Departmental Papers (SPP)

School of Social Policy and Practice

September 1997

Predictors of Exit and Reentry among Family Shelter Users in New York City

Yin-Ling I. Wong
University of Pennsylvania, iwong@sp2.upenn.edu

Dennis P. Culhane
University of Pennsylvania, culhane@upenn.edu

Randall Kuhn
University of Pennsylvania

Follow this and additional works at: http://repository.upenn.edu/spp_papers

Predictors of Exit and Reentry among Family Shelter Users in New York City

Abstract

This study explores the process of exit from and reentry to public family shelters for homeless families in New York City. A Cox proportional-hazards model was developed to identify the effects of demographic, family structure, reason for homelessness, an time-related variables on the hazard rates for different types of shelter discharge and shelter reentry. The study specifically explores the significance of type of housing placement as a predictor variable for shelter reentry. Various demographic and family structure attributes are linked with shelter exit and reentry, including race and ethnicity, family size, age of family head, pregnancy status, and public assistance recipiency status. Although there is a trade-off between length of shelter stay and type of housing placement at shelter discharge, procuring subsidized housing is associated with a substantially lower probability of shelter readmission. Policy implications of these findings and future directions for research on the dynamics of family homelessness are discussed.

Predictors of Exit and Reentry among Family Shelter Users in New York City

Yin-Ling Irene Wong
University of Pennsylvania

Dennis P. Culhane
University of Pennsylvania

Randall Kuhn
University of Pennsylvania

This study explores the process of exit from and reentry to public family shelters for homeless families in New York City. A Cox proportional-hazards model was developed to identify the effects of demographic, family structure, reason for homelessness, and time-related variables on the hazard rates for different types of shelter discharge and shelter reentry. The study specifically explores the significance of type of housing placement as a predictor variable for shelter reentry. Various demographic and family structure attributes are linked with shelter exit and reentry, including race and ethnicity, family size, age of family head, pregnancy status, and public assistance recipiency status. Although there is a trade-off between length of shelter stay and type of housing placement at shelter discharge, procuring subsidized housing is associated with a substantially lower probability of shelter readmission. Policy implications of these findings and future directions for research on the dynamics of family homelessness are discussed.

Despite the profound implications of family homelessness on social policy, little information is available on the patterns of exiting and returning to homelessness among homeless families and the conditions and circumstances that may affect these residential transitions. Based

on 8 years of administrative data on public shelter use among homeless families from New York City (from January 1, 1988, to October 1, 1995), this study compares the patterns of various types of exits from public family shelters in New York City; identifies demographic, family structure, reason for homelessness, and time-related variables that are associated with the transitions to distinct types of exits from public family shelters; compares the patterns of readmission to public family shelters, given the type of exit experienced by families; and identifies variables that are associated with public shelter readmission and, specifically, tests the significance of type of housing placement at shelter discharge as a predictor variable.

Background

Researchers of the contemporary homeless have been increasingly aware of the dynamic character of the homeless experience. From communitywide snapshot surveys, Rodger Farr, Paul Koegel, and Aubrey Burman; Peter Rossi, Gene Fisher, and Georgianna Willis; and James Wright and Eleanor Weber found that a significant portion of their homeless samples had experienced multiple episodes of homelessness.[1] More recently, researchers tracking the residential transitions of the homeless over time provide further support for the dynamic nature of the homeless experience.[2] These studies consistently portray a homeless population that is relatively transient, some of whom recycle between the streets, shelter, and conventional housing.

Although most of the longitudinal research to date has covered primarily single homeless adults, a few community-based studies have explored the phenomenon of repeat homelessness and the determinants of exit from and reentry among families with minor children.[3] Several findings have significant implications for efforts to enable families to leave homelessness and to prevent its recurrence. First, researchers found an association between a number of demographic and background attributes, including family size, race and ethnicity, reason for homelessness, use of social support, and welfare receipt and the likelihood of exiting homelessness. Second, they found an association between the type of domicile obtained upon leaving homelessness and subsequent residential stability. Specifically, a government housing subsidy was negatively associated with the incidence of repeat homelessness. Third, they found that the likelihood of leaving homelessness during a given time interval decreases markedly the longer homeless families stay in a shelter, implying a possible duration dependency for exiting homelessness.

There are reasons to suspect the validity of these findings. The homeless samples used in these studies are biased in several ways. John Stretch and Larry Kreuger's sample, for example, was based on

homeless families in a Midwest city that were well served by social services, and sample attrition in their study was more than 50 percent of the original sample.[4] Elinor Kelly, Clyde Mitchell, and Susan Smith's study was based on data collected from a single family shelter, thus raising questions about the generalizability of the findings.[5] Both Stretch and Kreuger and Yin-Ling Irene Wong and Irving Piliavin gathered residential histories from retrospective self-report.[6] Retrospective information may be susceptible to faulty memory. For the majority of the studies, there was a limited time period for observing exits from and returns to homelessness. Moreover, with the exception of Wong and Piliavin's study, measurement of timing of exits and returns was imprecise.[7] Finally, there is failure to distinguish between different types of domicile arrangements, thus limiting the ability to identify effects of specific arrangements upon leaving homelessness on the likelihood of repeat homelessness.

The study reported here, which was based on an administrative database of family shelter use in New York City between 1988 and 1995, addresses these shortcomings and offers an opportunity to replicate findings in previous research. Specifically, this study represents a clear departure from previous research on the dynamics of family homelessness in three important respects: we tracked all uses of public shelters in the city during the study period, we had information on the exact timing of entry to and departure from public family shelters, and we had detailed data on types of subsidized housing and other living arrangements homeless families obtained upon discharge from public shelters.

Methods

The Data

We employed the New York City Family Shelter System database, the Homeless Emergency Referral System (HOMES), in our study. The database was designed primarily as a reservation system, with a secondary function of providing information for case management. Information tracked in HOMES includes basic demographic characteristics of families and family members, including age, race and ethnicity, number of adults and children, family types (single-mother, single-father, or two-parent families), pregnancy status of female adult members, reason for homelessness, and income support (welfare) status. The database also tracked entries and exits from the shelter system by recording dates of admission, discharge, and subsequent readmission, as well as types of housing placements obtained by clients on discharge from shelter.

Homeless families enter the New York City shelter system through either Income Support Centers or Emergency Assistance Units (EAUs). To be considered a family, cohabiting couples must be legally married or be on the same Income Support grant; a marriage certificate or documentation of a shared grant must be provided to the EAU or Income Support staff. Parents must provide documentation that their children are their own. Pregnant women are admitted to the Family Shelter System regardless of their family status at the time of shelter admission. Homeless adults who do not meet these admission criteria are referred to the Adult Shelter System.

To avoid the problem of left censoring, we included shelter stays that started on or after January 1, 1988.[8] Shelter stays that began after October 1, 1993, were excluded from our analysis to ensure that families were observed for a minimum of 2 years. We recorded 27,919 first-time shelter stays with complete demographic information.[9] Duration data and discharge codes of these homeless episodes were used to compute hazard functions of shelter discharges. Of the 27,919 families, 88 percent (24,640 families) left the Family Shelter System before October 1, 1993. Duration data of shelter reentry of these 24,640 families were used to compute hazard functions of shelter reentry. We imposed a cutoff date for shelter discharge of October 1, 1993, to ensure that families that exited homeless shelters had a risk period of 2 years for shelter reentry.[10]

Definition of Exit and Types of Exit

We defined an exit from the Family Shelter System as a departure that lasted a continuous 30 days or longer. This definition avoids counting as having exited those families that left the system for a few days and returned. Under this definition, we collapsed all the shelter stays that occurred within 30 days of one another into one episode of homelessness. The 30-day exit criterion has been commonly employed by other researchers of homelessness.[11]

Four types of exits from the New York City Family Shelter System were considered in this study. The most common exit (48% of the 27,919 shelter episodes) was families exiting to subsidized housing. Families exiting to unknown arrangements (41%) was the next most common exit. There was no record in the HOMES database of the type of housing arrangements these families obtained. The third most common exit (7.5%) was to apartments that the families found themselves or to the family's former residence. Finally, 3.5 percent of shelter stays ended in "other exits," which included involuntary exits (such as arrests), discharges to shared lodging (with friends or relatives), and discharges to shelters for victims of domestic violence.

Among families that moved to subsidized housing ($N = 13,488$), 31 percent moved to apartments built and managed by the New York

City Housing Authority. Another 31 percent moved to previously private apartments that were now owned by New York Housing Preservation and Development. Finally, 33 percent moved to subsidized private lodging funded by the Emergency Assistance Rehousing Program, in which the city paid a one-time cash bonus to the landlord for renting to these families.[12] The remaining 5 percent moved to other types of subsidized housing.[13]

The classification of shelter exits into these four distinct modes involves a certain degree of arbitrariness. To our knowledge, there was no prior research available to offer conceptual guidance for classification of exit destinations. Nevertheless, it is intuitively appealing to distinguish between permanent housing arrangements that were subsidized by the government and those that were acquired by shelter clients without any public support. Indeed, two prior studies found a negative association between receipt of government housing subsidy and the probability of repeat homelessness.[14] We may expect that families would be less likely to experience shelter readmission if they were relocated to subsidized housing upon shelter discharge.

Moreover, we may expect that families that were able to locate housing on their own or return to their previous residences would be able to sustain more stable housing than families that were unable to do so. Ability to find one's own housing may indicate a certain degree of self-sufficiency on the part of the family head, while returning to former residences might indicate a short-term crisis that led to homelessness instead of a more debilitating situation.

Exiting the shelter to unknown arrangements is a less distinct category because destinations of these families were simply not known. However, compared with families that were placed in subsidized housing, it is likely that these families received less housing advocacy and fewer services that could result in stable housing. The residual category of "other exits" is a combined category that probably reflected different processes at work. We may expect that families that are discharged to shared lodging with family and friends were different from families that experienced involuntary discharges such as arrest and other forms of institutionalization. Despite the likely differences, the proportion of families that were discharged to each category of these exits was too small to warrant separate analysis.

Method of Analysis

The first stage of analysis is descriptive. The distributions of shelter-stay lengths were computed using survival analysis. Hazard functions for all exits, as well as for four specific forms of exits, are presented. Each hazard function determines change in the likelihood that a family would experience an exit (or a specific form of exit) during an interval

of time given that the family was at risk of an exit (or a specific form of exit) at the beginning of that interval. Similarly, hazard functions are presented to illustrate the overall rate of readmission to public family shelters as well as the rate of readmission given that the family had been discharged to a particular form of domicile. The hazard functions were based on a 2-year period from the time of first admission into the shelter system in the case of exit and from the time of shelter discharge in the case of reentry.

The hazard functions are useful for descriptive purposes but do not necessarily imply any causal relationship between the length of shelter stays and the probability that a family will experience a certain form of discharge. An increase or decrease in hazard function over time may reflect population heterogeneity rather than duration dependency of exits or returns. To identify factors that account for change in hazard rate, one must use multiple regression analyses.

We employed a competing-risk hazard rate regression model to estimate the effects of selected variables on shelter exits. The four exits specified are "competing" in the sense that while families were considered "at risk" of each of the four exits while they were in shelter, they could only experience one of the four types of discharge.

Given that our primary concern is to examine the effect of a set of selected variables on the hazard of exits and returns, the form of duration dependency is not of substantive interest here. We employed the Cox proportional hazards model to estimate the effects of covariates on the rate of exits and returns, without specifying the parametric form of the duration function.[15]

The model assumes that the hazard of exit from the Family Shelter System, $h_{ij}(t)$, is given by the following:

$$h_{ij}(t) = h_0(t)[\exp(\Sigma_{jk}\beta_{jk}X_{ijk})].$$

In this equation, $h_0(t)$ is an unspecified baseline time-dependent hazard for all sample members, X_{ijk} is the value of the kth covariate for person i in the equation for the jth competing exit from shelter, and β_{jk} is the parameter coefficient of the kth covariate in the model.

In estimating the effect of selected variables on the hazard of readmission to the Family Shelter System, we similarly employed a hazard rate regression model that specifies a single risk of readmission to shelter.

Study Variables

Several demographic and other selected variables were included as covariates in the regression analysis. Family demographic variables included family type, that is, single-mother family or other family type

(single-father or two-parent family); race and ethnicity, which included two dummy variables, Black and Hispanic, with individuals of other racial and ethnic backgrounds as the reference category; and the number of adults and number of children in the household. Other demographic variables included pregnancy status of female family member and an interval variable indicating age of the family head at the time of shelter admission.[16]

Reason for admission to family shelter was represented by three variables: environment-related reasons such as unlivable conditions or natural disaster; domestic violence (spousal or child abuse); and "other" reasons such as newly arriving in town or referral by an outside agency. The reference category was economic reasons for shelter admission, which included eviction by landlord, by primary tenant, or by the Housing Preservation and Development agency. Public income support (welfare) was measured by a dummy variable indicating active public assistance status.

A number of time- and state-related variables were included in the regression analysis. Time-related variables included five dummy variables indicating the year of entrance into shelter from 1989 to 1993 for the exit equations and another five dummy variables indicating the year of shelter discharge from 1989 to 1993 for the reentry equations. The reference category for both exit and reentry was 1988. Three variables were constructed to indicate season of the year of shelter entry or discharge, with summer as the reference category. In the reentry equations, we also included the natural logarithm of the total number of days in family shelter as well as several state-related variables to indicate the type of shelter discharge experienced by families. The type of discharge variables included returning to one's former residence or finding an apartment independently, moving to subsidized housing, and "other" exits. Families that exited the Family Shelter System to unknown arrangements constituted the reference category. In the second regression model for reentry, we further broke down the public housing variables into four categories: New York City Housing Authority, New York Housing Preservation and Development, Emergency Assistance Rehousing Program, and other types of subsidized housing. Table 1 contains the means (or percentages) of the variables used in regression analysis.

Limitations of the Data

Given our research objectives, there were several identifiable problems with the HOMES data. First, the category of exit to unknown arrangements is an ambiguous one because the destinations to which families were discharged were missing in the data. It is plausible to assume

Table 1

Demographic and background attributes of shelter users at risk of exit (N = 27,903):	
Family type (%):	
Single-mother family	90.9
Other family types	9.1
Number of adults in the household (mean)	1.3
Number of children in the household (mean)	1.8
Race (%):	
Black	59.2
Hispanic	34.6
Other	6.2
Age of household head at shelter admission (mean)	28.6
Female member currently pregnant (%)	17.3
Currently receiving public assistance (%)	73.5
Reason for homelessness (%):	
Economic	73.6
Domestic abuse	9.9
Environment-related (disaster, crime, unlivable conditions)	9.2
Other (newly arriving in town, referral)	7.3
Season of the year for shelter entry (%):	
Spring	26.6
Summer	28.8
Fall	19.5
Winter	25.1
Year of shelter entry (%):	
1988	15.2
1989	14.9
1990	18.3
1991	18.5
1992	19.5
1993	13.6
Demographic and background attributes of exited families at risk of shelter reentry (N = 24,627):	
Age of household head at shelter discharge (mean)	28.9
Length of shelter stay in days (mean)	79.0
Season of the year for shelter exit (%):	
Spring	28.4
Summer	28.4
Fall	21.1
Winter	22.1
Type of exit (%):	
Exit to unknown arrangements	44.3
Exit to own housing	7.0
Exit to subsidized housing	45.1
New York City Housing Authority	15.3
New York Housing Preservation and Development	14.9
Emergency Assistance Rehousing Program	12.7
Other subsidized housing	2.3
Exit to other destinations	3.6
Year of shelter exit (%):	
1988	9.9
1989	16.3
1990	20.1
1991	18.9
1992	20.3
1993	14.5

that an unknown proportion of these families might have been dis-
charged to the streets or to other unconventional dwellings. Due to
its ambiguity, it is also difficult to interpret factors that are significant
predictors for this type of exit. Second, there was no information on
the physical and behavioral health of families admitted to the New
York City Family Shelter System. This omission may upwardly bias
the estimated effects of variables included in the model. Moreover,
due to the limited range of variables contained in the data, the study
does not test any theoretical propositions that explain exit from and
reentry to homeless shelters. Third, except for the types of discharge
from the public shelter system, there was no information on the living
arrangements of families outside the shelter system. The incidence of
returning to homelessness, therefore, may be underestimated since
families might have chosen to live on the streets or in some unconven-
tional shelter after being discharged from public shelter, rather than
seeking readmission to the shelter.

Results

Comparison of Patterns of Four Types of Exits

Figure 1 shows the hazard functions for all types of discharge and the
breakdown of four different types of discharge as competing risks. The
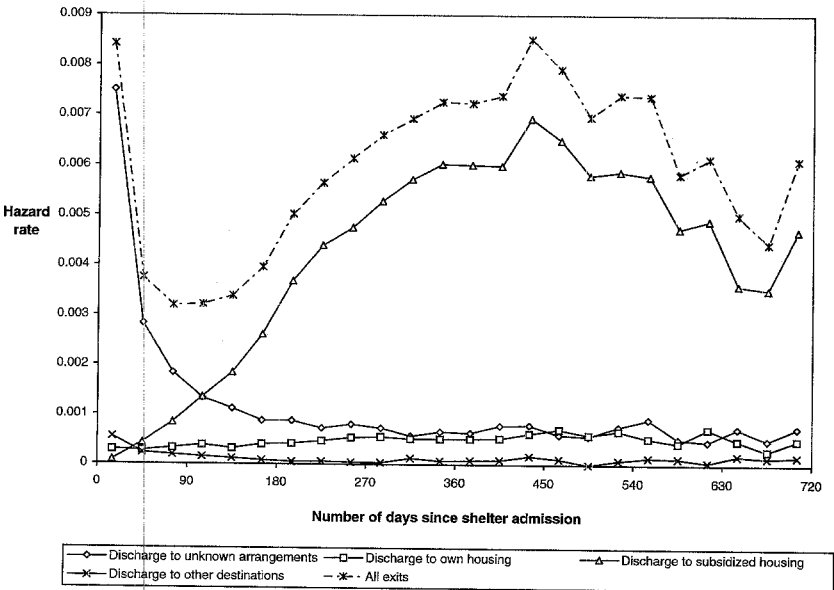

FIG. 1.—Hazard rates of exiting to different types of discharge and to all exits,
$N = 27,919$.

functions are cumulative in that the functions for the four types of discharge add up to the function of all types of discharge. As the broken line shows, the probability of a family being discharged from the shelter system is relatively high immediately after admission but declines rapidly during the first 3 months. The hazard of discharge then climbs gradually for 435 days from shelter admission, at which point it then declines.

The breakdown of the hazard rates into four competing risks of shelter discharge illustrates different processes at work. The hazard functions for families exiting to unknown arrangements and families exiting to subsidized housing display opposite patterns. The hazard function of families exiting to unknown arrangements is high immediately after shelter admission and declines very rapidly during the first 5 months of shelter stay, while the hazard function of families exiting to subsidized housing is very low in the beginning and rises steadily until 435 days of shelter stay. Thereafter, the hazard rate of discharge to subsidized housing declines gradually. The lower rate of discharge to subsidized housing at the early phase of shelter stay can be explained by the housing placement policy in New York City. Families are generally only eligible for public housing discharge after 90 days of shelter stay. Finally, the hazard functions for exiting to apartments found by the family or to the family's former residence and exiting to "other" destinations are very low and remain relatively stable.

Comparison of Patterns of Shelter Readmission

Figure 2 shows the hazard functions for readmission to the Family Shelter System for all families. Figure 3 shows the hazard functions
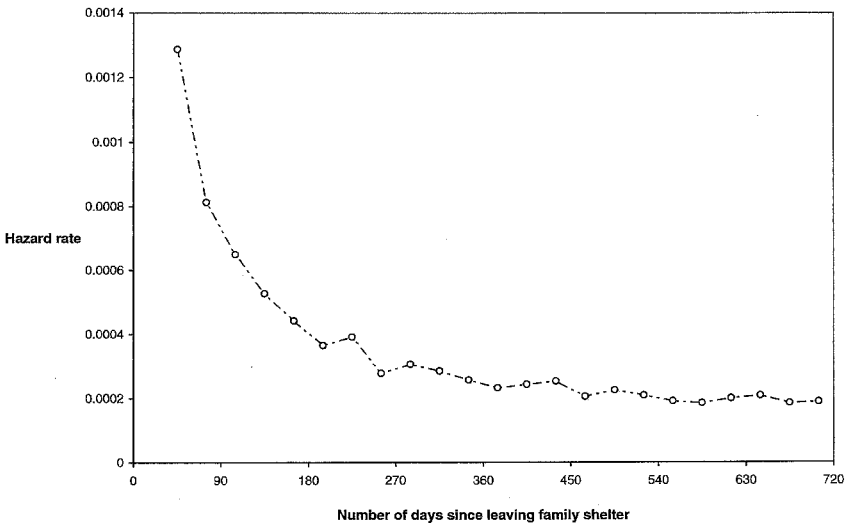

FIG. 2.—Hazard rates of returning to homeless shelter for the entire sample, $N = 24,640$.
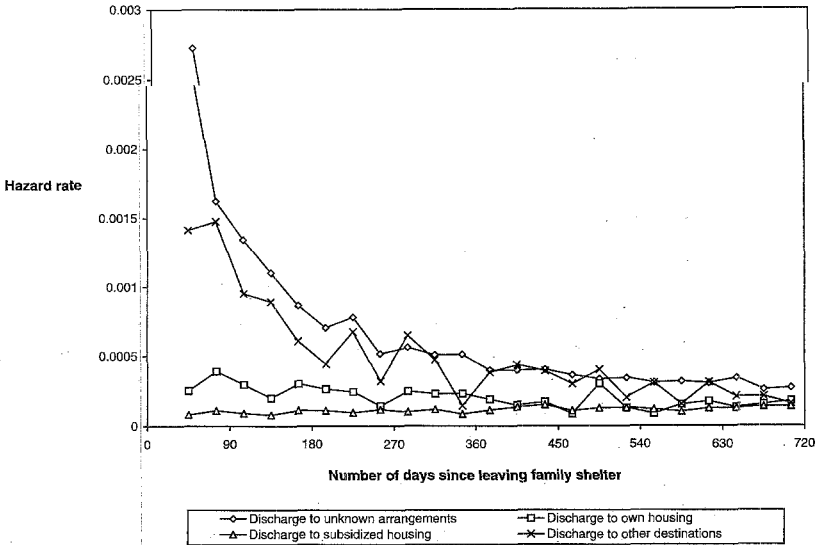
FIG. 3.—Hazard rates of returning to homeless shelter by discharge type, $N = 24,640$

for readmission given the four types of discharge experienced by families. As figure 2 shows, the probability of a family being readmitted to shelter is relatively high immediately after leaving shelter but declines very rapidly during the first 6 months after discharge. Thereafter, the hazard function of readmission stabilizes.

Figure 3 shows that the hazard function for readmission among families that exited to unknown arrangements closely resembles the hazard function for all families, suggesting that these families have a high probability of shelter reentry within 6 months of exit. The hazard function for families that were discharged to "other" exit destinations displays more irregularities, although the hazard rate is highest immediately after leaving shelter and declines somewhat thereafter. In contrast to these hazard functions, the hazard rates for families that either exited to their own housing or to subsidized housing remain consistently low and relatively stable.

Table 2 gives the rate of shelter reentry within 2 years of exit for families experiencing different types of shelter discharge. The rate of reentry is highest among families discharged to unknown arrangements (37%) and lowest among those discharged to subsidized housing (7.6%). Families discharged to their prior residence or to apartments independently located, and families discharged to other exit destinations, had a reentry rate of 13 percent and 30 percent, respectively.

Table 2

<small>RATE OF REENTRY TO FAMILY SHELTER SYSTEM BY TYPE OF DISCHARGE</small>

Type of Discharge	Reentry Rate (%)
Discharge to unknown arrangements	37.0
Discharge to own housing	13.2
Discharge to subsidized housing	7.6
New York City Housing Authority	3.6
New York Housing Preservation and Development	12.6
Emergency Assistance Rehousing Program	7.8
Other subsidized housing	1.9
Discharge to "other" destinations	29.6
All discharge types	21.8

Factors Associated with the Hazard Rates of Discharge from Family Homeless Shelters

Table 3 displays the conditional risk ratios, which are defined as the exponential of the parameter estimates (e^b).[17] There were 16 first shelter stays with missing information on explanatory variables, and these stays were excluded from the analysis. This yields a sample of 27,903 families.

A number of family structure variables are linked with the hazard rate of exiting the homeless shelter. As James Knickman and Beth Weitzman found, the rates of discharge to different housing types depend on the size of the family.[18] As row 2 of table 3 shows, the more adults in a family, the less likely the family will leave shelter to unknown arrangements, be moved to subsidized housing units, or leave for other destinations. The effect of the number of adults on the hazard of discharge to other locations is quite substantial. The hazard rate for a family with three adult members to exit to such destinations was 58 percent the rate for a family with one adult member.

The number of children was negatively associated with all types of exits, although only the coefficient for discharge to unknown arrangements reached statistical significance at the .01 level. All else being equal, an additional child was associated with a 17 percent decline in the likelihood of a family leaving shelter on its own to unknown arrangements. Interestingly, female headship was not significantly associated with any of the four types of discharge from shelter.

Age of the family head was negatively associated with the hazards of exiting homeless shelter. The age effect was largest for discharge to government subsidized housing and to "other" exit destinations. A 1-year increase in age was associated with a 1.6 percent and 1.7 percent decline, respectively, in the hazard rate of the two types of discharge.

Pregnancy status of a family member increased the likelihood that a family would exit to unknown arrangements. Pregnancy status was

Table 3

COMPETING RISK MODELS FOR LEAVING HOMELESS FAMILY SHELTER: PARAMETER ESTIMATES FOR CONDITIONAL RISK RATIOS

	RISK RATIO			
VARIABLE	Discharge to Unknown Arrangements	Discharge to Own Housing	Discharge to Subsidized Housing	Discharge to Other Destination
Single-mother family	.976	.969	1.033	1.092
Number of adults	.796*	.987	.915*	.763*
Number of children	.832*	.987	.988	.943
Age of family head	.992*	.991*	.984*	.986*
African American	.767*	.400*	.819*	.344*
Hispanic	.754*	.418*	.894	.357*
Pregnancy status	1.243*	.845	.940	.962
Receiving public assistance	.786*	.934	1.069*	.969
Domestic abuse	.928	3.079*	1.294*	10.754*
Environment-related reasons	.595*	1.582*	1.278*	1.414
Other reasons	.981	1.023	.995	1.118
Entrance in winter	1.028	.864	1.077*	1.035
Entrance in spring	1.063	1.071	1.088*	1.267*
Entrance in fall	1.028	.965	1.027	1.135
Entered shelter 1989	.852*	1.243*	2.174*	.832
Entered shelter 1990	.701*	.919	2.414*	.518*
Entered shelter 1991	.667*	.885*	1.519	.611*
Entered shelter 1992	.583*	1.030*	1.188	.585
Entered shelter 1993	.519*	1.251*	1.344*	.798*
N	27,903	27,903	27,903	27,903
Percentage exited	40.7	7.5	48.3	3.5
−2 log likelihood	1,754.65	579.46	1,567.79	1,672.25

NOTE.—Environment-related reasons include fire, crime, unlivable conditions, and natural disasters. "Other" reasons include newly arriving in town or referral by an outside agency.

* Coefficient is significantly different from zero ($p < .01$).

negatively associated with the other three types of shelter discharge, but none of the coefficients reached statistical significance at the .01 level.

Among all the demographic variables, race and ethnicity had a strong effect on the four modes of discharge. All else being equal, the hazard rate of discharge to "other" exits for African-American and Hispanic families was about one-third the rate for other racial and ethnic backgrounds. African Americans and Hispanics also had a lower hazard rate of exiting to their former residences or to apartments they found (40% and 42%, respectively). Moreover, the hazard rate of their exiting family shelters to unknown arrangements was 75 percent the rate for families of other racial and ethnic backgrounds. Although the risk ratios of obtaining subsidized housing placement among African-American and Hispanic families come close to those among families of other racial and ethnic groups (.82 and .89, respectively), the difference in the exit hazard rate for African-American families was statistically significant at the .01 level.

The lower hazard rates of African-American and Hispanic families for all forms of discharge is an important finding. This result cannot be explained by other factors, such as family and other characteristics (e.g., family type, number of adults and children, reasons for being homeless, income support status, and pregnancy status). Indeed, three recent studies also found significant effects of race and ethnicity in their study of homelessness patterns among adults.[19]

Another important finding is the close resemblance in the exit patterns for African-American and Hispanic families across all modes of shelter discharge. Our data provide no clear explanation for this finding. The magnitude of the effect of race and ethnicity on the hazard rate of exits and the similarity of discharge patterns between African Americans and Hispanics clearly calls for further research.

Families that reported domestic abuse and environment-related factors as their main reason for seeking shelter were more likely than families that reported economic factors to be discharged to their own housing, to subsidized housing, and to other exit destinations, but they were less likely to exit to unknown arrangements. The coefficient for the domestic abuse variable was very large for discharge to other exit. This finding may be tautological because discharge to shelter for victims of domestic violence was included in the "other exit" category. Another important finding pertaining to families that sought shelter because of domestic abuse is that these families were more likely than families that sought shelter because of environment-related reasons to be discharged to their former homes or to apartments they found. The result is difficult to interpret because the specific nature of domestic abuse was not reported in the data set and because our study did not differentiate between discharge to former residence and to private dwellings found by families.

Receipt of welfare lowers the likelihood that a family will exit to unknown arrangements but increases the likelihood of exiting to subsidized housing. The hazard rate for families that were active public assistance recipients was 79 percent the rate for families that were not to be discharged to unknown arrangements. Welfare receipt increases the hazard rate of discharge to subsidized housing by about 7 percent.

The time of the year of shelter admission had some effect on the hazard rate of discharge. Entering the shelter in winter and spring increased the hazard rate of discharging to subsidized housing by 8 percent and 9 percent, respectively. Entering family shelter in spring also increased the hazard rate of discharge to other exit destinations by 27 percent.

Finally, the dummy variables indicating year of entrance into the New York City Family Shelter System suggest a time trend of discharge to different exit locations. As the results show, on the one hand, the likelihood of a family leaving the shelter for unknown arrangements declined consistently as years passed. On the other hand, the likelihood of locating one's own housing or returning to a prior residence increased for families entering shelter in 1989, declined for families entering shelter in 1990 and 1991, and increased again for families entering in 1992 and 1993. The estimated coefficients were statistically significant for the years 1989 and 1993 only. Compared with families entering shelter in 1988, the likelihood of discharge to subsidized housing rose substantially for families entering shelter in 1989. The increase continued for families entering shelter in 1990, but reversed thereafter. The likelihood of discharge to other exit destinations generally declined for families that entered the Family Shelter System after 1988.

Factors Associated with the Hazard Rates of Readmission to Family Homeless Shelters

Table 4 shows the results of two proportional hazards models for readmissions to family shelter. The table presents regression parameter estimates, their standard errors, and the conditional risk ratios based on the regression coefficients. There were 13 families in the data set with missing information on explanatory variables, and they were excluded from the analysis, leaving a sample of 24,627 families.

The two models include all demographic, public assistance, and reason for homelessness variables included in the discharge equations. In addition, the natural logarithm of the total number of days in family shelter and types of discharge from shelter were included in the shelter readmission equations.[20] Model 1 includes three discharge destination variables: to one's own home, to subsidized housing, and to "other" exits. Model 2 further breaks down the subsidized housing variable

Table 4

PROPORTIONAL HAZARDS REGRESSION RESULTS: MODELS FOR REENTRY TO FAMILY SHELTERS

VARIABLE	MODEL ONE			MODEL TWO		
	Parameter Estimate	Standard Error	Risk Ratio	Parameter Estimate	Standard Error	Risk Ratio
Single-mother family	.006	.054	1.006	.012	.054	1.012
Number of adults	.241	.028	1.273*	.235	.028	1.265*
Number of children	.066	.012	1.068*	.069	.012	1.071*
Age of family head	−.026	.002	.974*	−.026	.002	.975*
African American	.997	.081	2.710*	.996	.081	2.708*
Hispanic	.728	.083	2.070*	.731	.083	2.078*
Pregnancy status	.548	.031	1.730*	.538	.031	1.713*
Receiving public assistance	.099	.032	1.104*	.104	.032	1.110*
Domestic abuse	−.060	.053	.942	−.057	.053	.944
Environment-related reasons	−.628	.070	.534*	−.602	.070	.547*
Other reasons	−.912	.076	.402*	−.908	.076	.403*
Natural logarithm of total shelter stay	−.005	.011	.995	−.004	.011	.996
Discharge in winter	.043	.039	1.043	.041	.039	1.042
Discharge in spring	.052	.037	1.054	.064	.037	1.066
Discharge in fall	−.023	.039	.977	−.016	.039	.985
Discharged to own housing	−1.068	.071	.344*	−1.075	.071	.341*
Discharged to subsidized housing	−1.757	.045	.173*			
New York City Housing Authority	. . .	. . .	. . .	−2.478	.091	.084*
New York Housing Preservation and Development	. . .	. . .	. . .	−1.271	.054	.281*
Emergency Assistance Rehousing Program	. . .	. . .	. . .	−1.808	.072	.164*
Other subsidized housing	. . .	. . .	. . .	−3.097	.303	.045*
Discharged to "other" destinations	−.041	.067	.960	−.046	.067	.955
Exited shelter 1989	.000	.048	1.000	−.001	.048	.999
Exited shelter 1990	−.087	.048	.917	−.084	.049	.919
Exited shelter 1991	−.163	.049	.849*	−.156	.048	.855*
Exited shelter 1992	−.199	.049	.819*	−.173	.049	.841*
Exited shelter 1993	−.282	.055	.754*	−.259	.055	.772*
N	24,627			24,627		
Percentage return	21.76			21.76		
−2 log likelihood	4,542.38			4,758.57		

* Coefficient is significantly different from zero ($p < .01$).

into four variables indicating particular types of subsidized housing: New York City Housing Authority, New York Housing Preservation and Development, Emergency Assistance Rehousing Program, and other types of subsidized housing. In both models, families that left the Family Shelter System for unknown arrangements represented the reference category. As the results show, breaking down the subsidized housing discharge variable affects the parameter estimates of other variables only slightly.

Factors associated with readmission. — A number of family demographic variables significantly predicted the hazard rate of readmission to the homeless shelter. Although the number of adults in the family negatively predicted three out of four modes of exit, it was positively associated with the hazard rate of readmission to shelter. Having an additional adult member in the family was associated with a 27 percent increase in the hazard rate of readmission to family shelter. Similarly, the number of children was positively associated with shelter readmissions. An additional child in the family raised the hazard rate of readmission to family shelter by 7 percent.

Age of the family head was negatively associated with the hazards of both discharge from and readmission to homeless shelter. A 1-year increase in age was associated with a 2.5 percent decline in the hazard rate of readmission to family shelter. As in the case of shelter discharge, there is no statistically significant association between single-mother families and the probability of readmission to homeless shelter.

Consistent with the findings of shelter discharge, race and ethnicity was a strong predictor of readmission to family shelter. Controlling for the effects of other variables and time, the hazard rates for readmission for African-American and Hispanic families were about 2.7 and 2.1 times that, respectively, than for families of other racial and ethnic backgrounds.

Pregnancy status and public assistance receipt at the time of shelter admission were both positively associated with the hazard rate of readmission to family shelters. Having a family member who was pregnant at the time of shelter admission increased the risk of readmission by about 70 percent, while the hazard rate of shelter readmission for public assistance recipients was 10 percent higher than nonrecipients. Reason for homelessness is also an important predictor of repeat homelessness. The hazard rate of repeat homelessness for families that were homeless because of environment-related reasons was about one-half that for families that were homeless because of economic reasons. The corresponding percentage for families that were homeless because of other reasons was 40 percent. There was no difference in the hazard rate of shelter readmission between families that reported domestic abuse as their main reason for homelessness and those that reported economic factors.

Although season of shelter entry was associated with the hazard rates of different discharge types, none of the season variables significantly predicted shelter readmission. There was, moreover, no association between the length of shelter stay and the hazard rate of shelter readmission.

It is interesting to note how the "type of discharge" variables affect the hazard rate of shelter reentry. As table 4 shows, all the discharge variables had negative parameter estimates, indicating a slower hazard rate to shelter readmission when compared with the reference group, which was composed of families that left family shelter to unknown arrangements. The hazard rate of returning to shelter for families that moved to apartments they located or to their former residence was 34 percent the rate for families in the reference group. The corresponding percentages for families that were discharged to subsidized housing units and "other" exit destinations were 17 percent and 96 percent, respectively. In addition to the small difference in hazard rates, the coefficient for other exit destinations did not reach statistical significance at the .01 level.

In model 2, we broke down subsidized housing discharge into four separate variables indicating the particular type of subsidized housing obtained by the family. The results show the different risks of shelter readmission for the four types of subsidized housing arrangements. The hazard rates of readmission for families that were discharged to private apartments owned by the New York Housing Preservation and Development and private lodgings subsidized by the Emergency Assistance Rehousing Program were 28 percent and 16 percent, respectively, the rate for families discharged to unknown arrangements. The conditional risk ratios for families that were discharged to apartments built and managed by the New York City Housing Authority and other subsidized housing were minuscule, 8 percent and 5 percent, respectively.

Finally, the dummy variables indicating year of discharge from the New York City Family Shelter System mark the time trend of readmission to family shelter. In general, the parameter estimates for the year of shelter discharge variables show that the hazard rate of shelter readmission declined over time.

Conclusion

This study demonstrates the use of tracking databases to shed light on the patterns of public shelter use among homeless families. Despite its limited generalizability—it was based on information from a single city—the study identifies a number of demographic variables that affect the likelihood of families being discharged to various modes of housing and their readmission to the shelter system. It also identifies

housing placement type as an important predictor of shelter readmission, a measure of housing instability among public shelter users.

Our results suggest contrasting patterns of discharge for the two primary routes out of homeless shelters in New York City—discharges to unknown arrangements and discharges to subsidized housing. As the survival analysis illustrates, while families that exited homeless shelters to unknown arrangements had relatively shorter stays in the shelters, families that were discharged to subsidized housing stayed in the shelters for substantially longer periods. This finding suggests that the city's policy to establish eligibility for subsidized housing only after 90 days of shelter stay might have provided an incentive for families to prolong their stays in the shelter system, even if these families would have been capable of seeking alternative accommodation.

Notwithstanding this, our data clearly indicate that subsidized housing is linked with a substantially lower rate of readmission to the Family Shelter System, a finding that has been consistently reported in previous studies. Therefore, the cost of providing longer term public shelter stays, if subsidized housing placements follow, may be easily offset by lower future shelter use. Furthermore, consistent with the findings of Beth Weitzman and Carolyn Berry, our results suggest that the risk of shelter readmission differs significantly across the different types of subsidized housing provided.[21] Future research should explore whether the different risks of shelter reentry for families placed in different types of subsidized housing are associated with the quality of housing obtained, the monetary value of the housing subsidy, the variability of case-management and housing advocacy services received, or with individual characteristics not measured in this study.

We identified a number of family characteristics that are important predictors of shelter exit and reentry: age, family size, race and ethnicity, pregnancy status, and public assistance receipt. The most troubling finding is the significant effect of race and ethnicity in predicting both exit and reentry. Prior research has documented that African Americans are more vulnerable to becoming homeless, and Hispanics have a lower risk.[22] Our study found that, at least in New York City, once they become homeless, both African-American and Hispanic families experience a slower rate of exiting public shelter as well as a faster rate of shelter readmission, even when effects of other variables are taken into consideration. Researchers on homelessness, including Martha Burt and John Belcher, have argued the importance of racial exclusion, housing segregation, and discrimination in understanding individual vulnerability to homelessness.[23] Further work should explore institutional factors that may account for the different rates among racial and ethnic groups in shelter exit and reentry.

Our study illustrates both the strengths and the shortcomings of using administrative databases in policy research. Although tracking

databases may provide readily available information and statistical power for addressing pertinent policy issues, the way in which the databases are constructed may omit predictor variables that are conceptually relevant to the analysis. In addition, categories constructed for a particular variable may be too imprecise to allow researchers to differentiate between conceptually meaningful population subgroups.

Further research on patterns of shelter use should include shelter-specific variables, such as types of service provided in each shelter. In addition, it would be useful to include measures of other individual characteristics, such as physical and behavioral health status and foster care placement status, because these attributes may account for variability in the rates of shelter exits and returns among various homeless subpopulations. Further research should examine other consequences of different types of shelter discharge besides that of shelter readmission—such as the risk of foster care placement and the risk of entrance into the shelter system for single adults—by employing case study and survey methods.

Notes

1. Rodger Farr, Paul Koegel, and Aubrey Burman, *A Survey of Homelessness and Mental Illness in the Skid Row Area of Los Angeles* (Los Angeles: Los Angeles County Department of Mental Health, 1986); Peter Rossi, Gene Fisher, and Georgianna Willis, *The Condition of the Homeless of Chicago* (Amherst, Mass.: Social and Demographic Research Institute; Chicago: National Opinion Research Center [NORC], 1986); James Wright and Eleanor Weber, *Homelessness and Health* (Washington, D.C.: McGraw-Hill, 1987).

2. Michael Sosin, Irving Piliavin, and Herb [Alex] Westerfelt, "Toward a Longitudinal Analysis of Homelessness," *Journal of Social Issues* 46, no. 4 (1990): 157–74; Irving Piliavin, Bradley Entner Wright, Robert Mare, and Alex Westerfelt, "Exits from and Returns to Homelessness," *Social Service Review* 70, no. 1 (1996): 33–57; Martha Burt, "Comment," *Housing Policy Debate* 5, no. 2 (1994): 141–52; Dennis Culhane, Edmund Dejowski, Julie Ibanez, Elizabeth Needham, and Irene Macchia, "Public Shelter Admission Rates in Philadelphia and New York City: The Implications of Turnover for Sheltered Population Counts," *Housing Policy Debate* 5, no. 2 (1994): 107–40; Dennis Culhane and Randall Kuhn, "Patterns and Determinants of Shelter Utilization among Single Adults in New York City and Philadelphia: A Longitudinal Analysis of Homelessness," *Journal of Policy Analysis and Management* (forthcoming); Cynthia Rocha, Alice Johnson, Kay Young McChesney, and William Butterfield, "Predictors of Permanent Housing for Sheltered Homeless Families," *Families in Society: The Journal of Contemporary Human Services* 77, no. 1 (1996): 50–57.

3. John Stretch and Larry Kreuger, "Five-Year Cohort Study of Homeless Families: A Joint Policy Research Venture," *Journal of Sociology and Social Welfare* 19, no. 4 (1992): 73–88; Elinor Kelly, J. Clyde Mitchell, and Susan Smith, "Factors in the Length of Stay of Homeless Families in Temporary Accommodation," *Sociological Review* 38, no. 4 (1990): 621–33; James Knickman and Beth Weitzman, *A Study of Homeless Families in New York City: Risk Assessment Models and Strategies for Prevention. Final Report*, vols. 1–3 (New York: New York University, Health Research Program, Urban Research Center, Graduate School of Public Administration, 1989); Rocha et al. (n. 2 above), pp. 50–57; Yin-Ling Irene Wong and Irving Piliavin, "A Dynamic Analysis of Homeless-Domicile

Transitions: A Comparison between the Individual Deficit and the Institutional Resource Perspective" (unpublished manuscript, University of Pennsylvania, School of Social Work, Philadelphia, 1996).

4. Stretch and Kreuger (n. 3 above).

5. Kelly, Mitchell, and Smith (n. 3 above).

6. Stretch and Kreuger (n. 3 above); Wong and Piliavin (n. 3 above).

7. Wong and Piliavin (n. 3 above).

8. The Homeless Emergency Referral System in New York City began before January 1, 1988. However, the referral system prior to that date did not record all the information on shelter users that was collected on and after January 1, 1988.

9. In the New York City Family Shelter System record, information on race and ethnicity, public assistance receipt status, and reasons for homelessness were elicited at the first contact with families that sought shelter admission. For 20 percent of families that had one or more shelter stays, the first contact with the Family Shelter System did not result in shelter admission. No information was available on these independent variables pertaining to the first shelter admission for these families and they were therefore excluded from the study.

10. Families that sought readmission to family shelter 730 days after shelter exit were considered censored, i.e., they were coded as not having the event of shelter reentry.

11. It should be noted that the 30-day exit criterion as specified by Piliavin and his colleagues (n. 2 above), and Wong and Piliavin (n. 3 above), was based on continuous stays in conventional housing, such as rented rooms, apartments, and rehabilitative and transitional housing. As this study focused on shelter use, no such qualification was employed. Culhane and Kuhn's study (n. 2 above) on patterns of shelter use among single adults in New York City and Philadelphia also used a 30-day exit criterion.

12. Families that were placed in the Emergency Assistance Rehousing Program also received Section 8 certificates. Whether other families received Section 8 certificates is unknown.

13. Other types of subsidized housing include Division of Alternative Management Programs and Mitchell-Lama. The division is an umbrella term for a variety of Housing Preservation and Development (HPD) programs aimed at turning over HPD housing to private and not-for-profit landlords. Mitchell-Lama, which was named after the legislators who proposed the original funding bill, was a middle-income housing program of the 1960s. In New York City, many Mitchell-Lama buildings are in large-scale developments.

14. Stretch and Kreuger (n. 3 above); Wong and Piliavin (n. 3 above).

15. Kazuo Yamaguchi, *Event History Analysis* (Newbury Park, Calif.: Sage, 1991).

16. In the reentry equations, age of family head was measured at the time of shelter discharge.

17. Conditional risk ratios are easier to interpret than the regression parameters. For a categorical variable, the risk ratio corresponds to the multiplicative change in the hazard rate associated with the group with a value of the variable equal to one, relative to the group with a value equal to zero, controlling for the effects of other variables and time. For interval-scale variables, the risk ratio corresponds to the multiplicative change in the hazard rate associated with a unit increase in the predictor variable. A risk ratio of less than one indicates a decrease in the hazard rate, whereas a risk ratio of greater than one indicates an increase.

18. Knickman and Weitzman (n. 3 above).

19. Culhane and Kuhn's study (n. 2 above) of shelter use among single adults in Philadelphia reported a 2.5 times higher likelihood of exit for white males than nonwhite males in Philadelphia. Rocha and her colleagues (n. 2 above) found that whites were 1.9 times more likely to find permanent housing than were African Americans. In Wong and Piliavin's study (n. 3 above), African-American men were less likely than single men of other racial and ethnic groups to exit a homeless spell, and African-American women were more likely than other single women to return to homelessness.

20. Only families that left the Family Shelter System before October 1, 1993 were included in the regression analysis for shelter reentry so that families had an equal risk period of 2 years for shelter readmission. The exclusion of 12 percent of the exit sample changes the distribution of types of shelter discharge in the analysis of reentry. Because it took longer for families to be discharged to subsidized housing (refer to fig. 1), these

families were a smaller proportion of the reentry sample than the exit sample (45% compared with 48%). Similarly, because families that exited the shelter to unknown arrangements took less time to do so, they were a larger proportion of the reentry sample than the exit sample (44% compared with 41%).

21. Beth Weitzman and Carolyn Berry, *Formerly Homeless Families and the Transition to Permanent Housing: High-Risk Families and the Role of Intensive Case Management Service, Final Report to the Edna McConnell Clark Foundation* (New York: New York University, Robert F. Wagner Graduate School of Public Service, June 1994).

22. Susan Gonzalez Baker, "Gender, Ethnicity, and Homelessness: Accounting for Demographic Diversity on the Streets," *American Behavioral Scientist* 37, no. 4 (1994): 476–504; Peter Rossi, "Minorities and Homelessness," in *Divided Opportunities: Minorities, Poverty, and Social Policy,* ed. Gary D. Sandefur and Marta Tienda (New York: Plenum, 1988), pp. 87–115.

23. Martha Burt, *Over the Edge: The Growth of Homelessness in the 1980s* (New York and Washington, D.C.: Russell Sage Foundation and Urban Institute Press, 1992); John Belcher, "Poverty, Homelessness, and Racial Exclusion," *Journal of Sociology and Social Welfare* 19, no. 4 (1992): 41–54.