Migration, urban living, and health in transitioning contexts: A fixed-effects analysis of blood pressure and self-reported health using nationally representative panel data from South Africa

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Abstract

Migration and urbanization are seen as both beneficial and potentially harmful for health, but the jury is still out on the net balance of positive and negative influences. In this paper we examine the relationship between geographic mobility and health, focusing on diastolic blood pressure (DBP) and self-reported health (SRH). We employ fixed effects modelling and nationally representative panel data for South Africa to determine how migration and urbanization predict changes in health. Overall, we find migration to be associated with poorer health, although this depends move type, health outcome, and sex. Men who experience rural-urban and urban-urban moves have higher DBP compared with non-movers, but male urban-urban movers report better SRH. Women who move locally have higher DBP and worse SRH. We argue for the importance of understanding the (gendered) social and demographic determinants of health in general, and non-communicable disease risk in particular, for urbanizing and on-the-move populations.

1. Introduction

Urbanization and migration have the potential to effect dramatically the health and well-being of a society. Arguably nowhere is this more the case than in South Africa. South Africa presents an extraordinarily dynamic population, both in health and in the demography of population distribution. Geographic mobility is high, manifest in both its pre-democracy patterns (before 1994) and contemporary movement (Reed 2013). This migration remains a critical livelihood strategy, manifest in job-seeking, remittances, and schooling.

Migration and urbanization are seen as both beneficial and potentially harmful for health. Rapid population redistribution is seen as outpacing key infrastructure (including sanitation and basic health delivery) while also introducing stressful daily life conditions and potentially deleterious lifestyle changes on those who move. In its basic depiction of health outcomes, the World Health Organization (WHO) points to urbanization as one of the key underlying drivers (WHO 2005). Similarly, in a well-known schematic describing the nutrition transition, urbanization figures prominently – and often negatively – for the role it plays in altering lifestyles (Popkin 2006; Yusuf et al. 2001). Even further, some writing has now linked urbanization and migration to epigenetic changes and subsequent adverse mental health outcomes (Rutten and Mill, 2009). But this urban hell-in-a-handbasket model is only one side of the coin (Harpham and Tanner 1995; Harpham 2009). Urbanization is seen as inextricably linked to economic development and individual betterment (Spence et al., 2009). Urban living, if combined with higher income, may allow for the

purchase of better health care when needed, more ready access to trained health practitioners, and access to more recent knowledge pertinent to livelihoods and health. The jury is still out on the net balance of positive and negative influences and on the channels that seem to operate most persuasively on migrants and those who stay behind.

There are further, more nuanced, considerations as well. Recent concerns have spread beyond overall levels (such as urban-rural differences in a health outcome measure) to heterogeneity or inequality in health conditions and outcomes. Indeed, the reduction of health inequity was a major theme of the recent Global Report on Urban Health (UN WHO 2016), with the report providing evidence of substantial within-urban-setting variation in health in both high and low income countries. Also along these lines Dye (2008; 2018) has expressed concern repeatedly for the uneven benefits of urbanization for health outcomes. The complicated relationship between migration and health is also seen in the proposition of the Healthy Migrant Paradox, a phrase concocted to capture the fact that migrants are often found to be healthier than other (in origin and destination) to whom they are compared. At the same time, analysts acknowledge that migrants are very much a non-random sample of individuals, and thus careful comparisons must be made for proper inference. Longitudinal studies are in a position to provide superior quantitative evidence on the degree to which health-related behaviors in a range of domains (diet, exercise, health-seeking behavior, among others) are altered with migration and continued urban exposure.

Given the interwoven nature of population distribution, economic well-being, and health, it is a pressing priority to determine the structure and magnitude of these relationships. In this paper we attempt to do so, focusing on two key health indicators—blood pressure and self-reported health. We bring to bear contemporary statistical procedures (fixed effects modelling) on nationally representative panel data for South Africa to determine—in a manner superior to what has come before—how migration and urbanization predict changes in health conditions. Our approach allows us to move beyond broad associational arguments, to test for predictive effects in a more population based and causally justifiable way. We elect two outcomes that can provide particularly valuable insights into the health transition in South Africa. Blood Pressure (BP) provides a widely utilized and objectively measures of health condition. It is clearly related to key chronic conditions of the sort mentioned above. Self-Reported Health (SRH), while clearly subjective, has the advantage of providing an overall assessment pertinent to the individual study respondent. In turn, SRH has appeared widely in studies of health and generally enjoys a positive reputation regarding the light it can shed on overall health status.

The implications of our work extend broadly within South Africa, but also beyond. Whereas once a notion of a simple Epidemiological Transition—an inexorable movement from acute infectious conditions to chronic non-communicable diseases—held sway, the present reality is quite different, with a "dual burden" (of IDs and NCDs). While other African nations are still heavily burdened by infectious diseases presently, they are likely to show increases in these NCD risk factors and the dual burden before long. South Africa itself manifests crucial risk factors: alcohol use, high body mass index (BMI), high blood pressure, dietary risks, and smoking (Healthmetrics 2014; 2015). All this points to a continuing dual burden of IDs and NCDs. Tellingly, in their recent review, Mayosi and colleagues referred to the South African situation as one of "colliding epidemics" (Mayosi et al. 2012). Such an assertion underscores the need for an investigation that looks at the broad social and demographic health drivers, among them migration and urbanization. Superior understanding of such factors will have benefit for South African health policy and for the urbanizing continent beyond its borders.

2. Data and Method

2.1 Data and Sample

We use South Africa's publically available National Income Dynamics Study (NIDS) in this analysis. NIDS was first fielded in 2008 to a nationally representative sample of residents and has been fielded every other year since. Four waves of data (2008, 2010, 2012, 2014) are currently available. NIDS collects extensive information from respondents, including on demographics, birth history, labor market participation, income, remittances, debt, education, health, household decision-making, social cohesion, and anthropometric measures (height, weight, waist circumference, blood pressure). We draw primarily from modules B (demographics), J (health), and N (measurements) in this paper. Our analytical sample consists of all adult respondents aged 18 or older who are classified as continuing sample members[1] with non-missing values on the variables of interest. 8,889 women contribute 25,757 person years each (range 1-4, average 2.9) 6,407 men contribute 16,286 person-years each (range 1-4, average 2.6) to the sample. In the second set of analyses that contains a subset of the full sample, 7,886 women contribute 18,441 person-years (range 1-3, average 2.3) and men 5,416 men contribute 11,863 person years (range 1-3, average 2.1).

2.2 Measures

[1] Continuing sample members (CSMs) are individuals who were sampled in the first wave of NIDS. CSMs are distinct from temporary sample members (TSMs) as they were not part of the initial sample but entered NIDS by co-residing with a CSM at at least one subsequent wave. Because of the nature by which they entered the sample, TSMs have an unknown sampling probability and therefore receive a post-stratified weight of zero. We exclude them from our analysis for this reason.

2.2.1 Dependent variables

The outcomes of interest are diastolic blood pressure and self-reported health. Blood pressure is a well-known and easily-treatable risk factor for cardiometabolic disease associated with the rise of non-communicable disease risk in low and middle income countries (LMICs) (Lawes et al. 2008). We report diastolic blood pressure for a number of reasons. Preliminary analysis of both SBP and DBP (not shown) indicate DBP to be more sensitive to mover status than SBP. Furthermore, because we only have two blood pressure readings rather than three (where we conventionally would average the second two readings), we worry about white coat hypertension. Since white coat hypertension is primarily systolic (Bloomfield and Park 2016), diastolic blood pressure is more robust against this phenomenon. Some studies find SBP to better predict cardiovascular disease particularly in older individuals (Kannal et al. 1971; Haider 2003), while others find DBP to be a better predictor of cardiovascular disease overall (Shiber-Ofer 2015). In general, DBP and SBP correlate well, and DBP has been found sufficiently to predict cardiovascular disease even if more conservatively than SBP for some age groups. Our measure of diastolic blood pressure is calculated from the average of two blood pressure measurements taken at least three minutes apart at the end of the NIDS survey. Blood pressure was measured with the respondent in a seated position with the blood pressure cuff placed on the left upper arm after an initial five minutes of rest.

Self-reported health (SRH) is a five-category variable that ranges from excellent to poor with higher values indicating worse health; we treat self-reported health as continuous. SRH is often used as a measure of individual health in both the sociological and public health literatures. SRH, unlike clinical measures of health such as BP, is subjective in that respondents report their own health either as a global measure or in relation to other members of their community of the same age (Jylha 2009). Numerous studies over many decades have shown self-reported health to correlate well with mortality and morbidity (Idler and Benyamini 1997; Idler, Leventhal, McLaughlin, and Leventhal 2004), which has led the measure to become widely accepted as valid and reliable. Scholars have, however, suggested caution in comparing SRH across socio-historical contexts, socio-economic status, and gender since respondents' reports about their health involves complex cognitive processes embedded in historical and cultural meanings of health and illness (Jylha 2009; Huisman and Deeg 2010; Layes et al. 2012). Evidence is mixed about the extent to which SRH is associated with mortality along dimensions of gender (Spiers 2003; Idler 2003; Zajacova, Huzurbazar and Todd 2017) so we stratify our analyses on this dimension to reduce some concern about the comparability

of the measure between men and women. While we expect SRH and DBP to correlate, we also expect them to capture different dimensions of health – with SRH involving a more comprehensive self-evaluation of both physical and mental health status and DBP to provide a better indication of an objective, or clinical, health.

2.2.2. Independent variables

The primary independent variable of interest is mover status – an indicator whether an individual has experienced a change in residence in the last two years. For waves 2-4, the mover variable is a derived NIDS variable based on a change in geocoded place of residence. For wave 1, we construct the mover variable to indicate a change of province between 2006 (two years pre-interview) and 2008; unlike in waves 2-4, the wave 1 mover indicator therefore does not capture within-province moves. We are limited by the lack of residential geocodes in the publically available data to make the wave 1 mover variable exactly consistent with that of waves 2-4. To check the sensitivity of the results to the differential coding of the mover variable in wave 1 compared with waves 2-4, we perform a sensitivity analysis that excludes wave 1 observations.

A second set of analyses examines move type, which indicates whether a geographic move from one wave to the next is "local" (defined as having change of residence recorded, i.e. is classified as a "mover", but has experienced no change of province or change in urban-rural residence classification), cross-province urban-urban move, cross-province rural-rural move, or rural-urban (either within or across province), or urban-rural (either within or across province). The second set of analyses is only possible for waves 2-4 since no classification of urban/rural residence is available for comparing residence type between the 2006 pre-interview period and the wave 1 place of residence.

2.2.3 Covariates

The set of covariates we include in our models are measures of demographics, socio-economic status, health and health behavior, geographic location, and period. Demographic variables include age, age-squared, and marital status. Age is measured in years. Marital status is a 4-category variable indicating whether an individual is married (0), living with a partner (1), divorced or widowed (2), or has never been married (4). Education and employment status capture socio-economic status in our models. Compared with the reference category of having no schooling (0), the education variable measures primary school or some high school attendance (1), high school completion (2), holding a certificate or diploma without a high school degree (3), or having any tertiary education (4). Our employment status variable differentiates those who are not economically active (0), from those who are unemployed but are discouraged and therefore not actively seeking

employment (1), those are unemployed and seeking employment (2), and individuals who are employed (3). Our health and health behavior measures include Body Mass Index (BMI), which is constructed using the standard formula $\left(\frac{Weight\ in\ kilograms}{(Height\ in\ meters)\times(Height\ in\ meters)}\right)$ from height and weight measurements. We include an indicator of whether an individual is currently taking blood pressure medication, is a smoker, or currently consumes alcohol. An 8-category healthcare access variable captures progressively longer lapses of time since healthcare has been accessed. The reference category consists of individuals who have received healthcare within the past 30 days (0) compared with having accessed it in the past one to five months (1), six to twelve months (2), one to two years ago (3), two to five years ago (4), five to ten years ago (5), more than ten years ago (6), or has never accessed healthcare (7). Locational variables include an indicator for urban versus rural residence, as well as an indicator for the nine provinces in South Africa, with Kwazulu Natal as the reference province. We finally include a period indicator, which we operationalize as the wave in which the survey took place. For the first set of analyses the reference category is wave 1. For the second set of analyses the reference category is wave 2.

2.3 Analytical Approach and Methodology

We employ an individual-level fixed-effects approach to estimate the relationship between mover status, move type, and health. We use a fixed-effects estimator because accounts for the fact that adult health is likely to be affected by a number of time-invariant unobservable characteristics (e.g. genetic predispositions to ill or good health, childhood health exposures, capacity to manage stress, etc.). It also relaxes the assumption that the independent variables are orthogonal to the context (individual) (Wooldridge 2009). And, unlike an OLS approach, the fixed effects estimator permits us to account for clustering within individuals over time since individuals who are observed to move once are more likely to move again in the future. Fixed-effects models also account for concerns about the selectivity of movers compared with non-movers, and the comparability of SRH measures across groups so that, as long as each individual consistently ranks their own health, our measure of SRH should be reliable. We estimate a series of regressions in which we progressively add in sets of covariates to examine the improvement in model fit as well as the the sensitivity of the coefficients to the addition of covariates. We report only our preferred (full) models, but results from the progression of sequential regressions are available from the authors upon request. We stratify our analyses and report our results by sex given the importance of sex for blood pressure and healthcare access in LMICs as well as to assuage concerns about the comparability of SRH across sex. The regression results are weighted using the most recent wave design weight for which an

individual is present in NIDS, but we also report unweighted fixed effects regression results in the appendix (Tables 4 and 5). We compare the fixed effects estimates with both standard and robust OLS regressions to asses the extent to which unobserved individual-level heterogeneity influences the relationship between migration and health. We report the results form robust regressions in the appendix (Tables 6 and 7).

3. Results

3.1 Descriptive results[2]

3.1.1 Men

Table 1 shows the descriptive statistics for the person-year sample by sex. While most men are non-movers, 17.78 percent of the male sample has experienced a residential change in the past two years. The sample is on average 40.17 years old, is 79.22 percent African, and is 37.37 percent married. 53.63 percent of the male sample has completed primary school and/or attended some high school; 18.58 percent have completed their high school education. 62.08 percent of the male sample is employed, and, while only 13.34 (2.24+11.10) percent is unemployed, a further 24.59 percent is not economically active. 67.50 percent is resident in urban locations. The male sample has elevated average blood pressure of 127.05/81.99 mm/Hg, but most report having either "excellent" (35.55 percent) or "very good" (29.31 percent) self-reported health. 8.96 percent of the male sample is taking blood pressure medication. Average BMI is normal at 24.71. Smoking and alcohol consumption is highly prevalent among men: 38.24 percent report smoking and 47.77 percent currently consume alcohol. 37.96 (17.91+12.86+7.19) percent accessed healthcare in the last year.

3.1.2 Women

Like the male sample, a vast majority of the female sample has not experienced a change in residence: 14.85 percent moved, the rest are non-movers. The average age of the female person-year sample is 41.76 years, slightly older than the male sample. The sample is 77.93 percent African and 35.55 percent married. 9.73 percent have no schooling, 54.55 percent have completed primary school and/or attended some high school, but only 16.32 percent matriculated high school. 40.43 percent of the sample is employed, 18.07 percent is unemployed (14.34+3.73), and 41.5 percent is not economically active. As with the men, most of the female sample resides in places classified as urban in the 2011 Census; the sample is 62.38 percent urban and 37.62 percent rural. 55.89 percent of the female sample report themselves to be in "excellent" or "good" health, scoring on average 2.38 on the self-reported health scale. 17.06 percent report having only fair or poor health, however.

[2] Descriptive results are weighted using the post-stratified weight, which calibrates the sample to reflect the South African Population. See NIDS technical paper 2 for details on calibration.

Average blood pressure is prehypertensive at 123.28/82.15 mm/Hg and 18.19 percent of the female sample is taking blood pressure medication – more than double that of the male sample. Average BMI approaches obese according to WHO classifications at 29.45. Smoking and drinking is much less prevalent in the female sample compared with the male sample, 8.63 percent report being smokers and 17.48 percent report current alcohol consumption. Women access healthcare with relative success: 28.88 percent of the female sample has accessed healthcare in last 30 days and 52.19 (28.88+15.65+7.66) percent of the sample has received care within the last year. Less than 10 percent has never accessed healthcare.

3.2 Regression results

3.2.1 Mover Status

Table 2 shows regressions results from individual-level fixed effects estimates of mover status on diastolic blood pressure and self-reported health. Being a mover compared with a non-mover is associated with higher blood pressure for both men and women holding all other covariates constant, although the relationship is only statistically significant for women. Women who are movers have diastolic blood pressure .0560 mm/Hg higher compared with non-movers ($p<.05$). Interestingly, both male and female movers have better self-reported health (lower SRH score) compared with non-movers, although not significantly so. Ageing for both men and women is associated with higher diastolic blood pressure at a decreasing rate. Advancing age also is significantly associated with poorer self-reported health for men, but this relationship is not statistically significant for women. There is no consistent relationship between marital status and health outcomes for men and women, although cohabitating women have DBP 1.478mmHg higher than their married counterparts while divorced or separated women have DBP .896mmHg lower. In terms of SRH, never-married women report being healthier than those married ($p<.05$). Overall, health appears to be more sensitive to marital status in the female sample, while men's health is notably associated with to socio-economic status as captured by education and employment. SRH and DBP for men do not, however, reveal a consistent relationship: whereas more education is associated with better SRH, high school graduation and tertiary education is associated with higher diastolic blood pressure for men. High school graduates have DBP 2.669mmHg higher than those with no schooling, while the tertiary educated have DBP 2.840mmHg higher than the uneducated ($p<.05$).

Consistent with the pathobiology of BP, we find BMI to be positively associated with DBP among both men and women: having a 1-point higher BMI correlates to .119 and .127 higher mm/Hg DBP for men and women respectively, a relationship that is highly statistically significant

(p<.001). BMI, however, is not a significant predictor of self-reported health for either men or women. Taking blood pressure medication associated with 2.188mmHg lower DBP for men compared with not taking medication (p<.001); no such relationship is evident for women. But, taking BP medication is associated with significantly poorer self-reported health among both sexes (p<.001). With respect to healthcare access, less frequent access to healthcare is associated with *better* self-reported health for both men and women compared with having accessed healthcare within the past month, while DBP is .813-1.761mmHg higher for men and 0.849-2.147 mmHg higher for women who accessed healthcare less frequently than in the past 30 days. In the fixed-effects specification we don't find evidence that smoking is associated worse health; the relationship between smoking and DBP is insignificant for men and women and, in fact, men and women who smoke report better self reported health than those who are non-smokers (p<.01). Alcohol consumption, on the other hand, is a predictor of worse diastolic BP among both men and women. Consuming alcohol is associated 1.448mmHg DBP for women (p<.001), but there is no statistically significant relationship between alcohol consumption and DBP for men or alcohol consumption and SRH for men or women.

Finally, we find no evidence that urban residence is associated DBP or SRH. In addition, there is little evidence that province of residence is significantly associated with blood pressure or self-reported health, except for living in the Mpumalanga and North West province where men appear to have significantly higher DBP by 8.988mm/Hg and 4.030mmHg (p<.001) compared with residents of KwaZulu Natal. And women who reside in Northern Cape have lower DBP by 7.922mmHg. There is no consistent trend toward either higher or lower diastolic blood pressure over time, but both men (p<.05) and women (p<.01) report better self-reported health in 2010 (wave 2) compared with 2008 (wave 1)

3.2.3. Move Type

In the first set of analyses, we examined all types of geographic mobility regardless of the characteristics of the move. Table 3 shows the results from the second set of analyses in which we operationalize geographic mobility using province of residence and rural/urban residence to understand whether move type is significantly associated with health outcomes. We find that rural to urban moves and urban to urban moves are associated with significantly higher diastolic blood pressure in the male sample: men who experience a rural-urban move have 1.784 mm/Hg higher DBP compared with not having moved (p<.05). Men who move from one urban location to another have DBP 2.724mm/Hg higher than those who do not move (p<.05). In contrast, men who

move from one urban location to another rate their own health as better than non-movers. In addition, while local moves for men are not significantly associated with DBP, local movers too rate their health as better than non-movers. These movers have a self-rated health score .116 points lower than non-movers ($p<.05$). For women, adverse health in terms of blood pressure is evident for those who experience a local move. A local move is associated with 1.889mm/Hg higher blood pressure compared with not having moved ($p<.001$). This adverse relationship is also evident in terms of SRH for women. Women who experience a local move rate their own health .0799 points worse than those who do not move ($p<.05$). Urban to rural moves are associated with .0287 better self-rated health among women, ($p<.05$) but there is no relationship between rural-moves and either SRH or DBP among women. Overall the remainder of the covariates behave as they do in Table 2.

3.3 Alternative specifications, sensitivity, and robustness checks

We compared the fixed effects estimates reported above with standard (not shown) and robust OLS regressions (reported in appendix) to examine the sensitivity of the results to alternative model specifications. While there are significant differences in some of the covariates in the OLS compared with the fixed effects estimators, the substantive results with respect to migration and urbanization are consistent and robust across these alternative modeling approaches. We also examined the NIDS data in the cross section, modeling migration and urbanization and its relationship to health outcomes for waves 1 and for waves 4 separately. Again our findings are substantively the same as we report from the fixed effects models. We examined the data closely for measurement error in height, weight, and blood pressure. While there were indeed some very high/large and low/small measurements, none seemed so extreme as to warrant exclusion. We also included dummy variables to indicate when measurements were based on a single rather than two measurements (not shown). In both sets of sensitivity checks, the substantive results remained unchanged.

4. Discussion

In this paper we ask, are changes in geographic location associated with changes health outcomes, either negatively or positively? Is there evidence that migration is associated with non-communicable disease risk in LMICs? What are the determinants of blood pressure and SRH in LMICs? Descriptively, we find in South Africa the classic characteristics of a LMIC context that is undergoing a health transition while also experiencing high rates of urbanization: the sample is nearly two-thirds urban, approximately 15 percent experience a residential change in a given two-year period, and non-communicable disease risk as characterized by prehypertension and obesity (in the female sample) is clearly evident.

The regression results from our first set fixed-effects analyses suggest that geographic mobility is associated with poorer clinical evaluations of health as captured by higher DBP, but this relationship depends on sex. Women who move have higher DBP than non-movers, but this is not true of men –controlling for a series of demographic, socio-economic, health behavior, and locational indicators. This finding indicates that moving matters more for women's health than for men's, at least in terms of blood pressure. We find no evidence that urban residence net of mover status is significantly associated with health for either men or women[3], but we do observe that marital status for women and socioeconomic status for men (employment and education) are strong predictors of both objective and subjective measures of health. These findings point to the potential importance of psycho-social determinants of health in LMICs and begs further questions about how decisions to move influence, and are influenced by, family and relationship dynamics for women, and employment opportunities for men; there are likely to be important indirect and/or interactive effects of moving and marital status for women, and with employment status for men that warrants further investigation. Because our mover variable captures all kinds of moves, however, it possible that the positive and negative aspects of moving for health could be washed out if some move types are good for health (e.g. local moves into better housing) while others are bad therefor (e.g. moves from one urban location to another because of scare job opportunities).

Indeed, once we investigate move type more closely, we find evidence that both rural-urban moves, and (cross-province) urban-urban moves are associated with worse (higher) DBP for men. To the extent that such moves are associated with significant physical and psycho-social disruption, poorer health among migrants is not surprising. Interesting, however, is that despite higher DBP, male urban-urban movers perceive their health to be *better* compared with non-movers. The explanation for this contradiction is not obvious. It is plausible, however, that a cross-province urban-urban move is driven by unsatisfactory living conditions or employment opportunities in the origin urban location and that the promise of a new place could lead to an optimistic health rating. This does not exclude the possibility that such a move is associated with significant stress that accompanies a change in labor markets and dislocation from social networks. For women, worse health is evident primarily for local movers both in terms of SRH and DBP, which is consistent with

[3] We do see a significant ($p<.05$) relationship between urban residence and blood pressure for men in the unweighted fixed effects (Table 4) and robust regressions (Table 6), but that this relationship becomes insignificant in the weighted fixed effects models suggests that this relationship is likely a result of sample composition rather than a true relationship.

the literature on residential instability (Suglia et al. 2011). While we would need more information about the reasons for moves to definitively comment on these apparent gender differences, our results do beg additional questions about whether and how men and women systematically experience different types of moves or experience stressors of moving differently. More nuanced thinking is needed about whether and how moving and its relationship to health might be gendered.

Overall our data and findings suggest that migration is associated with poorer health outcomes for men and women although we observe notable differences in objective and subjective measures of health, and interesting gender differences. Our results show that DBP and SRH capture different dimensions of individual health. This finding is not surprising and as we expected, but it does raise important policy questions about managing non-communicable disease risk in contexts where clinical indications of poor health are inconsistent or even in conflict with individuals' perceptions of their own health. Successfully linking individuals to treatment and care in LMICs—especially treatment requires behavioral changes (whether in terms of diet, exercise, or medication regimens) will need to address both the clinical indicators and the socio-cultural meaning of seeking treatment, obesity, and adherence to long-term medications, for example.

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Tables

Table 1: Descriptive Statistics of dependent variables, independent variables, and covariates by sex

	Men (N=16286)	**Women (N=25757)**
	mean/percent (SD)	mean/percent (SD)
Mover Status		
Non-mover	82.22	85.15
Mover	17.78	14.85
Age	40.17 (14.52)	41.76 (15.3)
Race		
African	79.22	77.93
Coloured/Indian/Asian	11.05	11.85
White	9.73	10.21
Marital Status		
Married	37.37	35.55
Living with Partner	7.74	8.06
Divorced/Widowed	6.69	16.13
Never Married	48.2	40.27
Education		
No Schooling	6.76	9.73
Primary School	53.63	54.55
High School Graduate	18.58	16.32
Certificate or Diploma without High School degree	4.24	3.09
Any tertiary education	16.78	16.3
Employment Status		
Not Economically Active	24.59	41.5
Unemployed - Discouraged	2.24	3.73
Unemployed - Actively searching	11.1	14.34
Employed	62.08	40.43
Residence		
Urban	67.5	62.38
Rural (Traditional and Farm)	32.5	37.62
Province		
Western Cape	10.18	11.15
Eastern Cape	10.44	12.18
Northern Cape	2.7	2.43
Free State	5.57	5.29
KwaZulu-Natal	17.24	20.29
North West	6.04	5.14
Gauteng	31.97	25.7
Mpumalanga	8.15	8.3
Limpopo	7.73	9.51
Systolic BP	127.05 (19.77)	123.28 (22.54)
Diastolic BP	81.99 (12.6)	82.15 (13.59)
Average self-reported health	2.14 (1.09)	2.38 (1.16)
Self-reported health		
Excellent	35.55	28.54
Very good	29.31	27.35
Good	23.93	27.05
Fair	7.9	11.93
Poor	3.31	5.13

Taking BP meds	8.95	18.19
BMI	24.71 (6.25)	29.45 (7.85)
Healthcare access		
In the last 30 days	17.91	28.88
One to five months ago	12.86	15.65
Six to twelve months ago	7.19	8.68
More than one and less two years ago	28.13	24.45
Two to four years ago	12.64	8.71
Five to ten years ago	5.47	2.69
More than ten years ago	3.28	1.36
Never	12.51	9.58
Smoker	38.24	8.63
Consumes Alcohol	47.77	17.48
Period		
Wave 1 (2008)	24.3	26.23
Wave 2 (2010)	23	22.61
Wave 3 (2012)	26.5	25.95
Wave 4 (2014)	26.2	25.21

Table 2: Weighted Fixed Effects Regressions of the relationship between Mover Status and health outcomes (most recent design weight)

	Men				Women			
	Diastolic BP		SRH		Diastolic BP		SRH	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mover	0.335	0.308	-0.0423	0.0289	0.560*	0.255	-0.0180	0.0237
Age	1.022***	0.292	0.0632*	0.0274	0.784***	0.235	-0.0158	0.0218
Age Squared	-0.00963***	0.00119	-0.000407***	0.000112	-0.0122***	0.000928	-0.000135	0.0000863
Marital Status								
Married (ref)								
Living with Partner	0.317	0.583	0.0182	0.0548	1.478**	0.498	-0.0249	0.0463
Divorced/Widowed	1.323	0.677	0.176**	0.0636	-0.896*	0.418	0.0343	0.0389
Never Married	1.222*	0.581	0.0789	0.0546	0.707	0.446	-0.0956*	0.0415
Education								
No Schooling (ref)								
Primary/Some High School	0.702	1.098	-0.154	0.103	-0.524	0.844	0.0305	0.0785
High School Grad or Equivalent	2.669*	1.311	-0.293*	0.123	-0.310	1.087	-0.0425	0.101
Certificate/Diploma without HS Grad	0.781	1.275	-0.326**	0.120	-0.875	1.077	-0.0284	0.100
Any Tertiary Education	2.840*	1.343	-0.333**	0.126	0.0365	1.100	-0.0847	0.102
Employment Status								
Not Economically Active (ref)								
Unemployed Discouraged	-1.306	0.691	0.136*	0.0649	0.822	0.436	-0.0455	0.0405
Unemployed	-1.172**	0.371	0.0307	0.0349	0.264	0.268	0.0443	0.0249
Employed	-0.640*	0.310	-0.00611	0.0292	0.0475	0.232	0.0386	0.0216
BMI	0.119***	0.0240	-0.00171	0.00226	0.127***	0.0165	-0.000360	0.00153
Taking BP Medication	-2.188***	0.507	0.209***	0.0477	-0.581	0.313	0.309***	0.0291
Accessed healthcare								
In the last 30 days (ref)								
One to five months ago	0.592	0.371	-0.178***	0.0348	1.019***	0.253	-0.136***	0.0236
Six to twelve months ago	1.761***	0.448	-0.228***	0.0421	1.119***	0.321	-0.225***	0.0298
More than one and less two years ago	0.823*	0.334	-0.481***	0.0314	1.077***	0.242	-0.476***	0.0225
Two to four years ago	1.103**	0.393	-0.504***	0.0369	1.305***	0.325	-0.446***	0.0303
Five to ten years ago	0.986	0.508	-0.488***	0.0478	1.514**	0.510	-0.507***	0.0474
More than ten years ago	0.859	0.623	-0.616***	0.0586	2.147**	0.684	-0.581***	0.0637
Never	0.813*	0.392	-0.511***	0.0368	0.849**	0.319	-0.554***	0.0296
Smoker	0.548	0.335	-0.131***	0.0315	0.560	0.522	-0.142**	0.0485
Consumes Alcohol	0.345	0.268	-0.0000885	0.0252	1.448***	0.287	0.0227	0.0267
Urban Residence	0.959	0.699	0.0170	0.0657	-0.760	0.602	-0.0326	0.0560

Province								
KwaZulu-Natal (ref)								
Western Cape	0.421	2.384	0.399	0.224	0.894	2.481	-0.270	0.231
Eastern Cape	3.295	1.876	0.152	0.176	-1.357	1.703	-0.129	0.158
Northern Cape	1.942	3.186	-0.108	0.300	-7.922*	3.512	-0.532	0.327
Free State	4.041	2.234	-0.00138	0.210	-1.935	2.505	-0.143	0.233
North West	4.030*	2.012	-0.0259	0.189	1.335	2.017	-0.109	0.188
Gauteng	2.319	1.577	0.00963	0.148	2.559	1.475	-0.00383	0.137
Mpumalanga	8.988***	1.880	-0.0458	0.177	2.357	1.858	0.0115	0.173
Limpopo	2.218	1.846	-0.0668	0.174	0.573	1.784	0.138	0.166
Period								
Wave 1 (ref)								
Wave 2	0.471	0.706	-0.279***	0.0664	0.943	0.569	-0.212***	0.0529
Wave 3	1.614	1.183	-0.211	0.111	2.521**	0.961	-0.0276	0.0894
Wave 4	-0.261	1.871	-0.217	0.176	1.331	1.515	0.0171	0.141
Intercept	48.98***	10.77	1.230	1.013	67.47***	9.098	4.027***	0.846
Observations	16286		16286		25757		25757	
Individuals	6407		6407		8880		8880	
R-squared: within model	0.0364		0.0631		0.0336		0.0743	

* p<0.05 ** p<0.01 *** p<0.001"

Table 3: Weighted Fixed Effects Regressions of the relationship between Move Type and health outcomes

	Men				Women			
	Diastolic BP		SRH		Diastolic BP		SRH	
	Coefficient	SE	SE	SE	Coefficient	SE	Coefficient	SE
Move Type								
No Move (ref)								
Local Move	0.0363	0.521	-0.116*	0.0497	1.889***	0.397	0.0799*	0.0369
Rural to Urban	1.784*	0.774	0.0703	0.0739	0.910	0.740	-0.0287	0.0686
Urban to Rural	0.784	1.078	0.102	0.103	-0.512	1.049	-0.202*	0.0973
Rural to Rural	-0.575	2.883	-0.113	0.275	-0.245	2.022	0.263	0.188
Urban to Urban	2.724*	1.132	-0.298**	0.108	0.802	1.370	-0.0615	0.127
Age	-0.301	0.387	0.0109	0.0370	0.368	0.312	-0.0448	0.0290
Age Squared	-0.00370	0.00192	0.0000671	0.000183	-0.0117***	0.00152	0.000301*	0.000141
Marital Status								
Married (ref)								
Living with Partner	1.000	0.714	0.0344	0.0681	1.655**	0.615	-0.0936	0.0571
Divorced/Widowed	0.304	0.852	0.214**	0.0813	-1.025*	0.512	0.00937	0.0475
Never Married	1.434*	0.704	0.0958	0.0672	0.764	0.559	-0.0982	0.0519
Education								
No Schooling								
Primary/Some High School	0.268	1.506	-0.334*	0.144	-0.857	1.079	0.0150	0.100
High School Grad or Equivalent	1.690	1.817	-0.453**	0.173	-1.090	1.422	-0.149	0.132
Certificate/Diploma without HS Grad	0.0656	1.687	-0.499**	0.161	-1.788	1.341	-0.0692	0.125
Any Tertiary Education	1.550	1.862	-0.416*	0.178	-0.558	1.445	-0.105	0.134
Employment Status								
Not Economically Active								
Unemployed Discouraged	-1.595	0.925	0.215*	0.0882	0.707	0.613	-0.0731	0.0569
Unemployed	-1.026*	0.461	0.0159	0.0440	0.836*	0.346	0.0262	0.0321
Employed	-0.214	0.382	-0.00737	0.0365	0.262	0.295	0.00420	0.0273
BMI	0.131***	0.0304	-0.00165	0.00290	0.155***	0.0204	0.00487**	0.00189
Taking BP meds	-1.671**	0.646	0.209***	0.0617	0.184	0.399	0.346***	0.0370
Healthcare access								
In the last 30 days								
One to five months ago	0.487	0.459	-0.193***	0.0438	0.991**	0.310	-0.168***	0.0287
Six to twelve months ago	1.059	0.570	-0.206***	0.0544	1.288**	0.398	-0.242***	0.0370
More than one and less two years ago	0.520	0.425	-0.479***	0.0406	0.892**	0.301	-0.454***	0.0279
Two to four years ago	1.763***	0.483	-0.468***	0.0461	0.742	0.396	-0.481***	0.0367
Five to ten years ago	0.932	0.623	-0.507***	0.0594	1.618**	0.615	-0.543***	0.0571
More than ten years ago	1.259	0.789	-0.605***	0.0753	2.282**	0.838	-0.499***	0.0778
Never	0.654	0.496	-0.447***	0.0473	1.118**	0.407	-0.531***	0.0378
Smoker	0.269	0.428	-0.167***	0.0408	-0.227	0.726	-0.0762	0.0674
Consumes alcohol	0.463	0.336	-0.0529	0.0321	1.367***	0.355	-0.00944	0.0330

Period								
Wave 2 (ref)								
Wave 3	2.830***	0.681	0.100	0.0650	2.155***	0.556	0.170***	0.0516
Wave 4	2.892	1.536	0.143	0.147	1.611	1.249	0.197	0.116
Intercept	95.06***	14.51	2.429	1.385	85.74***	12.33	3.840***	1.145
Observations	11562		11562		18411		18411	
Individuals	5416		5416		7886		7886	
R-squared: within model	0.0240		0.0680		0.0365		0.0761	

* p<0.05 ** p<0.01 *** p<0.001"

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APPENDIX

Table 4: Unweighted Fixed Effects Regressions of the relationship between Mover Status and health outcomes

	Men				**Women**			
	Diastolic BP		SRH		Diastolic BP		SRH	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mover	0.311	0.325	-0.00995	0.0292	0.560*	0.270	-0.0112	0.0251
Age	0.806**	0.312	0.00754	0.0280	1.061***	0.241	-0.0177	0.0225
Age Squared	-0.00810***	0.00125	-0.000406***	0.000112	-0.0105***	0.000910	-0.000397***	0.0000847
Marital Status								
Married (ref)								
Living with Partner	1.063	0.602	-0.0266	0.0541	0.628	0.509	-0.0213	0.0474
Divorced/Widowed	1.529*	0.717	0.0689	0.0645	-0.499	0.416	0.00446	0.0387
Never Married	1.463*	0.590	0.0280	0.0530	0.206	0.444	-0.0268	0.0413
Education								
No Schooling (ref)								
Primary/Some High School	-0.135	1.025	-0.205*	0.0922	-0.383	0.736	0.155*	0.0686
High School Grad or Equivalent	0.813	1.277	-0.340**	0.115	-0.309	1.047	0.149	0.0975
Certificate/Diploma without HS Grad	0.365	1.238	-0.265*	0.111	-0.497	1.034	0.217*	0.0963
Any Tertiary Education	1.174	1.318	-0.320**	0.118	-0.346	1.082	0.151	0.101
Employment Status								
Not Economically Active (ref)								
Unemployed Discouraged	-0.999	0.691	0.0517	0.0621	0.484	0.414	0.0118	0.0386
Unemployed	-0.914*	0.388	-0.00513	0.0349	0.157	0.279	0.0209	0.0260
Employed	-0.616	0.317	-0.00313	0.0285	0.307	0.232	0.0431*	0.0216
BMI	0.192***	0.0272	-0.00346	0.00244	0.158***	0.0183	-0.00145	0.00171
Taking BP Medication	-0.572	0.506	0.241***	0.0454	-0.0732	0.305	0.253***	0.0284
Accessed healthcare								
In the last 30 days (ref)								
One to five months ago	0.553	0.391	-0.187***	0.0352	1.117***	0.259	-0.137***	0.0241
Six to twelve months ago	1.191*	0.466	-0.221***	0.0419	1.078**	0.333	-0.178***	0.0310
More than one and less two years ago	0.939**	0.343	-0.494***	0.0308	1.181***	0.238	-0.446***	0.0222
Two to four years ago	0.824*	0.400	-0.568***	0.0359	1.405***	0.321	-0.485***	0.0299
Five to ten years ago	1.187*	0.519	-0.586***	0.0466	1.230*	0.515	-0.542***	0.0480
More than ten years ago	1.012	0.662	-0.674***	0.0595	2.091**	0.684	-0.584***	0.0637
Never	0.574	0.419	-0.619***	0.0377	0.784*	0.327	-0.563***	0.0305
Smoker	-0.169	0.348	-0.112***	0.0313	0.0476	0.493	-0.0563	0.0459
Consumes Alcohol	0.707*	0.281	-0.0261	0.0252	0.919**	0.296	0.0416	0.0276
Urban Residence	1.633*	0.643	0.0383	0.0578	-0.258	0.577	-0.0260	0.0537
Province								
KwaZulu-Natal (ref)								

Western Cape	-2.282	2.467	0.0755	0.222	-0.677	2.172	-0.0154	0.202
Eastern Cape	0.560	1.822	-0.115	0.164	0.810	1.631	-0.0384	0.152
Northern Cape	-5.238*	2.597	-0.266	0.233	-3.156	2.584	-0.126	0.241
Free State	-0.309	2.189	-0.0276	0.197	-3.070	2.359	0.163	0.220
North West	-0.989	2.095	-0.272	0.188	-1.859	2.070	0.112	0.193
Gauteng	-0.175	1.438	-0.101	0.129	0.643	1.411	0.0764	0.131
Mpumalanga	3.199	1.920	-0.0252	0.173	1.392	1.994	0.0924	0.186
Limpopo	-0.667	1.807	-0.0825	0.162	-0.959	1.781	0.0710	0.166
Period								
Wave 1 (ref)								
Wave 2	-0.255	0.757	-0.141*	0.0680	-0.839	0.585	-0.163**	0.0544
Wave 3	1.153	1.271	0.0559	0.114	0.177	0.989	0.0546	0.0921
Wave 4	-0.0915	2.019	0.143	0.181	-1.581	1.569	0.151	0.146
Intercept	58.37***	11.43	3.614***	1.027	55.13***	9.529	4.338***	0.888
Observations	16286		16286		25757		25757	
Individuals	6407		6407		8880		8880	
R-squared: within model	0.0258		0.0736		0.0247		0.0729	

* p<0.05 ** p<0.01 *** p<0.001

Table 5: Unweighted Fixed Effects Regressions of the relationship between Move Type and health outcomes

	Men				**Women**			
	Diastolic BP		SRH		Diastolic BP		SRH	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Move Type								
No Move (ref)								
Local Move	0.403	0.535	-0.0381	0.0474	1.153**	0.420	0.0511	0.0383
Rural to Urban	1.671*	0.715	0.102	0.0634	1.027	0.688	-0.0881	0.0629
Urban to Rural	0.186	1.131	-0.0113	0.100	0.210	1.063	-0.256**	0.0971
Rural to Rural	0.655	2.510	0.0232	0.223	0.158	1.943	-0.00539	0.177
Urban to Urban	2.960	1.515	-0.179	0.134	3.104*	1.454	0.000133	0.133
Age	0.0890	0.417	-0.0486	0.0369	0.177	0.320	-0.0534	0.0292
Age Squared	-0.00609**	0.00204	0.0000766	0.000181	-0.00611***	0.00151	0.0000210	0.000138
Marital Status								
Married (ref)								
Living with Partner	0.985	0.756	-0.0322	0.0670	0.0151	0.644	-0.0479	0.0588
Divorced/Widowed	1.191	0.915	0.117	0.0811	-0.757	0.517	-0.00280	0.0472
Never Married	1.271	0.744	-0.00189	0.0660	-0.0310	0.559	-0.0443	0.0511
Education								
No Schooling								
Primary/Some High School	0.271	1.371	-0.323**	0.122	-0.274	0.973	0.130	0.0888
High School Grad or Equivalent	1.281	1.744	-0.390*	0.155	0.0966	1.399	0.0533	0.128
Certificate/Diploma without HS Grad	0.0930	1.605	-0.331*	0.142	-0.182	1.310	0.148	0.120
Any Tertiary Education	1.001	1.787	-0.328*	0.158	0.344	1.449	0.0768	0.132
Employment Status								
Not Economically Active								
Unemployed Discouraged	-1.067	0.954	0.0468	0.0846	1.091	0.618	-0.107	0.0564
Unemployed	-0.866	0.492	-0.0145	0.0436	0.232	0.360	0.00190	0.0329
Employed	-0.551	0.404	0.00163	0.0358	0.572	0.301	-0.0168	0.0275
BMI	0.208***	0.0358	-0.00158	0.00318	0.201***	0.0235	-0.0000468	0.00215
Taking BP meds	-0.645	0.644	0.249***	0.0571	0.351	0.394	0.244***	0.0360
Healthcare access								
In the last 30 days								
One to five months ago	0.451	0.501	-0.176***	0.0444	0.814*	0.326	-0.131***	0.0298
Six to twelve months ago	1.211*	0.606	-0.187***	0.0537	1.138**	0.421	-0.203***	0.0385
More than one and less two years ago	0.520	0.441	-0.457***	0.0391	0.863**	0.302	-0.445***	0.0276
Two to four years ago	0.602	0.503	-0.517***	0.0446	1.191**	0.398	-0.485***	0.0363
Five to ten years ago	0.749	0.657	-0.550***	0.0582	0.742	0.639	-0.534***	0.0583
More than ten years ago	1.183	0.851	-0.637***	0.0754	1.960*	0.879	-0.538***	0.0802

Never	0.457	0.543	-0.552***	0.0481	1.038*	0.428	-0.541***	0.0391
Smoker	-0.0555	0.449	-0.138***	0.0398	-0.365	0.669	0.0132	0.0611
Consumes alcohol	0.753*	0.361	-0.0718*	0.0320	0.684	0.377	-0.00840	0.0345
Period								
Wave 2 (ref)								
Wave 3	2.519***	0.737	0.222***	0.0653	1.819**	0.574	0.218***	0.0524
Wave 4	2.586	1.676	0.359*	0.149	1.124	1.301	0.319**	0.119
Intercept	82.78***	15.58	4.835***	1.381	81.96***	12.93	4.734***	1.181
Observations	11562		11562		18411		18411	
Individuals	5416		5416		7886		7886	
R-squared: within model	0.0202		0.0738		0.0208		0.0668	

* p<0.05 ** p<0.01 *** p<0.001

Table 6: Robust Regressions of the relationship between Mover Status and health outcomes

	Men				Women			
	Diastolic BP		SRH		Diastolic BP		SRH	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mover	0.422	0.272	0.0420	0.0231	0.956***	0.239	0.0165	0.0204
Age	0.756***	0.0377	0.0368***	0.00320	0.677***	0.0286	0.0374***	0.00244
Age Squared	-0.00606***	0.000392	-0.000182***	0.0000333	-0.00473***	0.000286	-0.000173***	0.0000244
Race								
African (ref)								
Coloured/Indian/Asian	1.163**	0.358	-0.0827**	0.0303	1.566***	0.308	-0.168***	0.0263
White	-3.095***	0.525	-0.106*	0.0445	-3.057***	0.480	-0.362***	0.0410
Marital Status								
Married (ref)								
Living with Partner	0.746*	0.361	0.0750*	0.0306	1.508***	0.325	0.0802**	0.0277
Divorced/Widowed	1.600***	0.440	0.0686	0.0373	-0.622*	0.243	0.0672**	0.0207
Never Married	1.617***	0.293	0.124***	0.0249	-0.0305	0.212	0.107***	0.0181
Education								
No Schooling								
Primary/Some High School	-0.430	0.337	-0.227***	0.0285	-0.944***	0.248	-0.148***	0.0212
High School Grad or Equivalent	-0.303	0.420	-0.380***	0.0356	-1.741***	0.340	-0.321***	0.0290
Certificate/Diploma without HS Grad	-0.395	0.603	-0.360***	0.0511	-2.714***	0.583	-0.207***	0.0497
Any Tertiary Education	-0.0593	0.458	-0.438***	0.0389	-2.399***	0.357	-0.432***	0.0305
Employment Status								
Not Economically Active (ref)								
Unemployed Discouraged	-0.945	0.610	-0.0544	0.0517	0.356	0.393	-0.0986**	0.0335
Unemployed Strict	-0.487	0.345	-0.207***	0.0293	-0.0187	0.261	-0.0745***	0.0223
Employed	0.218	0.248	-0.231***	0.0210	0.262	0.191	-0.112***	0.0163
BMI	0.386***	0.0180	-0.00841***	0.00152	0.277***	0.0108	-0.00361***	0.000920
Taking BP Medication	4.382***	0.354	0.310***	0.0300	4.670***	0.224	0.331***	0.0191
Healthcare access								
In the last 30 days (ref)								
One to five months ago	0.552	0.354	-0.307***	0.0300	0.963***	0.247	-0.215***	0.0210
Six to twelve months ago	1.977***	0.418	-0.404***	0.0354	1.216***	0.315	-0.277***	0.0269
More than one and less two years ago	1.491***	0.299	-0.660***	0.0253	1.997***	0.220	-0.593***	0.0188
Two to four years ago	1.595***	0.352	-0.772***	0.0299	1.948***	0.299	-0.641***	0.0256
Five to ten years ago	2.274***	0.464	-0.826***	0.0393	2.533***	0.494	-0.740***	0.0422
More than ten years ago	2.324***	0.578	-0.893***	0.0490	2.659***	0.654	-0.751***	0.0558

Never	1.469***	0.372	-0.838***	0.0315	1.970***	0.308	-0.715***	0.0263
Smoker	0.790***	0.221	-0.110***	0.0188	-1.269***	0.309	-0.122***	0.0263
Consumes alcohol	1.648***	0.211	-0.0117	0.0178	2.027***	0.238	0.0617**	0.0203
Urban Residence	0.172	0.241	0.0153	0.0204	-0.233	0.200	0.0515**	0.0171
Province								
KwaZulu-Natal								
Western Cape	2.146***	0.419	-0.0793*	0.0355	1.067**	0.351	-0.0645*	0.0300
Eastern Cape	-0.349	0.349	-0.0842**	0.0296	0.104	0.268	-0.0666**	0.0228
Northern Cape	1.365**	0.427	-0.0398	0.0362	-0.731*	0.366	-0.0829**	0.0312
Free State	-0.490	0.452	0.0164	0.0383	0.317	0.372	-0.0230	0.0318
North West	0.567	0.398	-0.0926**	0.0338	0.0779	0.334	-0.0442	0.0285
Gauteng	0.480	0.364	-0.194***	0.0309	-0.143	0.312	-0.146***	0.0266
Mpumalanga	-0.416	0.399	-0.0884**	0.0338	-1.212***	0.322	-0.0468	0.0275
Limpopo	-0.937*	0.393	-0.200***	0.0334	-2.185***	0.295	-0.213***	0.0252
Period								
Wave 1 (ref)								
Wave 2	-0.377	0.275	-0.251***	0.0233	-0.956***	0.222	-0.350***	0.0190
Wave 3	0.405	0.268	-0.122***	0.0227	-0.727***	0.216	-0.262***	0.0184
Wave 4	-1.310***	0.271	-0.187***	0.0230	-3.046***	0.221	-0.371***	0.0188
Constant	48.49***	1.174	2.514***	0.0995	57.14***	1.021	2.309***	0.0871
Observations	16286		16286		25757		25757	
Adjusted R-squared	0.141		0.261		0.188		0.274	

* p<0.05 ** p<0.01 *** p<0.001

Table 7: Robust Regressions of the relationship between Mover Type and health outcomes

	Men				**Women**			
	Diastolic BP		SRH		Diastolic BP		SRH	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Move Type								
No Move (ref)								
Local Move	0.422	0.419	0.0380	0.0347	1.202***	0.349	0.0446	0.0292
Rural to Urban	1.892**	0.620	0.0637	0.0513	0.651	0.596	-0.0298	0.0499
Urban to Rural	0.302	0.945	0.00733	0.0781	-0.107	0.887	-0.0734	0.0743
Rural to Rural	-0.334	1.914	0.249	0.158	2.527	1.633	0.0490	0.137
Urban to Urban	1.163	1.171	-0.0579	0.0968	2.371*	1.187	0.0383	0.0994
Age	0.732***	0.0467	0.0245***	0.00386	0.584***	0.0352	0.0299***	0.00295
Age Squared	-0.00599***	0.000476	-0.0000702	0.0000394	-0.00399***	0.000344	-0.000110***	0.0000288
Race								
African (ref)								
Coloured/Indian/Asian	2.746***	0.316	-0.0416	0.0262	2.468***	0.283	-0.0977***	0.0237
White	-2.095***	0.623	-0.0755	0.0515	-2.395***	0.564	-0.282***	0.0472
Marital Status								
Married (ref)								
Living with Partner	0.848*	0.431	0.0832*	0.0356	1.433***	0.395	0.0861**	0.0330
Divorced/Widowed	2.068***	0.510	0.0853*	0.0422	-0.470	0.280	0.0607**	0.0235
Never Married	1.832***	0.341	0.126***	0.0282	0.0809	0.242	0.103***	0.0203
Education								
No Schooling (ref)								
Primary/Some High School	-0.349	0.398	-0.217***	0.0329	-0.618*	0.286	-0.103***	0.0240
High School Grad or Equivalent	-0.371	0.497	-0.378***	0.0411	-1.363***	0.398	-0.257***	0.0333
Certificate/Diploma without HS Grad	-0.266	0.679	-0.347***	0.0561	-2.480***	0.646	-0.164**	0.0541
Any Tertiary Education	-0.192	0.527	-0.417***	0.0435	-2.292***	0.404	-0.361***	0.0338
Employment Status								
Not Economically Active (ref)								
Unemployed Discouraged	-1.223	0.802	-0.0887	0.0663	0.549	0.557	-0.171***	0.0467
Unemployed Strict	-0.735	0.415	-0.180***	0.0343	-0.106	0.313	-0.0686**	0.0262
Employed	0.240	0.292	-0.225***	0.0241	0.352	0.222	-0.131***	0.0186
BMI	0.429***	0.0212	-0.00581***	0.00175	0.308***	0.0126	-0.00323**	0.00105
Taking BP meds	4.229***	0.407	0.299***	0.0336	4.764***	0.257	0.320***	0.0216
Healthcare access								
In the last 30 days (ref)								

One to five months ago	0.387	0.425	-0.244***	0.0351	0.830**	0.291	-0.194***	0.0244
Six to twelve months ago	1.605**	0.502	-0.314***	0.0415	1.096**	0.372	-0.241***	0.0311
More than one and less two years ago	1.189***	0.358	-0.603***	0.0296	1.912***	0.261	-0.557***	0.0218
Two to four years ago	1.560***	0.414	-0.708***	0.0343	1.929***	0.345	-0.605***	0.0289
Five to ten years ago	1.897***	0.545	-0.740***	0.0451	2.007***	0.568	-0.678***	0.0476
More than ten years ago	1.509*	0.694	-0.834***	0.0574	2.924***	0.783	-0.744***	0.0656
Never	1.147*	0.450	-0.734***	0.0372	2.258***	0.372	-0.661***	0.0312
Smoker	0.761**	0.265	-0.121***	0.0219	-1.583***	0.375	-0.109***	0.0314
Consumes alcohol	1.829***	0.250	-0.0223	0.0207	2.123***	0.273	0.0484*	0.0229
Period								
Wave 2 (ref)								
Wave 3	0.884**	0.284	0.131***	0.0234	0.279	0.226	0.0936***	0.0189
Wave 4	-0.875**	0.292	0.0789**	0.0241	-2.023***	0.235	-0.00366	0.0197
Constant	48.03***	1.462	2.348***	0.121	57.47***	1.261	2.000***	0.106
Observations	11562		11562		18411		18411	
Adjusted R-squared	0.124		0.236		0.166		0.249	

* p<0.05 ** p<0.01 *** p<0.001