

# **Limits of Demographic Surveillance and Lessons from Following A Highly Mobile Population**

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## **Short Abstract**

Demographic Surveillance Systems (DSS) collect a host of valuable information and vital statistics on individuals in LMICs. However, while most DSSs count in and out migration, they do not follow the migrants who leave the DSS site. This results in a substantial amount of selectivity and bias that little is known about. South Africa has a high level of internal mobility and people engage in both permanent migration as well as temporary and circular migration. The Migrant Health Follow Up Study, a 5-year cohort study of 3800 individuals, follows migrants out of the Agincourt Health and Demographic Surveillance Site to better understand migration, urbanization, and health in a transition setting, as well as how migrant selectivity contributes to biases in DSS data. Using preliminary data from Wave 1 we describe the high-level of mobility in our sample and make the case for utilizing survey instruments with finer temporal resolution.

## **Extended Abstract**

Demographic Surveillance Systems (DSS) are sites established in roughly 30 LMIC countries throughout the developing world in which vital statistics and annual census are collected of an entire population within well-defined geographic borders. While not typically designed to be nationally representative, the breadth, depth, and longitudinal nature of the data collection within the sites' boundaries make them particularly appealing to researchers from a number of fields who do work in LMICs. In many cases demographic surveillance is considered a gold standard in public health, epidemiological, and demographic research.

While DSS sites are very successful (and sometimes better than parallel national efforts) at collecting vital statistics and basic demographic information on the resident population, information about characteristics of migrants and their lives when they reside outside of the DSS is limited. Typically, every in-migration (entering the DSS site) or out-migration (leaving the DSS site) is tracked, and most DSS systems will distinguish between temporary migrants (being outside of the site for 6 months or less a year but still considered as a member of the origin household) and permanent migrants (those residing outside of the site but who are no longer considered a member of the origin household). However, the vast majority of DSS sites do not follow out-migrants, temporary or permanent. Lack of detailed knowledge about the lives of migrants when they out-migrate has important implications for our ability to address the potentially substantial biases in the DSS data that stems from the selectivity of migration. Although in many of the LMIC countries with DSS sites there are high amounts of international migration, and in particular, internal, circular, and temporary migration, these issues have not yet been adequately explored or addressed. Even in the migration literature, temporary and circular migration is frequently discussed but very often unmeasured (or poorly measured). These processes of outmigration undoubtedly drive considerable selectivity in the retained sample (for example, disproportionate out-migration of healthy working aged males; see Figure 1) and have substantial implications for the research coming out of DSS sites that does not take this into account.

## **Objectives**

This paper uses preliminary data from the Migrant Health and Follow Up Survey based out of the Agincourt Health and Demographic Surveillance System (Agincourt HDSS) in rural South Africa to 1) explore the characteristics of individuals that out-migrate from the Agincourt HDSS and the implications for bias in Agincourt HDSS data and 2) to understand the resolution of mobility among internal, circular, and temporary migrants in a highly mobile context (as Brown and Bell 2005 have suggested).

## **Internal Migration in South Africa**

In South Africa under apartheid, movement, land ownership and duration of stay at particular destinations was strictly controlled amongst the Black population, giving rise to patterns of temporary, circular labor migration (Aliber 2003; Posel et al. 2006). In this way the migrant labor system simultaneously developed wealth and structural poverty in South Africa (Wilson 2001). With the end of the pass laws and then the end of apartheid itself, constraints on geographic mobility were removed. Nevertheless, patterns of frequent rural-urban circulation and material exchanges were well established and temporary migration continues well beyond the dismantling of apartheid and into the 2000s (Maitra and Ray 2002, Crush et al. 2011; Mazzucato 2011).

## **The Case of Agincourt, South Africa**

In this paper, we focus on migrants and non-migrants from Agincourt, South Africa, a rural sub-district in the northeastern part of the country near Mozambique and about 300 miles from Johannesburg. Agincourt is part of what was formerly a homeland: an area where Black South Africans were forcibly resettled between 1920 and 1970 under apartheid regulations (Madhavan et al. 2008). Agincourt is a rural area consisting of a network of villages. The land is arid and unproductive, and thus not suitable for large scale agriculture (Collinson et al. 2009). Since the end of apartheid in 1994, the area has been marked by low to moderate levels of infrastructural development. At present, most households in Agincourt's villages lacked running water in their dwelling (Kahn et al. 2012).

The area is largely impoverished, and formal and lucrative employment opportunities are very limited: local unemployment rates remain high at 25% for men and 48% for women (Blalock 2014). Labor migration to Gauteng, Province, is a common economic strategy for many working-age individuals. Gauteng contains Johannesburg, South Africa's largest city and Pretoria, its administrative capital, and is the economic and financial center of South Africa and one of the largest economies on the continent (Parilla, Trujillo, and Berube 2015; South African Census 2011).

Migrant sending in Agincourt is well-established and stretches back to apartheid, when the region was a source of cheap labor for industries in Gauteng, like mining. Migration during this period was done under severely restricted and often cyclical movements. By the time apartheid ended in 1994, these migrant flows were firmly established and remain largely intact despite the lifting of legal restrictions on movement. Out migration from Agincourt to urban areas is sometimes permanent, but often occurs in a temporary, cyclical, and circular manner. Thus, both out-migration and return-migration are widespread in the area (Collinson et al. 2007).

In Agincourt, as in the broader LMIC settings described above, households utilize migration as a strategy to maximize economic gains. Most poor households rely on the

temporary labor migration of men, while the poorest households rely additionally on female labor migration (Collinson 2010). Remittances from labor migrants contribute important resources for their sending households.

## **Data and Methods**

In 1992, the Agincourt Health and Demographic Surveillance System (Agincourt HDSS) was established and has monitored all births, deaths, and in- and out-migrations taking place within the study site. The Agincourt HDSS annually updates their census of almost 110,000. Figure 1 shows the geographic setting. Although the Agincourt HDSS records in and out migration, it does not track individuals after they leave. Thus, little is known about the migrant population while they are outside of the study site.

In 2017, the Migrant Health Follow-up Study (MHFUS) began its first wave of data collection. MHFUS is a 5-year cohort study of 3800 individuals aged 18 to 39 and is aimed at better understanding the relationships between migration, urbanization, and health in a transition setting by following migrants who leave the Agincourt study area, usually to access employment in Gauteng province (which includes Johannesburg and Pretoria). The cohort was selected using a simple random sample from the Agincourt HDSS longitudinal research platform and includes residents of the Agincourt sub-district and temporary migrants who maintained contact with their origin households.

The project is in Wave 1 of data collection and thus far 1788 interviews have been completed out of the 3051 in the working sample. Of the initial working sample (which excludes refusals, those that were ineligible, and those that were unable to make initial contact with), 2142 (70%) were non-migrants residing in the Agincourt HDSS and 909 (30%) were migrants living in the Gauteng province or elsewhere outside of Agincourt at the time the sample was drawn.

The MHFUS questionnaire collects detailed information about many aspects of social and economic life, health and well-being, and traditional demographic indicators. In order to better understand the mobility of this highly mobile population, there are multiple sections focused on different aspects of migration, including motivations for migration, residence histories, remittance sending, and details about life in the destination location.

This paper uses these preliminary data to provide descriptive statistics to show just how mobile much of this population is and makes the case for finer temporal resolution in survey instruments on circular, temporary migration.

## **Preliminary findings**

Table 1 provides the distribution of the total number of migration events captured in a residence history module. To be consistent with the 6-month definition employed by many DSS sites, respondents were asked to report all “other places you have lived for a period of six months or more since age 15 years.” As expected, when comparing between the two groups in our sample, the migrants exhibit greater mobility and higher (relatively speaking) numbers of moves over their working-life to date. However, with over half of the migrant sample reporting only 1 move (presumably the move from Agincourt to their current location), this raises the question of

whether the 6-month definition adequately captures respondents' mobility. Indeed, our field work suggests we need to employ a finer temporal resolution.

Through the process of data collection, it has been observed that respondents in our sample are potentially much more mobile than initially anticipated and in frequent and shorter-term ways. From our initial sample of 2142 non-migrants and 909 migrants, we have had to make a number of sample reallocations for when an individual designated as a migrant in our initial sample returns home, and when a non-migrant moves away. Since the start of fieldwork in February 2017, a total of 9.9% of our initial working sample has moved from either being a migrant to non-migrant (3.3%), or became migrants (6.6%). By July, just 6 months into fieldwork, 4.6% of our sample changed status: 67 became migrants, and 76 moved back to the Agincourt HDSS site. By August, another 5% had moved: 134 became migrants, 25 became non-migrants. As these moves occurred within time periods of 6 months or less (February to July; July to August), the residence history module would not capture them. Further, there is additional mobility within sample allocations, in particular migrants who have moved over the course of fieldwork but not back to Agincourt (for instance, from Johannesburg to Pretoria).

## **Conclusion**

While the high degree of mobility among our sample was expected (and indeed the motivation for the study), it has proven more complex (and difficult) than anticipated in a number of ways. In terms of fieldwork, tracking a highly mobile sample presents a host of challenges including, foremost, tracking respondents and interviewing them, logistical coordination across field teams, and data management. Conceptually, we have had to reconsider our understanding of our sample as either simply migrants or non-migrants and the implications that might have for how we capture (and interpret) how migration impacts access to resources, social life, and health. It also points to significant potential gains in our understanding of temporary and circular migration, and overall migrant mobility, that might arise from collecting information on migrants with a finer temporal resolution.

## **References**

- Aliber, Michael. 2003. Chronic Poverty in South Africa: Incidence, Causes and Policies. *World Development*, 31(3): 473-490.
- Brown, Dominic and Martin Bell. 2005. Measuring Temporary Mobility: Dimensions and Issues. Paper prepared for the International Union for the Scientific Study of Population.
- Collinson, Mark, Steve Tollman, and Kathleen Kahn. 2007. Migration, settlement change and health in post-apartheid South Africa: triangulating health and demographic surveillance with national census data. *Scandinavian Journal of Public Health*; 35 (Suppl. 69): 77-84.
- Collinson, Mark, Kubaje Adazu, Michael White, and Salley Findley (eds). 2009. *The Dynamics of Migration, Health and Livelihoods: INDEPTH Network Perspectives*. Ashgate Publishing Limited. Farnham, England.

Collinson, Mark. 2010. Striving against adversity: the dynamics of migration, health and poverty in rural South Africa. *Global Health Action*, 3, 5080.

Crush, Jonathan, Green, Thuso, Pendleton, Wade, Campbell, Eugene, Simelane, Thokozani, Tevera, Daniel, and De Vletter, Fion. 2011. Migration, Remittances and Development in Southern Africa. Southern African Migration Project Migration Policy Series No. 44.

Kahn K., Collinson M.A., Gomez-Olive F.X., Mokoena O., Twine R., Mee P., Afolabi S.A., Clark B.D., Kabudula C.W., Khosa A., Khoza S., Shabangu M.G., Silaule B., Tibane J.B., Wagner R.G., Garenne M.L., Clark S.J., Tollman S.M. 2012. Profile: Agincourt Health and socio-Demographic Surveillance System. *International Journal of Epidemiology*. 41: 988-1001.

Madhavan, S., Townsend N.W., and Garey A.I. 2008. ‘Absent Breadwinners’: Father–child connections and paternal support in rural South Africa. *Journal of Southern African Studies* 34(3):647–63.

Maitra, Pushkar and Ranjan Ray. 2003. The effect of transfers on household expenditure patterns and poverty in South Africa. *Journal of Development Economics*. 71: 23-49.

Mazzucato, Valentina. 2011. Reverse remittances in the migration–development nexus: Two-Way Flows between Ghana and the Netherlands. *Population, Space and Place*, 417(5): 454–468.

Posel, Dorrit, James Fairburn, and Frances Lund. 2006. Labour migration and households: A reconsideration of the effects of the social pension on labour supply in South Africa. *Economic Modelling*, 23(5): 836-853.

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## **Figures and Tables**

Figure 1

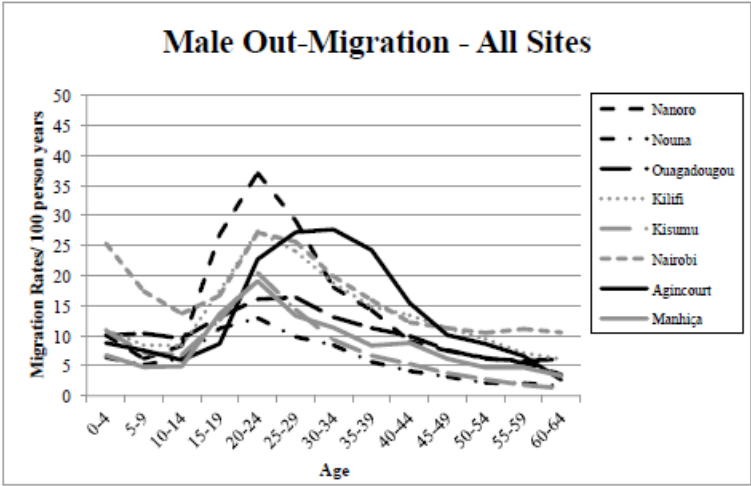


Figure 2

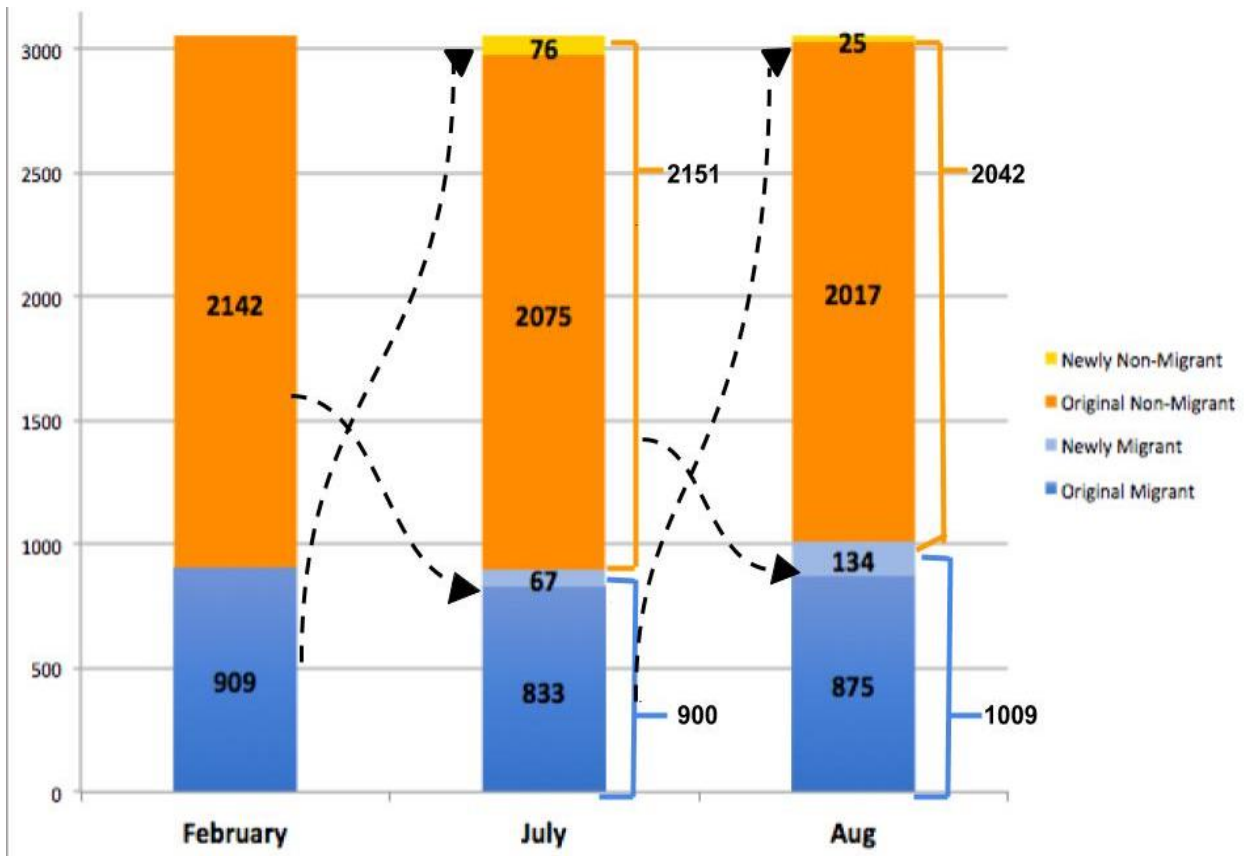


Table 1. Total Number of Residential Moves (to date)

	Non-migrants (%)	Migrants (%)
0	70.4	n/a
1	22.5	51.7

2	5.15	32.4
3	1.58	11
4	0.34	4
5+	n/a	1
Total	100	100