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# The impact of COVID-19 on a cohort of origin residents and internal migrants from South Africa's rural northeast

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ABSTRACT

South Africa has a large temporary migrant population with people commonly moving to metropolitan areas to access employment, while maintaining links with their rural origin households. The COVID-19 pandemic has impacted patterns of movement, livelihoods and health seeking, and the effects on internal, temporary migrants are unclear. Using longitudinal data spanning 2018 to 2020, this paper employs descriptive statistics and regression analyses to assess the impacts of COVID-19 on a cohort of 2971 persons aged 18–40 at baseline, both residents and migrants, from a rural district in South Africa's northeast. In contrast with 2018–2019, in 2020 the share of rural residents initiating a migration decreased by 11 percentage points ($p<0.001$), while the share of temporary migrants returning to origin households increased by 5 percentage points ($p<0.001$). Study participants who were continuing migrants reported fewer job losses in comparison with rural-stayers, while 76% of return migrants who were employed in 2019 were no longer employed in 2020. Further, among those who did not experience food shortages in 2019, rural-stayers had 1.42 times the odds of continuing migrants of suffering shortages in 2020. In 2020 health service use in the cohort decreased overall, with return migrants having still lower odds of utilising health services. The results highlight the differential geographic and socioeconomic manifestations of the pandemic, with worsening socioeconomic circumstances observed for rural-staying (disproportionately female) and returning populations, while continuing migrants fared relatively better. It is vital that a COVID-19 response considers the potentially heterogeneous impact of the pandemic on mobile and stable populations. Policy responses may include targeting migrants at their destinations in health promotion of COVID-19 messaging, and strengthening health care and social support in origin communities in recognition that these areas receive return migrants into their catchment population.

## 1. Introduction

As the SARS-Cov-2 (COVID-19) pandemic has evolved in South Africa, the impact on internal migrants has received little attention. Yet, South Africa has a large temporary migrant population that is a legacy of the past. Individuals leave their rural homes often relocating to metropolitan areas to access employment not available locally (Statistics South Africa, 2015). Labour migrants maintain strong connections to their origin areas, often seeing their lives in their destinations as temporary, while families at home rely on support, and remittances received from these absent household members help to sustain their livelihoods (Posel, 2010). While these trends have varied in the post-apartheid decades, an estimated 19% of households in tribal areas (former homelands) of South Africa continue to report non-resident household members (Posel, 2020).

Few data sources are able to shed light on the extent of labour migration due to its temporary and circular nature involving people residing in different locations at different times. As a result, health and social systems often fail to take account of geographically mobile populations, who may present with distinct health and welfare needs. South Africa's urban environments, while offering better-resourced and serviced health facilities than those located in rural areas (van Rensburg,

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2014), may still present difficulties of access among migrant groups. Internal migrants experience fewer challenges of exclusion than have been reported among international migrants (White & Rispel, 2021). Nevertheless, internal migrants may experience barriers impacting on health service use, in particular in relation to public facilities (Vearey et al., 2017). Furthermore, rural migrants' living conditions in urban areas of South Africa are often challenging in terms of housing, transport networks and labour market accessibility (Visagie & Turock, 2020). Many migrants entering cities are accommodated in informal settlements on the outskirts where they engage in unstable, informal-sector employment, and may be exposed to risks such as disease and crime (Statistics South Africa, 2015; Visagie & Turock, 2020).

Despite these precarious conditions, urban-ward movement provides opportunities for employment and socioeconomic improvement that may be out of reach in rural areas. South African studies of international and internal migrants have highlighted employment as a key driver of migration, and revealed favourable employment prospects among migrants with higher levels of education relative to non-movers (Statistics South Africa, 2019). While there is evidence of rural to urban migration as a mechanism for transitioning out of poverty (Visagie & Turock, 2020), South Africa's trajectory of poor economic growth and prevailing youth unemployment presents challenges for those seeking to gain access to the labour market. This has been exacerbated by the COVID-19 pandemic and the restrictions put in place to contain it.

On March 26, 2020, South Africa entered a strict lockdown as the first COVID-19 cases were detected. The 'State of Disaster' in South Africa continues as of this writing. The Government has taken a risk-adjusted approach to respond to the pandemic as it evolves, with consideration given to the level of infections, provincial-level trends and health systems capacity (South African Government, 2020a). The restrictions have extensively impacted the functioning and operating of businesses, international and internal travel, and social activity.

As the far-reaching social and economic impacts of COVID-19 are emerging, so too is the concern that the outcomes will exacerbate existing inequalities (Ahmed et al., 2020). In South Africa, as in other Low- and Middle-Income Countries (LMIC), prevailing socioeconomic and health issues present additional challenges in coping with and responding to the pandemic (Migration and Health Project Southern Africa, 2020). These settings confer additional risks for migrants, given their potentially more vulnerable circumstances and lower levels of engagement with, and access to, health services (Abubakar et al., 2018; Overseas Development Institute, 2016). While these challenges have been recognised by the international community, especially in the case of cross-border migration (International Organization for Migration, 2020; 2021; Orcutt et al., 2020), such concerns arise broadly for all migratory populations. In South Africa, concerns about the elevated risks faced by foreign-born migrants and refugees have been raised in relation to employment and health care access (Statistics South Africa, 2020a), yet there is little understanding of how the pandemic has affected South Africa's internal migrants.

We hypothesise that, due to their potentially less stable employment arrangements and the need for greater behavioural adjustments, the pandemic increased vulnerability among South Africa's internal migrants and their households of origin. The aim of the paper is to present evidence and offer insights on the impact of COVID-19 and consequent restrictions on a cohort of internal migrants and rural-origin residents of South Africa's northeast, using high quality longitudinal data that include pre-pandemic reference points and repeated socioeconomic measures. The study further aims to highlight potential parallel areas of investigation for other LMICs with similar internal migration dynamics.

## 2. Material and methods

In 2018, the Migrant Health Follow-Up Study (MHFUS) conducted its first wave of data collection drawing on the Agincourt Health and Demographic Surveillance System (HDSS) platform, which provides advantages for the study of rural-urban circular migration. The Agincourt HDSS was established in 1992 in the Agincourt sub-district in South Africa's rural northeast and has, for almost 30 years, monitored all births, deaths and migrations among approximately 116 000 people (Kahn et al., 2012). Included in the HDSS population under surveillance are both temporary and permanent migrants; however, permanent migrants do not retain links with their origin households and exit the surveillance population at the point of their move. Temporary migrants spend more than six months per year outside of the rural study area, yet are still considered to be members of the rural household as they maintain contact with their origin households and return home periodically. This circular pattern of migration is most often undertaken to access employment opportunities in urban areas of the Gauteng province (locus of Johannesburg and Pretoria) and surrounds. These migrants provide important economic support for rural households and communities in the form of remittances (Bowles & Posel, 2005; Collinson & Biyase, 2021).

The MHFUS cohort is based on a simple random sample of all members of the 18–40 year age-group who were included in the HDSS surveillance population in 2016, including temporary migrants who were reported to be members of the rural origin household that year. The longitudinal study design captures changes in migration status as people move for varying lengths of time, and tracks corresponding socioeconomic and health-related measures. Data collection on the cohort was administered through face-to-face interviews in 2018, followed by two rounds of telephonic interviews in 2019 and 2020. Cohort retention has been high, with 84% of the original simple random sample of 3694 eligible individuals taking part in the baseline interview, and a subsequent 98% of the Wave 1 cohort and 98% of the Wave 2 cohort completing interviews in Waves 2 and 3 respectively. Our examination of follow-up waves indicates continuing representativeness of the original sample. The profile of mobility by age and sex in the sub-district matches closely to the same measures in two other South African rural HDSS nodes, which have been harmonised into a population national research infrastructure (Collinson & Biyase, 2021). Further details of the MHFUS study design and fieldwork methods are detailed in Ginsburg et al. (2021).

The study observation window that spans 2018 to 2020 provides a pre-COVID-19 reference point from which to examine the impact on these individuals over time as the pandemic and the Government's response to it unfolded. The South African Government instituted a 5-level alert system with increasing levels of alert and consequent restrictions corresponding with higher levels of COVID-19 transmission. The Wave 3 interviews took place between September 2020 and March 2021 which corresponded with recommendations around the use of nonpharmaceutical interventions, prior to the commencement of the vaccine roll-out. This interval overlapped with a period between 21 September to December 28, 2020 when the country was on adjusted alert level 1 at the tail end of the first wave of the pandemic, and moved to the more restrictive alert level 3 from December 29, 2020 to February 28, 2021 as the second wave of the pandemic gained momentum (South African Government, 2020a). Both alert levels of lockdown regulations included a curfew, limitations on gatherings, travel and transport restrictions, and mandatory use of a face mask.

In this study, we define rural-origin residents and internal migrants in a particular study wave with reference to residence within or outside of the 420 square-kilometre Agincourt study site, as below. An individual's migration status may change from one data collection wave to the next in recognition of the fluidity and high prevalence of movement between origin and destination areas.

For any given cross-section wave, we classify individuals as:

- Rural-origin resident – residing within the HDSS community at interview
- Migrant – residing outside the HDSS community at interview

**Table 1**
Characteristics of the MHFUS cohort at Wave 3 (2020).

| | | Wave 3 cohort (n = 2971) | | Rural-origin resident at Wave 3 (n = 1434) | | Migrant at Wave 3 (n = 1537) | | p-value |
|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | |
| Migration status between Wave 2 and 3 | Rural-stayer | 1236 | 41.6% | 1236 | 86.2% | ~ | ~ | n/a |
| | Continuing migrant | 1372 | 46.2% | ~ | ~ | 1372 | 89.3% | |
| | New migrant | 165 | 5.6% | ~ | ~ | 165 | 10.7% | |
| | Return migrant | 198 | 6.7% | 198 | 13.8% | ~ | ~ | |
| Age | Mean (SD) | 30.6 (5.7) | | 30.4 (5.9) | | 30.8 (5.6) | | NS |
| | Min, Max | 20, 43 | | 20, 43 | | 20, 43 | | |
| Sex | Male | 1496 | 50.4% | 604 | 42.1% | 892 | 58.0% | p< 0,001 |
| | Female | 1475 | 49.6% | 830 | 57.9% | 645 | 42.0% | |
| Education Status | Primary school or lower | 118 | 4.0% | 87 | 6.1% | 31 | 2.0% | p< 0,001 |
| | High school incomplete | 885 | 29.8% | 541 | 37.7% | 344 | 22.4% | |
| | Matric or post school | 1966 | 66.2% | 804 | 56.1% | 1162 | 75.6% | |
| | Missing | 2 | 0.1% | 2 | 0.1% | 0 | 0.0% | |
| Employment status | Not in labour force | 320 | 10.8% | 170 | 11.9% | 150 | 9.8% | p< 0,001 |
| | Unemployed | 1423 | 47.9% | 932 | 65.0% | 491 | 31.9% | |
| | Employed | 1228 | 41.3% | 332 | 23.2% | 896 | 58.3% | |
| Employment Sector | Permanent | 728 | 59.3% | 131 | 39.5% | 597 | 66.6% | p< 0,001 |
| (Among those who were employed in Wave 3) | Fixed period/contract | 450 | 36.6% | 163 | 49.1% | 287 | 32.0% | |
| | Occasional/Irregular | 46 | 3.7% | 36 | 10.8% | 10 | 1.1% | |
| | Don't know | 4 | 0.3% | 2 | 0.6% | 2 | 0.2% | |
| Self-reported health | Good/Very good | 2873 | 96.7% | 1374 | 95.8% | 1499 | 97.5% | p< 0,01 |
| | Average/Poor | 98 | 3.3% | 60 | 4.2% | 38 | 2.5% | |
| Suffering from at least 1 chronic condition | Yes | 452 | 15.2% | 296 | 20.6% | 156 | 10.1% | p< 0,001 |
| | No | 2519 | 84.8% | 1138 | 79.4% | 1381 | 89.9% | |
| On medication for chronic condition | Yes | 310 | 68.6% | 206 | 69.6% | 104 | 66.7% | NS |
| (Among those reporting chronic condition) | No | 141 | 31.2% | 89 | 30.1% | 52 | 33.3% | |
| | Missing | 1 | 0.2% | 1 | 0.3% | 0 | 0.0% | |
| Used health services | Yes | 1596 | 53.7% | 811 | 56.6% | 785 | 51.1% | p< 0,01 |
| | No | 1374 | 46.2% | 622 | 43.4% | 752 | 48.9% | |
| | Missing | 1 | 0.0% | 1 | 0.1% | 0 | 0.0% | |
| Type of health service used | Government hospital/clinic | 1352 | 84.7% | 775 | 95.6% | 577 | 73.5% | p< 0,001 |
| (Among those who used services - | Private facility | 340 | 21.3% | 66 | 8.1% | 274 | 34.9% | p< 0,001 |
| categories not mutually exclusive) | Traditional | 127 | 8.0% | 78 | 9.6% | 49 | 6.2% | p< 0,05 |
| Shortage of food in past 3 months | Yes | 478 | 16.1% | 305 | 21.3% | 173 | 11.3% | p< 0,001 |
| | No | 2486 | 83.7% | 1124 | 78.4% | 1362 | 88.6% | |
| | Missing | 7 | 0.2% | 5 | 0.3% | 2 | 0.1% | |
| Sent remittances | Yes | 491 | 31.9% | ~ | ~ | 491 | 31.9% | n/a |
| (Migrants only) | No | 1033 | 67.2% | ~ | ~ | 1033 | 67.2% | |
| | Missing | 13 | 0.8% | ~ | ~ | 13 | 0.8% | |
| Province of residence | Mpumalanga | 2113 | 71.1% | 1434 | 100% | 679 | 44.2% | n/a |
| | Gauteng | 668 | 22.5% | ~ | ~ | 668 | 43.5% | |
| | Limpopo | 102 | 3.4% | ~ | ~ | 102 | 6.6% | |
| | North West | 51 | 1.7% | ~ | ~ | 51 | 3.3% | |
| | Other | 37 | 1.2% | ~ | ~ | 37 | 2.4% | |
| Settlement type | Rural | 1841 | 62.0% | 1434 | 100% | 407 | 26.5% | n/a |
| | Urban | 1125 | 37.9% | ~ | ~ | 1125 | 73.2% | |
| | Missing | 5 | 0.2% | ~ | ~ | 5 | 0.3% | |
| Residence type | Village (trust) | 1691 | 56.9% | 1434 | 100% | 257 | 16.7% | n/a |
| | Informal settlement/Township | 874 | 29.4% | ~ | ~ | 874 | 56.9% | |
| | City | 85 | 2.9% | ~ | ~ | 85 | 5.5% | |
| | Town | 209 | 7.0% | ~ | ~ | 209 | 13.6% | |
| | Other | 112 | 3.8% | ~ | ~ | 112 | 7.3% | |

For year-over-year (t to t+1) migration status (applying to Wave 1-Wave 2 and Wave 2-Wave 3 transitions), individuals are classified as:

- Rural-stayer – remained a resident within the HDSS from t to t+1
- Continuing migrant – remained outside the HDSS from t to t+1
- New migrant – resident within the HDSS at t; resided outside the HDSS at t+1
- Return migrant – resident outside the HDSS at t; resided inside the HDSS at t+1

At Wave 3, rural-origin residents therefore include rural-stayers and return migrants, while migrants in Wave 3 include continuing migrants and new migrants (see Table 1).

The Wave 3 study questionnaire maintained a consistent set of core questions that have been asked in previous waves exploring residential and migration histories, economic and educational activity, household relationships, general health, healthcare utilisation and food security. New Wave 3 questionnaire modules included questions investigating COVID-19-related behaviours, and impacts of COVID-19 on employment and health service use. The study design and cohort retention enable a comparison of 2020 outcomes in the domains of employment, migration, and health care utilisation, while accounting for pre-pandemic status in 2019, and in selected circumstances, for 2018 as well. We employ descriptive statistics (using $\chi 2$ tests, t-tests and tests of proportions) as well as regression analyses to examine these outcomes.[1]

[1] We examined alternative statistical models that adjust for sample loss. These models made use of weights and we found that the results were consistent with results presented.

## 3. Results

At the third wave of data collection (2020), the cohort comprised 2971 participants, of which 1434 (48%) were rural-origin residents of the Agincourt study area, and 1537 (52%) were internal migrants. The characteristics of the cohort by Wave 3 (2020) migrant status are presented in Table 1 (the baseline cohort characteristics are presented in Appendix A). There was no significant age difference between migrants and rural-origin residents. Cohort members' average age was 30.6 years at the time of their third interview. The gender composition of the cohort is even (50% female), but among internal migrants a significantly larger proportion is male (58% of Wave 3 migrants). Migrants have significantly higher levels of education with 76% holding a matric (completed high school) or post-school qualification compared with 56% of rural-origin residents ($p<0.001$). The largest proportions of migrants are located in destinations in Mpumalanga Province (44%) and Gauteng (44%). The majority of migrants are based in urban areas (73%) and reside in informal settlements or townships (57%).

### 3.1. Residence and mobility dynamics

At baseline in 2018, the majority of cohort members (57%) were rural-origin residents of the HDSS, and 43% had migrated. Fig. 1 presents transitions in migration status among cohort members for the two intervals: 2018 to 2019 (Wave 1 to 2), and 2019 to 2020 (Wave 2 to 3). In the period 2018–2019, 77% of 2018 rural-origin residents remained resident in the study area, while 23% of 2018 rural residents embarked on a new migration. In the 2018–2019 period, the proportion of continuing migrants made up 92% of the 2018 migrant cohort, while 8% of those who were migrants at the baseline of the study, returned to the rural origin area (return migrants). In the 2019–2020 period, only 12% of rural origin residents initiated a migration (representing a decrease of 11 percentage points compared to the prior period ($p<0.001$)). The same interval witnessed an increase in the share of temporary migrants returning back to their origin area (return migrants) from 8% to 13% ($p<0.001$).

Consistent with broad expectations for migratory behaviour, we find that the age distribution of new and return migrants within the MHFUS was younger than that of rural-stayers and continuing migrants ($p<0.001$). We find a modest gender differential as well, with males more heavily represented among new (54%) and return migrants (52%).

### 3.2. Economic impacts

We examined employment patterns and their links to mobility between years 2018 and 2020. In 2020, 58% of migrants indicated that they were employed, compared to only 23% of rural-origin residents (see Table 1). The majority of employed migrants had permanent positions (67%). In contrast, rural-origin residents were most commonly engaged in fixed-period contract positions (49%), followed by permanent employment (40%). Among rural-origin residents, the largest proportions of occupational categories were construction (15%), retail (10%) and unskilled work (10%). Among migrants, skilled work was most common, comprising 15% of occupations, and employment in retail comprised 14% of jobs.

Increased job losses, likely the result of reduced business operations during lockdown conditions, were a feature of the 2020 period: 29% of those employed in Wave 2 were unemployed in Wave 3. This compares with 23% of those who were unable to retain their employment between Waves 1 and 2 (pre-pandemic). Fig. 2 presents the employment status in 2019 and 2020 among the sub-set of those who indicated that they were employed in the prior study wave, by migration transition status. Across all migrant status categories, employment declined in the 2019–2020 period as compared to the 2018–2019 period. Nearly half (41%) of the Agincourt rural-stayers who were employed in 2019 indicated that they were unemployed in 2020. This is in contrast with the continuing migrant group, only 20% of whom had not maintained their employment in 2020. Of the small pool of new migrants, 16% had transitioned from 'employed' to 'unemployed'. The greatest decline in employment was among return migrants. Of the group of return migrants who indicated that they were employed in 2019, 76% were no longer employed. This can be contrasted with 61% in the 2018–2019 period. We find differential job loss by occupation within migrant status. Among rural-origin residents, job losses were higher among those employed in construction (22%), domestic work (12%) and unskilled work (10%). Among migrants, occupational categories that incurred higher job losses were retail workers (14%), skilled workers (13%), and drivers (11%).

In multivariate analyses, transitions in employment status were also strongly associated with migration dynamics. A multinomial logit model analysing employment status in Wave 3 conditional on having been employed in Wave 2, indicated that the relative risk of becoming unemployed was lower by a factor of 0.42 for continuing migrants compared to rural-stayers (CI: 0.31 0.56, $p<0.001$), while return migrants had 5.13 times the risk of unemployment compared to rural-

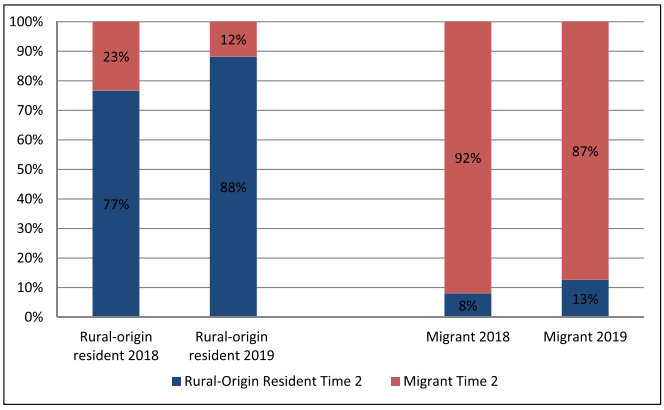


**Fig. 1.** Transitions in migration status for Wave 1 to Wave 2 (2018–2019) and Wave 2 to Wave 3 (2019–2020) (n=2971)

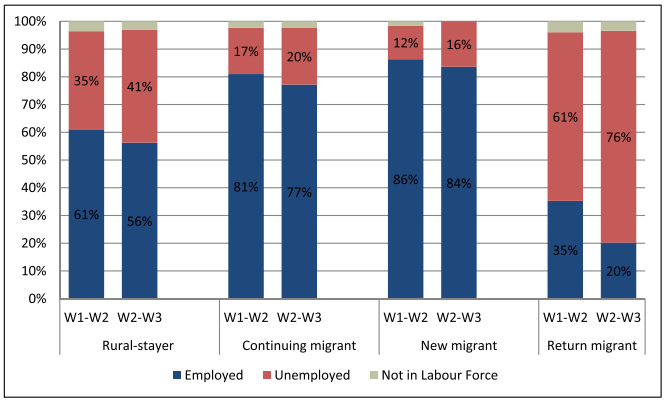


**Fig. 2.** Employment status by migration transition status in Wave 2 (2019) among those who were employed in Wave 1 (2018) (n=1366); and in Wave 3 (2020) among those who were employed in Wave 2 (2019) (n=1360)

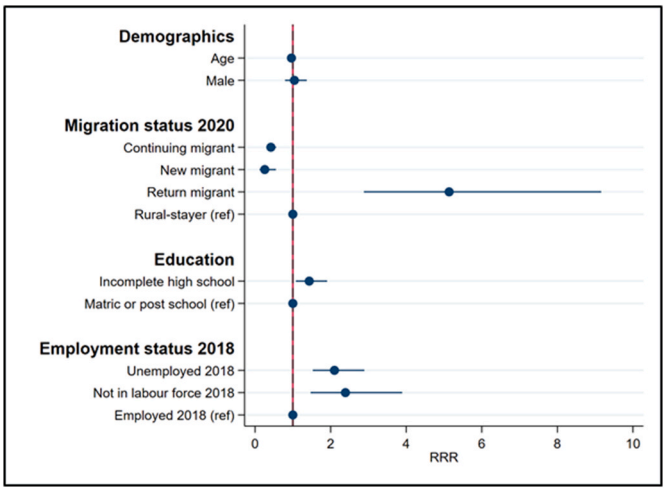


**Fig. 3.** Coefficient plot of multinomial regression analysis: relative risk of unemployment in 2020 among those employed in 2019 (n=1360)
* 95% confidence intervals are indicated by lines around the point estimates.

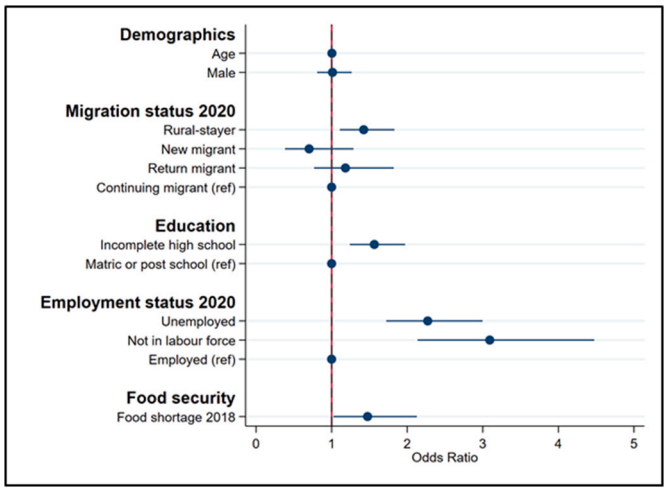


**Fig. 4.** Coefficient plot of logistic regression analysis: odds of a food shortage in Wave 3 (2020) among those who were food secure in Wave 2 (2019) (n=2623)
* 95% confidence intervals are indicated by lines around the point estimates.

stayers (CI: 2.88 9.16, p<0.001). The risk of unemployment among the previously employed was 1.43 times higher for those with incomplete high school education versus those with matric or beyond (CI: 1.08 1.91, p<0.05). Those who were unemployed or not part of the labour force in 2018 (Wave 1) had 2.10 (CI: 1.53 2.89, p<0.001) and 2.39 (CI: 1.47 3.89, p<0.001) times the risk of being unemployed in 2020, respectively (see Fig. 3).

In Wave 3, a set of questions were included in the interview to ascertain directly whether COVID-19 had affected a participant's earning capacity. Fifteen percent of the cohort indicated that their earnings had suffered as a result of the COVID-19 pandemic. Of those, 49% indicated that they had lost their job, 25% that they were on unpaid leave, 18% experienced reduced pay and 8% indicated that their businesses had suffered. As a policy intervention to support those whose livelihoods had been severely impacted by the pandemic, the South African Government distributed a R350 (equivalent to approximately $23) per month COVID-19 social relief of distress grant with eligibility based on a set of criteria such as no alternative income source (South African Government, 2020b). Approximately 15% of MHFUS participants accessed this grant, a significantly larger proportion of whom were rural-origin residents (p<0.001).

We investigated the pandemic's impact on food security in the cohort by asking if there had been days in the past three months that the household had experienced a food shortage due to insufficient funds. At the Wave 3 survey, 16% of the cohort reported having experienced a food shortage in the three months prior to their interview. The result differed significantly by migrant status, with 21% of rural-origin residents compared to 11% of migrants having reported a food shortage over this time frame (p<0.001) (see Table 1). Among those who reported being food secure in 2019, 15% reported a food shortage in 2020. In a multivariate binary logistic regression analysis of food security in 2020 among those who reported they were food secure in 2019, rural-stayers had 1.42 times the odds of continuing migrants of suffering shortages in food (CI: 1.11 1.83, p<0.01), while those who were unemployed had 2.27 times the odds of employed participants of reporting food insecurity (CI: 1.72 3.00, p<0.001), controlling for other demographic characteristics. Those who reported food insecurity in Wave 1 (2018) had 1.47 times the odds (CI: 1.02 2.13, p<0.05) of experiencing a food shortage in 2020, pointing to a population of continuing vulnerability (see Fig. 4).

We explored remittance behaviour among migrants by asking if participants typically send money or goods back to their origin areas when they are away. In the third wave of the MHFUS, 32% of migrants indicated that they had remitted home (see Table 1), a reduction of 13 percentage points as compared to levels of remittances among migrants in Wave 2. We examined transitions in remittance behaviour between 2019 and 2020 among the group of continuing migrants. Only 45% who indicated that they remitted in Wave 2 reported having remitted in Wave 3. A multivariate multinomial logistic regression model of remittance behaviour, contrasting those continuing migrants who remitted in both study waves with those who stopped remitting in Wave 3, revealed that employment status was the only significant determinant of continuing to remit. Employed continuous migrants had 4.87 times higher odds of continuing to remit compared to those who were unemployed (CI: 3.07 7.74, p<0.001). While bivariate analyses reveal gender differences in remittance behaviour, with a higher proportion of male continuing migrants (23%) sustaining their remittances compared to females (16%), the variable was not significant when combined with employment status in the multivariate model, implying that employed migrants of both genders were equally likely to remit (results not shown).

### 3.3. *Self-reported health and health service utilisation*

The MHFUS survey explores participants' self-reported health, diagnosis of a chronic condition, chronic medication use and health service utilisation. Despite the circumstances surrounding the pandemic, participants' self-reported health did not markedly diminish between Waves 2 and 3. The majority of participants (97%) who reported their health as 'good/very good' in Wave 2 had not shifted their perceptions in Wave 3. Prevalence of chronic disease in the cohort was self-reported at 15%, with significantly lower levels of chronic disease diagnoses among migrants (10%) compared to non-migrant rural residents (21%, see Table 1). Levels of chronic disease are expected to increase with age, and between Waves 2 and 3, 5% of the cohort reported having received a new diagnosis. In addition, almost a third of the cohort (31%) who indicated in Wave 3 that they were suffering from a chronic condition were not taking medication.

An important public health question in the South African context of high levels of chronic disease and the need for treatment continuity is whether the COVID-19 pandemic affected use of health services, and whether there have been differential impacts on health services utilisation for geographically mobile individuals. Analysis of the first wave of the MHFUS indicated that patterns of health service use differed by gender and migration status with men and migrants being less likely to use health services (see Ginsburg et al., 2021). At each of the three study waves, migrants were significantly less likely than rural-origin residents

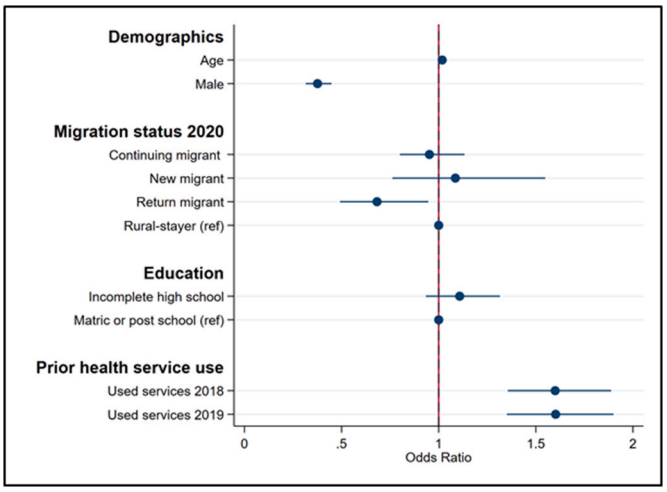


**Fig. 5.** Coefficient plot of logistic regression analysis: odds of health service use in Wave 3 (2020) (n=2963)
* 95% confidence intervals are indicated by lines around the point estimates.

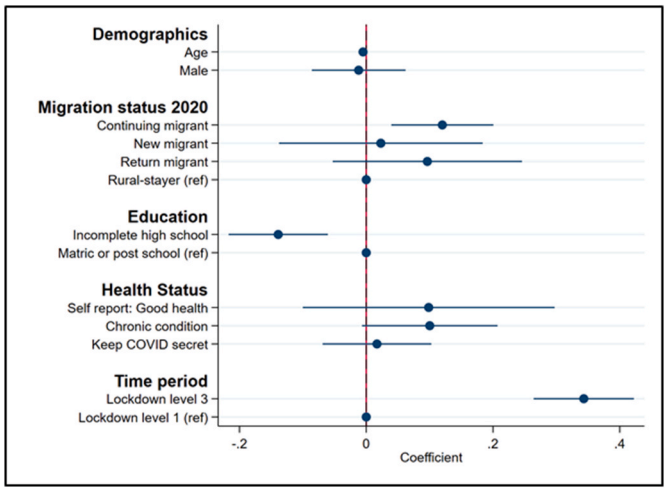


**Fig. 6.** Regression analysis of COVID-19 protection measures (based on an index combining: wearing a mask, sanitising and washing hands) (n=2969)
* 95% confidence intervals are indicated by lines around the point estimates.

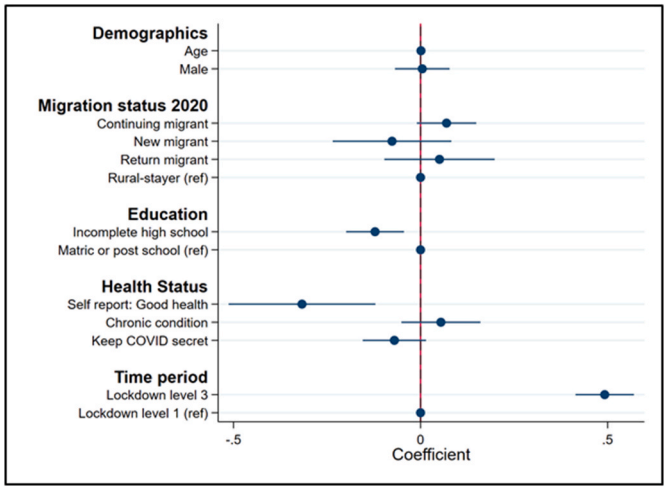


**Fig. 7.** Regression analysis of COVID-19 social measures (index representing restricted social interactions: avoiding crowds, social events and going out of the house) (n=2969)
* 95% confidence intervals are indicated by lines around the point estimates.

to use health services (p<0.01). In 2020, health service use in the cohort decreased (from 58% in 2019 to 54% in 2020, p<0.01). Further, migrants who used health services in 2019, were more likely than rural-origin residents to have transitioned out of using services; 61% of migrants who used services in Wave 2 also used them in Wave 3, compared to 67% of rural-origin residents (p<0.05).

Fig. 5 presents the results of a logistic regression analysis of health service use in Wave 3 (2020), controlling for health service use in Waves 1 (2018) and 2 (2019). Prior use of health services in Wave 1 (OR: 1.60 CI: 1.35 1.89, p<0.001) or Wave 2 (OR: 1.60 CI: 1.35 1.90, p<0.001) was associated with increased odds of using health services in Wave 3. Males had 0.38 the odds of females of using health services in 2020 (CI: 0.31 0.45, p<0.001), while return migrants had 0.68 times the odds of rural-origin residents of accessing a health service in 2020 (CI: 0.49 0.95, p<0.05).

We explored reduced engagement with health services through a set of questions about whether the COVID-19 pandemic had deterred people from accessing health care. Three percent of the cohort (n=102) answered that their health service use was affected by COVID-19. Reasons given for not accessing services included fear of being infected with COVID-19 (n=77), or a lack of funds for transport or to incur any related costs. As observed in earlier rounds of the study, in Wave 3 migrants were more likely than rural-origin residents to access private health services as opposed to government funded healthcare facilities. An exploration of changes in the type of service accessed between 2019 and 2020 revealed a significant increase in the share of rural-origin residents who used private health services from 5% to 8% between Waves 2 and 3 (p<0.05), while the share of migrants who used private services increased from 31% to 35% (p=0.06). This changing pattern of health service utilisation among rural-origin residents in favour of more costly private services may be a further impact of the pandemic.

### 3.4. COVID-19 behavioural changes

Finally, we explored behavioural and lifestyle changes made as a result of COVID-19 along two domains: i) COVID-19 protection measures, such as wearing a mask, sanitising and washing hands; and ii) social interaction measures, such as avoiding crowds, social events and going out of the house.

The vast majority of the cohort had heard of COVID-19 (98%) and of those, almost 100% indicated that they had made lifestyle changes as a result of the pandemic. Most commonly these involved using face masks (96%), the use of hand sanitiser (87%) and more frequent hand washing (68%). Figs. 6 and 7 present coefficient plots of the results of regression analyses based on two indexes, the first representing COVID-19 protection measures, and the second, social interactions. The dependent variables were derived from a principal component factor analysis of the set of positive responses (up to three) for each measure the participant indicated they had employed since hearing about COVID-19. We extracted a single factor to allow for empirically-derived component weights for the two indices. These factor scores correlated very highly, 0.82 and 0.99 respectively, with the original integer scales. Alternative models using the original scale with OLS regression or ordinal logit produced substantively equivalent results to those from these principal component models. The models further controlled for the timing of the interview – whether it was conducted during level 1 or level 3 (a stronger alert level consistent with rising COVID-19 infections).[2]

[2] A total of 24 interviews were conducted between 18 and 20 September 2020, prior to the move from alert level 2 to alert level 1 on 21 September. We categorised the timing of these interviews as level 1 in analyses as we do not have sufficient numbers to analyse the higher alert level 2 separately. The results excluding these interviews from the sample do not differ substantively from those presented.

Being interviewed during alert level 3 (β=0.34 CI: 0.26 0.42, p<0.001) and being a continuing migrant were significantly and positively associated with the use of COVID-19 protection measures (β=0.12 CI: 0.04 0.20, p<0.01), while incomplete high school education (β=−0.14 CI: −0.22 -0.06, p<0.01) was negatively associated with employing COVID-19 protections measures, see Fig. 6. While having a weaker effect in the model, suffering from a chronic condition (β=0.10 CI: −0.01 0.21, p=0.07) was positively associated with the use of COVID-19 protection measures (masks, sanitiser, hand washing). In relation to limiting social interactions (Fig. 7), the most significant predictor of restricting social interactions to prevent COVID-19 (avoiding crowds, social events, going out) was the timing of an interview during the more stringent alert level 3 (β=0.49 CI: 0.41 0.57, p<0.001). While not statistically significant, being a continuing migrant was positively associated with restricting social interactions to prevent COVID (β=0.07 CI: −0.01 0.15, p=0.09). Those self-reporting 'very good/good' health (β=−0.32 CI: −0.51 -0.12, p<0.01) and those who had not completed high school reported lower levels of restrictions on their social interactions (β=−0.12 CI: −0.20 -0.04, p<0.01). Stigma around COVID-19 was explored by asking 'If a member of your family got infected with COVID-19, would you want it to remain a secret or not?' Less than a quarter of the cohort (22%) indicated that they would prefer to maintain a COVID-19 infection as a secret, and the difference was not significant between migrants and rural-origin residents.

## 4. Discussion

Internal migration in South Africa is critical to productivity and economic sustainability with migrants fulfilling an important role in contributing to rural livelihoods. The current study uses longitudinal data from a cohort of internal migrants and rural-origin residents to examine the impacts of the COVID-19 pandemic and associated lockdown regulations on socioeconomic, health and mobility domains, spanning an interval before and during the South African COVID-19 pandemic and lockdown conditions. The study design captures temporal effects, with a focus on a specific rural-origin population.

We hypothesised that the COVID-19 pandemic would have increased economic and health vulnerabilities among migrants whose circumstances may be in greater flux than those of stable populations. This was indeed found to be the case, but not among the majority of migrants. Our results point to consequential heterogeneity among migrants: some were shielded against socioeconomic shock, able to retain employment, and were more likely to maintain their urban residence as continuing migrants. In contrast, another group of more vulnerable migrants reported job losses and returns to their origin household. The increase in levels of return migrations and lower levels of new migrations in the 2020 period align with circumstances surrounding COVID-19, which affected mobility, employment and economic wellbeing in the country.

Our findings accord with and expand on a survey conducted by Statistics South Africa on a national, cross-sectional convenience sample in June 2020, which found low levels of inter-provincial movement among respondents via retrospective report (Statistics South Africa, 2020b). Our results show a steep reduction in remittances in the MHFUS. They also highlight the likelihood that many migrants suffered considerable impacts on income as a result of job losses or reductions in pay associated with the COVID-19 context. These amplify results reported for international migrants, in which remittances had been negatively affected (World Bank, 2020), with lack of affordability being a key reason for not remitting in a sample of non-South African nationals (Statistics South Africa, 2020b).

Our study findings suggest that rural-origin residents, a larger proportion of whom are women, suffered greater socioeconomic disadvantages as a result of the pandemic as compared to migrants. This manifested in lower levels of food security, reductions in the receipt of remittances, and job losses. These are particularly vulnerable groups that motivate for more targeted COVID-19 policy responses, including the continued provision of social support through the COVID-19 relief grant. The disproportionately negative impacts of COVID-19 on women were observed in the South Africa National Income Dynamics Study – Coronavirus Rapid Mobile Survey (NIDS-CRAM) panel survey of 2020–2021, where men were more likely than women to have resumed employment in 2021 following 2020 job losses (Casale & Shepherd, 2021). Further analysis of the NIDS-CRAM survey revealed spatial disparities in relation to socioeconomic impacts of the pandemic. Job security was observed to be greater in metropolitan compared with rural areas, although recovery from the economic impact of early lockdown was slower in urban than in rural areas (Visagie & Turock, 2021). In the Gauteng City-Region Observatory's 2020–2021 Quality of Life Survey (GCRO QoL 2020/21), 18% of respondents reported job losses during the pandemic period and 19% of respondents suffered reduced working hours or pay (Maree et al., 2021).

For the MHFUS cohort as a whole, the use of health services was moderately reduced compared with pre-COVID-19 levels. Nevertheless, the decline in health service utilisation observed between 2019 and 2020 is noteworthy when seen as a deviation from the 2018 to 2019 trend of increased service use, consistent with aging of the cohort itself. Furthermore, return migrants were significantly less likely to use health services, suggesting potential health vulnerabilities in relation to this group. While there appeared to be some hesitancy in accessing care due to the pandemic, health care service avoidance as a result of COVID-19 was not widely reported in the cohort. The South African Population Research Infrastructure Network (SAPRIN) observed stable levels of chronic medication use within the Agincourt and DIMAMO (Limpopo) HDSS during the first wave of the pandemic; however, in the Africa Health Research Institute HDSS site in KwaZulu Natal, the extent of missed medication was significant (Harling et al., 2021). This suggests local variations in interruptions in health service use. Indeed the GCRO 2020–2021 Quality of Life Survey highlighted geographic disparities within the Gauteng province in relation to ease of access to healthcare (Maree et al., 2021). In the MHFUS, the increased levels of engagement among rural-origin residents with private health services suggest possible barriers to accessing public health services in the COVID-19 context, alongside pre-existing preferences among migrants to opt for private health services in destination areas. Indeed, the GCRO Quality of Life Survey reported increasing dissatisfaction among Gauteng residents with public health services (de Kadt et al., 2021), while the pandemic put strain on routine public sector services (Pillay et al., 2021). Further investigation into these trends could improve not only the COVID-19 response, but could also inform other features of health care delivery.

Very few studies have been conducted on COVID-19-related behaviours in South and sub-Saharan African contexts. In our study, we find evidence for adherence to announced policy restrictions, with continuing migrants making greater behavioural adjustments as compared to rural-origin residents. The greater behavioural adjustments observed among continuing migrants in the MHFUS cohort are likely a reflection of differences between urban and rural environments during the pandemic. South African urban areas, including those in the Gauteng Province, have experienced larger numbers of confirmed infections and deaths than rural areas of Mpumalanga and Limpopo Provinces (Data Convergence, 2021). This may, in turn, have prompted greater adherence to safety measures in urban areas. These results contradict frequent assumptions of risk-taking and other precarious behaviours often associated with urban areas. Our results correspond to a study conducted in Malawi where urban residents were more inclined to make use of COVID-19 protection measures (Banda et al., 2021), and are further consistent with findings from the GCRO Quality of Life Survey, where approximately 90% of Gauteng household respondents reported using sanitiser. However, lower levels of restrictions on social measures were reported in our cohort as compared to the GCRO respondents, 90% of whom reported avoiding indoor spaces and gatherings during South Africa's first two COVID-19 waves (Maree et al., 2021).

The MHFUS study has the distinct advantage—over other

contemporaneous data collection efforts—of gathering rich longitudinal data on a known cohort that reflects conditions before and during the pandemic. Few data sources are able to measure and identify return migration, which has significant implications for policy and planning. Indeed the official census population may even result in underfunding rural health care services due to people being listed in the census as residing near their workplace and not at the rural home to which they return. Given that initial migration away from a home community can be selective for socioeconomic differentials and health-related conditions, and given that return migration may be further selective along these dimensions, it is crucial for health and social policy to understand these residential and migratory differentials. In the COVID-19 pandemic, this is of arguably greater concern, due to population health variations in health-seeking behaviour and the pandemic's impact. Snapshot measurement of the distribution of clinical conditions can only partly point to variation in health behaviours and follow-up adverse socioeconomic effects on households and communities. While acknowledging that the MHFUS cohort is drawn from a specific rural sub-district which may not be generalizable to all parts of South Africa, the MHFUS study design, based on an initial random sample and with several of the analyses conducted with multivariate controls, offers a comparative advantage in that the variability observed over time is less likely to be linked to measurement effects. Furthermore, tight cohort management, employing strategies to minimise loss-to-follow-up, and the use of harmonised questions across survey rounds allow for analysis of changes over time and its concomitant factors.

The present study uniquely illuminates these important dynamics in its examination of the impact of COVID-19 using a pre-pandemic reference point. While 2020 (Wave 3) data collection took place too early in the pandemic to have extracted detailed information on infections and vaccine uptake among the cohort, these aspects will be explored in the upcoming 2022 MHFUS data collection wave. In a situation that is rapidly evolving, a further data collection point will shed light on the extent of socioeconomic recovery and the potential persistence of disadvantage.

## 5. Conclusions

The study contributes evidence that can help shape the South African COVID-19 policy response by shedding light on the impact of the pandemic on mobile populations who employ migration as a crucial livelihood strategy. The study further highlights the importance of examining COVID-19 impacts among internal migrants in other LMICs where similar migration dynamics may be present. Our analysis reveals heterogeneity among internal migrants, with those whose economic conditions allowed, more able to continue on as migrants. The results especially highlight the interdependency of urban and rural areas and the attendant risks for rural stable populations, disproportionately women, and more vulnerable return migrants who have seen socioeconomic conditions decline over the course of the pandemic. It is vital that a COVID-19 response considers evidence on the impact of the pandemic on mobile as well as stable populations. Policy directions may include targeting migrants at their destinations in messaging used for health promotion of COVID-19 health care and vaccination services, and strengthening health care and social support in origin communities, in recognition that these areas receive return migrants into their catchment population.

## Data availability

Data from the Migrant Health Follow-Up Study are available from the corresponding author on reasonable request. Agincourt Health and Demographic Surveillance Systems data are available through SAPRIN URL <http://saprin.mrc.ac.za/> and <http://saprindata.samrc.ac.za/>.

## Statement of ethical approval

The Migrant Health Follow-Up Study was reviewed by the University of the Witwatersrand Human Research Ethics Committee (Medical). The study was approved (clearance certificate number M170277) and the Mpumalanga Province Research and Ethics Committee (Department of Health). Consent for participation in the study was received in writing from all participants who were interviewed face-to-face. Permission was received from the University of the Witwatersrand Human Research Ethics Committee (Medical) to obtain verbal consent for interviews conducted in telephone-only waves, and in face-to-face waves in instances where migrant participants were located remotely and interviewed via telephone.

## Author statement

Carren Ginsburg: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Writing - original draft, Writing - editing and revisions. Mark Collinson: Conceptualization, Funding acquisition, Investigation, Methodology, Writing - original draft, Writing – review and editing. F. Xavier Gómez-Olivé: Investigation, Supervision, Writing – review and editing. Sadson Harawa: Data curation, Project administration. Chantel F. Pheiffer: Data curation, Writing – review, editing and revisions. Michael J. White: Conceptualization, Funding acquisition, Methodology, Data curation, Formal analysis, Investigation, Supervision, Writing - original draft, Writing - editing and revisions.

## Declarations of competing interest

None.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2022.101049.

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