POPULATION, SPACE AND PLACE
Popul. Space Place **20**, 528–551 (2014)
Published online 30 May 2013 in Wiley Online Library
(wileyonlinelibrary.com) **DOI**: 10.1002/psp.1794

Gendered Patterns of Migration in Rural South Africa

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ABSTRACT

Gender is increasingly recognised as fundamental to understanding migration processes, causes, and consequences. In South Africa, it is intrinsic to the social transformations fueling high levels of internal migration and complex forms of mobility. Although female migration in Africa has often been characterised as less prevalent than male migration and primarily related to marriage, in South Africa, a feminisation of internal migration is underway, fueled by women's increasing labour market participation. In this paper, we report sex differences in patterns, trends, and determinants of internal migration based on data collected in a demographic surveillance system between 2001 and 2006 in rural KwaZulu-Natal. We show that women were somewhat more likely than men to undertake any migration, but sex differences in migration trends differed by migration flow, with women more likely to migrate into the area than men and men more likely to out-migrate. Out-migration was suppressed by marriage, particularly for women, but most women were not married; both men's and women's out-migrations were undertaken mainly for purposes of employment. Over half of female out-migrations (vs 35% of male out-migrations) were to nearby rural areas. The findings highlight the high mobility of this population and the extent to which gender is intimately related to the processes determining migration. We consider the implications of these findings for the measurement of migration and mobility, in particular for health and social policy and research among highly mobile populations in southern Africa.

Accepted 9 March 2013

Keywords: gender; migration; mobility; South Africa

INTRODUCTION

Gender is increasingly recognised as fundamental to understanding migration processes, causes, and consequences. The first critical analyses of migration research through the lens of gender emerged some three decades ago, directing attention to the male gender bias embedded in migration studies (Pedraza, 1991; Tienda and Booth, 1991; Bilsborrow, 1992; Chant and Radcliffe, 1992; Hugo, 1993). Women's mobility in sub-Saharan Africa has continued to receive little attention in migration studies, in part because of an enduring paucity of national-level data for the study of sex-specific migration patterns in the region. However, a small number of recent studies using sex-specific data on migration (Beauchemin and Bocquier, 2004; Collinson *et al*., 2006; Collinson, 2009; Beguy *et al*., 2010; Reed *et al*., 2010) have yielded growing evidence for a feminisation of migration in sub-Saharan Africa,

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as in other developing regions (Bilsborrow, 1992; Hugo, 1993; Zlotnick, 2003). In South Africa, the available data suggest that a feminisation of internal labour migration has been underway for at least three decades (Casale and Posel, 2002; Feinstein, 2005; Posel, 2006). In the 1990s, some 16% of the rural South African population migrated annually to urban areas (Anderson, 2006) to seek opportunities and provide financial support to households of origin (van der Berg *et al*., 2002; Posel and Casale, 2003; Collinson *et al*., 2006; Collinson *et al*., 2009). The 2001–2002 census data showed that 42% of citizens of African origin had ever moved from one district to another and that 51% of these migrants were women (Wentzel *et al*., 2006). A number of studies using data from rural demographic surveillance sites (DSS) have documented an increasing trend of migration to other rural villages, semi-urban towns, and the rural perimeters of metropolitan areas. A higher proportion of female than male migrants travel to these areas, which are closer to rural and peri-urban homes in the Agincourt DSS population in Mpumalanga Province (Collinson *et al*., 2006; Collinson *et al*., 2007) and the DSS population for the present study in KwaZulu-Natal (KZN) (Lurie *et al*., 1997; Muhwava *et al*., 2010).[1] In Agincourt, rural-to-rural and rural-to-town migration flows have become more prominent (Collinson *et al*., 2006)[2] than migrations to the Johannesburg/Gauteng area. Female migration increased threefold between 1997 and 2001 (Collinson *et al*., 2006) and continued to increase from 1999 to 2003 (Collinson, 2007), with women aged 15–25 years being the most mobile population category. For the KZN population (this study), previous analyses also highlighted women's predominance in localised, shorter-distance migration flows (Muhwava *et al*., 2010).

Complex, novel migration and mobility patterns are emerging in South Africa, concurrent with rapid social transformations in gender underway in the nation. These patterns warrant closer attention to women's migration and its causes and consequences. In this paper, we present findings of a study on sex differences in the trends, patterns, and determinants of migration in a population living in a primarily rural area of KZN from 2001 to 2007. We use uniquely detailed data and a range of measures to examine the degree to which they adequately encompass both men's and women's participation in migration. Finally, we investigate possible sex differences in the determinants of migration and consider their implications for current and future studies of gender and migration in southern Africa.

BACKGROUND

Historical Context

The gendered patterns of migration in today's South Africa are rooted in its unique history as an extreme example of modern overseas settlement colonisation (Osterhammel, 1997). From the 17th century through the end of apartheid in the early 1990s, South Africa's governmental policies sought to extract the cheap labour of Black people to support the privileged position of White people (Feinstein, 2005). Male temporary labour migration was a cornerstone of South Africa's segregationist economy. 'Influx control' legislation, that is, urban residency and land ownership restrictions on the Black population, and apartheid policies governing the residence and movement of Black South Africans sought, among other things, to prevent women from migrating from rural areas (Preston-Whyte, 1978). Yet despite the state's best efforts, the male migrant labour system did not produce a stable population of women 'left behind' to maintain rural homesteads. Quite to the contrary, women have migrated independently to and within South Africa at least since the late 19th and early 20th centuries, when many moved to the Witwatersrand to pursue economic opportunities in the gold boom economy (van Onselen, 1982; Bonner, 1990). They came from rural areas of South Africa and from Swaziland and Bechuanaland (Botswana)(Cockerton, 1995; Dodson and Crush, 2004) to participate in the domestic labour and informal sectors, which evolved in tandem with the male migrant labour system (Walker, 1990). The apartheid regime's influx control laws specifically excluded women as labour immigrants to South Africa (Wilkinson, 1983), but the internal migration of women in southern African 'sending' nations of Lesotho, Swaziland, Mozambique, and Botswana increased over the 1970s: while the burden of agricultural production, falling exclusively upon women, became heavier, arable land became scarcer in sending areas, exacerbated by new systems of land tenure (Spiegel, 1981; Wilkinson, 1983). A similar phenomenon occurred in South Africa's internal migrant sending areas, leading to dramatic sex imbalances in the towns of the former 'homelands' (Preston-Whyte and Sibisi, 1975).

DOI: 10.1002/psp

Since at least the 1970s, the destinations of female migrants appear to have not been the distant large cities to which men migrated, but rather the small regional towns, peri-urban or semi-rural employment zones, or the informal peripheries of cities, all of which are closer to the rural homesteads to which women remain tied. In her history of a town in North West Province, Bozzoli (1991) noted that 'Migration [of women] did not involve spending the long lonely periods away from home which the more distant migrant would experience. The surrounding towns and cities were relatively well known and understood, in ways that reflected the mental maps Bafokeng women held of their own rural universe' (p. 95). Indeed, despite their weak or declining economic bases, informal settlement areas and peripheral, regional towns in South Africa have continued to be focal points for female migrants. A case study of migration in and out of a township area in northern KZN (Todes, 1998) documented changes in community members' attitudes towards female migration as economic conditions worsened over the 1990s: confronting 'older prejudices', 'families on the whole did not seem to prevent daughters from moving, and in fact were frequently supportive of their daughters' (*ibid*.: 325).

The Post-apartheid Era

The political, economic, and social changes of the past two decades have significantly altered the context, drivers, and legislative controls of migration in South Africa. In 1986, apartheid influx control measures were formally abolished, 'after a period in which it had broken down as people defied laws and streamed to the cities' (Todes, 1998: 311). An assumption had been that 'artificial' towns and peripheral industrial areas, created by apartheid through forced removals and influx controls, would 'wither away' after apartheid as people continued to migrate to urban areas (*ibid*.; Casale and Posel, 2002). However, net rural-to-urban migration rates are estimated to have increased from 2% in 1980–1984 to 15.4% in 1995–1999 per 1,000 population in South Africa (Anderson, 2006), with the caveat that the designation of 'urban' is difficult and controversial in the southern African context (Billsborrow, 1998; Anderson, 2006; Collinson, 2007). No longer subject to brutal spatial interventions by the apartheid state, informal settlement areas[3] have dramatically grown in size in South Africa over the past two to three decades, in a process of 'displaced urbanisation' (Anderson, 2006).

Concurrent with these changes, the HIV/AIDS epidemic rapidly spread between urban areas and from urban to rural areas in southern Africa, via the corridors of major population movement. The contributing role of South Africa's male migrant labour system to the nation's enormous epidemic is well documented (Jochelson *et al*., 1991; Abdool Karim *et al*., 1992; Williams and Campbell, 1996; Campbell, 2000, 2001; Hope, 2000). Perhaps as a result, the literature on migration and HIV has largely focused on risks to male labour migrants and their non-migrant female partners or migrants overall (Jochelson *et al*., 1991; Bwayo *et al*., 1994; Nunn *et al*., 1995; Hope, 2000; Lurie *et al*., 2003). Those measuring HIV risks to women via their direct involvement in migration, however, have documented high acquisition and transmission risks among female migrants (Abdool Karim *et al*., 1992; Pison *et al*., 1993; Boerma *et al*., 2002; Zuma *et al*., 2003; Lydie *et al*., 2004; Kishamawe *et al*., 2006; Camlin *et al*., 2010). Previous research in the population for this study found higher HIV prevalence among recent female migrants than among male migrants or non-migrants of either sex. Women's internal migration may be an under-recognised social antecedent to the HIV epidemic in South Africa (Camlin *et al*., 2010).

Causes of the Feminisation of Migration in South Africa

The factors driving a feminisation of internal migration in South Africa are thus multifaceted, with unique historical antecedents, but are also well explained by the new economics of labour migration (Stark, 1991; Massey *et al*., 1998; Massey, 2006): where urban labour markets are volatile and insecure, a geographically stretched household – one in which members live and work in multiple places – also diversifies its risks. In South Africa, this process of risk diversification has been highly gendered, and the large social transfers enacted after the democratic elections of 1994 may have facilitated women's labour migration. The research on pensions and remittances suggests that the presence of older women in rural households, and absence of older men and husbands, has facilitated the migration of working-age women. Prior research in this population found that an 'old age pension'-eligible woman provided

DOI: 10.1002/psp

not only access to pension income (Ardington and Lund, 1995; Ardington *et al*., 2009) but also the childcare that permitted reproductive-age women to migrate for work (Hunter, 2010; Ardington *et al*., 2009). This finding is supported by other research from South Africa showing that a greater percentage of female labour migrants came from households with at least one woman of pension-eligible age (41% compared with 25% in households without a female pensioner) (Posel, 2001). In the first decade of the 21st century in South Africa, the sending of a female migrant has become an essential livelihood strategy particularly advantageous to the poorest households (Kok *et al*., 2006; Collinson *et al*., 2009).

Transformations in gender norms in South Africa are also underway, relaxing 'traditional' gender-related constraints to female labour force participation and migration. Early anthropological research in the region (e.g. Meillassoux, 1960) documented the power that chiefs, fathers, and husbands held with respect to restricting women's mobility and reinforcing their roles in rural production. Women's roles in childcare and farming reduced the likelihood of migration, as did marriage. Gendered divisions of labour were upheld by social pressure, gender ideology, and women's economic dependence in rural communities (Posel and Casale, 2003). In South Africa and surrounding nations, male migrant labour systems are thought to have contributed to turbulent gender relations and disruptions of 'traditional' norms (Spiegel, 1991; Lovett, 1996; Breckenridge, 1998; Campbell, 2001; Hunter, 2007; Smith, 2007) and to the destabilisation of family structures and marriage systems (Murray, 1976, 1980; Wilkinson, 1983; Lovett, 1996). Indeed, South Africa's marriage rates are uniquely low in the region and probably declining,[4] and the structure and composition of households are changing. Reliable nationally representative estimates of nuptiality were lacking until recently, but the Demographic and Health Surveys for South Africa found that only 34% of women of reproductive age were currently married in 1998 (Department of Health, Medical Research Council, and ORC Macro, 1998), declining to 28% in 2003 (Department of Health, Medical Research Council, and ORC Macro, 2003). Previous analyses of the population for this study showed that the proportion of those that never married increased continuously from 2000 to 2006, when 69% of women had never been married (Hosegood *et al*., 2008). At the same time, women are participating in the labour force in greater numbers than ever before: whereas the male labour force participation rate dropped from 97% in 1960 to 65% in 1996, the rate for females rose in the same period from 30% to 49% (Feinstein, 2005).

There are few data sources for the study of sex-specific migration patterns and determinants in South Africa, and women's unique patterns and motivations for migration are not well described in the demographic literature. This study exploits a rich data source to address this gap. We present a case study of sex differences in trends, patterns, and determinants of migration in a population living in a primarily rural area of KZN from 2001 to 2007. A key aim of this analysis is to explore how the sex composition of migrants in the population shifted depending upon how migration was defined. We therefore use several measures to describe detailed patterns of migration and mobility in the adult population by sex. We examine sex differences in the individual and household characteristics that shape the likelihood of migration, in the destinations chosen by migrants over the period, and in the reasons given for migration. The data available for these analyses provide a detailed description of the gendered patterns of mobility in rural South Africa and the factors driving this mobility.

DATA AND METHOD

Data Source

Data are from the *Africa Centre Demographic Information System (ACDIS)* conducted by the Africa Centre for Health and Population Studies. Since 2000, ACDIS has collected demographic, social, and behavioural data in a population of over 100,000 individuals in the Umkhanyakude District, a predominantly rural area of KZN about 2 hours north of Durban (Tanser *et al*., 2008) (Fig. 1.) ACDIS was designed to closely reflect the complexity of the social organisation of rural communities of KZN and the high mobility of the population (Hosegood and Timaeus, 2005a; Tanser *et al*., 2008). The surveillance area is 435 km^2, and all bounded structures within the area that either have a residential purpose (homesteads) or provide a service (e.g. schools, clinics, and churches) are registered and updated routinely. The households that are resident at

DOI: 10.1002/psp

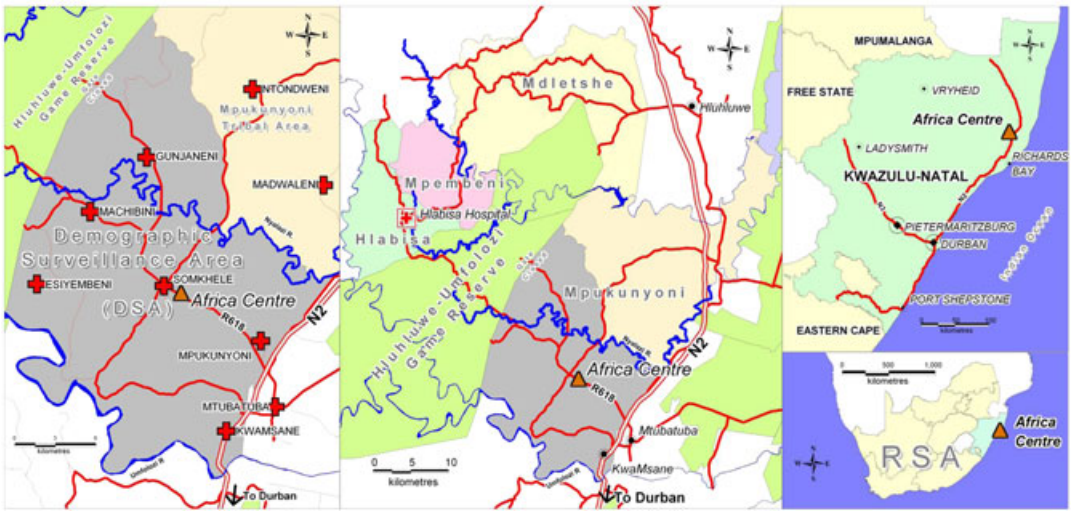


Figure 1. Location of demographic surveillance area, Hlabisa subdistrict and surroundings, KwaZulu-Natal, South Africa.

these structures are registered and followed, as are all members of these households.

In ACDIS, individuals are included in the surveillance population on the basis of being a member of a household in the study area irrespective of whether the person is a resident or not (Hosegood and Timaeus, 2005a; Tanser *et al.*, 2008). The residency status (whether resident or non-resident) and place of residence are routinely recorded for all household members. The place of residence is in most cases the place where a person keeps their daily belongings and spends most nights. Although ACDIS can record an individual as being a *member* of more than one household at a time,[5] for instance, in the case of polygamous marriage, an individual can only be recorded as being a *resident* within one bounded structure at any point in time.[6] At each fieldworker visit, any change in household residency is recorded, together with information about the origin or destination and date of the move. Changes in residency are referred to as migration events. These are classified as in-migrations (a migration into a homestead within the surveillance area), internal migrations (migrations within the surveillance area), or out-migrations (migration to a homestead outside of the area). A household migration involves a change of residence by all resident members of the household to another homestead; both individual and household migrations are recorded. At each visit to a household, the household roster is reviewed and updated on the basis of any changes due to events including births, deaths, and migration. The pattern of household presence (number of nights slept in the household since the previous visit and whether present on previous night) is also recorded for each household member. This analysis used routinely collected demographic data and information from the first round of the Household Socio-economic Survey (HSE-1), collected in 2001, about the household (household HSE-1 questionnaire) and each member of the household (individual HSE-1 questionnaire).

Setting

The surveillance area encompasses both land under tribal authority (Mpukunyoni) that was designated as a Zulu 'homeland' under the former apartheid policy and a township (KwaMsane) under municipal authority (Fig. 1). Previous analyses of ACDIS data indicate that there were 85,502 individuals in the population in the midyear of 2001 (Muhwava *et al.*, 2010). Some 28% was non-resident household members on that date (*ibid.*); the proportion of adult female non-residents has been lower than that of male non-residents since the start of ACDIS. Infrastructure and living conditions are poor: in 2001, 50% of households had no electricity, and only 13% had access to piped water. There is little subsistence agriculture in the area, and most households rely on pension, child support grants, and

DOI: 10.1002/psp

wage income (Case and Ardington, 2004; Case *et al*., 2005; Ardington *et al*., 2009).

Mortality in the study area rose sharply in the late 1990s, largely as a result of HIV: by 2000, the probability of dying between the ages of 15 and 60 years was 58% for women and 75% for men; AIDS with and without tuberculosis was the leading cause of death in adulthood (48%) (Hosegood *et al*., 2004b). In 2006, 27% of female and 13.5% of male residents were HIV infected (Welz *et al*., 2007). HIV prevalence was yet higher in non-residents, at 34% among men aged 15–54 years and 41% among women aged 15–49 years (*ibid*.). HIV incidence was sustained at a high level over the years 2003–2007, at an overall rate of 3.4 per 100 person-years (Bärnighausen *et al*., 2009). Overall population mortality and HIV-related adult mortality declined significantly between 2002 and 2006 following the rollout of HIV antiretroviral treatment in the population (Herbst *et al*., 2009).

Methods

Populations

This analysis begins with a presentation of sex differences in migration patterns and determinants for the first 2-year period from the start of ACDIS, 2001–2003. An analysis of sex differences in the pattern of presence in the household in the previous 4 months was carried out on the 1 January 2001 population, and age-specific rates of migration, by type of migration and sex, were also generated for this population. We also examine sex-specific trends in migration from 2001 through 2006, defining the populations for rates (i.e. the denominators) as all individuals aged 15 years and older who were members of households on 1 January of the calendar year. The numerators for rates were defined as the number of individuals who had at least one migration event, by type, within the year.

Analyses of characteristics associated with migration by sex were carried out on the 1 January 2001 population. We focus on individual, rather than household, migrations in 2001–2003, which comprised the majority of migration events over the period. We examined sex differences in migration destinations over the years 2001–2006, using the migration event as the unit of analysis (as information on destinations was often not available for out-migrants, the full 6 years of data was used to maximise non-missing responses). Table 1

Adjustment for selection bias in the first-round Household Socio-economic Survey data

Of the population of 48,163 adults aged 18 years and older, HSE-1 data were available for 41,919 individuals (87%). Other ACDIS data on the characteristics of the 6,244 adults for whom HSE-1 data were not available[7] showed that they differed from the population for whom HSE-1 data were available. To adjust for this selection bias, we used a propensity score weighting approach (Little and Rubin, 2002), generating a score representing the propensity of 'participation' in HSE-1 for all of the members of the population

Table 1. Sex differences in measures of residency status, migration, and presence in household on night before visit.

Measure of residency status, migration, and household presence on night before visit	Adult women		Adult men		aOR		
	n	col. %	*n*	col. %	Women : men	99% CI	
Non-resident status on 1 January 2001	10,122	38.5	11,044	50.4	0.64	0.61	0.67
Resident on 1 January 2001	16,142	61.5	10,873	49.6			
Any individual migration, 2001–2003	5,082	19.4	4,185	19.1	1.09	1.02	1.16
No individual migration in period	21,182	80.7	17,732	80.9			
Any in-migration 2001–2003, non-residents	1,544	15.3	1,473	13.3	1.14	1.03	1.26
No in-migration in period	8,578	84.8	9,571	86.7			
Any out-migration 2001–2003, residents	1,717	10.6	1,713	15.8	0.74	0.67	0.82
No out-migration in period	14,425	89.4	9,160	84.3			
Absent from household, night before visit	7,503	28.6	8,786	40.1	0.62	0.59	0.65
Present in household, night before visit	18,752	71.4	13,122	59.9			

Source: ACDIS. Data are for population aged 18 years and older who were members of households on 1 January 2001.
aOR: Odds ratios from logistic regression models are adjusted for age only.

DOI: 10.1002/psp

and using this score to apply a non-response adjustment weight to the analyses.[8] The weight was used as a frequency weight for analyses shown in Tables 2 and 3. (Unweighted data are shown in Appendix Tables A.1 and A.2.)

Variables

To identify characteristics predictive of migration, we used data on socio-economic and other characteristics of individuals that were collected prior to their subsequent migration events.[9] That is, we examine only the migrations undertaken *after* the HSE-1 data were collected. For this paper, we examine *residency status* and individual *out-migration* and *in-migration* events as defined in ACDIS and two measures of short-term mobility: a dichotomous measure of *present versus not present at household* on the night prior to data collection (the first visit after 1 January 2001) and a categorical measure of the extent of *recent presence in the household*, with four levels (in the household every night, present most nights, present approximately half of the nights, and present few or no nights in the previous 4 months).

On the basis of prior research, we examined a set of characteristics likely to be associated with migration: *sex*, *age*, *employment status*, *education level*, *marital/partnership status*, and *parenting status*.[10] We also examine the characteristics of individuals' households including *size*, the *sex and number of pension-eligible adults* (ages 60 years and older for women and 65 years and older for men), the *dependency ratio* (the ratio of children aged 0–17 years and pension-eligible adults to working-age adults), and measures of household socio-economic status, including *electricity*, *water source* and *sanitation*, and *household assets*. The asset scale is a sum of the number of up to 17 assets in the household, divided into tertiles to provide lower-level, middle-level, and higher-level groupings of economic status. A dichotomous measure of the occurrence of any *death of another adult in the household* in 2001–2002 prior to a migration was also included. The comparison category for this variable included individuals for whom no adult in the household died in the 2-year period prior to migration and individuals who may have lost another adult household member to death after migration. This variable was included because previous research in the population showed that households experiencing more than one adult death or an injury death were more likely than other households to dissolve within 2 years of the death (Hosegood *et al*., 2004a).

Table 3 shows the distribution of individual out-migrations by sex and *type of destination*; the categories of destinations included rural versus urban, and within the urban category, whether formal or informal. Destinations were also classified into the categories 'Mpukunyoni tribal area of Hlabisa district', which refers to areas that are within the local tribal area but not part of the ACDIS surveillance; 'elsewhere in KZN', referring to within-province migrations beyond Mpukunyoni and Hlabisa; and 'other South African province or international'. The latter category combines migrations to other South African provinces with migrations to other African countries and beyond, as international migrations were few in number (<1% of adult out-migrations in 2001–2006.)

Statistical analysis

Multiple logistic and ordinal logit regression models were fitted to characterise sex differences in patterns and determinants of migration events. For the basic logit model, the logistic transformation of the success probability p is given by

$$\text{logit}(p_i) = \log(p_i/1 - p_i);$$

$\text{logit}(p_i)$ equals $x'_i\beta$, where β denotes the $(K+1) \times 1$ vector of regression coefficients to be estimated (Powers and Xie, 2000). Given that we use several household-level variables in these models, we adjusted standard errors for the clustering of individuals within households.

We calculated age-adjusted sex differences in the predicted probability of degree of presence in the household by fitting an ordinal logit regression model with age and sex as independent variables and a four-level dependent variable measuring household presence. The cumulative probability of the ordered logit model, a 'proportional odds model', is written as

$$\begin{aligned} Ci,j &= \Pr(y_i \leq j|\ x_i) \\ &= \exp\left(\alpha_j = x'_i\ \beta\right)/1 + \exp\left(\alpha_j = x'_i\beta\right). \end{aligned}$$

Given the large population size for these analyses, the significance level for all statistical tests was set to 99%.

DOI: 10.1002/psp

Table 2. Characteristics predictive of subsequent migration in 2001–2003, by sex and type of migration (multiple logistic regression models with robust standard errors and 99% confidence interval).

	Out-migration of residents		In-migration of non-residents	
	Adult women aOR	Adult men aOR	Adult women aOR	Adult men aOR
Individual characteristics				
Age group quantile (years)				
18–22 (reference)				
23–28	1.00	0.91	0.84*	0.85
29–37	0.63***	0.47***	0.66***	0.63***
38–50	0.30***	0.36***	0.59***	0.47***
Over age 50	0.13***	0.15***	0.64**	0.69*
Partnership pattern				
No current marital partner (reference)				
Currently married	0.42***	0.66***	1.09	1.04
Employment status				
Unemployed (reference)				
Full or part-time employment	0.97	0.94	0.72***	0.54***
Education level				
None–standard 5 (reference)				
Standard 6–9	1.04	1.12	0.85	0.84*
Standard 10 (matric) or higher	1.25**	1.18	0.98	0.75**
Parenthood				
Not a parent to children in household (reference)				
Parent to ≥1 children in household	0.59***	0.92	1.08	1.30**
HOUSEHOLD CHARACTERISTICS				
Household dependency ratio	0.91*	0.96	1.02	1.05
Sum of adults employed full time	1.04	1.03	0.98	0.99
Drink water source				
Other source (reference)				
Piped (private/public)	1.04	0.93	1.07	1.04
Sanitation				
Other or none (reference)				
Flush toilet/VIP	1.04	0.87	1.24	1.01
Electricity				
No source of electricity (reference)				
Has electricity (grid/generator)	0.86*	0.66***	1.01	1.21**
Quantiles of household assets				
Lower tertile of assets (0–2) (reference)				
Middle tertile of assets (3–5)	0.86	1.09	1.11	0.96
Higher tertile of assets (6–17)	1.02	1.12	1.09	1.17
Pension-eligible adults in household				
None (reference)				
1 or more males or both sexes	0.99	0.83	0.85	0.86
1 or more females only	0.96	0.88	0.98	1.01
Death of adults in household prior to migration (by type)				
No death of other adult (reference)				
Death of ≥1 adults in household before 1st migration	1.56***	0.90	1.57***	1.71***
N	14,192	9,352	8,238	9,301
Wald χ^2 (19 *df*)	945.94	589.40	125.68	263.34

Source: ACDIS. Data are for population aged 18 years and older who were members of households on 1 January 2001. Standard error adjusted for clustering at the household level. Data weighted with survey participation propensity score weight.
aOR, adjusted odds ratio.
*$p < 0.05$;
**$p < 0.01$;
***$p < 0.001$.

DOI: 10.1002/psp

Table 3. Distribution of individual out-migrations in 2001–2006, by sex and destination type.

Destination characteristic	Adult men		Adult women			
	N	col. %	N	col. %	χ^2 (*df*)	*p*
Rural	3,057	35.3	4,802	50.4	423.2 (1)	<0.0001
Urban	5,616	64.8	4,732	49.6		
Formal	5,148	92.9	4,310	91.9		
Informal	396	7.1	381	8.1	3.4 (1)	0.062
Mpukunyoni tribal area or Hlabisa district	1,707	18.2	2,895	29.1	598.8 (2)	<0.0001
Elsewhere in KwaZulu-Natal	5,969	63.8	6,256	62.8		
Other South African province or international	1,681	18.0	811	8.1		

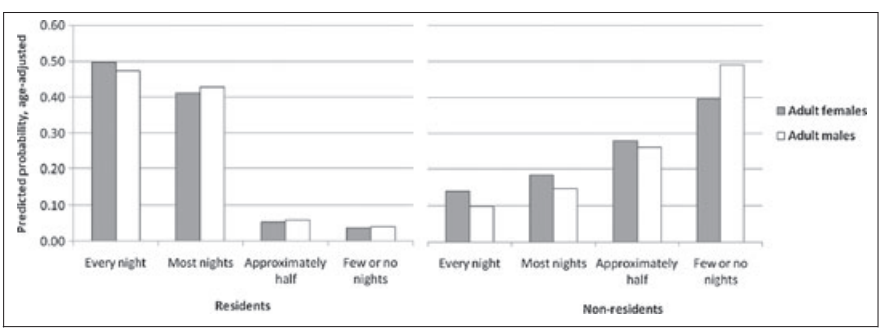
Source: ACDIS. Unit of analysis is migration event. Period shown is 1 January 2001 through 31 December 2006. $N = 170$ missing data on destination and $n = 1{,}282$ missing data on urban/rural designation; missing data not shown.

RESULTS

Sex Differences in Migration and Mobility Across Several Measures

As shown in Table 1, whether men or women predominated within the category of 'migrant' varied by the definition and measure used. In a composite measure of individual migration of any type, women slightly predominated: 19.4% of all adult women versus 19.1% of adult men, overall, migrated within a 2-year period. Yet men (50.4%) were more likely than women (38.5%) to be a non-resident household member; and male residents were more likely than female residents to have out-migrated at least once within 2 years (15.8% vs 10.6%). Men were also less likely than women to have been present in the household on the night of the first visit after 1 January 2001.

The level of recent mobility in the population was quite high, even among residents, who may be presumed to be more residentially stable than non-resident household members. Resident women had only a slightly higher probability than resident men (0.50 vs 0.47) of having been present *every* night in the household and a slightly lower probability than men (0.41 vs 0.43) of having been present *most* nights in the previous 4 months (Fig. 2). Among non-residents, men were more likely than women (0.49 vs 0.40) to have been in the home *few or no* nights, whereas women had higher probabilities than men of being in the home approximately *half* of the nights (0.28 vs 0.26), *most* nights (0.19 vs 0.15), and *every* night (0.14 vs 0.10) in the previous 4 months. Thus, although women are more likely to be classified as resident, they are nonetheless highly mobile: only half of resident women were present in the household every night in the past 4 months, and some 10% were present approximately half or fewer nights. Moreover, those classified as non-resident were often present in the household, with women more likely than men to have been present at least some nights.



Source: Africa Centre Demographic Information System (ACDIS). Data are for total population aged 18 and older who were members of households on 01 January 2001. Predicted probabilities are from ordered logit model of nights in household in past 4 months, controlling for age.

Figure 2. Probability of degree of presence in the household in past four months, by residency status.

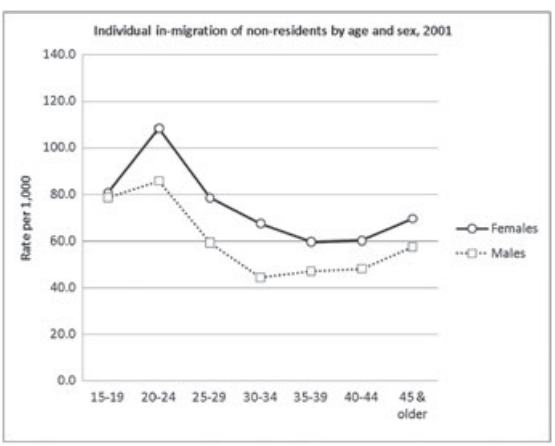
DOI: 10.1002/psp

Sex and Age Patterns of Migration Rates in 2001, by Type of Migration

Sex differences in migration rates were larger in some age groupings than in others, as shown in Figures 3 and 4. In 2001, in-migration rates for both non-resident men and women peaked in the 20–24-year age group, but the rates diverged widely by sex: 108 female versus 86 male non-residents in this group (per 1,000) in-migrated in 2001 (Fig. 3). In-migration rates declined in the age 30 years and older groups and rose again in the 40 years and older groups, but rates were higher for women than for men across all ages. The widest interval of sex difference was seen in the 30–34-year age group, in which 68 female versus 45 male per 1,000 non-residents in-migrated. An opposite pattern was seen in the age-specific out-migration rates of resident men and women in 2001 (Fig. 4): out-migration rates of men exceeded those of women in every age group except the 15–19-year group, in which 61 women versus 55 men per 1,000 out-migrated; and out-migration rates were virtually the same among men and women aged 25–29 years. The highest rate was again in the 20–24-year age group.

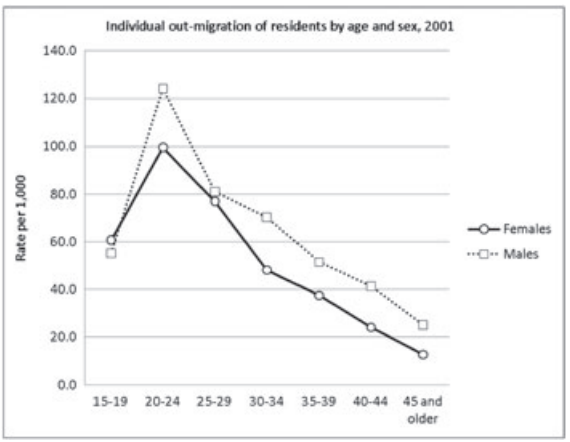
Sex Differences in Migration Trends, 2001–2006

Figure 5 displays the trends of migration in the years 2001–2006, by sex and type of migration. Rates of in-migration remained higher for women than for men (although the gap narrowed somewhat in 2005–2006), averaging 81 per 1,000 for female and 70 per 1,000 for male non-residents over the 6-year period. Individual out-migration rates remained higher among male than among female residents, averaging 99 for men and 64 for women per 1,000 over the period. Overall, the sex-specific annual rates of in-migration did not change remarkably over the period, but rates of male out-migration declined, confirming a widening sex ratio imbalance within the ACDIS population over the years 2001–2006 (Muhwava *et al.*, 2010).



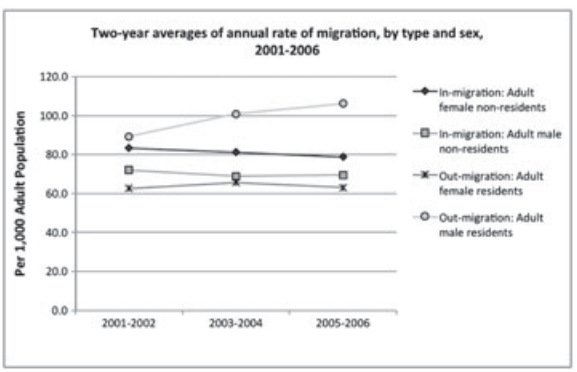
Source: ACDIS. Data are for population aged 15 and older who were non-resident members of households on 01January 2001.

Figure 3. Individual in-migration of non-residents by age and sex, 2001.



Source: ACDIS. Data are for population aged 15 and older who were resident members of households on 01 January 2001.

Figure 4. Individual out-migration of non-residents by age and sex, 2001.



Source: ACDIS. Data are two-year averages of annual rates of in-migration (per 1,000 population), for aged 15 and older who were non-resident members of households on 01 January in years 2001 through 2006.

Figure 5. Two-year averages of annual rate of migration, by type and sex, 2001–2006.

Socio-economic and Demographic Factors Predictive of Migration

As shown in Table 2, the factors predictive of migration in 2001–2002 varied both by sex and

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by the type of migration. Although out-migration was negatively associated with age for both men and women, other factors were more strongly predictive of women's out-migration. Women with a marital partner had almost 60% lower odds of out-migration relative to unmarried women [adjusted odds ratio (aOR) = 0.42, vs the equivalent aOR = 0.66 in men]. The out-migration of women, only, was positively associated with having attained the highest level of secondary education or higher (aOR = 1.25; relative to those with the least education) and with the recent death of another adult in the household (aOR = 1.56) and negatively associated with sharing the same household as one's child (aOR = 0.59). The household dependency ratio also negatively influenced women's out-migration only: each unit increase in the ratio (reflecting an increase in the number of dependents relative to the number of working-age adults) reduced the odds of out-migration by 9% (aOR = 0.91). However, the number of other adults with employment in the household had no influence on out-migration, suggesting that as the ratio of dependents to working adults increased, women's out-migration is reduced more because of their involvement in caregiving than because of the suppressing effect of earned income to the household from other adults.

The right columns of Table 2 show factors predictive of in-migration in the non-resident populations of female and male adults. Household members who were non-resident on 1 January 2001 but subsequently in-migrated are a special category of 'in-migrants': these are individuals who already had a significant tie to the area and are not newcomers (for whom ACDIS has no information). Many of the factors that appeared to facilitate out-migration may also constrain in-migration but, in contrast to the out-migration models, were more strongly predictive in men. In-migration was negatively associated with being employed for women (aOR = 0.72), but especially men (aOR = 0.54). In men only, in-migration was negatively associated with having attained the highest education level (aOR = 0.75) and positively associated with sharing a household with one's children (aOR = 1.30). The increasing role of men in caregiving, in the context of high HIV mortality in women, may account in part for this finding: the death of another adult predicted the in-migration of women (OR = 1.57), but especially men (OR = 1.71). Household infrastructure also appeared to facilitate men's migration: household electricity access was significantly associated with the in-migration of men only (aOR = 1.21).

Sex Differences in Out-migration Destinations

Out-migrations to rural areas were significantly more likely to be undertaken by women than men (50.4% vs 35.3%) in 2001–2006. The out-migrations to urban areas (64.8% by men and 49.6% by women) were predominantly to formal areas for both sexes, although migrations to informal urban areas trended towards a greater proportion of women. Out-migrations to local areas near the surveillance area were more likely to be undertaken by women (29.1%) than by men (18.2%), whereas male migrations outnumbered female migrations as a proportion of international out-migration events over the period (18.0% vs 8.1%). Across many measures, women were seen to undertake more local, shorter-term migration than men and to predominate in the rural–rural migration flow.

DISCUSSION

This study documents extraordinarily high levels of mobility in a population of adults living in an area on the northern coast of KZN, South Africa; an area that in many ways is typical of the rapidly changing, and urbanising, formerly rural 'homelands' of the nation. A large proportion of members of households are living away from their homes while continuing to be socially connected to them; and despite popular assumptions that women in rural areas are the 'stay-at-home' partners of male migrants, they are far from residentially stable. Resident members of households, who were disproportionately female and may have been assumed to represent the 'stable' population, were also highly mobile. At least half of both male and female residents were absent from home at least some of the time in the previous 4 months, and only 60–70% would have been found at home on the night prior to the surveillance visit.

This study used detailed measures of migration, examining sex-specific patterns of mobility over national and provincial boundaries and shorter-distance migrations in and out of a local

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surveillance area and finding distinct sex differences in the patterns and determinants of migration. Men's and women's migration flows and destinations differed significantly, with overall higher rates out of, but not into, the surveillance area in men than in women in 2001–2006. Women predominated in migration flows to other rural areas, and men in flows to urban areas; and men migrated over longer distances, greatly outnumbering women in inter-provincial and international migration. Yet when out-migration, in-migration, and localised internal migration were combined in a single indicator representing 'any migration', women's levels of participation in migration were similar or slightly higher than those of men.

The results highlight the importance of measurement both for ascertaining sex differences in migration patterns and flows and for the development of measures that accurately capture both men's and women's overall levels of participation in migration. This study exploited the unique advantages in DSS data for these purposes, providing the needed detail not available in either censuses or many existing surveys for the study of sex-specific forms of internal migration. These findings provide a quantitative referent to the historical and ethnographic accounts (e.g. Bozzoli, 1991; Todes, 1998; Hunter, 2007) of women's high levels of mobility in South Africa and of their participation in localised, rural-to-rural, and rural-to-peri-urban migration flows. They imply that health and social policy that assumes a uniform participation by women and men in processes of urbanisation, assuming equal participation by both sexes in rural-to-urban migration flows and the primacy of large urban areas as migration destinations, will under-recognise women's participation in and unique patterns of mobility. A closer attention to women's mobility reveals a rural South Africa in dramatic flux, with new configurations of household composition emerging in response to both the catastrophe of AIDS and the opportunities afforded by large social transfers (i.e. the old-age pension) and changing gender norms surrounding migration.

Mobility in the ACDIS population appears very high, compared with other South African populations: the detailed measures of migration used in ACDIS show very high rates of migration relative to national-level estimates of rural-to-urban migration rates using South Africa census data (e.g. 15.6 per 1,000 in 1990–1999) (Anderson, 2006). Our findings were more comparable with those of other DSSs using 'event-based' measures of migration (Adazu, 2009) than with census-based measures; however, ACDIS rates were higher even relative to the high in-migration and out-migration rates in the Agincourt DSS over the years 2000–2004, in which, for example, in-migration peaked at 34 and out-migration peaked at 49 per 1,000 women aged 20–24 years (Collinson *et al.*, 2006). Although not directly comparable, the ACDIS migration rates are closer to the high rates of migration observed in DSS populations in Kenya (Collinson, 2009). For example, at the rural Kisumu site in 2002, out-migration rates were highest in women aged 20–24 years, at over 30 per 100 person-years (*ibid.*); female migration in Kisumu, it was noted, was not only for purposes of employment but also for marriage, which, in contrast to South Africa, is very common. Cross-national research would be needed to ascertain the reasons for similarities and differences in rates across sites in the region. However, it is equally important to study location-specific forms of mobility and the economic and social processes producing these sometimes unique, complex forms (Deane *et al.*, 2010) and to draw inferences from these observations for similar locations.

This study also confirms prior research emphasising the saliency of women's increasing labour force participation as a driver of female migration in South Africa, as migration for nuptiality has declined (Casale and Posel, 2002) and as female migrant remittances have become a crucial livelihood strategy for the poorest households (Collinson *et al.*, 2009). In the ACDIS population, marriage reduced the likelihood of women's migration and had no influence on men's migration, but it was uncommon: in 2001, only 20.4% of adults were currently married, although almost all were parents. Given the low rates of marriage in this population, female migrants are not predominantly young, unmarried women without children, as is the case in settings in which marriage is universal. Indeed, the findings support the proposition (Hunter, 2007) that gender norms related to migration for marriage may be changing in South Africa, as marriage remains a valued ideal that is increasingly hard to attain.

In the ACDIS population, being unemployed was associated with both men's and women's migration from the area, whereas being employed

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outside of the area reduced the likelihood of a return. Migrants overall were more highly educated than non-migrants; however, educational attainment was also positively associated with women's out-migration and negatively associated with men's in-migration. Further research would be needed to ascertain whether women's aspirations, tied to educational attainment, more frequently drive their migration because of the lower benefits of education for women's employment in rural places of origin or whether women experience lower returns on education in labour markets in urban destinations, facilitating their return migrations to rural areas.

A previous analysis of ACDIS data on the effects of the old-age pension on households found that the arrival of a pension facilitated the labour migration of prime-aged household members (Ardington *et al*., 2009). This impact was attributed both to an increase in household resources, used to stake migrants until they become self-sufficient, and to the presence of pensioners who can care for children. In this study, the presence of pension-eligible adults in the household was not significantly associated with subsequent migration. However, this study was not designed to detect whether losses or gains of pensioners in households impacted upon migration, and such an approach may be required to replicate prior results.

A major driver of both men's and women's migration was the HIV-related death of another adult in the household, confirming prior research in this population: mortality due to HIV is known to have contributed to household instability, precipitating the migration of adults and children (Hosegood *et al*., 2004a; Ford and Hosegood, 2005; Hosegood and Timaeus, 2005b; Hosegood *et al*., 2007; Welaga *et al*., 2009). HIV-related mortality was high in the population during the period considered in this study (Hosegood *et al*., 2004b), although it began to decline after 2004 (Herbst *et al*., 2009). In South African households, the death of an adult member to an HIV-related illness can be catastrophic, stimulating the migration of other adults and children for a variety of reasons. People living with HIV migrate to be cared for or to live near the health services they need (Welaga *et al*., 2009).[11] The burden of women as caregivers in the epidemic is well-documented; however, gender norms related to caregiving may be changing.[12]

For health and social research and policy, close attention to the gender dimensions of mobility, and to the potential gender biases in conventional measures and data sources, will be needed: women's shorter-distance, shorter-term movements may be less easily measured or predicted than men's, with important implications for service planning and delivery. Promising new approaches may include time–location sampling strategies (for example, Stueve *et al*., 2001; Magnani *et al*., 2005; MacKellar *et al*., 2007) in key migration destinations and utilisation of cell phone technologies to track and communicate with clinic populations (Lester *et al*., 2006; Besser, 2010). New advances in the development of measures of complex patterns of mobility may be informative for characterising temporary 'service populations' (Taylor and Bell, 2011) in the era of health interventions such as HIV antiretroviral therapy.

In this context of multigenerational, geographically stretched households and low marriage rates, young women – like their male counterparts – are on the move to seek opportunities, follow aspirations, and earn income. Gender is intrinsic to the social transformations fueling high levels of internal migration and complex forms of mobility in South Africa, with diverse social, economic, and health consequences.

ACKNOWLEDGEMENTS

We thank Yu Xie, James Levinsohn, Mark Padilla, and Marie-Louise Newell for their reviews of Carol Camlin's dissertation chapters that formed the basis of this paper. We are grateful for the participation of the members of the Africa Centre surveillance population, the Community Liaison, field staff, data capturers, and database scientist in the production of data for this study.

Carol Camlin was supported by National Institute of Mental Health grants (T32-19105–20 and K01MH093205) during the writing of this manuscript. The content of this manuscript is solely the responsibility of the authors and does not necessarily represent the views of the National Institutes of Health. Several University of Michigan institutions also provided grant support for this research: the Rackham School of Graduate Studies, Center for the Education of Women, Center for Comparative and International Studies, International Institute, Alumni/

DOI: 10.1002/psp

Alumnae Council, South African Initiatives Office, Global Health Research and Training Initiative, and Institute for Research on Women and Gender. The Wellcome Trust provides core funding for the Africa Centre for Health and Population Studies, University of KwaZulu-Natal (UKZN), including for the surveillance data used for this study (grant GR082384/Z/07/Z). Victoria Hosegood was separately funded by the Wellcome Trust (WT082599MA).

ENDNOTES

1. Similarly, survey data from the Southern African Migration in 1997 showed that among immigrants to South Africa, men have continued to favour the mining areas in Gauteng, whereas women have favoured smaller towns and cities as destinations (Dodson, 2000).
2. A counter-urbanisation may even be occurring in South Africa as a result of decreasing standards of living in urban slums, as in other areas in the region (Collinson, 2007; Potts, 1995, 2005).
3. These are areas of high social instability, characterised by high-density housing and limited infrastructure. They are also typical settings for the informal sector employment (such as street trading, beer brewing, sewing, and other activities) in which women predominate. Hunter noted that since the early 20th century, informal settlements have been known to be places of poverty and transactional sex, but also as places that attracted female migrants, as they were known to allow women 'a certain independence' (Hunter, 2007, 2010).
4. One analysis of survey data showed that the national percentage of Black women currently married declined from 35 in 1993 to 30 in 1999 (Posel, 2006). Another study comparing 1970 and 1996 census data reported that in KZN, the percentage of those over age 50 years who were never married had risen from 14% to 27% among men and from 5% to 18% among women (Udjo, 2001).
5. In the population of 48,164 adults aged 18 years and older who were members of households on 1 January 2001, 1,966 individuals (4.1%) were members of more than one household on that date. To define these individuals' household characteristics, just one of their households was selected: the household at which they were a resident or had spent the most time in the previous 6 months.
6. Residency is unique to bounded structures, not to households. Therefore, some polygamous men were not only members but also residents of more than one household within a bounded structure at the same time. Where there were multiple memberships of households that were resident at the same bounded structure at the same time, we selected the residence at which the individual spent the most time in the previous 6 months.
7. Few of these individuals actively refused to participate: some had out-migrated after 1 January 2001 and not retained a household membership before the HSE-1 data collection began, some died before HSE-1 data collection began, and some were not found.
8. As described by Little and Rubin (2002), the score specification was estimated using a logit model, that is,$\ln[\Pr(M=1)/(1-\Pr(M=1))] = \beta 0 + \beta 1X1i + \beta 2X2i + \cdots + \beta iXi$where Xi . . . represents the known covariates of 'participation' in the HSE-1. These included sex, residency status, marital status, and other measures of household composition. The predicted probabilities from this model were the propensity scores. We then weighted the respondents by dividing the mean participation rate by the predictions of the regression; that is, weight = r(mean participated)/$\Pr(M=1)$. The method corresponds to 'inverse probability weighting', another term used in the literature on causal inference methods.
9. These analyses used the most recent demographic information collected prior to (or at same time as) the collection of socio-economic data for each individual who participated in the HSE-1. Where HSE-1 data were missing, the demographic information collected at the earliest visit after 1 January 2001 was used.
10. The social separation of parents and children in this population is common, with many children living with grandparents. A recent study found that only 27% of non-orphans were living with both parents (Hosegood *et al*., 2007). In a context of low marriage rates, the comembership of fathers with children is much lower than of mothers with children, which reduces the overall percentage of parents sharing household membership with children. This variable indicates whether either the mother or the father was a member of the same household as at least one of their children, on 1 January 2001.
11. The initiation of the Africa Centre HIV Treatment and Care Programme is 'growing alarmingly', increasingly drawing an influx of people into the area (Marie-Louise Newell, personal communication, 24 February 2011).
12. Montgomery *et al*. (2006) documented the ways in which, in the context of HIV, men in KZN are positively involved with their families: 'They care for patients and children, financially support [. . .] family members and are present at home, thereby enabling women to work [. . .]' (p. 2411).

DOI: 10.1002/psp

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APPENDIX

Table A1. Population characteristics in 2001, by subsequent migration in 2001–2003.

	Out-migration, residents 2001–2003 (%)	In-migration, non-residents 2001–2003 (%)	Internal migration, residents 2001–2003 (%)
Individual characteristics			
Sex			
Female	11.0	15.3	2.7
Male	16.0	13.3	1.6
Age group quantile (years)			
18–22	25.5	19.4	3.4
23–28	22.1	14.7	3.4
29–37	11.8	11.6	2.7
38–50	6.3	10.6	1.3
Over age 50	3.0	13.6	0.8
Partnership pattern			
No current partner	13.6	16.4	1.8
Marital partner	4.0	11.4	0.8
Regular non-marital partner	16.5	13.8	3.4
Casual partner	25.5	17.4	2.4
Employment status			
Unemployed	13.4	17.8	2.3
Full or part-time employment	11.1	10.4	2.1
Education level			
None or <1 year	5.6	13.5	1.3
Standard 1–5	9.6	13.7	1.9
Standard 6–9	17.8	14.3	3.1

(Continues)

DOI: 10.1002/psp

Table A1. (Continued)

	Out-migration, residents 2001–2003 (%)	In-migration, non-residents 2001–2003 (%)	Internal migration, residents 2001–2003 (%)
Standard 10 (matric)	21.0	14.7	2.4
Diploma, bachelor's, or master's	9.8	10.7	2.0
Parenthood			
Not parent to children in household	15.3	14.5	2.4
Parent to ≥1 children in household	7.2	13.4	1.8
Household characteristics			
Drink water source			
Other source	12.8	13.6	2.3
Piped (private/public)	12.5	14.7	1.9
Sanitation			
Other or none	12.7	13.8	2.3
Flush toilet/VIP	12.4	16.0	1.8
Electricity			
No source of electricity	13.5	13.1	2.6
Has electricity source (grid/generator)	11.9	15.1	1.9
Quantiles of household assets			
Lower tertile of assets (0–2)	13.4	14.3	2.5
Middle tertile of assets (3–5)	12.6	13.4	2.3
Higher tertile of assets (6–17)	13.0	14.9	1.8
Pension-eligible adults			
None	13.9	14.5	2.2
1 or more males or both sexes	11.0	13.0	2.1
1 or more females only	12.0	14.2	2.3
Household size			
1–4	11.0	12.2	1.8
5–7	12.6	14.9	1.9
8–10	12.8	14.3	2.2
11–14	14.2	15.5	2.4
15 or more	14.0	13.0	2.8

Source: ACDIS. Data are for population aged 18 years and older who were members of households on 1 January 2001. Percentages are weighted row percentages; survey participation propensity score weight applied.

DOI: 10.1002/psp

APPENDIX

Table A2: Characteristics of migrants and non-migrants, by type of individual migration.

	I. Adult residents				II. Adult non-residents				III. Adult residents			
	Out-migration, 2001–2003				In-migration, 2001–2003				Internal migration, 2001–2003			
	No migration		Any migration		No migration		Any migration		No migration		Any migration	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Individual characteristics												
Sex												
Female	14,420	89.4	1,717	10.6	9,569	86.7	1,471	13.3	15,717	97.4	420	2.6
Male	9,155	84.2	1,713	15.8	8,574	84.7	1,544	15.3	10,699	98.4	169	1.6
Age group quantile (years)												
18–22	3,874	74.6	1,318	25.4	3,964	80.6	953	19.4	5,017	96.6	175	3.4
23–28	3,464	78.0	977	22.0	4,771	85.1	833	14.9	4,289	96.6	152	3.4
29–37	4,447	88.4	584	11.6	4,576	88.4	602	11.6	4,896	97.3	135	2.7
38–50	5,300	93.8	351	6.2	3,327	89.4	395	10.6	5,578	98.7	73	1.3
Over age 50	6,490	97.0	200	3.0	1,505	86.6	232	13.4	6,636	99.2	54	0.8
Partnership pattern												
No current partner	6,835	86.4	1,073	13.6	4,046	83.7	791	16.4	7,771	98.3	137	1.7
Marital partner	6,797	96.0	284	4.0	2,859	88.6	369	11.4	7,025	99.2	56	0.8
Regular non-marital partner	9,169	83.5	1,813	16.5	10,171	86.1	1,636	13.9	10,611	96.6	371	3.4
Casual partner	726	74.5	248	25.5	995	82.5	211	17.5	951	97.6	23	2.4
Employment status												
Unemployed	14,450	86.9	2,174	13.1	7,225	82.3	1,556	17.7	16,256	97.8	368	2.2
Full or part-time employment	6,547	89.1	800	10.9	8,165	89.6	950	10.4	7,197	98.0	150	2.0
Education level												
None or <1 year	5,313	94.6	305	5.4	1,755	86.7	270	13.3	5,546	98.7	72	1.3
Standard 1–5	6,289	90.6	650	9.4	3,905	86.3	620	13.7	6,812	98.2	127	1.8
Standard 6–9	5,697	82.4	1,215	17.6	4,920	85.7	824	14.4	6,700	96.9	212	3.1
Standard 10 (matric)	2,636	79.2	694	20.8	3,836	85.2	669	14.9	3,249	97.6	81	2.4
Diploma, bachelor's, or master's	853	90.3	92	9.7	723	89.4	86	10.6	927	98.1	18	1.9
Parenthood												
Not parent to children in household	16,523	85.1	2,895	14.9	14,179	85.5	2405	14.5	18,960	97.6	458	2.4
Parent to children in household	7,052	93.0	535	7.1	3,964	86.7	610	13.3	7,456	98.3	131	1.7

(Continues)

Table A2. (Continued)

	I. Adult residents				II. Adult non-residents				III. Adult residents			
	Out-migration, 2001–2003				In-migration, 2001–2003				Internal migration, 2001–2003			
	No migration		Any migration		No migration		Any migration		No migration		Any migration	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Household characteristics												
Drink water source												
Other	12,506	87.5	1,789	12.5	9,900	86.4	1556	13.6	13,960	97.7	335	2.3
Piped (private/public)	8,501	87.7	1,191	12.3	5,494	85.3	950	14.7	9,510	98.1	182	1.9
Sanitation												
Other or none	18,775	87.6	2,670	12.5	14,215	86.2	2,280	13.8	20,970	97.8	475	2.2
Flush toilet/VIP	2,243	87.9	310	12.1	1,198	84.0	228	16.0	2,509	98.3	44	1.7
Electricity												
No source	10,137	86.8	1,542	13.2	8,758	86.9	1,326	13.2	11,387	97.5	292	2.5
Electricity source (grid/generator)	10,881	88.3	1,438	11.7	6,655	84.9	1,182	15.1	12,092	98.2	227	1.8
Quantiles of household assets												
Lower tertile of assets (0–2)	8,286	87.0	1,236	13.0	7,087	85.6	1,188	14.4	9,283	97.5	239	2.5
Middle tertile of assets (3–5)	7,162	87.7	1,007	12.3	5,487	86.6	853	13.5	7,985	97.8	184	2.3
Higher tertile of assets (6–17)	8,127	87.3	1,187	12.7	5,569	85.1	974	14.9	9,148	98.2	166	1.8
Pension-eligible adults in household												
None	13,584	86.3	2,155	13.7	10,632	85.5	1,808	14.5	15,399	97.8	340	2.2
1 or more males or both sexes	3,364	89.4	400	10.6	2,389	87.0	358	13.0	3,686	97.9	78	2.1
1 or more females only	6,627	88.3	875	11.7	5,122	85.8	849	14.2	7,331	97.7	171	2.3
Household size												
1–4	3,421	89.5	402	10.5	1,922	87.9	265	12.1	3,754	98.2	69	1.8
5–7	5,617	87.8	780	12.2	3,606	85.1	632	14.9	6,278	98.1	119	1.9
8–10	5,856	87.4	842	12.6	4,678	85.6	786	14.4	6,553	97.8	145	2.2
11–14	4,859	86.0	790	14.0	4,198	84.4	775	15.6	5,515	97.6	134	2.4
15 or more	3,822	86.1	616	13.9	3,739	87.0	557	13.0	4,316	97.3	122	2.8

Source: ACDIS. Data for population aged 18 years and older who were members of households on 1 January 2001. Unweighted row percentages shown.

DOI: 10.1002/psp

APPENDIX

Table A3. Baseline characteristics predictive of subsequent migration in 2001–2003, by sex and type of migration (multiple logistic regression models with robust standard errors and 99% confidence interval, CI).

	I. Out-migration of residents						II. In-migration of non-residents						III. Internal migration of residents					
	Adult women			Adult men			Adult women			Adult men			Adult women			Adult men		
	OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI	
Individual characteristics																		
Age group quantile (years)																		
18–22																		
23–28	1.01	0.82	1.24	0.91	0.74	1.12	0.84	0.68	1.04	0.85	0.68	1.06	0.97	0.65	1.44	1.11	0.62	2.00
29–37	0.63	0.49	0.82	0.48	0.37	0.62	0.66	0.50	0.85	0.63	0.48	0.81	0.98	0.62	1.55	0.71	0.35	1.46
38–50	0.30	0.22	0.41	0.36	0.27	0.49	0.59	0.43	0.81	0.47	0.34	0.66	0.38	0.21	0.70	0.46	0.18	1.17
Over age 50	0.13	0.09	0.18	0.16	0.10	0.24	0.64	0.43	0.95	0.69	0.47	1.00	0.20	0.10	0.38	0.25	0.08	0.80
Partnership pattern																		
No current marital partner																		
Currently married	0.42	0.31	0.56	0.64	0.47	0.88	1.09	0.81	1.47	1.04	0.79	1.38	0.36	0.21	0.62	1.03	0.42	2.52
Employment status																		
Unemployed																		
Full or part-time employment	0.97	0.80	1.19	0.94	0.78	1.15	0.72	0.59	0.88	0.54	0.45	0.66	0.97	0.67	1.40	2.00	1.19	3.36
Education level																		
None–standard 5																		
Standard 6–9	1.05	0.85	1.29	1.12	0.92	1.38	0.85	0.68	1.06	0.84	0.69	1.03	0.98	0.67	1.44	1.29	0.72	2.33
≥Standard 10 (matric)	1.27	1.00	1.61	1.18	0.93	1.50	0.98	0.77	1.23	0.75	0.60	0.94	0.93	0.58	1.47	0.64	0.29	1.42
Parenthood																		

(Continues)

Table A3. (Continued)

	I. Out-migration of residents						II. In-migration of non-residents						III. Internal migration of residents					
	Adult women			Adult men			Adult women			Adult men			Adult women			Adult men		
	OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI	
Not a parent to children in household																		
Parent to children	0.59	0.48	0.73	0.91	0.69	1.19	1.07	0.87	1.31	1.30	1.00	1.68	0.81	0.56	1.16	0.87	0.41	1.84
Household characteristics																		
Household dependency ratio	0.92	0.81	1.03	0.96	0.85	1.09	1.02	0.91	1.14	1.05	0.93	1.19	0.93	0.76	1.13	0.93	0.63	1.36
Sum of adults employed full time	1.04	0.98	1.10	1.02	0.96	1.09	0.98	0.92	1.04	0.99	0.94	1.05	0.97	0.87	1.09	1.06	0.88	1.26
Water source																		
Other																		
Piped (private/public)	1.06	0.88	1.26	0.93	0.78	1.11	1.06	0.89	1.28	1.04	0.87	1.24	0.86	0.62	1.18	0.86	0.51	1.45
Sanitation																		
Other/none																		
Flush toilet/VIP	1.04	0.79	1.36	0.88	0.65	1.18	1.24	0.91	1.68	1.00	0.74	1.37	1.07	0.60	1.91	1.08	0.44	2.62
Electricity																		
No source																		
Electricity source (grid/generator)	0.85	0.71	1.02	0.66	0.55	0.79	1.01	0.84	1.22	1.21	1.00	1.46	0.70	0.50	0.98	0.98	0.57	1.70
Quantiles of assets																		
Lower tertile of assets																		

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DOI: 10.1002/psp

Table A3. (Continued)

	I. Out-migration of residents						II. In-migration of non-residents						III. Internal migration of residents					
	Adult women			Adult men			Adult women			Adult men			Adult women			Adult men		
	OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI		OR	99% CI	
Middle tertile of assets	0.86	0.69	1.06	1.08	0.89	1.33	1.11	0.89	1.38	0.96	0.77	1.20	0.88	0.62	1.26	0.98	0.54	1.75
Higher tertile of assets	1.02	0.81	1.29	1.11	0.88	1.40	1.09	0.85	1.39	1.17	0.92	1.48	0.88	0.57	1.36	0.66	0.33	1.32
Pension-eligible adults																		
None																		
1 or more males or both sexes	0.99	0.75	1.32	0.85	0.64	1.11	0.87	0.65	1.16	0.86	0.65	1.12	1.05	0.67	1.65	1.23	0.59	2.57
1 or more females only	0.96	0.78	1.17	0.87	0.72	1.06	0.98	0.80	1.19	1.01	0.83	1.23	0.87	0.61	1.24	1.31	0.76	2.26
Death of ≥1 adults before 1st migration	1.57	1.18	2.11	0.89	0.67	1.18	1.54	1.16	2.04	1.71	1.28	2.28	9.01	5.33	15.26	23.65	12.14	46.09
N	14,193			9,356			8,241			9,303			14,193			9,356		
Wald χ^2 (19)	955.8			584.8			119.1			265.9			337.5			212		

Source: ACDIS. Data are for population aged 18 years and older who were members of households on 1 January 2001. Models using unweighted data shown.