

## Social Grants, Welfare, and the Incentive to Trade-Off Health for Income among Individuals on HAART in South Africa

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**Abstract** South Africa's government disability grants are considered important in providing income support to low-income AIDS patients. Indeed, anecdotal evidence suggests that some individuals may opt to compromise their health by foregoing Highly Active Antiretroviral Treatment (HAART) to remain eligible for the grant. In this study, we examined the disability grant's importance to individual and household welfare, and the impact of its loss using a unique longitudinal dataset of HAART patients in Khayelitsha, Cape Town. We found that grant loss was associated with sizeable declines in income and changes in household composition. However, we found no evidence of individuals choosing poor health over grant loss. Our analysis also suggested that though the grants officially target those too sick to work, some people were able to keep grants longer than expected, and others received grants while employed. This has helped cushion people on HAART, but other welfare measures need consideration.

**Keywords** AIDS · Highly active antiretroviral therapy (HAART) · Incentives · Social security · South Africa · Trade-offs · Welfare

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### Introduction

HIV/AIDS is an important public health and policy issue in South Africa, where nearly 20% of adults aged 15–49 are HIV positive [1]. Policies that help address AIDS' adverse health and socioeconomic consequences include public sector provision of Highly Active Antiretroviral Therapy (HAART) and the government's disability grant—available to those deemed too sick or incapacitated to work who meet an income-based means test [2].

The disability grant is a growing component of South Africa's relatively generous and well-developed social security system. The number of individuals receiving disability grants has more than doubled since 2000, rising to 1.4 million recipients in 2008, with much of this growth attributable to the expanding number of AIDS-sick people [3–7]. Government grants in general, and the disability grant and old age pension in particular (two of the largest transfers), are highly redistributive [3]. Largely because of South Africa's high unemployment rate (over a third of South Africa's labor force is without work), poor households with access to such grants are significantly better off than comparable households without pensioners or disability grantees [5, 7–16].

According to regulations, disability grants are awarded either on a 'temporary' basis (payments are provided up to 1 year, whereupon the individual has to reapply for further benefits) or on a 'permanent' basis (requiring renewal every 5 years) [2, 5]. Although there is significant variation across the country in the processes followed, some proof is required, normally from a physician or medical official, that the applicant is indeed too sick to work. Those who become healthy enough to work during the period of the grant are unlikely to be able to renew it.

HAART typically restores the patient's health within 6 months [17–19] and so patients would likely lose their

grants within a year of starting treatment. However, given the high rate of unemployment, these individuals are unlikely to be able to resume work once healthy. The loss of a disability grant could therefore have serious consequences for individual and household welfare. Indeed, some have pointed out that people on HAART may face perverse incentives to default on their treatment [5, 6, 16]. That is, it is possible that some may opt to stay, or once again become, sick to renew the grant. Qualitative studies from several South African provinces interviewing administrators, community workers, and persons with AIDS suggest that people contemplate making these trade-offs [13, 15] but whether these are isolated stories or part of a broader trend is unclear.

Our study explores the relationship between disability grants and individual and household welfare in Khayelitsha, a township of Cape Town, South Africa. To our knowledge, it is the first study of this relationship to employ quantitative analysis of a longitudinal data set of HAART patients. Our main aims were to assess the effect of the disability grant on individual and household welfare and to explore whether people reduced or stopped treatment to remain eligible for grants.

## Methods

### Setting and Data

The AIDS and Society Research Unit at the University of Cape Town collected the survey data used in this study from HAART patients in Khayelitsha, Cape Town's largest black township and the site of the first public sector HAART program in South Africa [20–22]. Unemployment is high in the area [23], and about a third of the women attending antenatal clinics are HIV positive [24].

The study sample was recruited in 2004 through social networks and contacts with clinics and support groups. Although this was not a random sample, the study recruited more than two-thirds of the 2001 starting cohort of HAART patients; more than a third of those tracked in the study were known to have been on HAART for over a year. Respondents were re-interviewed in early 2006 and again in late 2007.

These data are suitable for the purposes of this study for three reasons. First, Khayelitsha is a relatively poor area so the majority of the sample would be eligible for the disability grant. Second, Khayelitsha residents have access to social welfare facilities and support organizations and, therefore, a large proportion of eligible adults in Khayelitsha can be expected to access disability grants. Third, as HAART improved most participants' health, it was likely that disability grants would expire during the 3 year study period.

For our analysis, we used data on individual and household incomes (inclusive of all wages, profits, remittances and grants) and a binary measure of employment in the month preceding the interview as indicators of economic status. Specific measures of health used were self-reported health status (1–5 Likert scale, with 1 being poor and 5 being excellent health) and self-reported side effects experienced (a scale from 0 to 12, reflecting the number of different types of side effects). We considered side effects as these may reflect reduced HAART efficacy in conditions where income loss compromises nutrition. We also examined two measures of self-reported adherence to treatment: a 1–10 Likert scale, with 10 being perfect adherence, and a binary measure from the 2007 wave indicating whether the respondent would, hypothetically, opt to forego treatment to continue receiving the disability grant.

### Empirical Analysis

We began by examining trends in treatment adherence, health, employment status, and income across the three waves of the panel study to see if there were differences between disability grant recipients and non-recipients. We also followed the health, employment, and income status of those individuals who lost disability grants between the first two waves of the survey to assess the extent to which improved employment prospects compensated for the income shock from grant loss.

To assess the impacts of the disability grant on individual and household welfare formally, we used individual fixed effects regressions, a procedure which controls for time invariant unobservable characteristics that may be jointly correlated with disability grant receipt and individual and household welfare outcomes [25]. For example, those who receive grants may be worse off or poorer than those who do not, thus leading to underestimates of the impact of grant loss. The bias may work in the opposite direction as well: those who receive grants may be better able to navigate the social security system using skills that are also beneficial in gaining employment and sustaining health. Fixed effects controls for both types of bias.

Specifically, we used disability grant receipt as the main independent variable, with logged individual and household incomes, the binary measure of current employment, self-reported health, side effects, adherence to treatment, and household demographic characteristics (household size, number of pensioners, and number of children). We included the demographic variables because previous research has shown them to be responsive to social welfare transfers [12]. In all models, we included dummy variables for the 2006 and 2007 survey waves, and interactions between these variables and age, gender, level of education, and time on HAART recorded at baseline. These

variables served as controls to account for differential time trends that may influence both disability grant receipt and the outcome variables.

We cannot necessarily rely on the fixed effects approach to evaluate whether sample individuals traded off health for income because, in our data, we only observe individuals at three time points. If respondents interrupted treatment *between* survey waves to remain on grants, we would only observe individuals retaining grants from round to round and miss their intervening behaviors to do so.

We therefore used several indirect strategies to assess whether individuals responded to perverse incentives. First, we utilized information from questions directly asking individuals whether they would be willing to forego treatment to retain disability grants and whether they adhered to treatment between survey waves. Second, since response patterns to these questions may reflect social desirability bias, we followed self-reported health and side effects over time for individuals deemed *a priori* most likely to respond to perverse incentives. Evidence from the large-scale clinical trial carried out by the Strategies for Management of Antiretroviral Therapy (SMART) Study Group suggests that frequent (structured) breaks from treatment lead to poorer health and increased risk of complications and death over a 3–4 year period [26]. From this it seems reasonable to suppose that intermittent breaks from treatment uninformed by clinical parameters will be deleterious for one's health. Thus, if individuals were foregoing treatment from time to time to continue receiving grants, we would expect to see worsening self-reported health and side effect profiles for those who were financially more vulnerable than those who were better off.

With these insights, we estimated models with self-reported health and side effects as the main dependent variable; the main independent variables were the interaction between being in a 'vulnerable' group and binary indicators for the survey year. Those individuals who reported having had to renew their grant prior to 2004 and/or those individuals in the bottom quartile of the baseline income distribution were classified as vulnerable. We chose the former classification because, as mentioned earlier, these individuals could be on temporary grants and thus stood to lose the transfers during the study period. The latter classification was chosen because it is likely that these individuals were most reliant on grant income for consumption.

Finally, we investigated possible biases due to attrition across the survey waves. We used regression techniques to model the probability of leaving the panel study as a function of age, gender, level of education, employment status, household income, household size, disability grant receipt and self-reported health at baseline. Relating to the preceding discussion about perverse incentives, if attrition

was due to death, an outcome that is perhaps more likely for those who do not adhere to treatment, then the relationships between grant receipt and/or poverty and attrition may provide additional insight into whether individuals trade off their health for income.

## Results

Table 1 presents means for household and individual income, self-reported health, number of side effects, and the proportions of individuals employed, by sample year and by receipt of disability grant.

Three important findings are evident in Table 1. First, disability grant receipt was associated with economic status. Individual income was statistically and substantively larger for those receiving grants than for those without, especially in the first survey wave (176 vs. 123 USD/month, respectively;  $P < 0.01$ ). The differences in household income were more muted and statistically insignificant. Furthermore, among disability grant recipients, grant income constituted the majority of individual income (almost two-thirds in 2004/2005 and 2006, and 59% in 2007) and about 40% in 2004/2005 and 2006 and 34% in 2007 of household income. Finally, those receiving disability grants were less likely to report working in all three survey waves.

Second, grant status was unassociated with health outcomes: with the exception of side effects in the third wave, differences in reported health measures across those with and without grants were substantively and statistically insignificant. Third, the disability grant system did not appear to have operated as intended: the majority of the individuals receiving disability grants reported being in good or excellent health, and nearly a third of all grant recipients in the sample were employed in 2004/2005 and 2006 (43% of grant recipients were working in 2007).<sup>1</sup> In addition, of the 42 individuals who started receiving disability grants before 2002, exactly half continued to report receipt in 2007 (not shown here). Even under the assumption that these individuals were issued permanent (5 year) grants, all of these grants should have been terminated by the final survey wave.

Finally, while we do not report treatment adherence results in the tables due to lack of variation in adherence behaviors, our findings on this measure are substantively important. For example, all individuals reported perfect or near-perfect adherence (9 or 10 out of 10 on the Likert scale)

<sup>1</sup> Not only did individuals continue to receive grants after commencing employment, but several individuals actually started receiving grants while engaged in steady wage or self-employment over the previous year (not shown here).

**Table 1** Descriptive statistics for employment, health, and income by year and disability grant receipt

Disability grant status	2004/2005		2006		2007	
	Recipient	Non-recipient	Recipient	Non-recipient	Recipient	Non-recipient
Sample size	178	64	104	120	90	122
Employment (% working in month preceding interview)	30*	42*	32***	52***	43**	57**
Average individual income (\$ US/month)	176***	123***	173**	131**	192*	148*
Contribution of disability grant to individual income (%)	65	n/a	65	n/a	59	n/a
Average household income (\$ US/month)	298	285	284	257	331	298
Contribution of disability grant to household income (%)	39	n/a	40	n/a	34	n/a
Self-reported health (1–5 scale, 5—excellent)	3.75	3.6	3.61	3.56	3.89	3.93
Self-reported side effects (number experienced)	2.61	2.56	3.43	2.9	2.78***	1.61***

Significance values are for *T*-tests comparing outcomes for Recipients and Non-Recipients within each survey wave

\*\*\*  $P < 0.01$ , \*\*  $P < 0.05$ , \*  $P < 0.10$

Income measures for 2006 and 2007 were adjusted to 2004 values to account for inflation. We then converted South African Rand to US Dollars using the average exchange rate for 2004

See main text for further details regarding variables

across all survey waves. In addition, not a single individual indicated that they would “stop taking ARVs” to “get (back) [their] disability grant” in the 2007 wave. That is, despite a high probability of grant loss during the survey period, no individual reported imperfect adherence or an inclination to modify treatment for grants.

Table 2 explores the effects of grant loss on health and income by following individuals whose disability grant was terminated (and not renewed) between the first two survey waves. The analysis was stratified by employment in order to assess the impacts of grant loss by labor market status. The results show that both unemployed and employed individuals experienced marked declines in individual and household income after grant loss, with a much larger decrease in individual income. However, the percentage drop with respect to values from the baseline wave was much larger for those who are unemployed (126 vs. 9 and 28 USD/month in 2006 and 2007, respectively;  $P < 0.01$  for both). This was also true, though to lesser extent, for

household income. Table 2 also suggests that grant loss had little impact on health outcomes. While reported side effects from HAART increased for those who were unemployed after grant loss (2.37 vs. 3.76,  $P < 0.05$ ), the overall pattern suggests little change across survey waves.

Results for fixed effects models evaluating the potential impact of disability grants on various measures of individual and household welfare appear in Table 3. To reduce clutter, we only report coefficients on the disability grant variable. The first panel of the table illustrates results for logged income (individual and household) and employment. Consistent with the results from Tables 1 and 2, the estimates suggest that losing a disability grant was associated with a 75% decrease (coefficient/[coefficient + 1]) in individual income ( $P < 0.01$ ). The results for household income suggest a similar pattern, though the percentage decreases are much smaller (43%,  $P < 0.01$ ). This could reflect the effect of consumption- and income-smoothing mechanisms among families and other social networks.

**Table 2** Descriptive statistics for health and income by year and by employment status for those who lost disability grants between 2004 and 2006

Sample	2004/2005		2006		2007	
	Employed	Unemployed	Employed	Unemployed	Employed	Unemployed
Sample size	22	43	28	37	33	22
Average individual income (\$ US/month)	331	126	194***	9***	198***	28***
Average household income (\$ US/month)	429	265	367	173**	307**	194*
Self-reported health (1–5 scale, 5—excellent)	4.22	3.74	3.89	3.45	4.30	3.88
Self-reported side effects (number experienced)	3.74	2.37	1.57	3.76**	1.37	1.68

Significant values are for *T*-tests comparing outcomes from 2006 and 2007 to those from 2004/2005 wave *within* employment status groups

\*\*\*  $P < 0.01$ , \*\*  $P < 0.05$ , \*  $P < 0.10$

**Table 3** Fixed effects regression estimates of the association between disability grant receipt and individual and household welfare

Panel 1—Economic variables	Ln (Individual Income)	Ln (Household Income)	Employment
Disability grant	2.988*** (0.254)	0.755*** (0.157)	−0.035 (0.056)
Sample size	675	648	675
Panel 2—Health variables	Self-Reported Health	Self-Reported Side Effects	
Disability grant	0.156 (0.129)	−0.007 (0.385)	
Sample size	672	675	
Panel 3—Demographic variables	Household Size	No. Under 10	No. Pension Eligible
Disability grant	0.052 (0.197)	0.210** (0.086)	0.009 (0.047)
Sample size	673	673	673

Standard errors in parentheses

\*\*\*  $P < 0.01$ , \*\*  $P < 0.05$ , \*  $P < 0.10$

All models include dummy variables for 2006 and 2007 survey waves, and the interaction between these variables and baseline age, time since commencing HAART, education, and gender

Ln (individual income) and Ln (household income): the natural logs of individual and household income, respectively. Zero values for the income variables were coded as 1

See main text for further details regarding variables

We found no substantive or statistically significant association between disability grant receipt and employment status, contrary to findings from recent work which suggest that the grants may provide a disincentive to employment [27, 28].

In the second panel of Table 3, we present results for self-reported health and side effects from treatment. We found no statistically significant association between disability grant receipt and these health status indicators. The findings in this panel are consistent with those in Tables 1 and 2.

Finally, the third panel of Table 3 illustrates the association between disability grant receipt and household demographics. We found a positive association between grant status and the number of children under the age of 10: having a disability grant is associated with 0.21 additional children in the household ( $P < 0.05$ ). We found no statistically significant relationships between disability grant status and either total household size or the number of pension-eligible elderly living in the household. These findings suggest that households with access to a disability grant were able to accommodate more dependent children than those without. This effect of grant availability on household composition is consistent with the literature on the South African Old Age Pension [12].

It is, of course, possible that the fixed effects models are confounded by other time-varying factors which may jointly impact both grant receipt and the various welfare measures. However, the results presented in Table 3 were not sensitive to age, gender, or education-specific trends and are supported by an instrumental variables specification (available on request).

Table 4 presents results for fixed effects models comparing the health trajectories of population groups who were deemed *a priori* more likely to respond to perverse incentives generated by the grant program than their better-off counterparts. For the self-reported health variable, we found no evidence of worsening health status both for renewers as well as those in the bottom quintile of the income distribution at baseline. Indeed, the point estimates indicate slightly improved health status over time for these groups vis-à-vis their better off counterparts. Furthermore, the 95% confidence intervals ruled out large negative trends in self-reported health. The point estimates for the side-effects models were substantively and statistically insignificant, as well, though, in select models, the 95% confidence intervals did not rule out potentially meaningful increases in the number of side effects over time for vulnerable groups.

Finally, none of the baseline characteristics (health, income, side effects, disability grant receipt, age, and



**Table 4** Fixed effects regression estimates of trends in self-reported health and side effects by baseline vulnerability

Self-Reported Health	Coeff (SE)	95% CI
<i>Trends by Renewal</i>		
Renewal × Wave 2	0.052 (0.216)	(−0.374, 0.478)
Renewal × Wave 3	0.368 (0.223)	(−0.071, 0.807)
<i>Trends by Baseline Income Group</i>		
Poor × Wave 2	0.108 (0.22)	(−0.324, 0.540)
Poor × Wave 3	0.091 (0.223)	(−0.350, 0.530)
<hr/>		
Self-Reported Side Effects		
<i>Trends by Renewal</i>		
Renewal × Wave 2	0.25 (0.651)	(−1.032, 1.531)
Renewal × Wave 3	0.366 (0.671)	(−0.955, 1.686)
<i>Trends by Baseline Income Group</i>		
Poor × Wave 2	0.412 (0.653)	(−0.870, 1.69)
Poor × Wave 3	−0.271 (0.662)	(−1.672, 0.931)

Standard errors in parenthesis

\*\*\*  $P < 0.01$ , \*\*  $P < 0.05$ , \*  $P < 0.10$

Indicator × Wave refers to the interaction between the group variable and survey round

Renewal = 1 if respondent had to renew disability grant at baseline

Poor = 1 if individual is in the bottom quintile of the baseline income distribution

Sample size for Renewal = 485; for Poor = 641

Renewal = 1 if respondent had to renew disability grant at baseline  
See main text for further details

education level) were significant predictors of survey attrition (available upon request). This suggests that the estimates in Tables 3 and 4 were not biased by poorer, sicker individuals selectively withdrawing from the survey.

## Discussion

The disability grant program provides an important source of support to many South Africans living with AIDS. Individuals who contract AIDS are eligible to receive this substantial transfer payment, but stand to lose it when they become well enough to work. Given high rates of unemployment, the loss of a grant could have substantial impacts on socioeconomic status and health. As the number of

people losing their disability grants annually is likely to rise to about half a million by 2010 [5], it is therefore important to assess the consequences of grant loss and the measures taken to prevent or mitigate this shock. This potential trade-off could have serious social implications and may contribute to the development of resistance to HAART [29].

The aims of our study were to estimate the effect of disability grants and their loss on measures of individual and household welfare, such as income and health status, and to investigate whether individuals declined or interrupted treatment in order to remain grant-eligible. Using data from a non-random sample of individuals on HAART recruited through health clinics and social networks in Khayelitsha, we found that disability grant termination was associated with lower individual and household incomes, especially for those who could not find employment after grant loss. Households without disability grants also had fewer dependents, likely either the consequence of income loss or a mechanism to cope with it. Despite these findings, however, we found no association between grant loss and self-reported health status or side effects from HAART.

In addition, the results of various empirical tests did not support anecdotal evidence that individuals declined or modified treatment to continue receiving disability grants, despite potentially large decreases in individual and household income. Thus, this particular cohort of HAART patients did not appear willing to sacrifice health for continued access to the disability grant. It should be noted that this runs contrary to recent work (based on hedonic regressions) that suggesting that Africans place a low monetary value on their lives and health [30].

Another important finding was that the disability grant system did not work in practice as it is intended. Individuals who *a priori* should have been ineligible for grants continued to receive them, suggesting that oversight of grant administration may be ineffective or that medical officers may sympathize with the plight of HAART patients and help them ‘game’ the system. It also suggests that the means test is far from foolproof given that some people on disability grants were also working.

There are several limitations in our study that should be addressed in future work. First, it is possible that our results may not generalize to other populations on HAART. As mentioned above, our sample was recruited using convenience/snowball methodologies. Consequently, the individuals in our panel study may have been especially vigilant about their health: they were among the very first people who received HAART and hence would have received extensive counseling as part of the pilot program. Indeed, these patients were part of a cohort which pioneered access to treatment for all: the pilot has been closely associated with civil society organisations such as the

Treatment Action Campaign. As a result, our sample may well exclude those who would be less likely or able to adhere to treatment in the face of grant loss and/or more likely to forego treatment for income.

Second, our strategies to explore whether individuals respond to perverse incentives were indirect. While findings from a variety of our tests suggest that individuals do not trade off health for income, future research would do well to procure more direct evidence.

Third, self-reported measures of health may be prone to reporting biases. While a growing literature points to the utility of self-assessed health for its reflection of both objective and subjective well-being [31, 32], future research should seek to use more objective indicators, such as viral loads or CD4+ counts. On this point, we did use some self-reported information on CD4+ counts, and the results conformed to our other findings. However, self-reported CD4+ counts are only available for about 60% of the sample, and the number of reported counts varies greatly across individuals. Thus, we did not highlight these results due to concerns about recall bias and sample selection.

Our findings indicate several directions for further research and policy. Regarding the disability grant program specifically, future work should investigate the issue of perverse incentives with a more direct approach. The reasons that ineligible individuals continue to receive grants should be probed as well. More broadly, our findings that large drops in income and changes in household composition follow the loss of a disability grant illustrate the need to investigate alternate social welfare programs for unemployed AIDS patients and/or more effective mechanisms to smooth consumption and income over time.

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