

# Poverty, Inequality and Health in Sub-Saharan Africa: Evidence from the Demographic and Health Surveys

Draft Proposal for a Collaborative Research Program submitted to the Poverty Monitoring, Measurement and Analysis Network (PMMA) of the Poverty and Economic Policy (PEP) Research Network

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## 1. Main research questions and core research objectives

There are different approaches to the measurement of poverty. In essence, one can distinguish between the conventional approach to the measurement of poverty, which is based on income and/or expenditure data, and a number of alternative approaches, such as those that employ socio-economic indicators and participatory poverty assessments. Of these alternative approaches, the asset index approach applied to data from international Demographic and Health Surveys (DHS) has gained increasing popularity in recent years (Filmer and Pritchett, 1998; Sahn and Stifel, 2000; World Bank, 2000). The main objectives of this project are to:

- Calculate an asset index for a sample of sub-Saharan African countries from pooled data from the Demographic and Health Surveys conducted in these countries over the past 25 years.
- Calculate a range of standard poverty indices (e.g. FGT indices) and inequality measures (e.g. Gini coefficients and concentration indices) for these countries based on the asset index.
- Compare estimates of poverty and inequality in this group of countries over space and time.
- Perform decompositions of changes in poverty and inequality over space and time.
- Employ cross-country regression analysis in exploring the determinants of socio-economic inequalities in select health outcomes, notably health service utilisation, injury rates, and risky sexual behaviour and vulnerability to HIV infection.
- Apply regression analysis to pooled individual level data to investigate the role of poverty in explaining select health outcomes, notably health service utilisation, injury rates, and risky sexual behaviour and vulnerability to HIV infection.
- Draw general conclusions regarding the health and other policy interventions required to address inequalities in health and the ill-health (poverty) impacts of poverty (ill-health) in developing countries in Sub-Saharan Africa.

The one core research objective therefore is to apply the asset index methodology to pooled data from a sample of Sub-Saharan African countries to investigate trends in poverty and inequality. The second core research objective is to employ the resulting indicator of socio-economic status or welfare to investigate the relationship between health and poverty at the country and individual level.

## **2. Scientific contribution of the research, including key references and knowledge gaps**

The World Bank (2000) has published a twenty-two country reports describing the health, nutrition and population status and service utilization among individuals of different socio-economic classes using DHS data. Filmer and Pritchett's (1998) asset index approach to the measurement of poverty, the same approach to be employed in this work, was used to quantify differences in socio-economic status. Although these asset index estimates have been employed in a number of research papers as measure of socio-economic status, no such analysis has attempted to pool the data from Sub-Saharan Africa to guide this investigation of the linkages between health and poverty. Sahn and Stifel (2000) have applied a similar approach to that suggested here in pooling data from eleven African countries and using the resulting asset indices to calculate poverty estimates for these countries and to explore trends in poverty in Sub-Saharan Africa across time and space. However, it seems Sahn and Stifel (2000) did not go further like we suggest to employ these asset indices in investigating certain dimensions of poverty, the focus in the case of this project being on the health dimensions of poverty. In fact, this is the strength of the DHS surveys, i.e. the wealth of demographic, nutrition and health information it collects from households and male and female members of these households. In addition, the increasing number of DHS surveys that have been conducted in recent times (a total of twenty-four DHS surveys have been conducted in Sub-Saharan African countries since 2000) means that the pool of data can we hope be expanded considerably as part of this work, thus making it relatively more representative of Sub-Saharan Africa, but also allow a large number of countries to be included in the analysis of trends in poverty over time (to date, a total of seven countries have conducted four or more DHS surveys). This project in particular proposes to focus on three particularly important health issues, namely health service utilisation, the injury epidemic, and risky sexual behaviour and vulnerability to HIV infection, which brings us to the policy relevance of this work.

Why is a focus on *health service utilisation* important in the context of this analysis? An enhanced understanding of *health-care seeking behaviour* (demand) is important in terms of planning for the delivery of health care services (supply). There is limited evidence of the particular manner in which, and reasons why, individuals seek health care from public, private and other facilities over the course of an illness. In addition, health-care seeking behaviour may change as individuals and households move into and out of poverty over time. So, for example, persons may opt for private care when they access to medical aid, whereas they may opt for public care when not having access to medical aid. DHS surveys generally ask questions about visits for health care facilities in general in the past month. Hence, the data can be employed in exploring questions regarding the specific dynamics of health-care seeking behaviour relative to type of facility, illness (where possible) and other socio-economic characteristics of the individual.

**Injury** and particularly unintentional injury have been described as an accelerating epidemic, with its share in the global burden of disease estimated to increase from 15.1 to 20.1 percent between 1990 and 2020 (Zwi, 1999). Moreover, injury has only fairly recently come to be viewed as a public health problem (Rivara *et al.*, 1997). Rivara *et al.* (1997) argue that injury is the ‘most common cause of death among people 1 to 34 years of age, a leading cause of disability and years of life lost, and a major contributor to health care costs’. Zwi (1999) reports that injury accounts for a significant burden of mortality, morbidity, disability and health care costs. This injury epidemic is likely to worsen as poverty and inequality increase, and as globalisation, urbanization and industrialization continue to accelerate, as is the case in Africa in particular. The poor has been argued to suffer the most insofar as they have limited access to those mechanisms that can reduce their exposure to risk of injury (Zwi, 1999). Childhood injuries in particular are often associated with poor standards of health, poor adult supervision and lower economic status (Roberts *et al.*, 1998). The poor also have limited access to emergency care services. The available evidence from developed countries, however, provides conflicting views of the relationship between poverty and injury. Some studies report risk of injury to be higher at lower levels of socio-economic status. Others studies found no evidence of a statistically significant relationship between socio-economic status and injury (Cubbin *et al.*, 2000). In fact, Zwi (1999) contends that relatively little work has been conducted in developing countries in exploring inequalities in injury. Hence, this research can fill a particularly important gap in this specific area.

The link between poverty and **HIV/AIDS**, although much debated, is relatively complex. The HIV/AIDS epidemic poses a severe threat to the economies of developing countries, and those on the Sub-Saharan African continent in particular. The socio-economic impact of HIV/AIDS combine to create a vicious cycle of poverty and HIV/AIDS in which affected households are caught up (World Bank, 1998; Bonnel, 2000; Whiteside, 2002). In Sub-Saharan Africa, therefore, HIV/AIDS exposes already vulnerable, resource-poor households to further shocks. These are all ways in which HIV/AIDS can cause poverty to increase. However, poverty can also result in increased vulnerability to HIV/AIDS, which in turn can aid the spread of the disease. Poverty, apart from being associated with poor nutrition and a breakdown of immune systems, also stand to increase the vulnerability of people to HIV/AIDS by resulting amongst others in unsafe sexual practices as a result of lack of knowledge and lack of access to means of protection, due to women’s inability to negotiate about condom use with sexual partners as a result of entrenched gender roles and power relations, and because of violence and coercion (Whiteside, 2002). In fact, both Desmond (2001) and Whiteside (2002) emphasize how complex the relationship between poverty and HIV/AIDS actually is and how many facets it has, e.g. how labour migration induced by rural poverty can contribute to the spread of the disease and how poor, single mothers may be forced to become occasional sex workers in order to survive (Desmond, 2001; Poku, 2001). Gillies *et al.* (1996) and Nyamathi *et al.* (1996), moreover, highlight the importance of homelessness, urban/rural migration patterns, migrant labour practices and the breakdown of social support networks in communities with limited access to social service delivery and in developing countries in increasing the vulnerability of poor people to HIV/AIDS. Recent work in this field, however, has reported contradictory results, with country-level work finding HIV prevalence to be higher in poorer countries, whereas individual level

analysis finds evidence for both a positive and negative relationship between poverty/wealth and HIV/AIDS (World Bank, 1998). The focus in this work on the role of poverty in explaining vulnerability to HIV infection thus will play an important role in moving forward our knowledge about the relationship between poverty and HIV/AIDS.

### 3. Policy relevance

Inequalities in health present a major obstacle to economic development. Deaton (1999: 6) describes health inequalities as ‘deeply offensive, more so than the economic and social inequalities to which they are related’, with their elimination presenting a major focus of public health policy. Moreover, almost all countries in Sub-Saharan Africa have politically committed themselves to ensuring equitable access to health care. The socio-economic right to health care is entrenched in a number of human rights instruments to which countries are signatory, including the Universal Declaration of Human Rights (article 25), the United Nations Covenant on Economic, Social and Cultural Rights (article 12), the African Charter on Human and People’s Rights (article 16), and a range of other international conventions (Ngwena, 2000: 5-9). As such, inequalities in health and the health dimensions of poverty represent an important yardstick of progress towards development in general. This research, which stands to illuminate these linkages at both the country and individual level in the context of three particularly important health issues, namely health service utilisation, the injury epidemic, and risky sexual behaviour and vulnerability to HIV infection (see above discussion on importance of this focus), thus will play an important role in highlighting those development interventions and health policies that are likely to be important in achieving better health and wealth in Sub-Saharan Africa.

### 4. Methodology

The DHS traditionally does not include questions on income and expenditure. As a result, it is not possible to apply the conventional approach to the measurement of poverty. Filmer and Pritchett's (1998) asset index approach to the measurement of poverty will be employed to quantify differences in socio-economic status. The index is based on data from the household questionnaires administered during the DHS. The variables used for this purpose include those items that measure household ownership of consumer durables, access to services and aspects of housing infrastructure. Scoring factors for each of these variables are estimated with the aid of iterated principal factor analysis. The score on each variable is standardized in relation to the unweighted mean and standard deviation of the particular variable. The resulting scores are weighted with the scoring coefficient for that variable. The value of the household asset index is calculated by summing the score on each variable across all the variables included in the principal component analysis. In mathematical terms, the asset index for asset variables 1 to n can be represented as:

$$A_j = f_1 \times (a_{j1} - a_1) / (s_1) + \dots + f_n \times (a_{jn} - a_n) / (S_n) \quad (1)$$

where  $A_j$  represents the asset index,  $f$  the scoring factors or coefficients for each asset,  $a_{jn}$  the household’s score on the particular asset, and  $a$  and  $s$  the mean and standard deviation of each asset variable (Filmer and Pritchett, 1998: 6). The asset index will be employed in determining the extent of inequality and the incidence, prevalence and

depth of poverty in a sample of developing countries in Sub-Saharan Africa, including work aimed at determining how robust a measure of poverty the asset index represents. This work will also potentially assist in better understanding inequality in Africa, in view of the paucity of data in this regard. For instance, in Xavier Sala-I-Martin's (2002) recent attempt to arrive at world inequality and poverty estimates, one of the major data deficiencies was with respect to distributional data from Africa. Although the DHS contains no income or expenditure data, work on intra- and intercountry inequality based on the wealth indices constructed can be of relevance for other poverty and inequality research.

Differences in health, nutrition and population status across different socio-economic classes will be analysed by comparing various health indicators (pertaining to those health issues notes above and based on information collected from respondents during the DHS surveys) across individuals with different asset scores. Individuals are assigned the score on the asset index for the particular household to which they belong. For the purpose of these comparisons, scores on the asset index will be divided into population quintiles, with comparisons being made across the five quintiles.

In addition, the research will focus on two summary indicators employed in the HNP country reports to quantify inequalities in health across the five so-called wealth quintiles derived from the asset index, namely the poor/rich ratio and the concentration index (World Bank, 2000). These two summary indicators on inequalities in health will be employed in exploring the socio-economic disparities in the above-mentioned aspects of health, nutrition and population in Sub-Saharan Africa.

Regression analysis will be employed in investigating the determinants of socio-economic inequalities in select health outcomes at a country level as well as across countries, employing the poverty and inequality measures calculated from the data, certain national estimates of variables reported from the DHS datasets, as well as other data reported at the national level. Le Grand (1987) and Van Doorslaer *et al.* (1997) explored inequalities in health in developed countries with the aid of such regression analysis. Mwabu (2001), however, emphasize that inequalities in health also need to be evaluated with reference to differences in the environments in which health status and access to health care are assessed, e.g. the presence and absence of natural disasters and political instability, the nature of national health systems, and national policies and priorities, which will be attempted in this work (insofar as data availability allows it may be added). In addition, regression analysis based on pooled individual level data will be employed to explore the linkages between poverty/wealth and select health issues to inform policy (see above). An example of such work is that of Booyesen and Summerton (2002), which explores the role of poverty in risky sexual behaviour and vulnerability to HIV infection in South Africa, thus representing the early descriptive work of these authors in applying such approach to the South African DHS data. Importantly, the analysis suggested here allows the pooling of data to enhance the statistical power and representativeness of such individual level analysis.

## 5. Data requirements and sources

According to Sahn and Stifel (2000: 2127), more than seventy nationally representative Demographic and Health Surveys (DHS) have been conducted in more than fifty countries since 1984. One of the major strengths of these surveys is the relative standardisation in certain areas, albeit that individual surveys may also include country-specific questions and country-specific modules. These datasets are available for download on the website of Macro International once clearance for a particular research project has been obtained from the administrators of the website. The research team will apply to the administrator and access the necessary datasets from this website. Following a detailed comparison of the questionnaires and datasets employed in each of these surveys (including the questions on asset ownership, housing infrastructure, and access to services, as well as the necessary health modules to be employed in investigating certain linkages between health and poverty), the research team will select those countries and individual surveys to be included in the analyses proposed in this research proposal. However, one need to in the process note the observation of UNFPA () that there is a certain bias in country coverage, with those lower and middle income countries where USAID concentrate its development efforts being more likely to be included, as are larger countries and countries in need of programme assistance.

## 6. Dissemination strategy

The researchers and students involved in this project will be encouraged to present the interim and final results of their work at national and international conferences. Researchers and postgraduate students partaking in the project will each be expected individually or in partnership contribute a working paper on a specific part of the analysis as described in the main objectives. In addition, the University of the Free State will publish a selection of working papers from this research, which will be made available on their website. A summary of the main findings will be published in a policy brief that will be circulated to policy makers and will be made available to the public, using an established network such as ID21 for such dissemination. Finally, papers will be prepared from this research for publication in academic journals.

## 7. Short list of key references

- Booyesen, F. le R. & Summerton, J., 2002. Poverty, Risky Sexual Behaviour, and Vulnerability to HIV Infection: Evidence from South Africa. *Journal of Health, Population and Nutrition* 20(4): 285-288.
- Cubbin, C., Le Clere, F.B. & Smith, G.S., 2000. Socio-economic Status and the Occurrence of Fatal and Nonfatal Injury in the United States. *American Journal of Public Health* 90(1): 70-77.
- Deaton, A. 1999. *Inequalities in Income and Inequalities in Health*. Research Program in Development Studies, Princeton University.
- Desmond, D., 2001. Joint Epidemics: Poverty and AIDS in Sub-Saharan Africa. *Harvard International Review* Fall: 54-58.
- Filmer, D. & Pritchett, L., 1998. Estimating Wealth Effects without Expenditure Data - or Tears: An Application to Educational Enrollments in States of India. World Bank Policy Research Working Paper No. 1994. Washington, DC: Development Economics Research Group (DECRG), The World Bank.

- Gillies, P., Tolley, K. & Wolstenholme, J., 1996. Is AIDS a Disease of Poverty? *AIDS Care* 8(3): 351-363.
- Le Grand, J., 1987. Inequalities in Health: Some International Comparisons. *European Economic Review* 31: 182-191.
- Mwabu, G. 2001. Health Status in Africa: A Regional Profile. *South African Journal of Economics* 69(2): 319-335.
- Ngwena, C. 2000. Aids in Africa: Access to Health Care as a Human Right. *SA Public Law* 15: 1-25.
- Nyamathi, R.N., Flaskerud, J., Leake, B. & Chen, S., 1996. Impoverished Women at Risk for AIDS: Social Support Variables. *Journal of Psychosocial Nursing* 34(11): 31-39.
- Poku, N.K., 2001. Africa's AIDS Crisis in Context: 'How the Poor are Dying'. *Third World Quarterly* 22(2): 191-204.
- Rivara, F.P., Grossman, D.C. & Cummings, P., 1997. Injury Prevention: First of Two Parts. *New England Journal of Medicine* 337(8): 543-548.
- Sahn, D.E. & Stifel, D.C. 2000. Poverty Comparisons over Time and across Countries in Africa. *World Development* 28(12): 2123-2155.
- Sala-i-Martin, X. 2002. *The world distribution of income*. NBER Working Paper 8933. Cambridge, Mass: NBER
- UNFPA, 2002. *State of the World Population: People, Poverty and Possibilities*. New York: UNFPA.
- Van Doorslaer, E., Wagstaff, A., Bleichrodt, H., Calonge, S., Gerdtham, U., Gerfin, M., Geurts, J., Gross, L., Häkkinen, U., Leu, R.E., O'Donnell, O., Propper, C., Puffer, F., Rodriguez, M., Sundberg, G. & Winkelhake, O., 1997. Income-related Inequalities in Health: Some International Comparisons. *Journal of Health Economics* 16: 93-112.
- Whiteside, A., 2002. Poverty and HIV/AIDS in Africa. *Third World Quarterly* 23(2): 313-332.
- World Bank, 1998. *Confronting AIDS*. Washington, DC: World Bank.
- World Bank, 2000. *Country Reports on Health, Nutrition, Population and Poverty*. Available: <https://www.worldbank.org/poverty/health/data/intro.htm> [accessed 13 February 2001].
- Zwi, A. 1999. Injuries, Inequalities, and Health: From Policy Vacuum to Policy Action. In Leon, D. & Walt, G. (eds). *Poverty, Inequality, and Health*. Oxford: Oxford University Press.

## **8. Prior training and experience of team members in the issues and techniques involved**

Professor Frikkie Booysen has been trained as an economist and has in the past few years focussed primarily on research pertaining to health and poverty in South Africa, employing the South African DHS data in the way it is envisaged that multi-country DHS will be employed in this research project. He has developed an asset index for South Africa and has employed this index *inter alia* in investigating the role of poverty in relation to health service utilisation, injury, and risky sexual behaviour and vulnerability to HIV infection in South Africa, the three health focus areas highlighted as part of this research.

Servaas van der Berg, an economist, works mainly on issues of poverty, inequality and social policy, including benefit incidence analysis. His work has thus far mainly been confined to South African datasets.

Ronelle Burger, also an economist, has focused her recent research mainly on poverty and inequality and on education. Her PhD thesis, which she is undertaking at the University of Gothenburg, is on investment in Africa.

### **9. Expected capacity building for researchers and institutions**

A number of young researchers and postgraduate students at these two institutions will be drawn into this project and will benefit from an exposure to poverty analysis, the use of DHS datasets in the study of poverty, and the study of poverty and health issues in particular. Therefore, researchers and students stand to gain, not only in terms of exposure to data analysis, but also to the writing up of research papers and the reporting of results (see dissemination strategy above). It is also envisaged that this asset index, once developed and included in the large dataset, can be employed by researchers and students to explore any number of research questions related to poverty and health/wealth.

### **10. Any ethical, social, gender or environmental issues or risks which should be noted**

None.

### **11. List of past, current or pending projects in related areas involving team members (i.e. name of fund, institution, title of project, list of team members involved)**

World Health Organisation and Medical Research Council of South Africa. *Chronic Disease, Poverty and Lifestyle*. Steyn, K., Bradshaw, D., Booysen, F. le R.  
Mellon Foundation. *Geography as destiny: Considering the spatial dimensions of poverty, inequality and social mobility*. Van der Berg, S. & Burger, R.  
(South African) National Research Foundation. *Poverty and Affluence: Towards understanding inclusion and exclusion from the economic mainstream*. Van der Berg, S & Burger, R.