Check for updates

Understanding the transient population: insights from linked administrative data

Nan Jiang[1] · Gail Pacheco[2] · **Kabir Dasgupta[2]**

Abstract

There is growing evidence that frequent residential relocation is often associated with adverse socio-economic outcomes related to education, health and wellbeing. Prior research aimed at exploring the extent of residential movement has usually been restricted to survey evidence or infrequent census data. This study makes use of newly linked administrative data to design a framework for quantifying different levels and types of residential movement for an entire population. Within this context, we are able to derive working definitions for the transient and vulnerable transient. We also assess their interaction with a number of social service providers as well as important life events, both prior to and during the sample period. Our research contributes to understanding the key risk factors (in terms of both experience and intensity) associated with transience for adults, youth and children.

Keywords Residential mobility · Transience · Linked administrative data · Neighbourhood deprivation

✉ Gail Pacheco
gail.pacheco@aut.ac.nz

1 Faculty of Business, Economics and Law, School of Economics, Auckland University of Technology, Auckland, New Zealand

2 Faculty of Business, Economics and Law, NZ Work Research Institute, Auckland University of Technology, Auckland, New Zealand

Introduction

There is growing evidence that illustrates the link between frequent residential movement and poorer outcomes for affected individuals and their families. These include impacts on educational outcomes for children (see Bull and Gilbert 2007; Hutchings et al. 2013; Schwartz et al. 2015; Mollborn et al. 2018), as well as detrimental impacts on both physical and mental well-being (see Heller 1982; Stokols et al. 1983; Magdol 2002; Schafft 2006). Consequently, frequent residential movement (particularly when involuntary in nature) is likely to also be related to poor labour market outcomes[1] (Currie and Madrian 1999).

Better understanding the scale and different types of residential movements occurring across a population is important for the development of policy concerning housing provision, family security and safety, as well as neighbourhood design. Our study focusses on the NZ population, and within that context there are a number of policy arenas where a better understanding of residential movement is imperative. This includes service transience (including school absenteeism), early childhood education access and participation, child vulnerability and resilience, and supporting families that require multiple service interventions.

This study aims to contribute to the extant literature on residential movement by focussing on transience (and further to that, vulnerable transience). The existing body of research across the health, economic and social science literature has yet to produce a standard (or widely accepted) definition for transience. This is surprising, given that the term transience has in fact been used in a wide variety of research avenues—such as in situations where students have experienced frequent movement from school to school at a level that is deemed sufficient to disrupt their educational progress (Bull and Gilbert 2007), or in reference to unstructured residential movement patterns (Coulter et al. 2016), etc. We therefore build on the existing conceptual literature by constructing a working definition for both transience and vulnerable transience (T and VT respectively) with the aid of population-wide information on frequency and socio-economic characteristics of move.[2]

Prior research on residential movement has often relied on survey evidence (either cross-sectional or panel in nature) or infrequent census data (see Mostafa 2016; Beck et al. 2016; and Gambaro and Joshi 2016). In contrast, a particular focus of our research is building a blueprint by which administrative data sources can be utilised to define, quantify and examine both the T and VT populations. We use newly linked administrative data from Statistics NZ's Integrated Data Infrastructure (IDI). This permits the combination of address records from eight data sets (which span six government agencies) to produce an efficient geospatial resource by which

---

[1] Changes in neighbourhood qualities and social characteristics, associated with residential movement, may also influence labour market activities and employment outcomes (Weinberg et al. 2004; Bayer et al. 2005; Oishi 2010). This highlights the complexity of this field of research where the same factors can be both determinants and outcomes (of frequent moves).

[2] While our study focuses only on individuals who move between residential locations, in some circumstances, transience has also been used to refer to homelessness (Polio 1997; German et al. 2007; Bender et al. 2010).

we define different types of residential movement patterns, which include both T and VT.

For our empirical analysis, we employ a longitudinal perspective in assessing the key risk factors associated with being part of the T or VT groups. This involves using information on these factors for prior to and during the period of interest. Our key factors include a range of demographic characteristics, health events (mental health and addiction-related, emergency visits and acute hospital admissions), access to social services (benefits, youth services, social housing), family and life events, youth abuse, marriage, and separation), and justice events (court charges, convictions, and incarceration). Importantly, our analysis is able to distinguish between experiencing a particular event (characteristic or social service interaction) versus any incremental change in that event. For example, our regression analysis can assess the role of being a benefit recipient with regards to the odds of being VT, as well as any additional increase in these odds associated with a rise in the number of months on the benefit.

The remainder of this paper is organized as follows: Sect. 2 provides background evidence regarding conceptualising transience; Sect. 3 compares data sources available and illustrates why administrative data is best fit for purpose; Sect. 4 details the methodology adopted to classify different types of residential movement; Sect. 5 describes the key populations of interest; while Sect. 6 links additional administrative data to empirically model the key risk factors associated with being T or VT; with Sect. 7 concludes with implications for policy makers and directions for future research in this space.

What is transience, and what are the key drivers?

As described earlier, there is growing evidence of frequent residential movements being linked with poorer outcomes for affected individuals. With respect to implications for children, these can be broadly classified into poor health and behavioural outcomes (mental problems, delinquency and violence among adolescents), a drop in academic performance and future labour market challenges (Hawkins et al. 2000; Dong et al. 2005; Haynie and South 2005; Jelleyman and Spencer 2008). The social implications associated with repeated involuntary residential relocations such as lack of social ties and organizational participation and movements to lower quality neighbourhoods can have a deterrent impact on individuals' employment and economic conditions (Butler et al. 1973; Montgomery 1994; Damm 2014). Further, the literature evidence of a close association between involuntary moves and poor physical and mental well-being among adults is suggestive of some of the indirect channels through which transience can negatively affect individuals' labour market opportunities and socio-economic conditions (Stokols et al. 1983; Magdol 2002; Schafft 2006).

Considering the extant literature on the severity of the negative life outcomes that are associated with transience, there appears to be substantial scope for public policy intervention. In this context, our study contributes to the current literature by characterizing and identifying the individuals who are at risk of being vulnerable

transient. With this aim in mind it is necessary to begin with a discussion regarding what the term 'transience' may encompass. In general, this term equates to temporary or short-lived. However, there is no single definition of transience universally accepted in research or social policy circles. A summary of the typology of definitions that is evident in the literature is provided in Table 1, where it is clear that the focus is often on movement between residential locations. This is expected as home or place of residence is the key mode of connection to a neighbourhood, community, social support services, and other forms of social capital.[3]

Table 1 also shows there are four facets of movement that surface in the extant literature. These are the frequency of move, the socio-economic dimensions of the neighbourhood, and the direction and distance of the move. In this study, we will focus on all but distance as a preliminary empirical investigation finds that the majority of the moving population in NZ move within territorial local authorities.[4] Consequently, there is little variation across individuals that move frequently in terms of distance travelled.

The first factor (frequency of move) is commonly used as a way of measuring the dose–effect of residential movement. The second factor (socio-economic dimensions of the neighbourhood) is often a proxy for the potential socioeconomic status of the individual and their likely vulnerability. The third factor direction—upward movement (to a less deprived neighbourhood) is often associated with good outcomes and tends to represent positive change; while downward movement (to a more deprived neighbourhood) can be associated with mixed outcomes and is highly dependent on the driver(s) of the move(s) (Exeter et al. 2015; Lupton 2016).

While not illustrated in Table 1, the driver(s) of the move(s) can be key in understanding the nature of transience and the link between frequent movement and negative outcomes. Drivers of residential movements can either be voluntary or involuntary, and they can generally be attributed to one of the following life event classifications: (1) Relationship events such as marriage, divorce and re-partnering (Clark and Huang 2003; Michielin and Mulder 2008); (2) Economic events, such as changes in employment opportunities (Clark and Davies Withers 1999; Böheim and Taylor 2002); (3) Housing events, such as homeownership and foreclosure or eviction (Phinney 2013; Desmond et al. 2015); (4) Institutional changes such as development in housing policies and housing market conditions; (5) Health events, which can be both a driver and an outcome (Norman et al. 2005; Andreasen and Agergaard 2016; Cooke and Shuttleworth 2017); (6) Justice events (Skobba and Goetz 2013); and finally (7) Natural calamities such as earthquakes and floods (Gray and Mueller 2012).

In addition, it is important to understand the quality of moves induced by the aforementioned drivers. For example, positive life course experiences such as better

---

[3] Note this is not the case for homeless individuals.

[4] Territorial local authorities are geographic units defined under the Local Government Act—there are 67 of these units across NZ (Statistics NZ 2017). In our preliminary analysis we find that 93% of the sample population only moved within a region, and among them, 97% only moved within a territorial local authority over the three-year reference period.

Table 1 Typology of the definitions of transience

Typology	Nature of move	Definition
Residential movement in general	Disadvantaging	Involuntary or frequent moves, or moves to poorer housing or worse neighbourhoods or schools (Baker et al. 2016; Lupton 2016)
	Advantageous	Moves that are voluntary, timely and to better homes, better neighbourhoods, or better schools (Baker et al. 2016; Lupton 2016)
Residential movement by deprivation	Downward	Moves from less deprived neighbourhoods into more deprived neighbourhoods (Clark et al. 2006; Exeter et al. 2015)
	Sideways	Moves within or between neighbourhoods with the same level of deprivation (Özüekren and Van Kempen 2002; Exeter et al. 2015)
	Upward	Moves from more deprived neighbourhoods into less deprived neighbourhoods (Clark et al. 2006; Exeter et al. 2015)
Residential movement by frequency	Stayers	This includes people who do not move in a given period (Haynie and South 2005; Exeter et al. 2015)
	Medium	This includes people who move, but not frequently. Usually only once during a given period (Fitchen 1994)
	High	This includes people who move frequently over a given period of time. The number of moves and time period depends on the definition used (Fitchen 1994)
Residential movement by distance	Local move	This can be defined by moves within smaller geo-political units (such as territorial authorities), or by distance (e.g. ≤ 50 km, ≤ 5 km) (see Morton et al. 2014)
	Intra-regional move	This includes people who move within a region during a given period (Statistics NZ 2006)
	Inter-regional move	This includes people who move between regions within NZ during a given period (Statistics NZ 2006)
	International move	This includes people who move to or from another country during a given period (Statistics NZ 2006)
Transience unrelated to residential move	Changing school	This includes those who change school frequently (for reasons unrelated to progression) without moving residential address. This may be based on school preference, but may also include children in foster care, with special needs, disciplinary issues (Arsen et al. 1999; Bull and Gilbert 2007)
	Changing health provider	This includes those who change health provider frequently without moving residential address. Reasons for this may include low level of satisfaction with existing provider, financial difficulties or other reasons unrelated to any measure of hardship (Barnett and Barnett 2004; Naidu 2009)

Authors' compilation

employment opportunities, marriages, and/or childbirths can increase the likelihood of moving to better residential locations or even minimize the frequency of residential movements through homeownership or housing stability (Warner and Sharp 2016; Cooke and Shuttleworth 2017; Morris 2017). On the other hand, adverse circumstances triggered by negative events such as divorce/separation, financial instability, forced evictions, criminal convictions can compel people to move to poorer neighbourhoods and also increase individuals' mobility rate (Ding et al. 2016; Warner 2016; Mikolai and Kulu 2018). Unlike other drivers, research evidence on the potential impacts of health-based factors on residential mobility suggest that the relationship is not straightforward. While some authors argue that having serious health conditions in a family can restrict members' ability to move (Darlington et al. 2015), survey-based evidence in a recent study suggests that health is a major concern that aged people consider in their decision to move (Coulter and Scott 2015). The latter is potentially due to people's desire to be in healthier conditions and in locations with better healthcare access (Andreasen and Agergaard 2016).

Further, previous research has also explored residential mobility trends by demographic characteristics. Based on the evidence documented in the literature, age appears to be an important demographic attribute that is associated with people's desire to move. For example, while children's residential mobility is primarily dependent on parental choices, adolescents and young adults appear to be highly mobile, in order to access better education and employment opportunities (Coulter and Scott 2015; Falkingham et al. 2016). Residential mobility rates decline during middle age when cost of relocations increases as individuals gain higher economic stability and accumulate family commitments with events such as marriage and childbirth (Coulter and Scott 2015).

In the context of our study, we have information on the majority of the events and characteristics recognized in the current literature as key drivers of residential mobility. Utilizing our administrative data sources, we test the associations between these events and the propensity of being transient. Importantly, our longitudinal data permits obtaining information about these events in the time period prior to that when measuring transient status. Further, existing evidence on residential mobility indicates that individuals' wellbeing is not only influenced by the number of times people move but is also affected by the direction of those moves. Our study considers both aspects to define transience and vulnerable transience.

Data options for residential movement

Most international research on population movements has relied on either survey (whether one-off for a population sub-group or longitudinal in nature for a cohort) or census data. Examples include annual information from the Current Population Survey (Cooke 2011), five waves (cut-points) in the UK Millenium Cohort Study (Mostafa 2016),[5] or five-yearly census based information (Statistics NZ 2013).

---

[5] Data was collected on five occasions—when the child was 9 months, three, five, seven, and 11 years.

In NZ's case, existing evidence has been scant and for the most part relied on the Census. For instance, based on the last Census[6] (in 2013), close to half the usually resident population aged 5 years and over (49.4%) reported living at the same address as 5 years ago. This was an increase from the comparable figure in the 2006 Census of 41.1% and a reversal of a declining trend that was evident from the 1991 Census through to 2006. This recent apparent drop in population movements mirrors trends in the international literature—see Champion and Shuttleworth (2015a, b) for UK evidence, and Cooke (2011, 2013), and Molloy et al. (2011) for US evidence.

Our study differs from past literature in that it makes use of newly linked administrative data via Statistics NZ's Integrated Data Infrastructure (IDI). This is a large research database containing microdata about all individuals and households stored in a wide range of government administrative records, Statistics NZ surveys, as well as information from non-government organisations.[7] All data within the IDI are in confidentialised form and each individual has a unique identifier (snz_uid). This permits linkages across different data sets. For our purposes, we make links across data sources that each contain residence location information, as well as notifications of change in residence, and make links within a longitudinal perspective (such that the relationship between prior life events and social service interactions with residential movement patterns can be assessed).

The IDI also includes the most recent Census from 2013, and therefore provides a unique opportunity for comparing the information provided by relying solely on the Census survey versus linked administrative sources. Both options are detailed below and compared for the purposes of our research context.

Census information

The target population of interest with this self-reported survey are individuals in NZ on Census night (5th March 2013), who were usually resident in NZ. There are two questions in the Census that provide information related to population movements, and these are listed in Table 2, alongside the possible options available for respondents.

As evident from Table 2, the main disadvantage of using Census data is that it does not capture number of moves within a specified time-frame, or for that matter, durations of residence at each new location. There is also a dearth of information related to young children. For instance, with the first question in Table 2, there is no information available for individuals aged under five. Additionally, with respect to the second question in Table 2, for those children aged less than one, we cannot distinguish between those that actually moved in the last year (and that is why they have been at their address for less than a year) and those that have lived at the same

---

[6] Note that while there was usually a 5 year gap between Census waves, there was a 7 year gap between the 2006 and 2013 waves, due the impacts of the Christchurch earthquake in 2011.

[7] Comprehensive information about the IDI is available through the Statistics NZ website at http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx.

Table 2 Census questions related to population movements Sourced from the 2013 Census data dictionary

Residential move within 5 years	Duration of residence
Question	*Question*
'Where did you usually live 5 years ago, on 5 March 2008?'	'How long have you lived at the address you gave in Question 5?' (Address provided in Question 5 is the individual's current address.)
Response codes	*Response codes*
1 Same as usual residence 2 Elsewhere in NZ 3 Not born 5 years ago	Integer values 0–98 representing the number of years a person lived in her current address.
4 Overseas	777 Response unidentifiable
5 No fixed address 5 years ago	999 Not stated
77 Response unidentifiable	
99 Not stated	

address since their birth. A further potential drawback of the Census is that it may be subjected to recall bias due to the self-reported nature of the data collected.

Administrative sources

The IDI permits combination of address records from eight sources (spanning six agencies)—Ministry of Health Primary Health Organisation registers[8]; Ministry of Health National Health Index records[9]; Ministry of Social Development (MSD) residential; MSD postal addresses; Ministry of Education records; Accident Compensation Corporation (ACC) client addresses; Inland Revenue (IR) Tax registration addresses and 2013 Census. All the address information is geocoded and prioritised for each individual by Statistics NZ. The order of priority is provided in the list above; indicating that an address registered with the Ministry of Health Primary Health Organisation will take priority over other sources. After which, the next source of priority is an address recorded with the Ministry of Health National Health Index. If no address exists for that source, we move down the list until reaching the lowest ranked address, which is the 2013 Census. The result is a chronological record of the (prioritised) usual residential address for individuals in the IDI, which is denoted as the address notification table.

---

[8] The majority of health care in NZ is publicly funded through taxation. The Ministry of Health oversees this sector, while much of the day-to-day business, and around three quarters of the funding, is administered by district health boards (DHBs). This includes funding for primary care, hospital services, public health services, aged care services, and services provided by other non-government health providers. Primary health organisations ensure the provision of essential primary health care services, mostly through general practices and nurses, to people who are enrolled (i.e. registered) with the PHO.

[9] The National Health Index number is a unique identifier that is assigned to every person who uses health and disability support services in NZ.

One potential setback of the address notification information is that it is 'observational' in nature. A record of an address only occurs when an individual notifies an agency of a change in address. These observation points are therefore unlikely to be the actual date of the residential move.

A second disadvantage of the address table is that some sources may have missing data, and/or other quality issues. This potential bias affecting estimates of population movement is likely to be more prevalent for individuals not in our focus (i.e. not transient). This is because it is likely that transient individuals have greater interactions with the aforementioned agencies and are therefore more likely to have their address changes recorded, and less likely to have missing information. This is especially true for agencies such as the Ministry of Health and MSD, where address information is required from clients. Further to the above caveats there may, of course, be a subgroup of individuals who do not interact with any social agency or the health system and rely on the informal support of charity groups. These individuals will not be captured in the IDI. Hence, the results obtained in our study may not be representative of the group of individuals not captured in the IDI. However, based on our expectation regarding the IDI analysis sample, we believe that the sample size of the unaccounted individuals in the IDI is negligible.[10]

Finally, as will be discussed later as well, it is important to note that estimated results obtained in our study may just represent correlation and not causation. This is because there might be unobserved heterogeneities not documented in the IDI, which can affect both the dependent as well as independent variables. This may generate biases in our estimates. For example, if an omitted variable is positively linked with the included independent variables as well as the dependent variable, there will be a positive bias (when estimated effect exceeds the true causal impact). However, since identification of these unmeasured variables is not plausible, it is hard to discern the direction and the nature of the biases generated by the excluded unobserved heterogeneities.

Census versus address table comparison

To construct a comparison between the *2013 Census* and the address table, we limit our population of interest from the address table to those with census records. This encompassed 93.3% of the population covered in the census wave, which is 4.06 million individuals.

As a point of comparison, we focus on the first question in Table 2, movement patterns in a 5-year time-frame. Figure 1 shows that of those reporting in the Census to have moved in the last 5 years (the solid line), 12% of these individuals did not have an address notification change in the address table in the IDI, 34% have one address change, and the remainder of this sample have multiple address change notifications. While census figures may be affected by recall bias and measurement error, the size of the mismatch in terms of those who report moving in the Census

---

[10] Note that because we do not know the composition of this potential group, it is difficult to speculate regarding the direction of impact on the quantification of transient and vulnerable transient persons.
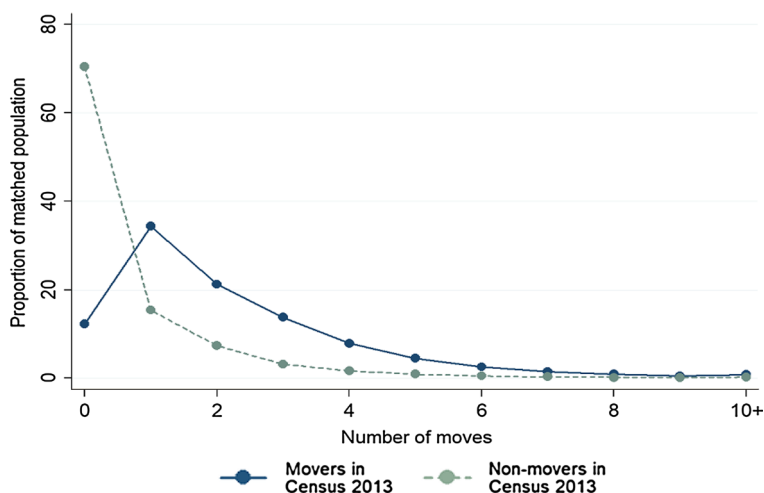
Fig. 1 Comparison of 2013 Census and address table—5 years prior to census date *Source*: Matched population between Census 2013 and address table in the IDI. Number of moves based on information from address table. Authors' compilation (Numerical data for table is available upon author request)

versus what is picked up in the address table (12%), signals that there is likely to be some residential movements that are not picked up by the address table. However, as mentioned earlier, this group are unlikely to be our population of interest, otherwise their details would have been captured by NZ's welfare agency (MSD) or health providers.

Figure 1 also illustrates that the address table provides additional information beyond a dichotomous response of move/did not move, via data on the number of moves. For instance, for those captured as moving in the census in the 5-year timeframe, the address table showed that close to 53% of these individuals moved more than once.

Also shown in Fig. 1, for those that reported being at their current address for more than 5 years (the dashed line), approximately 70% of this group were also classified as non-movers according to the address table.[11] Therefore, for the remaining 30% of the matched population sample, Census provides lower population movement estimates relative to the address table.

Of most importance for our research context, the address table provides information on number of moves. This frequency is imperative in building a workable definition of transience, and as such for the remainder of this paper we focus solely on the address table from the IDI to conduct our empirical analysis.

---

[11] We also conducted the Census versus address table comparison based on the second question in Table 2. The match rate was 79% and 80% for movers and non-movers, respectively.

Identifying populations of interest

We begin with the full list of prioritised address notifications in the IDI for the last 3 years of available data, i.e. 01 August 2013 to 31 July 2016 (hereafter denoted as the reference period). The reason for this time-frame is two-fold: (1) It is post the 2011 Christchurch earthquake, which created a temporary spike in involuntary population movements in the South Island; and (2) It includes the most up to date data, such that policy inferences can be made with the latest information. Based on this reference period, our sample is approximately 11.93 million address records, which are associated with 8.29 million unique individuals. In cases where an individual seems to have the same address in two consecutive address notification spells, Statistics NZ has recommended collating these spells. This reduces our data sample to 11.88 million address events.

We then make the following exclusions with this base population:

- 0.63 million individuals who have death records during the reference period (based on data from the Department of Internal Affairs—DIA, and Ministry of Health—MOH).
- A further 0.97 million individuals who do not have NZ citizenship or residence (based on immigration data from the Ministry of Business, Innovation and Employment). In particular, individuals for whom their most recent visa application belonged to the 'temporary' category, or was for 'residence' but not granted before 01 August 2013.
- Another 1.41 million individuals who spent less than 50% of their time in NZ during the reference period (based on data from the Statistics NZ's international travel and migration table, which tracks all international travel information into and out of NZ).
- 0.305 million babies who were born after the start of our reference period, i.e. 01 August 2013, and 0.079 million individuals with a death record with MOH but not in DIA.
- An additional 1461 individuals whose address records are missing deprivation information. This deprivation data indicates socio-economic status of the neighbourhood and as will be evident in the following sections, is required for defining both the T and VT populations.[12]

Our final sample equates to 3857,433 unique NZ residents who lived through the entire reference period for our analysis.

We next partition our sample based on how often individuals have moved in the last 3 years, and whether their moves were to a less or more deprived neighbourhood (or neither). The framework we use is presented in Fig. 2 below and incorporates the three key elements discussed earlier of frequency, direction and deprivation.

---

[12] This final exclusion was minor in nature and only related to 1461 individuals.
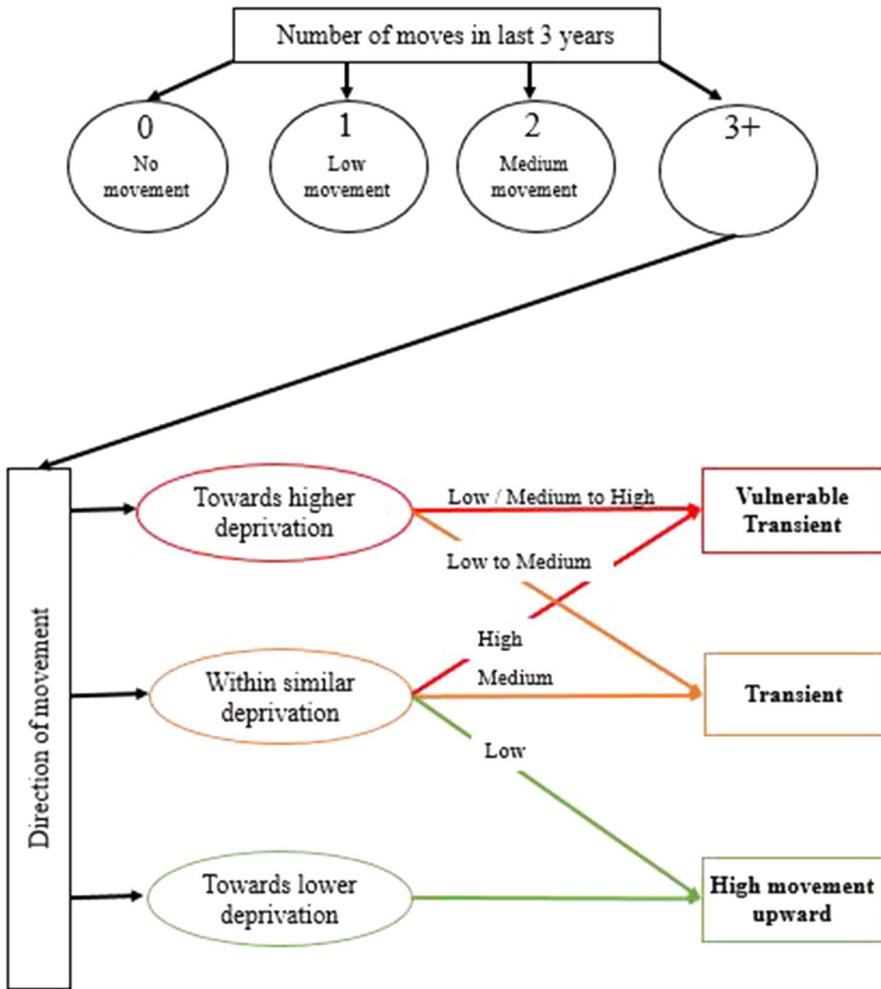
Fig. 2 Defining residential movement groups. *Note*: Low, medium and high deprivation categories equate to deprivation index values of 1–3, 4–7 and 8–10 respectively. A prioritised approach is utilised when assessing direction of movement across the three year timeframe for those with three or more moves. If at least one move is towards or within high deprivation, they are classified as Vulnerable Transient (VT). If not in this category and at least one of their moves is towards or within medium deprivation, they are classified as Transient (T). If not in either VT or T, they are classed as High movement upward. Author's compilation

The population is split firstly based on frequency of moves during the reference period (of 01 August 2013 to 31 July 2016), into four outcomes—non-movers, low, medium and high movement. Low movement is defined as one move in

that time period, medium movement equates to two moves, and individuals that have moved at least three times in the last 3 years are classed as high movement.[13]

The high movement population is then broken down based on the direction of their moves. In this context, 'direction of move' is not geographic in nature, but rather represents the socioeconomic direction of an individual's move. For this purpose, we use the deprivation index (i.e. NZDep2013) for the meshblock[14] corresponding to each address event in our sample. This deprivation score is based on nine variables from the census, reflecting eight dimensions of deprivation. The deprivation score is grouped into deciles where 1 represents the areas with the least deprived scores, and 10 represents the areas with the most deprived scores. As such, a value of 10 for the deprivation index indicates that the relevant meshblock is in the most deprived 10% of areas in NZ.

We collapse the deprivation index values into three categories, such that for each address record, an individual will fall into one of the following categories: low deprivation (index of 1–3); medium deprivation (index of 4–7); and high deprivation (index of 8–10).

Next, we use the associated deprivation category for an address event to ascertain the direction of move for any address change in our sample timeframe. There are three possible permutations for an individual's direction of move—towards a worse category (e.g. low to medium, medium to high, or low to high deprivation); within the same category (e.g. low to low, medium to medium, and high to high deprivation); and towards an improved category (e.g. high to medium, high to low, and medium to low deprivation).

We use a prioritized system to classify each individual's direction across the 3-year time frame. The high movement population is separated into the following three prioritized categories: (1) An individual is classed as "VT. Vulnerable transient" if any of the moves during our reference time frame were toward high deprivation; and/or within high deprivation (index of 8–10); (2) For those that are not VT, they are classed as a "T. Transient" if they ever moved from a low deprived area to a medium deprived area; or if any of the moves were within medium deprivation (index of 4–7); (3) The remainder are classed as high movement-upward.

Who is transient?

In this section, we apply the classification system as described in Fig. 2 to quantify the relevant populations of interest. We then link these populations with eleven other administrative data sources in order to describe their demographic profile, as well as their characteristics with respect to life events, social service participation, justice

---

[13] This is in line with the classification used by Rumbold et al. (2012) and Hutchings et al. (2013), who show that children who are subjected to at least one residential move per year on average (based on the total number of moves they consider in a given period), are at a greater risk of suffering from mental health problems and poor academic outcomes.

[14] A meshblock is the smallest geographic unit used by Statistics NZ. The median size of this unit was 87 people (across 35 households) in 2006—see Meehan et al. (2018).

Table 3 Data—definitions and sources

Variables	Definition	Source in IDI	
Demographic characteristics			
Female	Dummy variable: 1 if female; 0 otherwise	Personal details	
Ethnicity	Six dummy variables for NZ European; Māori; Pacific Peoples; Asian; Middle Eastern/Latin American/African; Other ethnicities		
Age	Ten dummy variables for age ≤5 years; 6–13; 14–17; 18–23; 24–29; 30–39; 40–49; 50–59; 60–69; age ≥70 years.		
Life events	Two dummy variables for getting married (or civil union); and getting divorced.	Department of Internal Affairs	
Social service participation			
Working for families (WFF)	Dummy variable: 1 if a WFF receipt; 0 otherwise	WFF	
Benefit receipt	Dummy variable: 1 if associated with any a benefit spell[a], 0 otherwise	Benefit dynamics	Ministry of Social Development
Child, youth and family (CYF)	Two dummy variables for intake and placement events	CYF	
Youth service intervention (YST)	Dummy variable: 1 if individual receives a youth intervention; 0 otherwise	YST	
Social housing receipt	Dummy variable: 1 if lived in social housing; 0 otherwise	Housing NZ	
Justice events	Two dummy variables for being charged with a court case and receiving a conviction.	Ministry of Justice	
Health information			
Mental health event	Dummy variable: 1 if experienced a mental health or addiction event; 0 otherwise	Programme for Integration of Mental Health Data (PRIMHD)	
Emergency department visit	Dummy variable: 1 if had an emergency department visit; 0 otherwise	National Non-Admitted Patient Collection (NNPAC)	

Table 3 (continued)

Variables	Definition	Source in IDI
Acute admission	Dummy variable: 1 if had an acute hospital admission; 0 otherwise	National Minimum Dataset (NMDS)
Outcomes of interest		
Nn (Non-movers)	No address change in three years	
Lm (Low movement)	One residential movement in three years	
Mm (Medium movement)	Two residential movements in three years	
HmU (High movement—upward)	At least three residential movements in three years and moves are only towards or within low deprivation areas (i.e. deprivation index values of 1 to 3)	Address notification table
T	At least three residential movements in three years and at least one move was towards or within medium deprivation areas (i.e. index values of 4 to 7)	
VT	At least three residential movements in three years and at least one move was towards or within high deprivation areas (i.e. index values of 8 to 10)	
Time periods of relevance	Reference period = 01 August 2013–31 July 2016; Pre-reference period = 01 August 2008–31 July 2013	

[a] Associations can take the form as primary benefit recipient; associated partner; or associated child

Table 4 Descriptive profile

Variables	Nm	Lm	Mm	HmU	T	VT
Proportion of sample (%)	70.2	16.9	7.3	0.3	1.3	4.0
Average number of residential moves	0.0	1.0	2.0	3.3	3.5	4.1
Proportions within each population group (%)						
Demographic characteristics						
Female	50.5	49.1	52.1	62.2	59.8	54.6
NZ European	54.3	49.6	44.6	63.6	56.1	27.7
Māori	13.6	18.8	23.5	10.5	16.3	37.5
Pacific Peoples	9.0	8.8	9.7	3.2	4.2	12.7
Asian	8.8	6.3	4.7	4.0	3.6	2.8
Middle Eastern/Latin American/African (MELAA)	7.1	8.6	9.2	10.3	10.3	9.6
Other ethnicity	7.2	7.9	8.3	8.4	9.5	9.7
Age ≤ 5 years	9.0	11.9	9.7	6.1	5.5	6.2
6–13 years	11.5	12.6	13.4	8.7	11.0	17.6
14–17 years	4.4	7.4	11.4	9.9	15.4	18.0
18–23 years	6.1	10.9	14.1	11.8	17.2	16.4
24–29 years	6.4	9.2	9.5	8.7	10.3	9.6
30–39 years	13.2	13.9	12.7	12.5	11.2	11.8
40–49 years	16.9	13.2	11.8	16.0	12.1	10.6
50–59 years	14.8	10.4	9.2	13.3	9.6	6.2
60–69 years	10.1	6.6	5.2	7.9	4.9	2.4
Age ≥ 70 years	7.6	3.9	3.0	5.1	2.8	1.2
Life events						
Got married (or civil union)	2.7	6.3	6.1	6.3	6.3	4.8
Got divorced	1.1	2.6	2.7	2.9	3.4	2.6
Social service participation (pre-reference period)						
Working for families receipt	22.7	41.9	49.9	34.7	51.2	77.1
Benefit receipt	12.8	28.7	39.9	22.4	39.1	68.1
Child, youth and family intake and/or placement event	0.03	1.0	1.8	1.0	1.8	5.7
Youth service intervention	3.5	5.6	6.5	3.5	4.5	12.3
Social housing receipt	3.5	6.0	8.0	1.3	3.1	16.9
Justice events						
Court charge(s)	3.6	10.0	14.9	7.7	14.1	35.1
Conviction(s)	2.8	7.9	12.3	5.6	11.0	30.9
Health information						
Mental health and addiction event	2.9	6.5	10.2	8.9	13.9	43.4
Emergency department visits	23.9	39.3	45.8	42.6	49.3	60.9
Acute admission	14.2	22.6	26.7	27.1	30.0	38.0

Nm = non-movers; Lm = low movement; Mm = medium movement; HmU = high movement (upward); T = transient; VT = vulnerable transient (as defined in Sect. 4). Data sourced from the IDI, with specific datasets listed in Table 3. Ethnicity information is prioritised in the following order—Māori; Pacific Peoples; Asian; MELAA; Other; NZ European (For further details regarding ethnicity prioritisation ranking see Table 1 at https://www.educationcounts.govt.nz/data-services/collecting-information/code-sets-and-classifications/ethnic_group_codes). Life event and working for family statistics are based on the adult population; Court charges and convictions are based on the youth plus adult population; Youth service intervention statistics are based on the youth population; and Child, youth and family events are

Table 4 (continued)

based on the youth plus child population. All other statistics are based on the full sample of adults, youth and children, defined as aged 20 and over, 15-19, and under 15 at the start of the pre-reference period. N = 2,473,371; 264,084; and 811,458 respectively

events, and health information. The main variables of interest, their definitions, and the relevant source within the IDI are described in Table 3.

The size of the relevant populations of interest are provided in Table 4, along with their descriptive profile. We find that 4% of the population fall into the VT group, and a further 1.3% can be classed as T. There are two pathways to being part of the VT grouping—either an individual has moved towards a high deprivation neighbourhood (i.e. low to high or medium to high); or they have moved within the high deprived category. When we delve further into the makeup of the VT group, we find that moving towards high deprivation dominates moving within high deprivation cases. The exact proportions are 67.8% versus 32.3% respectively.

When viewing the descriptive statistics in Table 4, it is important to recognise there are two time periods to focus on. All the outcome variables regarding residential movement (Nm, Lm, Mm, HmU, T and VT) are captured for the reference period of 01 August 2013 to 31 July 2016; whereas all explanatory variables are based on their information for the pre-reference period of 01 August 2008 to 31 July 2013.[15] The purpose of this approach is to identify the extent to which prior socioeconomic attributes and life events are associated with risk of transience. Further, selecting both information on individuals' residential movements and the key independent variables for the same period may involve reverse causality problems.

With respect to demographics, it is clear that the ethnic minorities of Māori and Pacific Peoples are more prevalent in the VT group, relative to other population groups. For instance, Māori are three times more likely to be in VT compared to non-movers (Nm), 37.5% versus 13.6% respectively. In contrast, a different minority group of Asians is less than half as likely to be VT as they are to be Nm. In terms of age, schooling years (i.e. age 6–17) and young adult years (age 18–23) correspond to greater levels of residential movement.

Table 4 also presents life event information—specifically, information on formal relationship events such as marriages, civil unions, and divorces. Non-movers stand out as the one group with the lowest rates of marriage and divorce. However, across the remaining population groups, there is no clear pattern regarding rates of marriage or divorce preceding different levels of residential movement. It is useful to note at this point that there may be informal relationship events, which could also play a role as triggers to residential relocations in general, and transience in particular, but unfortunately, these are not captured in the IDI.

The next group of characteristics exhibited in Table 4 are indicators of social service participation. Working for families is a package aimed at families and includes family tax credits, accommodation supplements, and childcare subsidies. It is clear

---

[15] Except for demographic characteristics, which are based on the start of the reference period—01 August 2013.

that the proportions of T and VT receiving working for families is much higher than the comparable proportions for other population subgroups. Similar statements apply to benefit receipt; child, youth and family events; youth service interventions and social housing, for the VT group. The most noteworthy statistic is that of child, youth and family intake and/or placement events. This includes circumstances where concern is raised about a child or young person (CYP)—in terms of their behaviour or insecurity of care; or it is believed that the CYP is being harmed, abused, or deprived; or it is believed that the CYP is alleged to have committed an offence. In such circumstances, when the concern or report is flagged to the Ministry of Social Development, it is then captured in the IDI. We find that amongst individuals aged below 20 in the VT group, 5.7% had a CYF intake and/or placement event. The comparable numbers for Nm and Lm were 0.03% and 1.0% respectively.

In the final two categories in Table 4, it is evident that individuals who are in the VT group are more likely to have experienced both justice and health events in the preceding time period, relative to other population categories. The differences are stark in several of the descriptives. For example, 43.4% of those in the VT group had a mental health referral in the 5 years prior, compared to 13.9% in the T group. This statistic follows a downward pattern as level of residential movement decreases, until we arrive at 2.9% of the Nm group.

Risk factors associated with transience

Method

We estimate three separate logistic regression models to investigate factors associated with transience for adults, youth and children separately. Adults are defined as age 20 and over, youth are 15 to 19, and children are under 15 as at the start of the pre-reference period (01 Aug 2008).

Model (1):

$$
\log\left(\frac{P(Y)}{1 - P(Y)}\right) =
$$

$$
\begin{aligned}
& \alpha_a + X'\beta_a + \delta_{1a}.Benefit + \theta_{1a}.(Benefit \times numberweeks) \\
& + \delta_{2a}.SocialHousing + \theta_{2a}.(SocialHousing \times numbermonths) \\
& + \delta_{3a}.CourtCharges + \theta_{3a}.(CourtCharges \times numberconvictions) \\
& + \delta_{4a}.WFF + \theta_{4a}.(WFF \times numbermonths) \\
& + \delta_{5a}.Marriage + \delta_{6a}.Divorce \\
& + \delta_{7a}.MentalHealth + \theta_{5a}.(MentalHealth \times numberevents) \\
& + \delta_{8a}.EDvisit + \theta_{6a}.(EDvisit \times numberdays) \\
& + \delta_{9a}.AcuteAdmission + \theta_{7a}.(AcuteAdmission \times numberadmissions)
\end{aligned}
$$

$$(1)$$

Equation (1) provides the regression model for the adult population. Out of all the possible explanatory variables detailed in Table 3, the adult model (Eq. 1) omits the CYF and YST variables, which are not of relevance for this population sub-group. The youth model is similar to the adult model, with the exceptions being that it omits WFF information and relationship event indicators for marriage/civil union, and divorce; and adds in CYF and YST information. Finally, the child model is the same as the youth equation, with court charges and YST information dropped. Court charges are not included due to lack of relevance for children, and YST is primarily targeted at 15 to 19 year olds.

In all three models, we incorporate not just the indicator variables for social services, health and justice events; but also measures of the dose effect. For example, the adult model (Eq. 1) includes a dummy for court charges, and a variable which interacts that dummy with number of convictions. Similarly, all three models (adult, youth and child) include a dummy for having a mental health referral, as well as a variable which interacts that dummy with number of referrals.

In all specifications employed, X is a vector of the demographic characteristics encompassing age, gender and ethnicity. Y denotes two possible outcome variables = being T or VT; and being VT. As noted earlier, both outcomes of interest are based on the reference period, and all independent variables are based on the pre-reference period.

Results

Table 5 presents the results of logistic regressions aimed at assessing the risk factors associated with experiencing transience. There are several noteworthy findings. First, for all variables, except for ethnicity indicators, there is little difference in the odds of belong to T and VT versus belonging to just VT (ceteris paribus). For instance, if an adult had court charges in the preceding time period, they were 1.6 times more likely to be T or VT, relative to individuals with no court charges; and 1.7 times more likely if we narrow the outcome of interest to just VT. Another example of this pattern is mental health events—adults, youth and children were 1.7, 1.4, and 1.9 times more likely (in each respective sample) to belong to the combined group of T and VT relative to individuals without a mental health event; and these odds remain at the same level when the outcome variable is narrowed to just VT.

The only variables that do not fit the above pattern are ethnicity indicators. For these, and particularly for Māori and Pacific Peoples, the odds increase substantially between the two possible outcomes illustrated in Table 5. For example, holding all other factors constant, if a child is Māori, they are 1.6 times more likely to belong to the combined group of T and VT compared to the reference group of NZ European. These odds increase to 2 times more likely when the outcome is just VT. A similar pattern is evident for adult and youth Māori, and for all age groups of Pacific Peoples (and to a lesser extent for MELAA—Middle Eastern, Latin American and African individuals). Interestingly, Asians are the only ethnic group with lower odds of experiencing transience relative to NZ Europeans.

Table 5 Logistic regressions to study how usage of social services and life events are associated with the risk of transience

Variables	Odds ratios (Robust standard errors)					
	Adults		Youth		Child	
	T and VT	VT	T and VT	VT	T and VT	VT
	(1)	(2)	(3)	(4)	(5)	(6)
Demographic characteristics						
Female	1.380*** (0.010)	1.246*** (0.011)	2.066*** (0.028)	1.857*** (0.029)	1.684*** (0.025)	1.679*** (0.028)
Age	0.966*** (0.001)	0.970*** (0.001)	0.531*** (0.088)	0.412*** (0.078)	0.682*** (0.007)	0.700*** (0.008)
Age²	1.000*** (0.000)	1.000*** (0.000)	1.012*** (0.004)	1.017*** (0.004)	1.023*** (0.000)	1.021*** (0.000)
Māori	1.619*** (0.015)	2.209*** (0.025)	1.306*** (0.022)	1.674*** (0.032)	1.656*** (0.032)	2.021*** (0.043)
Pasifika	1.291*** (0.018)	1.893*** (0.029)	0.881*** (0.020)	1.248*** (0.031)	1.100*** (0.028)	1.402*** (0.039)
Asian	0.797*** (0.017)	0.988 (0.026)	0.554*** (0.020)	0.706*** (0.030)	0.541*** (0.022)	0.592*** (0.028)
MELAA	1.346*** (0.018)	1.525*** (0.024)	1.126*** (0.024)	1.250*** (0.031)	1.388*** (0.035)	1.522*** (0.043)
Other ethnicity	1.381*** (0.016)	1.631*** (0.022)	1.191*** (0.028)	1.368*** (0.036)	1.361*** (0.044)	1.461*** (0.052)
Life events						
Marriage/civil union	1.071*** (0.018)	1.003 (0.020)	–	–	–	–
Divorce	1.349*** (0.030)	1.225*** (0.033)	–	–	–	–
Social service participation						
Working for families (WFF)	1.922*** (0.041)	2.050*** (0.053)	–	–	–	–
WFF * number of months	0.997*** (0.000)	0.999*** (0.000)	–	–	–	–
Benefit receipt	2.498*** (0.029)	2.671*** (0.037)	2.511*** (0.043)	2.657*** (0.053)	2.783*** (0.063)	2.800*** (0.070)
Benefit receipt * number of weeks	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)
Child, youth and family event (CYF)	–	–	1.484*** (0.144)	1.390*** (0.137)	2.419*** (0.124)	2.434*** (0.128)
CYF * number of events	–	–	0.983 (0.022)	0.984 (0.022)	1.039** (0.006)	1.041*** (0.006)
Youth service intervention (YST)	–	–	1.117*** (0.036)	1.184*** (0.040)	–	–
YST * number of weeks	–	–	1.000** (0.000)	1.000*** (0.000)	–	–

Table 5 (continued)

Variables	Odds ratios (Robust standard errors)					
	Adults		Youth		Child	
	T and VT	VT	T and VT	VT	T and VT	VT
Social housing (SH)	2.013*** (0.045)	2.220*** (0.052)	1.635*** (0.059)	1.819*** (0.067)	2.204 (0.083)	2.423*** (0.094)
SH * number of months	0.969*** (0.001)	0.968*** (0.001)	0.979*** (0.001)	0.979*** (0.001)	0.976 (0.001)	0.977*** (0.001)
Justice events						
Court charges	1.628*** (0.019)	1.700*** (0.021)	1.504*** (0.027)	1.560*** (0.030)	–	–
Court Charges * number of convictions	1.030*** (0.001)	1.030*** (0.002)	1.031*** (0.002)	1.032*** (0.002)	–	–
Health events						
Mental Health	1.705*** (0.021)	1.700*** (0.023)	1.473*** (0.033)	1.430*** (0.034)	1.961*** (0.057)	1.925*** (0.058)
Mental Health * number of events	1.027*** (0.002)	1.027*** (0.002)	1.029*** (0.004)	1.029*** (0.004)	1.054*** (0.009)	1.051*** (0.009)
ED visit	1.653*** (0.018)	1.669*** (0.021)	1.706*** (0.030)	1.618*** (0.032)	1.571*** (0.032)	1.557*** (0.035)
ED visit * number of days	1.042*** (0.003)	1.046*** (0.003)	1.073*** (0.004)	1.075*** (0.004)	1.097*** (0.006)	1.097*** (0.006)
Acute admission	1.186*** (0.013)	1.174*** (0.015)	1.223*** (0.023)	1.111*** (0.025)	1.142*** (0.028)	1.113*** (0.030)
Acute admission * number of admissions	0.976*** (0.004)	0.970 (0.004)	0.948*** (0.008)	0.938*** (0.008)	0.941*** (0.010)	0.944*** (0.010)
Number of observations	2,473,371	2473,371	264,084	264,084	406,113	406,113
Pseudo R²	0.192	0.241	0.178	0.207	0.215	0.231

Reference groups are males and NZ European. Definitions of indicator variables are provided in Table 3. Adults, youth and children are defined as age 20+, 15-19, and under 15 at the start of the pre-reference period. The child results are based on a 50% random sample of their population, as their full population model did not converge.

***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively

The next key result of note is the importance of social service participation. For the majority of these indicators, interactions with social service agencies in the preceding time period is associated with a two-fold increase in the risk of transience. For example, benefit receipt for adults is associated with an individual being 2.5 times more likely to belong to T or VT, compared to individuals not receiving a benefit. Additionally, having a child, youth and family event is associated with a child being 2.4 times more likely to belong to T or VT.

It is also evident from the odds ratios for social service participation, as well as justice and health events, that experiencing a particular event is itself the biggest contributor to increasing the odds of being transient, with the intensity of the event usually making minimal difference to the odds. For instance, having at least one court charge in the preceding time period is associated with an individual being 1.7 times more likely to be VT, compared to not having any court charges. For a measure of the intensity effect of justice events, we interacted indicator of court charges with number of convictions. This indicates that for each additional conviction, the odds increase by just 3%. Similar examples can be found for benefit receipt and WFF, noting that these findings are not directly comparable based on the different scales used. Intensity of benefit receipt is based on number of weeks and WFF intensity is number of months.[16]

Finally, it is important to remember that the odds ratios presented in Table 5 represent associations, and future analysis should attempt to isolate the potential drivers that are exogenous in nature to investigate causal relationships.

Conclusions

Existing studies have often found negative outcomes (for education, health and wellbeing) associated with frequent residential movement, especially movement to neighbourhoods with lower socio-economic status and higher deprivation. While much of the prior literature has highlighted to importance of understanding the different types and drivers of residential movement, there is to our knowledge no consistent definition quantifying transience. Furthermore, past literature has also had to rely on survey data or infrequent census information to build knowledge of factors linked with transience.

Our study contributes to the extant body of knowledge on two fronts. First, using newly linked administrative data for the NZ population, we develop a framework for defining and quantifying different types of residential movement. This includes a focus on two particular groups of interest, transient (T) and vulnerable transient (VT). Second, by linking longitudinal information from close to a dozen administrative data sources to our populations of interest, we are able to investigate risk factors (during a 5 year pre-reference period) associated with being either T or VT (during a 3 year reference period).

---

[16] We are unable to rescale these intensity variables for consistency due to the structure of the relevant datasets.

We find that 4% of the NZ population can be classified as vulnerable transient, and a further 1.3% as transient. The former of these groups is defined as moving at least three times in 3 years and at least one of these moves being towards or within a high deprivation neighbourhood.

We also found, via logistic regression, that being female, Māori, or Pacific Peoples, participating with social service provisions (e.g. WFF, benefit receipt, CYF, YST, and/or social housing), experiencing justice or health events, were all associated with a substantial increase in the odds of belonging to the VT group. The most important characteristic appears to be association with a social welfare benefit. For all three groups (adult, youth and child), the odds of being VT are more than 2.5 times greater for individuals associated with a benefit during the 5 years before our reference period than for those never involved with the benefit system over the same pre-reference period (holding all other factors constant). It was also evident for most characteristics, that the fact of having experienced that characteristic at all contributes more to the risks of being part of the transient population compared to the intensity of experience.

There are several policy implications of this research. First, quantification of the scale of the issue means that resources can be appropriately budgeted for with respect to the relevant service providers—such as social housing. Additionally, given that regression results highlighted the importance of the full range of social service participating agencies, it becomes imperative that there is greater collaboration between state agencies, as well as strong relationships between social providers, such that service provision is integrated in nature.

There are a few caveats that accompany the findings in this study. First, our analysis focusses on risk factors associated with transience, and therefore causal inferences cannot be made. Future analysis could build upon this research to isolate the triggers of residential moves that are potentially exogenous in nature, in an attempt to tease out causal relationships. Second, there may be some transient individuals that are not picked up in the IDI if they do not interact with any social agency or the health sector. Third, the IDI currently includes no information on household formation in a longitudinal fashion. While we can see family and household composition for the population in the 2013 Census data, we cannot see how that family or household changes over time. As such our analysis focussed on individuals as the unit of observation.

To conclude, it is worth noting one further future research direction. Building upon the frameworks developed in this study, future analysis could investigate the causal implications of transience and begin the process of attempting to tease apart the inter-relationships between moving residence and relevant confounding factors.

References

Andreasen, M. H., & Agergaard, J. (2016). Residential mobility and homeownership in Dar es Salaam. *Population and Development Review, 42*(1), 95–110.

Arsen, D., Plank, D., & Sykes, G. (1999). School choice policies in Michigan: The rules matter. For full text: http://edtech.connect.msu.edu/choice/conference/default.asp. Accessed 20 Sept 2017.

Baker, E., Bentley, R., Lester, L., & Beer, A. (2016). Housing affordability and residential mobility as drivers of locational inequality. *Applied Geography, 72,* 65–75.

Barnett, R., & Barnett, P. (2004). Primary health care in New Zealand: Problems and policy approaches. *Social Policy Journal of New Zealand*, *21*, 49–66.

Bayer, P., Ross, S., & Topa, G. (2005). Place of work and place of residence: Informal hiring networks and labor market outcomes (No. w11019). National Bureau of Economic Research.

Beck, B., Buttaro, A., Jr., & Lennon, M. C. (2016). Home moves and child wellbeing in the first five years of life in the United States. *Longitudinal and Life Course Studies: International Journal., 7*(3), 240–264.

Bender, K., Ferguson, K., Thompson, S., Komlo, C., & Pollio, D. (2010). Factors associated with trauma and posttraumatic stress disorder among homeless youth in three US cities: The importance of transience. *Journal of Traumatic Stress, 23*(1), 161–168.

Böheim, R., & Taylor, M. P. (2002). Tied down or room to move? Investigating the relationships between housing tenure, employment status and residential mobility in Britain. *Scottish Journal of Political Economy, 49*(4), 369–392.

Bull, A., & Gilbert, J. (2007). *Student movement and schools—What are the issues?*. Evaluation and Social Assessment, Wellington: Centre for Research.

Butler, E. W., McAllister, R. J., & Kaiser, E. J. (1973). The effects of voluntary and involuntary residential mobility on females and males. *Journal of Marriage and the Family, 35,* 219–227.

Champion, T., & Shuttleworth, I. (2015a). *Are people moving home less? An analysis of address changing in England and Wales, 1971–2011, using the ONS longitudinal study*. London: London School of Economics, UK Spatial Economics Research Centre.

Champion, T., & Shuttleworth, I. (2015b). *Is internal migration slowing? An analysis of four decades of NHSCR records for England and Wales*. London: UK Spatial Economics Research Centre, London School of Economics.

Clark, W. A., & Davies Withers, S. (1999). Changing jobs and changing houses: Mobility outcomes of employment transitions. *Journal of Regional Science, 39*(4), 653–673.

Clark, W. A., Deurloo, M., & Dieleman, F. (2006). Residential mobility and neighbourhood outcomes. *Housing Studies, 21*(3), 323–342.

Clark, W. A., & Huang, Y. (2003). The life course and residential mobility in British housing markets. *Environment and Planning A, 35*(2), 323–339.

Cooke, T. J. (2011). It is not just the economy: Declining migration and the rise of secular rootedness. *Population, Space and Place, 17,* 193–203.

Cooke, T. J. (2013). Internal migration in decline. *The Professional Geographer, 65*(4), 664–675.

Cooke, T. J., & Shuttleworth, I. (2017). The effects of information and communication technologies on residential mobility and migration. *Population, Space and Place, 24*(3), 1–11.

Coulter, R., & Scott, J. (2015). What motivates residential mobility? Re-examining self-reported reasons for desiring and making residential moves. *Population, Space and Place, 21*(4), 354–371.

Coulter, R., van Ham, M., & Findlay, A. M. (2016). Re-thinking residential mobility: Linking lives through time and space. *Progress in Human Geography, 40*(3), 352–374.

Currie, J., & Madrian, B. C. (1999). Health, health insurance and the labor market. *Handbook of Labor Economics, 3,* 3309–3416.

Damm, A. P. (2014). Neighborhood quality and labor market outcomes: Evidence from quasi-random neighborhood assignment of immigrants. *Journal of Urban Economics, 79,* 139–166.

Darlington, F., Norman, P., & Gould, M. (2015). *Migration and health. Internal Migration: Geographical perspectives and processes*. Farnham: Ashgate.

Desmond, M., Gershenson, C., & Kiviat, B. (2015). Forced relocation and residential instability among urban renters. *Social Service Review, 89*(2), 227–262.

Ding, L., Hwang, J., & Divringi, E. (2016). Gentrification and residential mobility in Philadelphia. *Regional Science and Urban Economics, 61,* 38–51.

Dong, M., Anda, R. F., Felitti, V. J., Williamson, D. F., Dube, S. R., Brown, D. W., et al. (2005). Childhood residential mobility and multiple health risks during adolescence and adulthood: the hidden role of adverse childhood experiences. *Archives of Paediatrics & Adolescent medicine, 159*(12), 1104–1110.

Exeter, D. J., Sabel, C. E., Hanham, G., et al. (2015). Movers and stayers: The geography of residential mobility and CVD hospitalisations in Auckland, New Zealand. *Social Science and Medicine, 133,* 331–339.

Falkingham, J., Sage, J., Stone, J., & Vlachantoni, A. (2016). Residential mobility across the life course: Continuity and change across three cohorts in Britain. *Advances in Life Course Research, 30,* 111–123.

Fitchen, J. M. (1994). Residential mobility among the rural poor 1. *Rural Sociology, 59*(3), 416–436.

Gambaro, L., & Joshi, H. (2016). Moving home in the early years: What happens to children in the UK. *Longitudinal and Life Course Studies: International Journal., 7*(3), 265–287.

German, D., Davey, M. A., & Latkin, C. A. (2007). Residential transience and HIV risk behaviors among injection drug users. *AIDS and Behavior, 11*(2), 21–30.

Gray, C. L., & Mueller, V. (2012). Natural disasters and population mobility in Bangladesh. *Proceedings of the National Academy of Sciences, 109*(16), 6000–6005.

Hawkins, J. D., Herrenkohl, T., Farrington, D., Brewer, D., Catalano, R., Harachi, T., & Cothern, L. (2000). *Predictors of youth violence (OJJDP Juvenile Justice Bulletin)*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Haynie, D. L., & South, S. J. (2005). Residential mobility and adolescent violence. *Social Forces, 84*(1), 361–374.

Heller, T. (1982). The effects of involuntary residential relocation: A review. *American Journal of Community Psychology, 10*(4), 471–492.

Hutchings, H. A., Evans, A., Barnes, P., Demmler, J., Heaven, M., Hyatt, M. A., et al. (2013). Do children who move home and school frequently have poorer educational outcomes in their early years at school? An anonymised cohort study. *PloS One, 8*(8), e70601.

Jelleyman, T., & Spencer, N. (2008). Residential mobility in childhood and health outcomes: A systematic review. *Journal of Epidemiology and Community Health, 62*(7), 584–592.

Lupton, R. (2016). Housing policies and their relationship to residential moves for families with young children. *Longitudinal and Life Course Studies: International Journal, 7,* 288–301.

Magdol, L. (2002). Is moving gendered? The effects of residential mobility on the psychological wellbeing of men and women. *Sex Roles, 47*(11–12), 553–560.

Meehan, L., Pacheco, G., & Pushon, Z. (2018). Explaining ethnic disparities in bachelor's degree participation: evidence from NZ. *Studies in Higher Education*. https://doi.org/10.1080/03075 079.2017.1419340.

Michielin, F., & Mulder, C. H. (2008). Family events and the residential mobility of couples. *Environment and Planning A, 40*(11), 2770–2790.

Mikolai, J., & Kulu, H. (2018). Short-and long-term effects of divorce and separation on housing tenure in England and Wales. *Population Studies, 72*(1), 17–39.

Mollborn, S., Lawrence, E., & Root, E. D. (2018). Residential mobility across early childhood and children's kindergarten readiness. *Demography, 12,* 1–26.

Molloy, R., Smith, C. L., & Wozniak, A. (2011). Internal migration in the United States. *Journal of Economic Perspectives, 25*(2), 1–42.

Montgomery, J. D. (1994). Weak ties, employment, and inequality: An equilibrium analysis. *American Journal of Sociology*, *99*(5), 1212–1236.

Morris, T. (2017). Examining the influence of major life events as drivers of residential mobility and neighbourhood transitions. *Demographic Research, 36,* 1015–1038.

Morton, S. M. B., Atatoa Carr, P. E., Berry, S. D., Grant, C. C., Bandara, D. K., Mohal, J., et al. (2014). *Growing Up in New Zealand: A longitudinal study of New Zealand children and their families. Residential mobility report 1: Moving house in the first 1000 days*. Auckland: Growing Up in New Zealand.

Mostafa, T. (2016). Measuring the impact of residential mobility on response: Evidence from the Millenium Cohort Study. *Longitudinal and Life Course Studies: International Journal., 7*(3), 201–217.

Naidu, A. (2009). Factors affecting patient satisfaction and healthcare quality. *International Journal of Health Care Quality Assurance, 22*(4), 366–381.

Norman, P., Boyle, P., & Rees, P. (2005). Selective migration, health and deprivation: A longitudinal analysis. *Social Science and Medicine, 60*(12), 2755–2771.

Oishi, S. (2010). The psychology of residential mobility implications for the self, social relationships, and well-being. *Perspectives on Psychological Science, 5*(1), 5–21.

Özüekren, A. S., & Van Kempen, R. (2002). Housing careers of minority ethnic groups: Experiences, explanations and prospects. *Housing Studies, 17*(3), 365–379.

Phinney, R. (2013). Exploring residential mobility among low-income families. *Social Service Review, 87*(4), 780–815.

Polio, D. E. (1997). The relationship between transience and current life situation in the homeless services-using population. *Social Work, 42*(6), 541–551.

Rumbold, A. R., Giles, L. C., Whitrow, M. J., Steele, E. J., Davies, C. E., Davies, M. J., et al. (2012). The effects of house moves during early childhood on child mental health at age 9 years. *BMC Public Health, 12*(1), 583.

Schafft, K. A. (2006). Poverty, residential mobility, and student transiency within a rural New York school district. *Rural Sociology, 71*(2), 212–231.

Schwartz, A. E., Corcoran, S., Siskin, L. S., et al. (2015). Moving matters: The causal effect of moving schools on student performance. *IESP Working Paper 01-15.*

Skobba, K., & Goetz, E. G. (2013). Mobility decisions of very low-income households. *Cityscape, 15*, 155–172.

Statistics New Zealand. (2006). QuickStats about population mobility: 2006 Census. Retrieved from http://www.stats.govt.nz/Census/2006CensusHomePage/QuickStats/quickstats-about-a-subject/population-mobility.aspx. September 2017.

Statistics New Zealand. (2013). Internal migration update. Retrieved from http://www.stats.govt.nz/browse_for_stats/population/Migration/internal-migration/tables.aspx#internal. September 2017.

Statistics New Zealand. (2017). Classification of territorial authority. Retrieved from http://archive.stats.govt.nz/methods/classifications-and-standards/classification-related-stats-standards/territorial-authority.aspx. September 2017.

Stokols, D., Shumaker, S. A., & Martinez, J. (1983). Residential mobility and personal well-being. *Journal of Environmental Psychology, 3*(1), 5–19.

Warner, C. (2016). The effect of incarceration on residential mobility between poor and nonpoor neighborhoods. *City and Community, 15*(4), 423–443.

Warner, C., & Sharp, G. (2016). The short-and long-term effects of life events on residential mobility. *Advances in Life Course Research, 27,* 1–15.

Weinberg, B. A., Reagan, P. B., & Yankow, J. J. (2004). Do neighborhoods affect hours worked? Evidence from longitudinal data. *Journal of Labor Economics, 22*(4), 891–924.