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Aging, HIV, non-communicable disease and poverty: A case study of syndemics in a low-income population

SHORT Abstract for PAA 2019

The landscape of health in South Africa is shifting. The HIV epidemic is aging due to anti-retroviral treatment rollout and continued HIV risk at older ages. Simultaneously, social, health and economic risk factors are contributing to an emerging non-communicable disease (NCD) epidemic. Poverty and post-apartheid social conditions include a split public/private health care system, relegating poorer individuals to less robust care. Public services further marginalize older persons in ill health as the services were designed for maternal and child health, and TB/HIV care, but not for NCDs or diseases of aging. Employing a "syndemics" framework and a qualitative case study and survey data from rural northeastern South Africa, we highlight the need to explore the intersections between aging, HIV, NCDs and poverty. By incorporating a biosocial conception of health, we can better understand older South Africans' health profiles, and generate more holistic interventions to address their critical health needs.

LONG ABSTRACT FOR PAA 2019

Tintswalo, age 76 in 2018, stays alone. She is living with HIV, asthma, high blood pressure and most recently a stroke, which paralyzed the left side of her body. She stays alone, having left her husband who did not treat her well, and who had had many affairs. She is able to provide for herself with the help of social grants – first a disability pension, and since she turned 60, an old-age pension. Her pension is sufficient to cover necessities like maize meal, relish (vegetables) and electricity. She also contributes to a Stokvel that enabled her to build an additional room on her house and which she uses for household furnishings, and she belongs to a funeral society so her sister, who is her closest kin, will not suffer when she died.

When Tintswalo left her husband in the late 1990s, he was sick and later passed away, likely of HIV/AIDS. Despite knowing about her husbands' affairs and having been treated for a number of STIs over the years, they never used condoms. Thus, she assumes she contracted HIV from her husband. Soon after she moved to the Agincourt sub-district and built her own home close to her sisters, she tested for HIV, learned she was HIV-positive, and started on antiretroviral therapy. She was in her mid-50s then, so already outside of the age group that was being 'counted' for AIDS data. She disclosed to her family when she became sick, calling on them at various times for assistance when she was sick.

Between 2013 and 2018, Tintswalo suffered a stroke which further debilitated her. Although, Tintswalo is still able to cook and clean for herself, she has no living children, so when she is struggling, she depends on her sisters, nieces and nephews for assistance. She says her illness is growing and that she has more pain now than in the past in her leg and hands. Sometimes the pain is so great that she cannot manage to cover herself with a blanket and needs to call her sister in the middle of night for help. Without any children, no one else helps her with money, she depends on her pension to cover her trips to the clinic for ARV and to an Indian doctor who gives injections, the latter care is expensive. While Tintswalo seems to be adherent and managing her HIV and her high blood pressure, the increasing restrictions to her

mobility and general health are likely to create additional difficulties, exemplifying the syndemics of HIV, NCDs, insufficient social support programs, in a context of poverty and inefficient health care systems.

Background

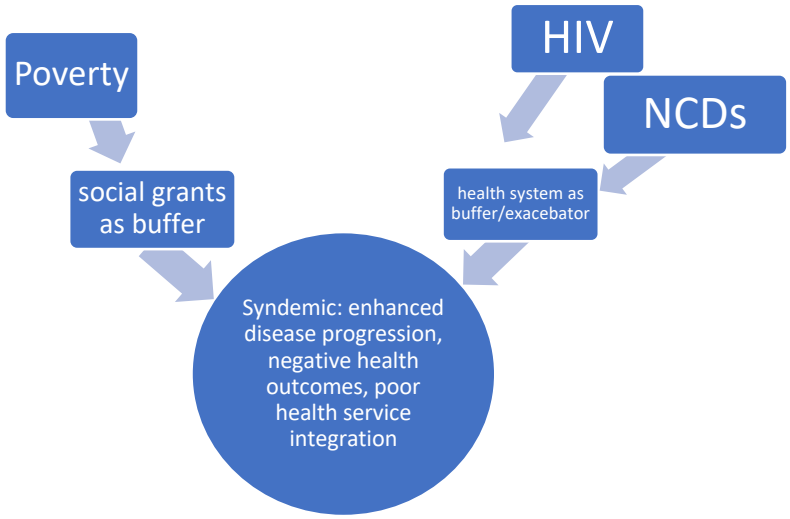
South Africa has experienced extensive changes in political, social, and health environments over the last 30 years (Alaba & Chola, 2013; Allison & Harpham, 2002; Kahn et al., 2006). The early 1990s saw the end of apartheid and birth of a nation with a new Constitution and the election of the first black president, Nelson Mandela. The revised South African Constitution aimed to ensure racial and gender equality to make up for decades of racist policies (Albertyn, 2007). Despite the new political agenda, the social and economic life of black South Africans remains onerous, particularly in former homeland areas to which black population were forcibly moved under the apartheid system, and remain today (Collinson, 2010; Kahn et al., 2007; Posel, 2005). Agincourt sub-district, where this study takes place, and was part of the Gazankulu Homeland until the early 1990s, continues to be marked by this legacy, with poor soil for farming, a lack of infrastructure, and in sufficient employment opportunities (Collinson, 2010; Schatz, Madhavan, & Williams, 2011). This space is also where a dual burden of disease has emerged –epidemics of both HIV and non-communicable disease (NCD) (Gómez-Olivé et al., 2013; Kahn et al., 2006; Mayosi et al., 2009). At first these two diseases affected different populations – the HIV epidemic raged among the young and those in the prime of life, while the NCD epidemic was the scourge of those aged 50 and above (Mayosi et al., 2009; Shisana et al., 2005). Before the rollout of antiretroviral therapy, and to a greater extent in the years since, the overlapping of the epidemics in those aged 50 and above in the context of poverty has produced a syndemic (Gómez-Olivé et al., 2013; Kabudula et al., 2017; Knight, Schatz, & Mukumbang, 2017; Mendenhall, Kohrt, Norris, Ndetei, & Prabhakaran, 2017; Singer, Bulled, Ostrach, & Mendenhall, 2017; Tsai, Mendenhall, Trostle, & Kawachi, 2017). In this paper we explore syndemic formed by these overlapping epidemics, and the social and health system factors that contribute to it.

In the syndemic model, not only are there biological interactions between co-occurring epidemics, but these interactions are further aggravated by contextual or social factors. Poverty, social trauma, and limited health-care access are three key factors that can exacerbate biological interactions in co-occurring epidemics (Singer et al., 2017). These interactions are even greater in populations experiencing structural, political, and social vulnerabilities (Mendenhall et al., 2017). The syndemic framework posits that "macro-level social factors promote disease clustering at the population level and impact disease pathologies at the individual level" (Mendenhall et al., 2017, p. 889). Singer et al.'s (2017, p. 941) definition that outlines the importance of both the biological and social highlighting the "co-present, or sequential diseases and the social and environmental factors that promote and enhance the negative effects of disease interaction." This definition helps to uncover that the drivers of the co-occurrence of HIV and NCD among older South Africans, both at the population and individual levels, is both biological and affected by social and environmental factors including poverty, health care access, and lifestyle risk factors that enhance negative disease interaction.

Our case study, which includes both qualitative and quantitative data from a rural community in South Africa, outlines the co-occurring of the HIV and NCD epidemics in a context of structural vulnerabilities exacerbated by aging. Together factors contributing to this syndemic include: (a) HIV shifts at population level such that a greater proportion of those living with HIV are aged 50 or older, (b) an NCD epidemic due to behavioral and environmental factors, (c) poverty and post-apartheid social conditions producing structural vulnerabilities, and (d) health care services designed to serve younger persons (e.g., maternal and child health). [See Figure 1]. Thus, HIV/NCD multi-morbidity is a result of the interaction of pathogens and illness (both physical and mental health), social factors, and the (lack of) efficacy of

treatment. In this paper we will expand on and provide evidence of each of the factors above, as well as highlight the pathways through which the socioenvironmental conditions exacerbate HIV and NCDs. We will discuss how greater health burdens and health disparities emerge from undiagnosed ailments and bifurcated treatment. In the discussion, we will present a syndemic care system that could increase treatment efficiencies and reduce both physical and economic treatment costs.

Figure 1: Elements of Aging Sydnemic: HIV, NCD, & Poverty



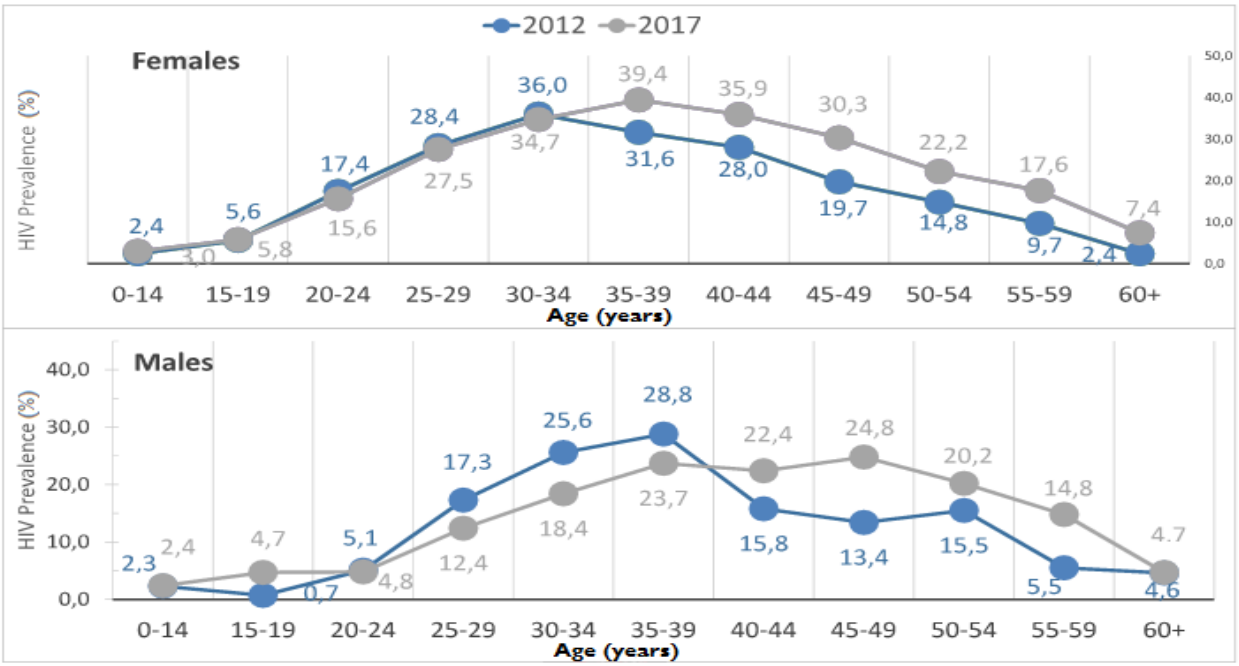
THE HIV EPIDEMIC

There was a rapid increase in the number of people living with HIV, from 1 million in the mid-1990s to 7 million currently. But during that time, there have been significant shifts in the age distribution of the epidemic.

In 1990s, the early years of the epidemic, older persons were more often affected by HIV than infected. Death was a prominent feature of HIV in older person's families and networks, but it was more often their children and nieces/nephews who were sick and dying than their peers (Posel, Kahn, & Walker, 2007; Seeley, Wolff, Kabunga, Tumwekwase, & Grosskurth, 2009). During these years, older persons, and older women in particular often provided care to those who were sick and dying from HIV/AIDS, as well as those who were orphaned by it (Bohman, Vasuthevan, van Wyk, & Ekman, 2007; Schatz, 2007; Schatz et al., 2011; Schatz & Ogunmefun, 2007). As the middle generation hollowed out, life expectancy at birth decreased, and yet the population aged as a growing proportion of the overall population was aged 50 plus (Kabudula et al., 2017; UNAIDS, 2014).

As early as the early 2000s, and certainly by the 2010s, evidence began to emerge that there was a significant number of those in their 50s and above, particularly men, who were living with HIV. In recent years, the number of older persons living with HIV has increased (Negin & Cumming, 2010; UNAIDS, 2014). At the same time, very recently, there is beginning to be drops in incidence in younger ages, resulting in a reduction in prevalence at younger ages (Human Sciences Research Council, 2018). Because of ART rollout, and thus individuals living longer with HIV, the prevalence at older ages is likely to continue to increase in the years to come as the high prevalence of individuals currently in their 30s

age. Similar patterns of the aging of the epidemic are being seen in data from our study site, as the rollout of ART is reducing mortality from HIV at all ages, but there is a cohort of individuals already infected who will continue to age on ART as long as they remain adherent (Gómez-Olivé et al., 2013; Mee et al., 2016).



Human Sciences Research Council (HSRC), 2018. http://www.hsrc.ac.za/uploads/pageContent/9234/FINAL%20Presentation%20for%2017%20July%20launch.pdf

While much of the increase in HIV prevalence at older ages is due to individuals living longer on ART, there are also new cases at older ages (Negin et al., 2016; Negin, Martiniuk, et al., 2012). There is some evidence that older persons who contract HIV at older ages, only test for HIV when they are symptomatic, and thus receive a later diagnosis (Cornell et al., 2015; Negin, Nemser, et al., 2012; Schatz & Knight, 2017; Snow, Madalane, & Poulsen, 2010). This can lead to both a greater biological impact, but also negative mental health outcomes if the diagnosis is unexpected or particularly stigmatized among older persons (Schatz & Knight, 2017). HIV is a sexually transmitted disease making the stigma potentially greater for older persons, and older women in particular, since sexual activity is often assumed to decrease and eventually stop in older ages (Angotti, Mojola, Schatz, Williams, & Gomez-Olive, 2018; Sennott & Mojola, 2016). Because of this assumption that older persons are not sexually active, it may feel especially shameful or shocking for an older person to learn that they are HIV-positive.

- Before PAA, we will incorporate more primary data from Agincourt (HIV and NCD Surveillance Study conducted in 2010-11 and Life History Interview data from 2013 – expanding Tintswalo's story at the beginning).

The stigmatization, trauma and stress related to diagnosis may contribute to the onset or exacerbation of other diseases (Singer et al., 2017), perhaps particularly mental health and ailments like high blood pressure and hypertension, which can be affected by worry and anxiety. Very few services exist, particularly in rural areas, to address mental health issues. This is perhaps evidenced by the shockingly

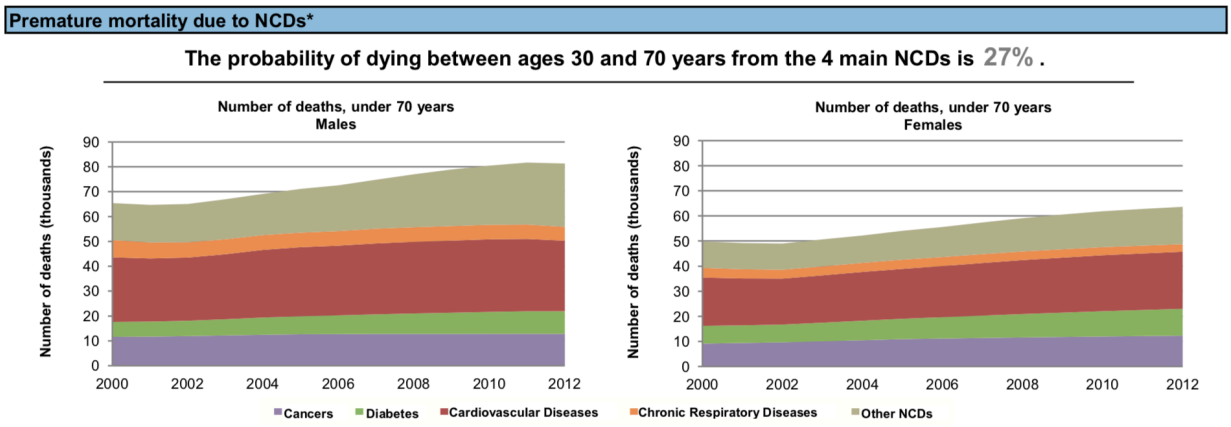
high suicide rate in the study area (it was the fifth most common cause of death among those 15-49 from 1992-1995) (Kahn, Tollman, Garenne, & Gear, 1999). It is also important to note that HIV services in particular, but health services more generally in South Africa as well, are very much set up to serve younger generations. The key clientele are mothers, infants, and children. With the expansion of HIV and TB services, more services geared toward adults are available, but clinic remain both a female space, and one geared to serve younger persons (Dovel, Yeatman, Watkins, & Poulin, 2015).

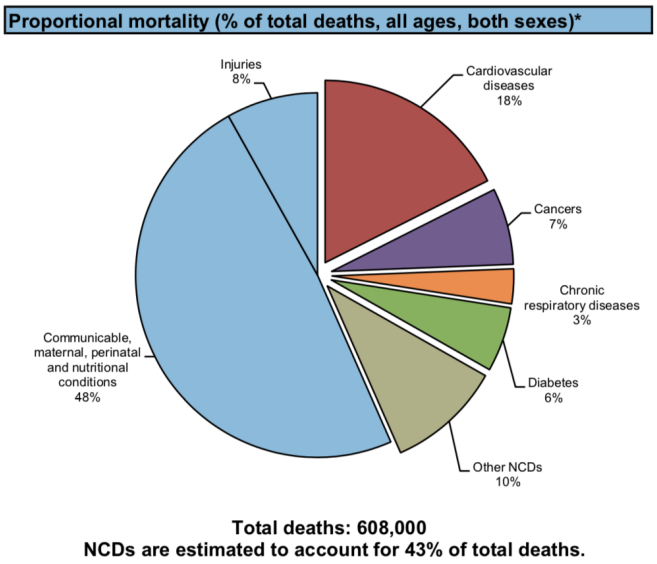
Biological aging resulting in frailty and immunosenescence, contributes to the likelihood of multimorbidity among older persons living with HIV (OPLWH) heightening their vulnerability to TB, other infectious diseases and NCDs (Narayan et al., 2014; Oni et al., 2015). Despite need and well documented justification, screenings and treatment for cardiovascular disease and other NCDs are not well integrated into HIV programs in LMICs (Rabkin et al., 2018).

EMERGENCE OF AN NCD EPIDEMIC

Non-communicable diseases (NCDs) are at epidemic levels in South Africa, and have been since the early 2000s, if not before (Mayosi et al., 2009, 2012). There are some differences by HIV status, age, gender, and geography, but the burden of disease is significant. The national picture shows that there has been a steady increase in the number of deaths due to NCDs for both men and women between 2000 and 2012 (World Health Organization, 2014). [See Figure 3]. The NCDs tracked in this particular country profile include cancers, diabetes, cardiovascular diseases, chronic respiratory diseases, and other NCDs. In the early 2000s, about 68,000 men and 50,000 women died each year from NCDs; in 2012, over 80,000 men and around 65,000 women had NCD-related deaths. Fourth-three percent of all deaths (all ages and both sexes) were attributable to NCDs, with the largest segment of that being deaths from cardiovascular diseases. [See Figure 4].

Figures 3 & 4: Reproduced from South Africa's Profile in Noncommunicable Disease Country Profiles 2014 (World Health Organization, 2014)





Since cardiovascular diseases are the greatest contributor to NCD-related mortality, it is a key NCD to examine in terms of prevalence, morbidity, and risk factors. Hypertension is now more prevalent in LMICs than in high-income countries (World Health Organization, 2013). The prevalence of raised blood pressure in the African region was 46% over all (about 48% among men and 45% among women), the highest in any region in the world (World Health Organization, 2013). South Africa had the highest recorded levels of hypertension (78%) in the WHO-SAGE study of six countries across Africa, Asia and Latin America (Lloyd-Sherlock, Beard, Minicuci, Ebrahim, & Chatterji, 2014). The growing epidemic of hypertension is attributable to population aging and increases in behavioral risk factors like unhealthy diet, excessive alcohol use, limited physical activity, obesity and stress. These, along with tobacco use are also the main risk factors for all major NCDs. In the WHO Noncommunicable Disease Country Profile for South Africa (2014), it was reported that 28% of men and 8% of women were current smokers in 2011, and men's total alcohol per capita consumption was 18.4 liters of pure alcohol, much higher than among women, which was 4.2 liters (2010 data). The percent of men and women with raised blood pressure in 2008 was reported as similar with 35.2% of men and 32.4% of women. Obesity (2008 data) was significantly higher among women at 41% compared to men at 21% (World Health Organization, 2014). Other work from South Africa also showed that being overweight/obese was a key risk factor, particularly for women; other factors included being in the poorest wealth quintile and being a heavy drinker (Lloyd-Sherlock et al., 2014). The large number of persons at risk is a key factor in this epidemic, but health system inefficiencies are also culpable in there being large numbers of persons with undiagnosed, untreated and, therefore, unmanaged hypertension. In the WHO-SAGE study mentioned above, Lloyd-Sherlock and colleagues (2014) found that the percentage of South Africans who were aware of their hypertension and were on treatment, was astonishingly low, 38% were aware, about 31% reported being on treatment, and only 8% were controlling their hypertension.

Data from our study site in the rural northeast of South Africa (reported in Clark et al., 2015) among persons aged 18 and over, show that while risk factors and levels of hypertension are lower than in the national data, that the levels are still significant and call for attention. Smoking rates were slightly lower – 1% of women and 21% of men reported that they ever smoked. Alcohol use was measured in a different way, making it harder to compare, but 3% of women and 16% of men reported a relatively high frequency of drinking 1-5+ days per week. A particularly important finding is that nearly half of women and over one-third of men reported low physical activity. Age-adjusted rates among those 18 and older

for obesity were at 26% among women, 7% among men, for hypertension 39% among women and 37% among men, for any condition requiring chronic care were 56% of women, and 49% of men. As with a number of other studies, they reported that those living with HIV and on treatment having better outcomes for other NCDs because their NCD is being treated and managed, as well (Clark et al., 2015; Manne-Goehler, Montana, et al., 2017; Manne-Goehler, Siedner, et al., 2017; Negin, Nyirenda, Seeley, & Mutevedzi, 2013). More recent work that restricts the sample to just those 40-plus shows much higher rates of hypertension – 36% among those in their 40s, 46% among those in their 50s, 61% among those in their 60s and 69% among those in their 70s (Mojola et al., working paper 2018).

- Before PAA, we will incorporate more primary data from Agincourt (HIV and NCD Surveillance Study conducted in 2010-11 and Life History Interview data from 2013 – expanding Tintswalo's story at the beginning).

- Before PAA, we will incorporate additional literature on NCD prevalence and impact on communities like the one in which we are working, discuss the capacity of the health system to address NCDs, and make further connections between NCDs and poverty/lifestyle.

Adjaye-Gbewonyo, Kafui, Ichiro Kawachi, S. V. Subramanian, and Mauricio Avendano. "Income Inequality and Cardiovascular Disease Risk Factors in a Highly Unequal Country: A Fixed-Effects Analysis from South Africa." *International Journal for Equity in Health* 17, no. 1 (March 6, 2018): 31. https://doi.org/10.1186/s12939-018-0741-0.

Context of poverty and unprepared health system

The legacy of apartheid is still evident in both rural and urban South Africa in terms of geographical distribution of communities and resources. Apartheid as a political system encompassed policies of institutionalized racial and gendered segregation (Coovadia, Jewkes, Barron, Sanders, & McIntyre, 2009). Between 1913 and 1975, a series of governmental acts forcibly relocated Black, Colored and Indian populations to particular geographic spaces. In rural areas, the Black population was moved to arid agricultural lands with limited economic infrastructure. Men, in particular, were forced to seek low-wage labor in mines, farms, or other industries away from their families and communities. Apartheid and post-apartheid realities continue to relegate the Black population to less desirable living and economic spaces.

- Before PAA, we will incorporate more primary data from Agincourt (HIV and NCD Surveillance Study conducted in 2010-11 and Life History Interview data from 2013 – expanding Tintswalo's story at the beginning).

- We will use this section to discuss the context of poverty post-apartheid, and the role of old-age pensions (and other social grants) in sustaining older persons and their families.

Burns, Jonathan K., Andrew Tomita, and Crick Lund. "Income Inequality Widens the Existing Income-Related Disparity in Depression Risk in Post-Apartheid South Africa: Evidence from a Nationally Representative Panel Study." *Health & Place* 45 (May 1, 2017): 10–16. https://doi.org/10.1016/j.healthplace.2017.02.005.

Kangmennaang, Joseph, and Susan J. Elliott. "Towards an Integrated Framework for Understanding the Links between Inequalities and Wellbeing of Places in Low and

Middle Income Countries." *Social Science & Medicine* 213 (September 1, 2018): 45–53. https://doi.org/10.1016/j.socscimed.2018.07.002.
Seekings, Jeremy, Nicoli Nattrass, and Kasper. *Policy, Politics and Poverty in South Africa*. Springer, 2015.

Case, Anne, and Angus Deaton. "Large Cash Transfers to the Elderly in South Africa." *The Economic Journal* 108, no. September (1998): 1330–61.
Case, Anne, and Alicia Menendez. "Does Money Empower the Elderly? Evidence from the Agincourt Demographic Surveillance Site, South Africa." *Scandinavian Journal of Public Health* 35, no. 69 suppl (2007): 157–64. https://doi.org/10.1080/14034950701355445.
Lloyd-Sherlock, Peter. "Old Age and Poverty in Developing Countries: New Policy Challenges." *World Development* 28, no. 12 (December 2000): 2157–68. https://doi.org/10.1016/S0305-750X(00)00077-2.
Lloyd-Sherlock, Peter, Martin McKee, Shah Ebrahim, Mark Gorman, Sally Greengross, Martin Prince, Rachel Pruchno, et al. "Population Ageing and Health." *The Lancet* 379, no. 9823 (April 13, 2012): 1295–96. https://doi.org/10.1016/S0140-6736(12)60519-4.
Lloyd-Sherlock, Peter, Armando Barrientos, Valerie Moller, and João Saboia. "Pensions, Poverty and Wellbeing in Later Life: Comparative Research from South Africa and Brazil." *Journal of Aging Studies* 26, no. 3 (August 2012): 243–52. https://doi.org/10.1016/j.jaging.2012.02.003.
Ralston, Margaret, Enid Schatz, Jane Menken, F. Xavier Gómez-Olivé, and Stephen Tollman. "Who Benefits—Or Does Not—From South Africa's Old Age Pension? Evidence from Characteristics of Rural Pensioners and Non-Pensioners." *International Journal of Environmental Research and Public Health* 13, no. 1 (December 25, 2015): 85. https://doi.org/10.3390/ijerph13010085.
Schatz, Enid, F. Xavier Gómez-Olivé, Margaret Ralston, Jane Menken, and Stephen Tollman. "The Impact of Pensions on Health and Wellbeing in Rural South Africa: Does Gender Matter?" *Social Science & Medicine* 75, no. 10 (November 2012): 1864–73. https://doi.org/10.1016/j.socscimed.2012.07.004.

- We will also discuss the legacy of apartheid on the health care system – both in terms of the aims of the 'new' decentralized system that was built up after apartheid and how it was not designed for the needs of an aging population and NCDs, but rather to provide acute care and care for maternal and child health. We will include a discussion of policy and health services – set up for MCH, HIV/TB, - not 'intended' for older persons – We may add additional national/provincial data on spending on MCH, HIV/TB, vs NCDs. As Mendenhall outlines, "delayed medical attention aggravates undiagnosed disorders since people receive medical care only when symptoms become advanced." (Mendenhall et al., 2017). Some health service delays and difficulty in access derive from the vertical nature of public health services in South Africa. The focus of health services has been on maternal and child health, and more recently on integrating HIV and TB care.

Allison, Maria, and Trudy Harpham. “Southern African Perspectives on the Geography of Health.” *Health & Place* 8, no. 4 (December 2002): 223–25. https://doi.org/10.1016/S1353-8292(02)00004-7

Mayosi, Bongani M., and Solomon R. Benatar. “Health and Health Care in South Africa — 20 Years after Mandela.” *New England Journal of Medicine* 371, no. 14 (October 2, 2014): 1344–53. https://doi.org/10.1056/NEJMsr1405012.

Price, Max. “Health Care as an Instrument of Apartheid Policy in South Africa.” *Health Policy and Planning* 1, no. 2 (June 1, 1986): 158–70. https://doi.org/10.1093/heapol/1.2.158.

Schneider, Helen, and Joanne Stein. “Implementing AIDS Policy in Post-Apartheid South Africa.” *Social Science & Medicine* 52, no. 5 (March 1, 2001): 723–31. https://doi.org/10.1016/S0277-9536(00)00174-X.

Rabkin, Miriam, Margaret E. Kruk, and Wafaa M. El-Sadr. “HIV, Aging and Continuity Care: Strengthening Health Systems to Support Services for Noncommunicable Diseases in Low-Income Countries.” *AIDS* 26 (July 2012): S77–83. https://doi.org/10.1097/QAD.0b013e3283558430.

Susser, Mervyn, and Violet Padayachi Cherry. “Health and Health Care under Apartheid.” *Journal of Public Health Policy* 3, no. 4 (1982): 455–75. https://doi.org/10.2307/3342009.

Tollman, Stephen M, Kathleen Kahn, Benn Sartorius, Mark A Collinson, Samuel J Clark, and Michel L Garenne. “Implications of Mortality Transition for Primary Health Care in Rural South Africa: A Population-Based Surveillance Study.” *The Lancet* 372, no. 9642 (September 13, 2008): 893–901. https://doi.org/10.1016/S0140-6736(08)61399-9.

Van Rensburg, H.C.J., and S.R. Benatar. “The Legacy of Apartheid in Health and Health Care.” *South African Journal of Sociology* 24 (November 1993): 99–111. https://doi.org/10.1080/02580144.1993.10431680.

HIV, NCD and poverty syndemic

Older South Africans are also potentially vulnerable to both HIV and NCDs because of social and economic conditions such as poverty, poor living conditions and structural factors related to the vertical nature of the health care system (Knight et al., 2017; Lloyd-Sherlock, 2018; Singer et al., 2017). Despite policy intentions, many older persons experience a bifurcated care system, where they have to seek care for HIV and NCDs separately. This sometimes means seeing different providers, having separate appointments, or having to seek care at multiple places (Schatz & Knight, 2017). Older South Africans are often not seen as at risk for HIV, so they may be treated for other chronic conditions rather than being tested for HIV, thus HIV is often identified late exacerbating negative health outcomes (Akers, Bernstein, Henderson, Doyle, & Corbie-Smith, 2007; Schatz & Knight, 2017). Other barriers to care may, such as the cost of transportation or mobility limitations, may prevent others from seeking care as regularly as is needed to manage chronic conditions. Or as is the case particularly for older men, they may never engage with the health system, such that they die from HIV-related or NCD-related causes without ever having a diagnosis.

- Before PAA, we will incorporate more primary data from Agincourt (HIV and NCD Surveillance Study conducted in 2010-11 and Life History Interview data from 2013 – expanding Tintswalo's story at the beginning).

As is evident from Figure 5, not only is the majority of the population over the age of 40 in Agincourt suffering from at least one chronic condition, many are living with both HIV and an NCD. Hypertension alone is experienced by a significant proportion of the population in their 60s and above.

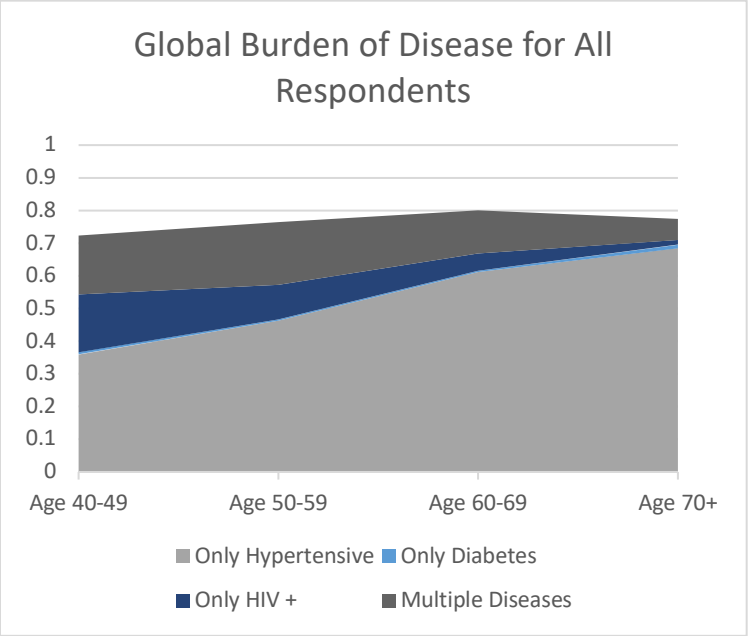


Figure 5: Global burden of disease for all respondents (Agincourt 2010-11)

- In this final section we will discuss how treating these three prongs of the syndemic (poverty, HIV and NCDs) together can improve prevention strategies as well as augment care by "addressing both the roots of sickness (inequality) and the treatment of symptoms (clinical care)" simultaneously (Mendenhall et al., 2017). We will offer a 'syndemic care system.' It will focus both on the unintended counter-syndemic (when efforts to treat one condition improves or eliminates another) (Singer et al., 2017) that has already been seen among older persons living with HIV who are adherent to ART and have an 'ART advantage' such that they are also more likely to have had NCDs diagnosed and treated (Manne-Goehler, Montana, et al., 2017; Manne-Goehler, Siedner, et al., 2017; Negin et al., 2013). This suggests that among older persons who are living with NCDs but undiagnosed HIV, or undiagnosed conditions in general, that simply increasing regular engagement with the health system, and shifting ideas about what illnesses older persons should be screened for and when, could go a long way to improving the care of older persons in South Africa. But, it is also about shifting and improving social policy aimed at older persons, whether that means increasing the availability and knowledge of community health workers to address older persons wholistic needs, or bringing more social workers into the health system to address social and mental health concerns raised by older persons; each of these may help reduce some of the structural vulnerabilities felt by older persons in these communities (Mendenhall et al., 2017). Thus the resulting syndemic care

system will include a mix of recommended social and health polies that recognize the needs of older persons in the health system, such that individuals living with HIV will be screened and treated for NCDs, but also that individuals with NCDs will be screened and treated for HIV, and that mental health resources and social support will be threaded throughout. “The provision of patient-centred medical care that incorporates diagnostics and routine care within a single clinical encounter can save patients valuable time and money and improve patients’ outcomes by working to overcome underlying social, economic, and psychological impediments to treatment regimens.”// “health systems that take syndemic interactions into account will be designed to optimise wellbeing of whole persons and address underlying social and structural causes rather than asking clinicians to treat individual diseases in isolation” (Mendenhall et al., 2017).

Works Cited

Akers, A., Bernstein, L., Henderson, S., Doyle, J., & Corbie-Smith, G. (2007). Factors Associated with Lack of Interest in HIV Testing in Older At-Risk Women. *Journal of Women's Health*, *16*(6), 842–858. https://doi.org/10.1089/jwh.2006.0028

Alaba, O., & Chola, L. (2013). The social determinants of multimorbidity in South Africa. *International Journal for Equity in Health*, *12*(1), 63. https://doi.org/10.1186/1475-9276-12-63

Albertyn, C. (2007). Substantive Equality and Transformation in South Africa. *South African Journal on Human Rights*, *23*(2), 253–276. https://doi.org/10.1080/19962126.2007.11864921

Allison, M., & Harpham, T. (2002). Southern African perspectives on the geography of health. *Health & Place*, *8*(4), 223–225. https://doi.org/10.1016/S1353-8292(02)00004-7

Angotti, N., Mojola, S. A., Schatz, E., Williams, J. R., & Gomez-Olive, F. X. (2018). "Taking care" in the age of AIDS: older rural South Africans' strategies for surviving the HIV epidemic. *Culture Health & Sexuality*, *20*(3), 262–275. https://doi.org/10.1080/13691058.2017.1340670

Bohman, D. M., Vasuthevan, S., van Wyk, N. C., & Ekman, S. (2007). "We clean our homes, prepare for weddings and go to funerals": Daily lives of elderly Africans in Majaneng, South Africa. *Journal of Cross-Cultural Gerontology*, *22*, 323–337.

Clark, S. J., Gómez-Olivé, F. X., Houle, B., Thorogood, M., Klipstein-Grobusch, K., Angotti, N., … Tollman, S. (2015). Cardiometabolic disease risk and HIV status in rural South Africa: establishing a baseline. *BMC Public Health*, *15*, 135. https://doi.org/10.1186/s12889-015-1467-1

Collinson, M. (2010). Striving against adversity: The dynamics of migration, health and poverty in rural South Africa. *Global Health Action*, *3*(5080). Retrieved from http://www.globalhealthaction.net/index.php/gha/article/view/5080/5671

Coovadia, H., Jewkes, R., Barron, P., Sanders, D., & McIntyre, D. (2009). The health and health system of South Africa: historical roots of current public health challenges. *The Lancet*, *374*(9692), 817–834. https://doi.org/doi: DOI: 10.1016/S0140-6736(09)60951-X

Cornell, M., Johnson, L. F., Schomaker, M., Tanser, F., Maskew, M., Wood, R., … Myer, L. (2015). Age in antiretroviral therapy programmes in South Africa: a retrospective, multicentre, observational cohort study. *The Lancet HIV*, *2*(9), e368–e375. https://doi.org/10.1016/S2352-3018(15)00113-7

Dovel, K., Yeatman, S., Watkins, S., & Poulin, M. (2015). Men's heightened risk of AIDS-related death: the legacy of gendered HIV testing and treatment strategies. *AIDS (London, England)*, *29*(10), 1123–1125. https://doi.org/10.1097/QAD.0000000000000655

Gómez-Olivé, F. X., Angotti, N., Houle, B., Klipstein-Grobusch, K., Kabudula, C., Menken, J., … Clark, S. J. (2013). Prevalence of HIV among those 15 and older in rural South Africa. *AIDS Care*, *25*(9), 1122–1128. https://doi.org/10.1080/09540121.2012.750710

Human Sciences Research Council. (2018). *South African National HIV Prevalence, Incidence, Behavior and Communication Survey, 2017*. Presented at the HSRC Presentation. Retrieved from http://www.hsrc.ac.za/uploads/pageContent/9234/FINAL%20Presentation%20for%2017%20July%20launch.pdf

Kabudula, C. W., Houle, B., Collinson, M. A., Kahn, K., Gómez-Olivé, F. X., Clark, S. J., & Tollman, S. (2017). Progression of the epidemiological transition in a rural South African setting: findings from population surveillance in Agincourt, 1993-2013. *BMC Public Health*, *17*(1), 424. https://doi.org/10.1186/s12889-017-4312-x

Kahn, Kathleeen, Tollman, S., Thorogood, M., Conner, M., Garenne, M., Collinson, M., & Hundt, G. (2006). Older adults and the health transition in Agincourt, rural South Africa: New understanding, growing complexity. In B. Cohen & J. Menken (Eds.), *Aging in Sub-Saharan Africa: Recommendations for furthering research*. National Academies Press.

Kahn, Kathleen, Tollman, S. M., Collinson, M. A., Clark, S. J., Twine, R., Clark, B. D., … Garenne, M. L. (2007). Research into health, population and social transitions in rural South Africa: Data and methods of the Agincourt Health and Demographic Surveillance System. *Scandinavian Journal of Public Health*, *35*(69 suppl), 8–20. https://doi.org/10.1080/14034950701505031

Kahn, Kathleen, Tollman, S. M., Garenne, M., & Gear, J. S. S. (1999). Who dies from what? Determining cause of death in South Africa's rural north-east. *Tropical Medicine & International Health*, *4*(6), 433–441. https://doi.org/10.1046/j.1365-3156.1999.00415.x

Knight, L., Schatz, E., & Mukumbang, F. C. (2017). "I attend at Vanguard and I attend here as well": barriers to accessing care among older South Africans living with HIV and NCDs. Presented at the AIDS Impact Conference, Cape Town, South Africa.

Lloyd-Sherlock, P. (2018). Long-term Care for Older People in South Africa: The Enduring Legacies of Apartheid and HIV/AIDS. *Journal of Social Policy*, (June), 1–21. https://doi.org/10.1017/S0047279418000326

Lloyd-Sherlock, P., Beard, J., Minicuci, N., Ebrahim, S., & Chatterji, S. (2014). Hypertension among older adults in low- and middle-income countries: prevalence, awareness and control. *International Journal of Epidemiology*, *43*(1), 116–128. https://doi.org/10.1093/ije/dyt215

Manne-Goehler, J., Montana, L., Gómez-Olivé, F. X., Rohr, J., Harling, G., Wagner, R. G., … Gaziano, T. A. (2017). The ART advantage: healthcare utilization for diabetes and hypertension in rural South Africa. *Journal of Acquired Immune Deficiency Syndromes (1999)*, *75*(5), 561–567. https://doi.org/10.1097/QAI.0000000000001445

Manne-Goehler, J., Siedner, M., Geldsetzer, P., Harling, G., Montana, L., Rohr, J., … Barnighausen, T. (2017). Leveraging the ART Advantage: diabetes and hypertension along the HIV care cascade in rural South Africa. *Open Forum Infectious Diseases*, *4*, S58–S58. https://doi.org/10.1093/ofid/ofx162.137

Mayosi, B. M., Flisher, A. J., Lalloo, U. G., Sitas, F., Tollman, S. M., & Bradshaw, D. (2009). The burden of non-communicable diseases in South Africa. *The Lancet*, *374*(9693), 934–947. https://doi.org/10.1016/S0140-6736(09)61087-4

Mayosi, B. M., Lawn, J. E., van Niekerk, A., Bradshaw, D., Abdool Karim, S. S., & Coovadia, H. M. (2012). Health in South Africa: changes and challenges since 2009. *The Lancet*, *380*(9858), 2029–2043. https://doi.org/10.1016/S0140-6736(12)61814-5

Mee, P., Kahn, K., Kabudula, C. W., Wagner, R. G., Gómez-Olivé, F. X., Madhavan, S., … Byass, P. (2016). The development of a localised HIV epidemic and the associated excess mortality burden in a rural area of South Africa. *Global Health, Epidemiology and Genomics*, *1*. https://doi.org/10.1017/gheg.2016.3

Mendenhall, E., Kohrt, B. A., Norris, S. A., Ndetei, D., & Prabhakaran, D. (2017). Non-communicable disease syndemics: poverty, depression, and diabetes among low-income populations. *The Lancet*, *389*(10072), 951–963. https://doi.org/10.1016/S0140-6736(17)30402-6

Narayan, K. M. V., Miotti, P. G., Anand, N. P., Kline, L. M., Harmston, C., Gulakowski, R., & Vermund, S. H. (2014). HIV and noncommunicable disease comorbidities in the era of antiretroviral therapy: a vital agenda for research in low- and middle-income country settings. *Journal of Acquired Immune Deficiency Syndromes*, *67 Suppl 1*, S2-7. https://doi.org/10.1097/QAI.0000000000000267

Negin, J., & Cumming, R. G. (2010). HIV infection in older adults in sub-Saharan Africa: extrapolating prevalence from existing data. *Bulletin of the World Health Organization*, *88*(11), 847–853. https://doi.org/10.2471/BLT.10.076349

Negin, J., Gregson, S., Eaton, J. W., Schur, N., Takaruza, A., Mason, P., & Nyamukapa, C. (2016). Rising Levels of HIV Infection in Older Adults in Eastern Zimbabwe. *PLOS ONE*, *11*(11), e0162967. https://doi.org/10.1371/journal.pone.0162967

Negin, J., Martiniuk, A., Cumming, R. G., Naidoo, N., Phaswana-Mafuya, N., Madurai, L., … Kowal, P. (2012). Prevalence of HIV and chronic comorbidities among older adults. *AIDS (London, England)*, *26 Suppl 1*, S55-63. https://doi.org/10.1097/QAD.0b013e3283558459

Negin, J., Nemser, B., Cumming, R., Lelerai, E., Ben Amor, Y., & Pronyk, P. (2012). HIV attitudes, awareness and testing among older adults in Africa. *AIDS and Behavior*, *16*(1), 63–68. https://doi.org/10.1007/s10461-011-9994-y

Negin, J., Nyirenda, M., Seeley, J., & Mutevedzi, P. (2013). Inequality in Health Status Among Older Adults in Africa: The Surprising Impact of Anti-Retroviral Treatment. *Journal of Cross-Cultural Gerontology*, *28*(4), 491–493. https://doi.org/10.1007/s10823-013-9215-4

Oni, T., Youngblood, E., Boulle, A., McGrath, N., Wilkinson, R. J., & Levitt, N. S. (2015). Patterns of HIV, TB, and non-communicable disease multi-morbidity in peri-urban South Africa- a cross sectional study. *BMC Infectious Diseases*, *15*, 20. https://doi.org/10.1186/s12879-015-0750-1

Posel, D. (2005). Sex, Death and the Fate of the Nation: Reflections on the Politicization of Sexuality in Post-Apartheid South Africa. *Africa: Journal of the International African Institute*, *75*(2), 125–153.

Posel, D., Kahn, K., & Walker, L. (2007). Living with death in a time of AIDS: A rural South African case study. *Scandinavian Journal of Public Health*, *35*(Suppl 69), 138–146.

Rabkin, M., Palma, A., McNairy, M. L., Gachuhi, A. B., Simelane, S., Nuwagaba-Biribonwoha, H., … El-Sadr, W. M. (2018). Integrating cardiovascular disease risk factor screening into HIV services in Swaziland: lessons from an implementation science study. *AIDS (London, England)*, *32 Suppl 1*, S43–S46. https://doi.org/10.1097/QAD.0000000000001889

Schatz, E. (2007). 'Taking care of my own blood': older women's relationships to their households in rural South Africa. *Scandinavian Journal of Public Health*, *35*(Suppl 69), 147–154.

Schatz, E., & Knight, L. (2017, November). *"I was referred from the other side": Gender and HIV testing among older South Africans living with HIV*. Presented at the University of Western Cape, School of Public Health - Research Seminar, Bellville, South Africa.

Schatz, E., Madhavan, S., & Williams, J. (2011). Female-headed households contending with HIV/AIDS-related hardship in rural South Africa. *Health & Place*, *17*, 598–605. https://doi.org/10.1016/j.healthplace.2010.12.017

Schatz, E., & Ogunmefun, C. (2007). Caring and contributing: the role of older women in multi-generational households in the HIV/AIDS era. *World Development*, *35*(8), 1390–1403.

Seeley, J., Wolff, B., Kabunga, E., Tumwekwase, G., & Grosskurth, H. (2009). "This is where we buried our sons": people of advanced age coping with the impact of the AIDS epidemic in a resource-poor setting in rural Uganda. *Ageing & Society*, *29*(1), 115–134.

Sennott, C., & Mojola, S. A. (2016). 'Behaving well': the transition to respectable womanhood in rural South Africa. *Culture, Health & Sexuality*, *0*(0), 1–15. https://doi.org/10.1080/13691058.2016.1262062

Shisana, O., Rehle, T., Simbayi, L., Parker, W., Zuma, K., Bhana, A., … Pillay-van-Wyk, V. (2005). *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey, 2005*. Cape Town, South Africa: HSRC Press. Retrieved from http://www.hsrc.ac.za/Media_Release-379.phtml

Singer, M., Bulled, N., Ostrach, B., & Mendenhall, E. (2017). Syndemics and the biosocial conception of health. *The Lancet*, *389*(10072), 941–950. https://doi.org/10.1016/S0140-6736(17)30003-X

Snow, R. C., Madalane, M., & Poulsen, M. (2010). Are men testing? Sex differentials in HIV testing in Mpumalanga Province, South Africa. *AIDS Care*, *22*(9), 1060–1065. https://doi.org/10.1080/09540120903193641

Tsai, A. C., Mendenhall, E., Trostle, J. A., & Kawachi, I. (2017). Co-occurring epidemics, syndemics, and population health. *The Lancet*, *389*(10072), 978–982. https://doi.org/10.1016/S0140-6736(17)30403-8

UNAIDS. (2014). *The Gap Report*. Geneva, Switzerland: UNAIDS.

World Health Organization. (2013). *A global brief on hypertension*. Geneva, Switzerland: World Health Organization. Retrieved from http://www.who.int/cardiovascular_diseases/publications/global_brief_hypertension/en/

World Health Organization. (2014). *Noncommunicable diseases country profiles 2014*. Geneva, Switzerland: World Health Organization.