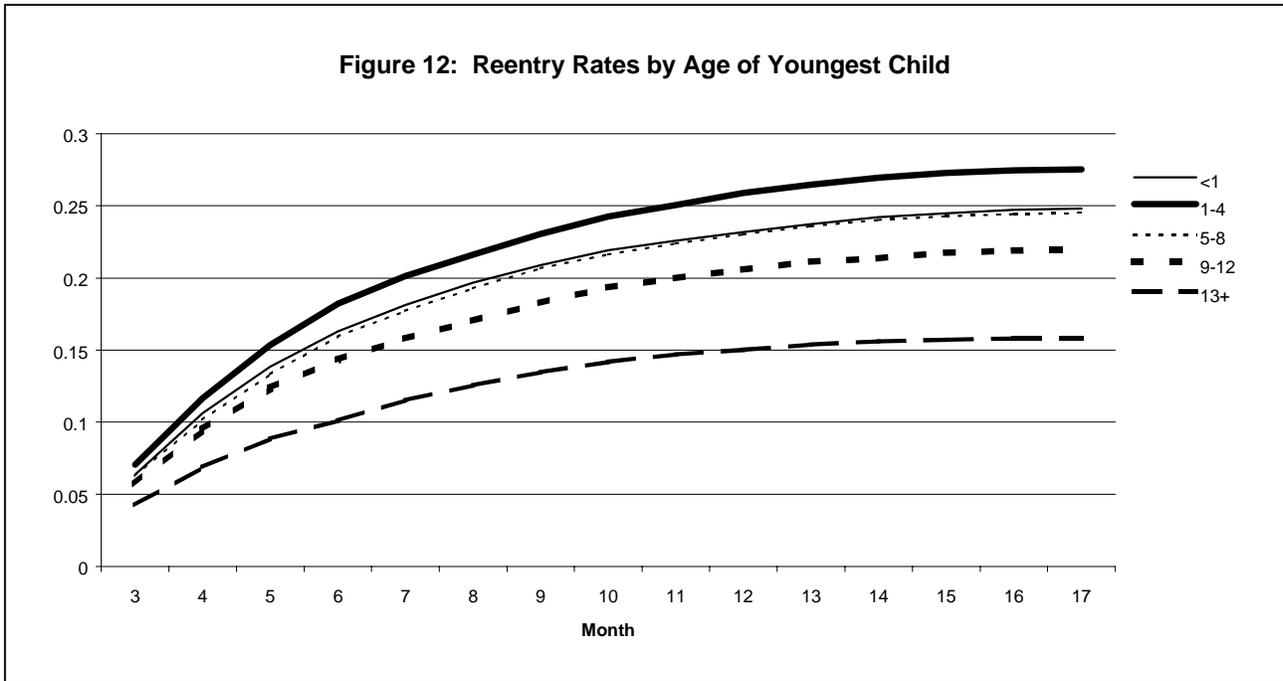
Figures 11 through 16 show cumulative reentry rates of the population by various demographic categories. Of course, it bears mentioning that the results in this section are only meant to be illustrative. These simple calculations can help us understand the various causes of reentry, but they cannot independently identify the true effects of each characteristic holding all other factors constant. Such an analysis is possible, however, and is presented below.

As indicated by previous studies, age can have an effect on the probability of reentry. As shown in Figure 11, assistance groups whose caretaker is younger than twenty-five are most likely to experience a return. Younger caretakers are more likely to have younger children, a possibility that is explored below. They may also have less job experience and training that may prevent them from obtaining a job that pays sufficient earnings. Without sufficient monthly income a return to welfare becomes more likely.



The implementation of time limits makes the age of the youngest child at closure a necessary variable to include in any analysis of reentry. An assistance group is limited to sixty months of lifetime benefits and becomes ineligible once the youngest child reaches the age of 18. As a result, the age of the youngest child plays a key role in the reentry decision (for additional discussion, see Grogger and Michalopoulos, 1999, or Grogger, 2000). Assistance groups with younger youngest children may be more likely to cycle on and off Families First, given that they have longer time horizons over which benefits might be necessary. This theory would also suggest assistance groups with younger youngest children would also be expected to exit the program more frequently than other groups in order to conserve benefit eligibility. Similarly, assistance groups with older youngest children have a shorter time horizon over which benefits could be used, so the child's age should play less of a role in the reentry decision. Figure 12 reveals this tendency, as assistance groups whose youngest child is between the ages of one and

four are most likely to return. Excluding those with youngest children under the age of one, the probability of reentry falls as the age of the youngest child increases.



Residence in an urban area might also have an impact on the probability that an assistance group will return to Families First. As shown in Figure 13, those in urban areas are more likely to reenter than are those in rural areas. Despite the perceived availability of jobs and important services such as child care in an urban environment, urban residents are more likely to return for a variety of reasons. For example, urban residents probably live closer to a TDHS office than residents of more rural areas. Further, one can receive Families First benefits in greater anonymity in an urban setting; welfare receipt in a smaller town is potentially more difficult to conceal. Yet another explanation is that public assistance might be seen as a more

acceptable alternative in an urban environment. Finally, urban residents might just have other characteristics that tend to make them more likely to return to the rolls.

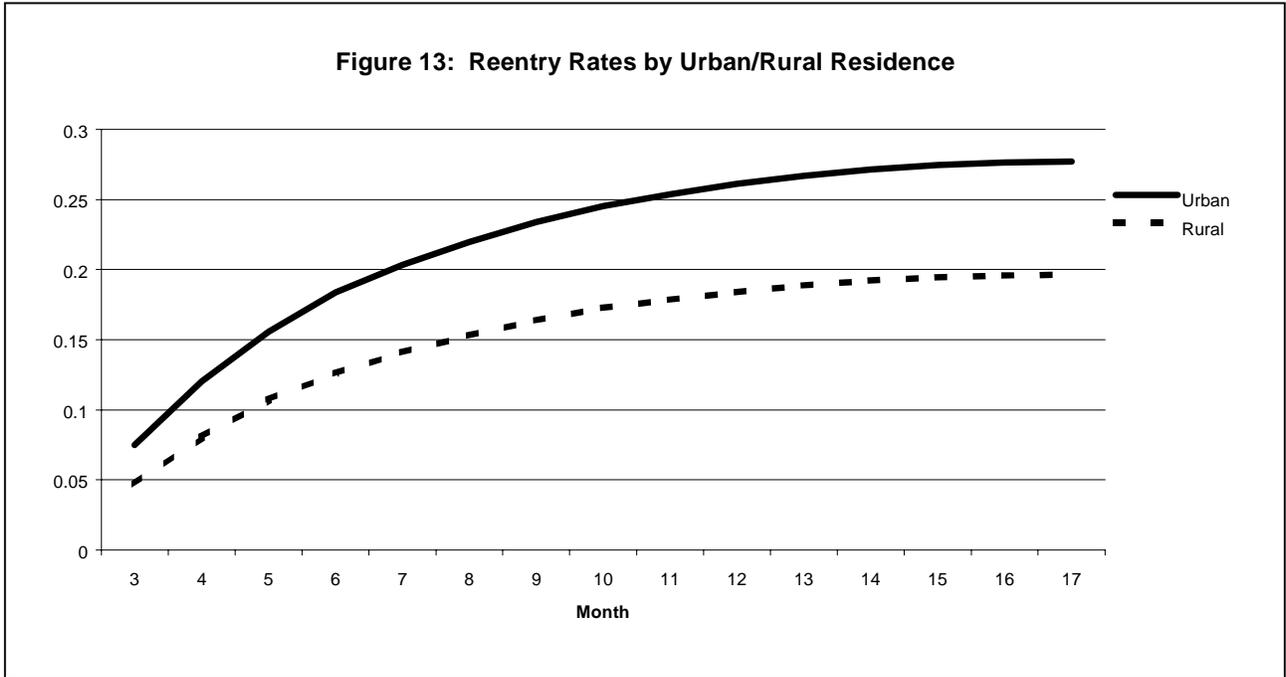


Figure 14 shows that the larger the number of recipients in the assistance group, the more likely the group is to return to the rolls. Self-sufficiency for AGs of larger sizes is certainly more difficult to maintain than it is for smaller groups. As a final preliminary look at the demographics of reentry, Figure 15 shows that AGs with black caretakers are more likely to experience a return to welfare than any other ethnic groups. Again, it is not possible in these pair-wise analyses to discern whether this is truly an ethnic effect, or whether black AGs tend to have other characteristics (such as urban residence or larger assistance groups) that make them more likely to reenter. With this, we turn to a more in-depth statistical analysis of the causes of reentry that allows us to assess each characteristic's independent effect on reentry rates.

Figure 14: Reentry Rates by AG Size

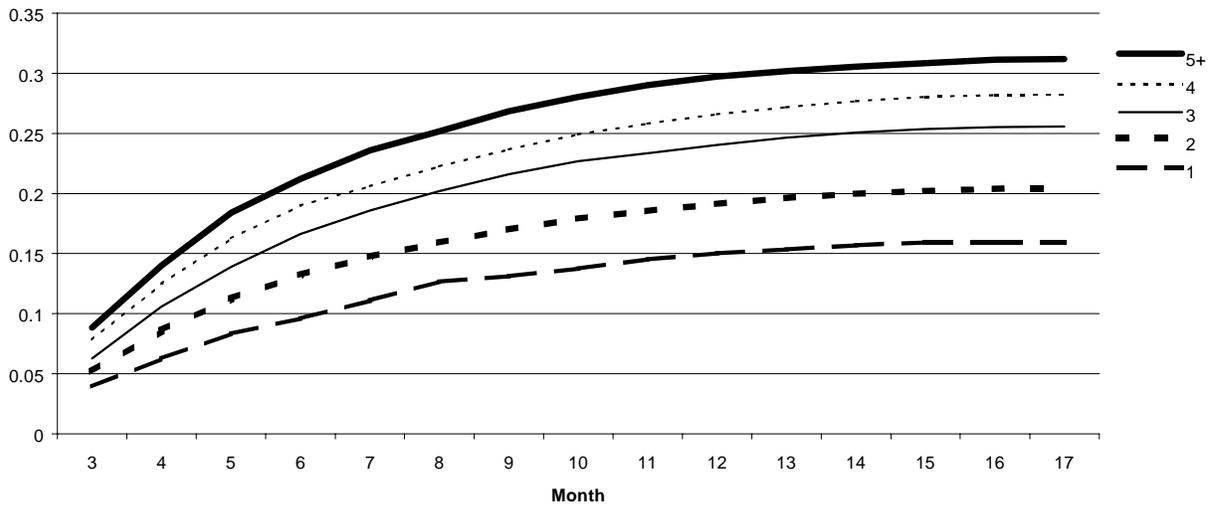
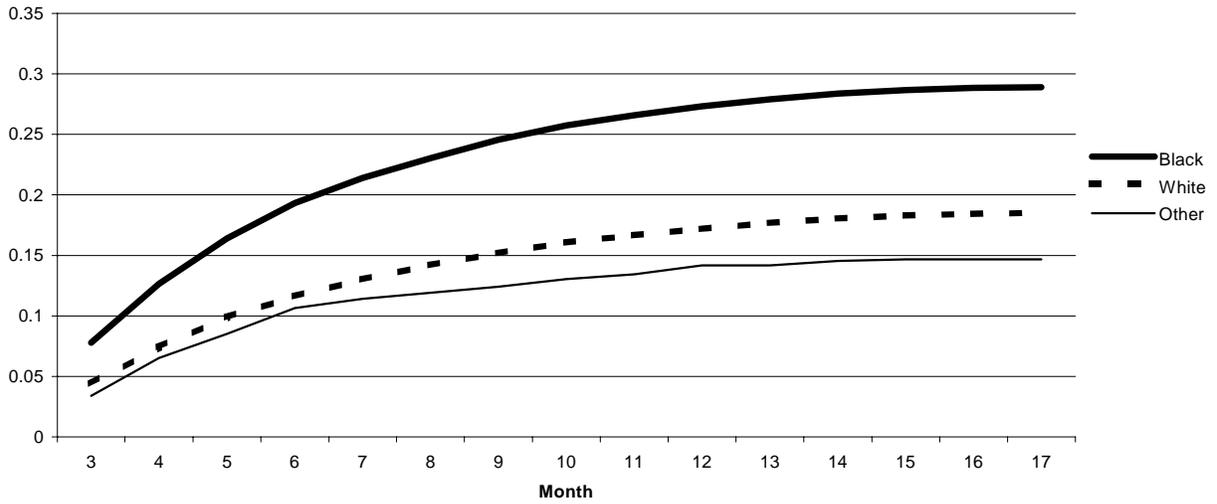


Figure 15: Reentry Rates by Ethnicity



## Multivariate Statistical Results

A variety of methods are available for examining time-duration data. We investigate the effects of various characteristics on reentry rates using a Cox Proportional Hazards Model. In sum, this model is similar to regression analysis in that it allows us to gauge the impact of each characteristic on reentry, holding all other factors constant. It should be noted that all characteristics in this analysis are measured at the time of initial closure, because no other information is available (except for reentrants, as noted above). Additional details on the methodology implemented below are provided in the Appendix.

Cox Proportional Hazards estimates are presented in Table 4. The hazard ratios can be interpreted as the relative probability of reentry for assistance groups with various characteristics. Estimates that exceed one represent a positive impact on the probability of reentry, while estimates below one represent negative impacts. For example, the estimate for caretaker's age (0.977) tells us that the probability of reentry is lower for assistance groups with older caretakers. This mirrors our earlier finding, but represents a stronger conclusion since all of the other factors in the model are being held constant.

The other results in Table 4 largely mirror our earlier findings. Assistance groups with male caretakers are only 65.9 percent as likely to return as AGs with female caretakers. Blacks are 46.4 percent more likely to return (or, 146.4 percent as likely to return), all else equal. Members of other non-white groups are actually less likely to return. An additional child (or other AG member) increases the probability of reentry by 15.1 percent. Those with larger benefits or unearned income at the time of the closure are less likely to reenter, while earned income has an imprecise effect.

**Table 4: Cox Proportional Hazards Model Estimates**

<b>Variable</b>	<b>Hazard Ratio</b>	<b>Standard Error</b>
Caretaker age at closure	<b>.977</b>	<b>.001</b>
Male	<b>.659</b>	<b>.037</b>
Black	<b>1.464</b>	<b>.034</b>
Other race	<b>.711</b>	<b>.067</b>
Number of recipients in AG	<b>1.151</b>	<b>.011</b>
Earned income at closure	1.003	.003
Unearned income at closure	<b>.956</b>	<b>.007</b>
Amount of benefit at closure	<b>.934</b>	<b>.015</b>
Age of youngest child < 1	1.040	.042
Age of youngest child = 1 to 4	<b>1.206</b>	<b>.043</b>
Age of youngest child = 5 to 8	<b>1.112</b>	<b>.020</b>
Age of youngest child = 9 to 12	<b>1.087</b>	<b>.014</b>
Left due to increase in income	<b>1.156</b>	<b>.028</b>
Left due to failure to meet req's.	1.027	.060
Voluntarily left the program	.944	.095
District 1	<b>.880</b>	<b>.031</b>
District 2	<b>1.230</b>	<b>.045</b>
District 3	<b>.900</b>	<b>.039</b>
District 4	<b>1.065</b>	<b>.039</b>
District 5	<b>.896</b>	<b>.028</b>
District 6	<b>.944</b>	<b>.027</b>
District 7	<b>.876</b>	<b>.026</b>
Number of observations	56,318	
Number of reentrants	13,422	
Log likelihood	-141,096.39	
Chi2(23)	2,107.89	
Prob > chi2	0.000	

Note: Bold type represents statistical significance at the 10 % level.

Results for the age of youngest child categories must be interpreted as relative to the oldest category (youngest child 13 or older). Assistance groups with younger youngest children are always more likely to reenter. Further, with the exception of the youngest bracket (less than one), the effect is largest for the youngest age categories. It should be noted that the choice of reference category has no effect on the pattern of these results.

Reasons for initial case closure provide surprisingly little information in assessing return probabilities. Assistance groups that leave as a result of increased income are about 15.6 percent more likely to return. Other closure reasons (failure to comply with program requirements, or voluntary exit) do not have a statistically significant effect on reentry.

Finally, the district of residence apparently exerts an independent effect on reentry rates. As with the age of the youngest child, these results must be interpreted in relation to the omitted category, which is District 8 (Shelby County). Again, the choice of the reference category is irrelevant and does not affect the relative patterns of reentry. To summarize, residents of Districts 2 and 4 are more likely to reenter than those in District 8, while those in all other Districts are less likely to reenter.

## **Conclusions, Caveats, and Areas for Future Research**

The Tennessee experience with welfare reentry has been similar in many ways to earlier findings. About 24 percent of those who leave Families First return within 18 months, and most of that reentry occurs fairly quickly. Age (both of the caretaker and of the youngest child), gender, ethnicity, AG size, and unearned or benefit income all exert intuitive effects on reentry rates. Assistance groups with younger, black, or female caretakers, and those with more and younger children are most likely to reenter. Those with more unearned income or higher Families First benefit levels at the time of closure are less likely to return, while those who leave the program as a result of income increases are more likely to return.

While this analysis has presented some of the first findings that are specific to Tennessee, use administrative data, and focus on post-1996 data, a number of questions remain unanswered. First, as noted above, the economy has performed remarkably during our period of analysis. Should the national and state economies take a turn for the worse, reentry rates might change (although the direction of any change is not clear).

Second, Families First policy undergoes regular changes, and we have not been able to isolate the effects of various policy changes on the overall reentry picture. Future research will need to consider more policy variables, such as exemptions, work requirements, and time limits.

Third, we have not been able to fully consider changes over time in various characteristics while former recipients are off the program. The future availability of good survey data will hopefully improve our capabilities along these lines.

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## Appendix: Multivariate Statistical Methods

As noted, a number of statistical methods are available for analyzing duration data. We have selected the Cox Proportional Hazards Model for its simplicity not only in estimation, but also in interpretation of the results. This Appendix provides additional detail on this useful econometric tool.

Define each individual's off-program spell length as  $T$ , which is a random variable. It is typically assumed that  $T$  has a continuous probability distribution function, given by  $f(t)$ . The associated cumulative distribution function is  $F(t) = \int_0^t f(s)ds = P(T \leq t)$ . We are usually interested in the probability that a spell lasts at least as long as some length  $t$ , which is given by the *survival (or survivor) function*:  $S(t) = 1 - F(t) = P(T \geq t)$ .

One common way to analyze duration data is through this general question: given that a spell has lasted a certain length, what's the probability that it will end soon? Specifically, what's the probability that it will end within a short period of time, say  $\Delta$ ? Mathematically, this probability is  $P(t \leq T \leq t + \Delta \mid T \geq t)$ . The limit of  $[P(t \leq T \leq t + \Delta \mid T \geq t)] / \Delta$  as  $\Delta$  goes to zero is known as the *hazard rate*:

$$\lambda(t) = \lim_{\Delta \rightarrow 0} \frac{P(t \leq T \leq t + \Delta \mid T \geq t)}{\Delta} = \lim_{\Delta \rightarrow 0} \frac{F(t + \Delta) - F(t)}{\Delta S(t)} = \frac{f(t)}{S(t)}$$

The hazard rate is the rate at which spells are completed immediately after  $t$ , given that they have lasted at least until  $t$ .

Proportional hazards models are perhaps the most popular multivariate way to examine duration data. They assume that the hazard function takes the following general form:

$\lambda(t \mid X) = e^{X\beta} \lambda_0(t)$ , where  $X$  is a vector of characteristics,  $\beta$  represents the vector of coefficients (or the effects of the  $X$  variables on the hazard rate) and  $\lambda_0(t)$  is referred to as the *baseline hazard*.

We use Cox's (1972) method to estimate the coefficients in  $\beta$  without needing to estimate the baseline hazard (which we are usually not interested in, anyway). The estimated coefficients can be transformed to represent the constant proportional effect of each  $X$  variable on the conditional probability of *completing* a spell, as demonstrated in Table 4.

Of course, other methods are available that require us to explicitly model the hazard rate (or, the hazard function), including various loglinear models that specify a particular distribution for the baseline hazard. Experimentation with these other methods yielded results similar to those in Table 4, so they are not presented here. For additional information on these and other methods, interested readers should consult Greene (2000) or Kiefer (1988).

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