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Residential mobility among patients admitted to acute psychiatric wards

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## Background

In contrast with the voluminous literature on mobility in the general population (Rossi 1980; Cadwallader 1992; Clark & Dieleman 1996; Dieleman & Mulder 2002), only a small number of studies have used multivariable techniques to investigate the associations of residential mobility among individuals with mental disorders (Appleby & Desai 1987; Caton & Goldstein 1984; DeVerteuil et al. 2007; Lamont et al. 2000; Lix et al. 2006; Lix et al. 2007; McCarthy et al. 2007; Tulloch et al. 2010). Interestingly, the most consistent finding in this small literature has no counterpart in the general population literature: all but one (Lamont et al. 2000) of these eight analyses found some association between hospital admission and mobility. We aimed to explore this finding further. In particular, we aimed to determine whether presence on a psychiatric ward in fact defines a *place* and a *time* at which mobility from one residential environment to another is likely to occur, analogously to the way in which homeless shelter stays may interspace longer periods of institutional residence (Hopper et al. 1997). This is a point that remains unclear: previous studies of residential mobility in this population have used data that did not specify dates of mobility together with dates of admission and discharge, and the association with mobility has been demonstrated only over the medium- to long-term, rendering it prone to conflicting interpretation.

For example, Appleby & Desai (1987) suggested that residential mobility (or “residential instability”) was in effect an indirect cause of psychiatric admission. This seems to imply that a high level of residential mobility (including frank homelessness) would tend to precede admission, if not necessarily immediately: ‘Patients who measured very low on residential instability would be seen as generally maintaining enduring and consistent ties to some form of supportive environment and might be thought to have more favourable psychiatric outcomes. As events change and instability increases in living situations, outcomes would be more unpredictable, though probably less favourable; social supports decrease, alienation increases, hospitalizations rise’ (Appleby & Desai 1987, pp.516-517).

Other authors, however, suggest precisely the kind of direct association between presence in a psychiatric hospital and residential mobility postulated above, and the concrete mechanisms they suggest specifically imply a pattern of *inpatient-associated* residential mobility in which mobility would tend to occur at or around the time of hospital discharge. Caton & Goldstein (1984), who analysed repeated cross-sectional data for a cohort of hospital discharges, concluded that “housing change” occurred after repeated (or “revolving door”) admission. They considered that ‘[p]atients may

not want to return to stressful home environments after a rehospitalization episode, or may not be welcome in such settings. Further, the experience of rehospitalization often leads to the loss of an apartment lease or a welfare hotel room, requiring a new housing placement at discharge from hospital' (Caton & Goldstein 1984, p.763). This last point is echoed by Lamont et al (2000), who asserted that '[p]atients with severe mental illness are often evicted at the point of admission and therefore have a geographical move forced on them at the time of discharge' (p168); they also note that a prolonged absence from an address due to hospital admission may itself lead to repossession and a need for rehousing. A similar relationship between housing and discharge is postulated by the literature on "delayed discharge", in which length of stay (LOS) is considered to have been prolonged beyond that required by some non-medical factor. Prevalence surveys of all forms of delayed discharge in the United Kingdom (Fulop et al. 1992; Fulop et al. 1996; Shepherd et al. 1997) have found that it is frequently attributed to a perceived need to await housing before discharge, leading in effect to an antecedent effect of residential mobility on LOS and a termination of the admission at the point at which residential mobility occurs.

All of the above authors also suggest that there are effects of homelessness on residential mobility among inpatients. As noted above, Appleby & Desai (1987) imply that homelessness (which they consider as a form of high "residential instability") would tend to precede admission, if not necessarily immediately. They also note (not specifically in relation to hospital admission) that homelessness is often followed by the acquisition of a fixed address. The other interpretations above suggest still more strongly that homelessness among inpatients may be part of the process of residential mobility. Therefore, homelessness should be considered as a potentially important association of residential mobility and also as a potential mediator of indirect effects of other variables on residential mobility. Homelessness is reported by a significant minority of those admitted to psychiatric hospital in both the UK (Koffman & Fulop 1999) and the US (Appleby & Desai 1985; Herman et al. 1998; Mowbray et al. 1987; Rosenheck & Seibyl 1998; Susser et al. 1991). There are few data describing when such homelessness starts, but it seems unlikely that all cases are long-standing at the point of admission: homelessness may also arise shortly before admission (Herzberg 1987), and causes of eviction and repossession at or during admission were noted above (Lamont et al. 2000). Two of the studies of residential mobility cited above estimated the effect of homelessness and found that it was associated with mobility, although these studies were of course not restricted to inpatients and neither

reported the extent to which other variable effects were or were not mediated by homelessness (Appleby & Desai 1987; McCarthy et al. 2007).

A practical difficulty in studying residential mobility in clinical populations may be that available health datasets do not include adequate address data (DeVerteuil et al. 2007; Larson et al. 2004). As noted above, there is the further requirement in the present case to use data that relate dates of mobility to dates of admission and discharge from hospital. Fortunately, the period around admission is a time when address data would be expected to be subject to less interval censoring of residential mobility than during periods of community residence, when treatment by mental health services may be intermittent. We were able to make use of an anonymised repository of electronic patient records that preserves dates resident in a particular Office of National Statistics Output Area for those with a valid address, and dates of homeless periods, as well as clinical, demographic and service use data. We aimed to describe the timing, prevalence and associations of residential mobility around the period of admission to inpatient mental health services, and to test the hypothesis that other associations with this postulated inpatient-associated residential mobility are attributable to confounding by homelessness.

## Methods

Data were taken from the Case Register maintained by the NIHR Specialist Biomedical Research Centre for Mental Health. This repository is a copy of the South London and Maudsley NHS Foundation Trust's paperless electronic patient record database, anonymised and optimised for data extraction (Stewart et al. 2009). All activity since 2006 is covered, with some earlier data. All analysis was performed using Stata 10.

### **Sample definition.**

We extracted all admissions that culminated in a discharge between 31<sup>st</sup> December 2007 and 31<sup>st</sup> December 2009 and for which the first ward was one of the adult psychiatric wards serving the London Boroughs of Croydon, Lambeth, Lewisham and Southwark. These four boroughs cover a population of approximately 1.1 million people, mainly living in inner-city areas. The admission wards concerned are general adult wards and psychiatric intensive care units that overwhelmingly serve patients aged 18-65. Some patients had more than one discharge in the study period. In these cases, the most recent admission only was selected. (The use of a multi-level dataset with multiple admissions per person would have invalidated the approach used for missing data.) Contiguous periods on different wards were concatenated, but periods separated by one day or more out of hospital were treated as separate admissions. Periods of ward leave were disregarded.

### **Non-housing data.**

Non-housing data merged with these were age, sex, ethnicity, marital status, employment status, primary diagnosis recorded nearest to the date of discharge, lifetime drug and alcohol misuse, Mental Health Act status, longest admission leading to a discharge in the preceding two years, having no admission in the preceding two years, having a psychiatric intensive care unit admission in the preceding two years and the set of Health of the Nation Outcome Scales (HoNOS; (Wing et al. 1998) ratings recorded nearest to the date of admission, excluding scores made more than 3 days before or 21 days after admission and post-discharge scores. In order to reduce computing time for multiple imputation, HoNOS item scores were recoded as dichotomous variables (0-1 "low" versus 2-4 "high") with the exception of HoNOS item 11 (problems with living conditions) which was retained as a five level categorical variable.

**Address data.**

All addresses in use before, during or after the admission were merged with the admission data. In the source database, each address record consists of the address, postcode, a start date and an end date. Individuals who are of no fixed abode are represented in the clinical system by a mock postcode and the phrase “No fixed abode” in place of the usual address details. As an anonymised data repository, the Case Register does not include full address and postcode information. Instead, postcodes in the source database are grouped into the corresponding Output Area using the lookup file provided by the Office of National Statistics, supplemented with a lookup for the mock postcode used to represent “No Fixed Abode”. Output Areas contain approximately 100 households so their use will only fail to detect changes of address if these are within a very small area. As detection of homeless periods using the method above depends on the entry of a specific mock postcode, housing data were supplemented by an automated search of the progress notes entered during the relevant admission looking for the strings “no fixed abode” and “homeless” and correcting records where necessary.

**Residential variables.**

These address spells were used in three ways. First, the timing of any residential moves relative to admission and discharge were calculated for each admission. We restricted the analysis to moves that were recorded 28 days or less before admission, during the admission, or 28 days or less after discharge; therefore housing data outside this range were discarded. Second, variables were defined recording homelessness at the time of admission, or arising during admission. Third, a dichotomous variable for residential mobility was defined for use in the analyses of its associations. In view of the findings of initial descriptive analyses (see below), we defined residential mobility for this purpose by the acquisition of a new address between the time of admission and 28 days after discharge and therefore did not include the period directly before admission.

**Missing data.**

Multiple imputation was used to generate 50 datasets containing imputed values for missing data using the Stata module *ice* (Royston 2004). These imputed data were also used for separate analyses of homelessness and LOS. All exposure variables were included in the imputation procedure, together with the Nelson-Aalen cumulative hazard estimator from a Cox regression of LOS performed without covariates, residential mobility (see above), and period of admission and first ward of admission, both of which were predictors of missingness.

**Descriptive analysis.**

The initial stages of analysis were graphical, and aimed to demonstrate the temporal sequence of admission, discharge and residential mobility; these and the single variable analysed used the original (unimputed) data. A series of histograms of times of residential moves was constructed (Figure 1). As noted above, moves occurring more than 28 days before admission or more than 28 days after discharge were not shown. Each histogram represents the timing of residential mobility relative both to admission and to discharge. On the X-axis of these graphs, “0” denotes the day of admission, “1” denotes the day of discharge, “-1” denotes 28 days before admission, and “2” denotes 28 days after discharge. Therefore moves occurring before admission or after discharge were scaled in order to appear at the appropriate point relative to the 28 days before admission or after discharge, and moves occurring during the admission were scaled in order to appear at the appropriate point relative to the LOS. This process allowed stays to be overlapped and the timing of moves to be compared across multiple admissions with differing LOS. We graphed times of residential moves separately within deciles of LOS, in order to minimise the extent to which the timing of moves during the admission was distorted by scaling. Single variable analyses were used to further describe the prevalence and timing of residential mobility and also to find unadjusted associations with residential mobility.

**Multivariable analysis.**

Multiple logistic regression was performed in order to define the adjusted associations of residential mobility; these analyses used the imputed data. As an initial step, appropriate transformations for the two continuous covariates (age and length of the longest admission in the preceding two years) were found using the method of fractional polynomials (Royston et al. 1999). This entailed testing each imputed data set separately and selecting the transformations most frequently selected by the algorithm used (Stata’s mfp command).

The full analysis of the original and imputed data was then performed, combining results from the analysis of each imputed dataset to give overall results for the sample (Rubin 1987). With the exception of eventual LOS, all variables found to have an unadjusted association with residential mobility with  $p < 0.05$  in a complete cases analysis were included in the initial step. (Eventual LOS was not included as a covariate in view of the likelihood that longer stay may be in part a consequence of processes antecedent to residential mobility.) A backwards elimination procedure was followed, selecting variables for elimination based on the combined results at each step. Two separate analyses



were performed. The first excluded homelessness, and the second included it, allowing estimation of the extent to which other variable effects were mediated by their association with homelessness.

## Results

### Graphical analyses.

Graphical analyses of the timing of residential mobility relative to admission and discharge are shown in Figure 1 below. Especially in the graphs for middle and upper deciles, there is a clear peak in residential mobility at or around the time of discharge that abates shortly afterwards. In the case of the bottom deciles of LOS it is not possible to meaningfully differentiate admission and discharge, which were only separated by at most a few days, and the most that can be said is that there is an increase in residential mobility around the inpatient period. However, in the upper deciles of LOS, in which admission and discharge are spaced apart, there does appear to be a very small spike on the day of admission itself, as well as the peri-discharge peak. One possibility that we considered was that this earlier spike was a data artefact resulting from the correction of out of date addresses at the time of admission; however, it was also apparent to some extent when the analysis was restricted to the approximately 60% of individuals who were being treated in community services for at least 28 days before admission (graphs not reproduced).

In view of these findings, and in particular the lack of evidence of any excess of moves occurring in the period before admission, the definition of residential mobility adopted for use in the analyses of its associations was the following: *a change from one address to another, or from homelessness to a fixed address, occurring on the day of admission, during admission, or up to 28 days after discharge*. By this definition 15% of the 4386 subjects with complete address data moved residence. Some individuals were discharged from community mental health services less than 28 days after discharge, which would have biased this estimate downwards. Overall, the extent of the latter effect is likely to be small, but may have particularly affected individuals who were homeless at some point during the admission: In the entire sample, 3746 individuals (83.5%) were followed up for the full 28 days after discharge, while 739 (16.5%) had a last day of contact prior to that. Among the non-homeless part of the sample, measured residential mobility was 9.3% both among those followed up throughout, and those who were not; among the homeless part of the sample, however, residential mobility was 251/485 (51.8%) among those who remained in contact with services for at least 28 days

after hospital discharge, but 53/234 (22.7%) among those who were discharged from services within 28 days of discharge. An alternative possibility would be that follow-up and residential mobility were somehow related among homeless individuals.

INSERT FIGURE 1 – TIMING OF RESIDENTIAL MOBILITY RELATIVE TO ADMISSION AND DISCHARGE

#### **Single variable analyses.**

Selected results of single variable analyses are tabulated in Table 1. In single variable analyses, exposure variables which were associated with residential mobility at the level of  $p < 0.05$  were homelessness at or during admission, younger age, male gender, ethnicity, being single, being unemployed, diagnosis, legal status, length of the longest admission in the preceding two years and not having an admission in the preceding two years. High scores on the following HoNOS items were associated with reduced residential mobility: physical illness, depressed mood and other mental symptoms. HoNOS problems with living conditions and HoNOS cognitive impairment were associated with increased residential mobility. All of the above variables were therefore entered into the multivariable analysis.

INSERT TABLE 1 – UNADJUSTED ASSOCIATIONS WITH RESIDENTIAL MOBILITY

#### **Multivariable analyses.**

Based on the results of the initial series of multivariate fractional polynomial analyses, age was entered into the final backwards elimination procedure as the inverse of its square, while length of the longest admission in the preceding two years was entered as a linear term, along with the dichotomous variable representing whether there had been an admission in the preceding two years.

In the final multivariable model, variables which were associated with residential mobility were homelessness both at the time of admission and beginning after admission; age, which demonstrated a non-linear relationship, with the odds of residential mobility initially reducing rapidly with advancing age, then remaining stable; legal status, with highest odds for those detained under forensic sections of the Mental Health Act, significantly higher odds for those detained under Section 2

and non-significantly higher odds for those detained under Section 3; higher score on the HoNOS cognitive impairment item (item 4) and lower score on the HoNOS other mental symptoms item (item 8).

Rerunning the backwards elimination procedure without entering the homelessness variable and the HoNOS problems with living conditions variable led to statistically significant effects being retained for male sex ( $p=0.011$ ), marital status ( $p=0.004$ ) and length of the previous admission / having no previous admission (non-linear effect;  $p=0.02$ ). These effects became non-significant after addition of the homelessness variable, and it was therefore inferred that they were mediated by homelessness (full results not shown).

Results are tabulated in Table 2. The odds ratios for the effect of agebands are category-based estimates derived from the regression equation and appropriate central values of age (Royston & Sauerbrei 2008, pp.88-89).

INSERT TABLE 2 – ADJUSTED ASSOCIATIONS WITH RESIDENTIAL MOBILITY

## Discussion

We used routinely collected clinical and administrative data to explore the most replicated finding in studies of residential mobility among individuals with mental disorder, namely its association with hospital admission. The majority of residential moves in a sample of 4386 admissions with address data occurred around the time of discharge, showing clearly that this period is a time of high mobility relative to the period before admission and subsequent weeks.

A small group of exposure variables were found to be associated with residential mobility among psychiatric inpatients. Younger age and homelessness, whether recorded at the point of admission or beginning during the admission, were strongly associated with residential mobility, as were detention under a forensic section of the Mental Health Act and, with borderline significance, detention under Sections 2 and 3. (Section 2 provides for detention for up to 28 days; Section 3 for up to six months. Forensic sections are most restrictive but apply to only a very small minority of admissions.) There was a smaller positive association with a high score on the HoNOS cognitive problems item and a small negative association with the HoNOS other mental and behavioural problems item. Unadjusted effects of marital status, male gender and length of the longest admission in

the preceding two years were removed by adjustment for homelessness. The extent to which these findings should be expected to be consistent with previous findings is uncertain, given the varying sample sizes, diverse methods and widely differing settings of the small number of other studies, and the restriction of the present analysis to inpatients. However, the three largest previous studies of residential mobility in psychiatric populations (Dembling et al. 2002; DeVerteuil et al. 2007; McCarthy et al. 2007) found effects on residential mobility of marital status and previous admissions; effects of age and gender have been inconsistently described. Our results confirm previous findings of an association with homelessness (Appleby & Desai 1987; McCarthy et al. 2007).

#### **Strengths of the analysis.**

The first strength of the analysis was that we were able to look at the temporal relationship between hospital admission, hospital discharge and residential mobility. Although the relationship between residential mobility and admission is well-established over the medium term, previous data have obscured the clear temporal pattern that we found.

A second strength of this study was its ability to examine the association between residential mobility during or after admission and homelessness at or during admission. The higher rates of residential mobility seen in populations with mental illness compared to the general population have been suggested to be associated with higher rates of homelessness (DeVerteuil et al. 2007), but evidence in support of this derives from repeated cross-sectional data (Appleby & Desai 1987; McCarthy et al. 2007), obscuring what we found to be a clear relationship between homelessness and residential mobility within a short period of time defined by hospital admission.

A final strength of the analysis was that through the use of data from electronic patient records, we were able to examine a wide range of candidate exposure variables.

#### **Limitations of the analysis.**

We relied on anonymised, routinely collected data: these are inevitably subject to many unknown contingencies, and did not record some variables which would have been of interest, in particular relating to the tenancy pattern and type of accommodation. Weaknesses in such data must however be balanced against the greater sample size that they allow. A limitation of the study as a whole is that we focused on description of residential mobility occurring in association with admission and comparison of inpatients who did move with those who did not: we did not study people with mental disorders who were not admitted to hospital or people without mental disorders, and therefore it

is not possible to say how our findings compare to those groups. Considering that the median LOS was 22 days, and that 15% of inpatients moved during admission or up to 28 days after discharge, the overall rate of mobility among these inpatients per unit time was high in comparison to the estimates of overall rates of mobility from population based samples, for example, 20% over two years (McCarthy et al. 2007) and 35% over three years (DeVerteuil et al. 2007) among people with schizophrenia.

One analytic difficulty must be mentioned: because residential mobility is likely to lead to increased LOS through the phenomenon of “delayed discharge” (this is not analysed here), it would have been invalid to include LOS as a covariate in the analysis. It is therefore not possible to allow for the extent to which LOS itself, or increasing LOS, may cause residential mobility, that is, whether merely spending an increasing time in hospital makes subsequent mobility more likely, an effect that might be expected on the basis of clinical experience (Lamont et al. 2000). This means that estimates of effect for other variables also do not allow for the possibility of confounding by LOS. This point should be borne in mind during the discussion that follows: in essence, the clarity with which a variable effect may be interpreted is in inverse proportion to its association with LOS.

A final limitation of this study is that it was not based on survey or qualitative data describing individual inpatients’ subjective experiences of mobility. Among other things, we were therefore unable directly to examine whether residential moves were experienced as voluntary or forced—a central distinction in the micro-level general population literature (Rossi 1980), although one that is not without ambiguity (DeVerteuil 2003). This is a weakness shared with previous studies among people with mental illness. It means, firstly, that we were not able to explore a previous finding that dissatisfaction with housing, intending to move, and dissatisfaction with neighbourhood safety were unassociated with subsequent residential mobility in a population of individuals with severe mental illness (Tulloch et al. 2010). Secondly, it means that the interpretations that we provide in terms of the distinction between voluntary and forced mobility are inevitably somewhat speculative: we have therefore taken care to consider mechanisms of either type that might account for the effects we observed.

#### **Interpretation of associations found.**

##### ***Homelessness.***

Homelessness was very strongly associated with residential mobility, regardless of whether homelessness was recorded at or after admission. Nonetheless, this association is not invariable: Cross

tabulation of homelessness and residential mobility indicated that only 41% of those homeless at the point of admission and 44% of those who became homeless during the admission moved during the admission or up to 28 days after, and also that only 53% of those who moved had been recorded as homeless at any point. We also found that homelessness appeared to mediate the effect of several variables which had unadjusted associations with residential mobility (marital status, male gender, and longest hospital stay in the preceding 2 years).

At the level of individual mobility, homelessness is plainly a state that prompts efforts to secure a new address, whether these are on the part of the homeless person or social institutions, but it cannot be regarded as a self-sufficient explanation—rather, there is a need to investigate how homelessness arises in this population, as well as the effects that it has on mobility. In other analyses (not shown) we found that homelessness was either present at admission or was recorded within 1 week of admission in 70% of cases. Therefore investigation of the part it plays in residential mobility among psychiatric inpatients cannot be restricted to studies of inpatients: it would also require investigation of the period before admission, in order to account for the possibilities that admission itself is related to homelessness, and that homelessness leading to admission and homelessness not leading to admission may have different implications for subsequent mobility.

The importance of homelessness seems to strongly invite an explanation in terms of forced/voluntary mobility, bearing in mind the caveats outlined above. If it is assumed that homelessness is in all cases involuntary—that no-one would freely choose it—then this implies that much of the mobility observed in association with psychiatric admission is likely to be involuntary. However, this may be over-simplistic, as has been previously found to be the case in relation to homeless mobility in the community (DeVerteuil 2003). In the present case, it may be pertinent that institutionalised arrangements for housing in the UK mean that relinquishing a property or even accepting eviction may be necessary in order for an inpatient to be given a new tenancy, and this possibility may even influence the decision to suggest (or accept) hospital admission in the first place.

#### ***Younger age.***

Residential mobility was also found to be associated with younger age. The relationship was non-linear, and for practical purposes higher levels of residential mobility were seen only in the 16-25 year age band. This association was reduced but persisted after controlling for homelessness, and is unlikely to be due to residual confounding by the latter. Furthermore, there is little association between

age and LOS (analyses not shown), so that the association between age and residential mobility is unlikely to be due to LOS.

An association between residential mobility and age is one of the most consistent associations in the general population literature, although inconsistently described in the psychiatric literature (McCarthy et al. 2007). Clark (1980), whose sampling units were households, and who measured age of the household head, suggested that this was due to the tendency to household expansion at this stage in the life-cycle (p. 124). This mechanism is accepted by other authors such as Cadwallader (1992) (p. 199) and Clark & Dieleman (1996), although the number of life-cycle stages associated with younger age may be extended to include income and career changes and household formation as well as expansion. The strongly age-structured nature of these events means that very similar relationships between age and residential mobility are seen in every developed country, with high levels of mobility in childhood (when subject to parental housing choices), and then a peak in the early to mid 20s (Dieleman & Mulder 2002).

Whether, and how, these findings apply to users of mental health services and to the present sample is unknown. It is difficult to imagine why hospital admission should coincide with these kinds of voluntary residential mobility, especially given that many of the relevant life-cycle events are likely to be disrupted among young adults with mental illnesses severe enough to warrant hospital admission. Our supposition, again based on practical knowledge of the institutional arrangements involved in rehousing, is that the 16-25 year age band contains a disproportionate number of inpatients who reside with parents or other family members (we were unable to test this). Families may in some cases be prevailed upon to provide a letter to the local authority stating an intention to evict the patient, rather than simply ejecting a younger family member. In such a situation, a person would fall under the definition of priority need from the point of view of the local authority, without, however, being literally homeless at that point. This situation is reported nationally to account for up to 36% of statutory homeless declarations reported by local authorities (National Audit Office 2005, p.30). Whether such a person is homeless is then in part a question of institutional definition. From the point of view of the local authority, such a person is homeless, while from the point of view of the health service, such a person continues to be accommodated but with the expectation that they will be rehoused, there perhaps being no need to record in the clinical notes that the person is homeless. Again,

whether such mobility is voluntary or forced may be ambiguous; such “intention to evict” letters may be viewed by both parents and the patients as a means to an end.

***Other associations.***

Reduced autonomy may also be part of the explanation of the effect of legal status: Patients subject to the provisions of the Mental Health Act may be prevented from returning home, even on leave, making it more likely as time goes on that they may be convinced to accept alternative accommodation. In this case, however, the role of LOS may be relevant: the effects of legal status on LOS are so large that the effects of legal status on residential mobility may conceivably result from increasing LOS, which is then further prolonged. (As noted above, it is impossible to estimate any effect of increasing LOS on residential mobility, as it is very likely that residential mobility or its antecedents then further prolong LOS.)

In the absence of a clear a priori theory, all HoNOS items were explored in the analysis. Most of the non-housing HoNOS items were not associated with residential mobility. The two adjusted associations found have no clear common sense interpretation. The modest association with the HoNOS cognitive problems item may perhaps reflect the effect of more severe functional impairment among those with serious mental illness. However, it is difficult to see why this would not also be the case for the HoNOS problems with activities of daily living item. (It should be borne in mind that primary organic problems are very uncommon among working age adult psychiatric admissions). The negative association with the HoNOS other mental and behavioural problems item is difficult to interpret given the range of different phenomena that may be subsumed under it. The most likely explanation is that these only modestly significant effects arose due to chance.

**Conclusions.**

The literature on associations of residential mobility among individuals with established mental disorder is modest. We chose to explore its most consistent finding, the association with hospital admission, finding in particular that homeless and young adult inpatients had higher rates of mobility, and estimating that the overall rate of mobility during and directly after admission is 15%. There continues to be a need to follow the example of research into residential mobility in the general population and homeless mobility (DeVerteuil 2003; Hopper et al. 1997) by performing studies that directly examine subjective motivations and explanations for mobility in this population. It will also be



important to discover, at a reasonably detailed level, whether particular types of residential move, including the special kind of inpatient-associated mobility investigated here, lead to the same increased satisfaction that is assumed to be the aim of most mobility in the general population (Rossi 1980).

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Table 1 - *Unadjusted Associations With Residential Mobility*

Variable	N with complete data	Non-movers	Movers	p value
Overall	4386	3740 (85%)	646 (15%)	
Age	4385	mean 39.8 (SD 12.2)	mean 37.0 (SD 12.4)	<0.001
Gender	4386			<0.001
Male		2042 (84%)	403 (16%)	
Female		1698 (87%)	243 (13%)	
Ethnicity	4296			0.009
White British		1471 (87%)	216 (13%)	
Black African or Caribbean		1410 (84%)	277 (16%)	
Other		778 (84%)	144 (16%)	
Marital status	4041			<0.001
Single		2446 (84%)	481 (16%)	
Divorced, separated or widowed		517 (87%)	80 (13%)	
Married		470 (91%)	47 (9%)	
Employment	2546			
No		1913 (85%)	352 (16%)	0.013
Yes		253 (90%)	28 (10%)	
Diagnosis	4024			0.039
Drug & alcohol		299 (83%)	63 (17%)	
Non-psychotic		1015 (87%)	146 (13%)	
Other psychotic		1079 (86%)	183 (15%)	
Schizophrenia		1039 (85%)	200 (16%)	
Legal status	4386			<0.001
Informal legal status		2120 (87%)	324 (13%)	
Section 2 Mental Health Act		941 (82%)	200 (18%)	
Section 3 Mental Health Act		618 (86%)	97 (14%)	
Forensic section		61 (71%)	25 (29%)	
Admission in previous 2 years	4386			0.132 <sup>a</sup>
Yes		1583 (86%)	253 (14%)	
No		2157 (85%)	393 (15%)	
HoNOS cognitive problems	3330			0.047
Score 0 or 1		2213 (86%)	361 (14%)	
Score 2, 3 or 4		628 (83%)	128 (17%)	
HoNOS other mental and behavioural problems	3352			0.009
Score 0 or 1		1203 (83%)	238 (17%)	
Score 2, 3 or 4		1657 (87%)	254 (13%)	
Homelessness	4386			<0.001
Housed throughout admission		3325 (91%)	342 (9%)	
At admission		233 (59%)	159 (41%)	
Day 1 onwards		182 (56%)	145 (44%)	

*Note. Other psychotic* comprised ICD-10 codes F21 to F31 inclusive. Legal status was defined as the most restrictive section of the Mental Health Act in force during the first week of the admission. Detention only under Section 136, Section 5(2) or Section 5(4) was treated as informal legal status..<sup>a</sup> A fractional polynomial transformation of length of the longest admission in the preceding two years and a dummy variable for those who had not had an admission over that period were jointly significant at  $p < 0.0001$  when entered together into an unadjusted logistic regression.

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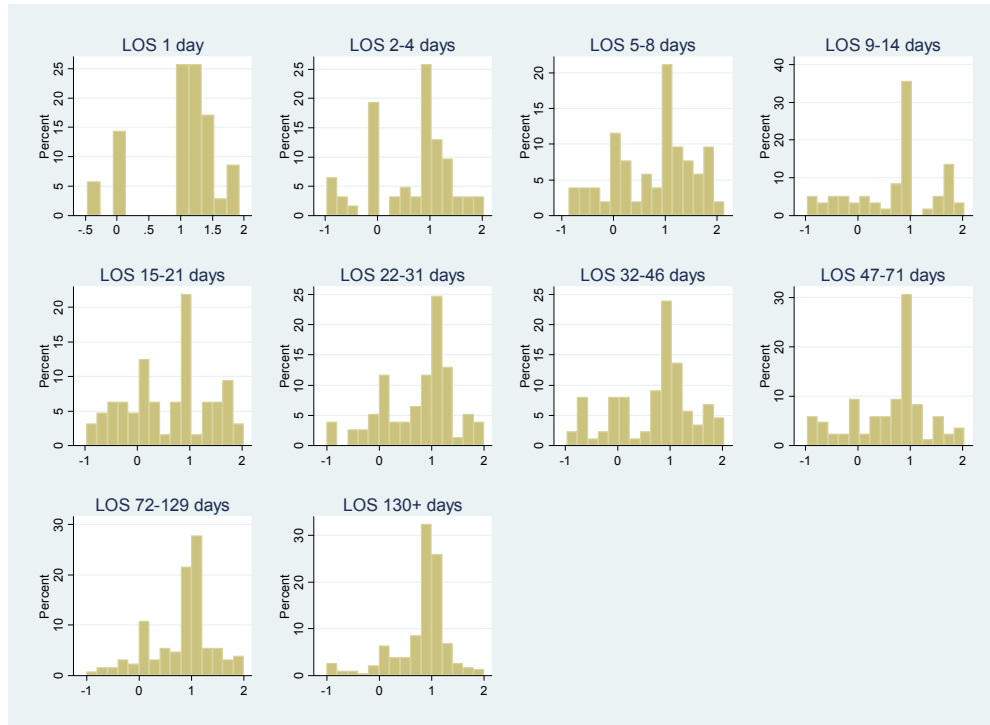
Table 2

*Adjusted Associations With Residential Mobility*

Variable	OR (95% CI)	P
Age		<0.001
16-25y	1	
26-35y	0.7 (0.6,0.8)	
36-45y	0.6 (0.5,0.8)	
46-55y	0.6 (0.4,0.8)	
56-65y	0.6 (0.4,0.8)	
Legal status		0.004
Informal legal status	1	
Section 2 Mental Health Act	1.3 (1.1,1.7)	
Section 3 Mental Health Act	1.2 (0.9,1.6)	
Forensic section	2.1 (1.2,3.5)	
HoNOS cognitive impairment	1.3 (1.0,1.7)	0.020
HoNOS other mental symptoms	0.8 (0.6,1.0)	0.036
Homeless at admission	6.7 (5.3,8.5)	<0.001
Homeless after admission	7.2 (5.6,9.3)	
Domiciled throughout admission	1	

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Figure 1

*Timing of Residential Mobility Relative to Admission and Discharge*

- We investigated the association between psychiatric hospital admission and residential mobility
- There is a peak in mobility around the time of hospital discharge
- Mobility occurs in 15% of admissions
- The most important associations are with homelessness and younger age

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