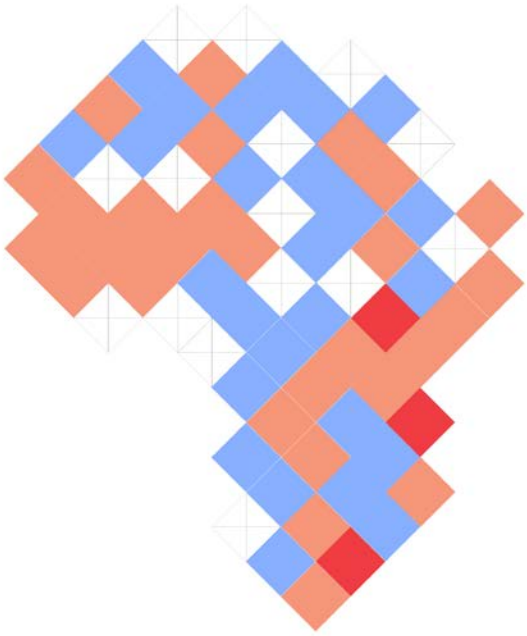

The African Research in Kidney Disease (ARK) Study:

Determining the prevalence and characterising the profile of chronic kidney disease and co-morbidity in the Agincourt Health and Demographic Surveillance site, South Africa; in collaboration with the ARK Study Sites in Uganda and Malawi

Chronic Kidney Disease (CKD) is an emerging global public health challenge. In sub-Saharan Africa (SSA), we estimate the prevalence of CKD to be 13.9% however, there are very little reliable, population-based data from our region and this may well be an overestimate. In high income countries, the rise in CKD is largely attributable to type 2 diabetes mellitus and obesity. In low to middle income countries, which includes all our study sites in Uganda, Malawi and South Africa, the risk factor profile for CKD is thought to be high. This is because we observe multiple stressors in societies undergoing rapid epidemiological transitions. Together, these stressors include rural /urban migration patterns, changes in diet and levels of physical activity and an emerging burden of “diseases of lifestyle” such as type 2 diabetes and obesity. These co-exist with an existing burden of communicable disease that is dominated by HIV and TB. Maternal and perinatal factors also play a critical role in determining the functioning nephron mass at birth and future CKD risk in offspring. CKD is also an independent risk factor for all-cause and cardiovascular morbidity and mortality.

So why are we doing this study?

Firstly, to determine the population prevalence of CKD in South Africa.

We will determine the population prevalence for CKD in rural South Africa, through the work done nested within the Agincourt Health and Demographic Surveillance Site. While this will be the first study of this kind to be done in a rural setting in South Africa, by pooling our data with Uganda and Malawi, we will be contributing to the understanding of CKD prevalence not only for South Africa, but also the sub-Saharan African region. The absence of this information obstructs the development of integrated public health policy for the screening and prevention of CKD within a broader framework of chronic non-communicable diseases for southern Africa. This is particularly relevant as access to lifesaving treatment for end-stage kidney disease is extremely limited across the region.

Secondly, to develop an equation to accurately measure kidney function in South Africa.

The equations used to estimate kidney function are known to be inaccurate in Africans and adjustment for ethnicity based on African American populations is inappropriate, which is current practice. We will evaluate the performance of existing equations and develop our own equation that accurately predicts kidney function in South Africans. The Ugandan and Malawi sites will do the same and we will compare the equations developed for each site. By doing this, we will clarify whether the necessary equations are site specific, or whether, by pooling data, we can develop an equation that can be applied across the southern African region.

Thirdly, we will characterise phenotypic and genotypic risk factors for CKD.

Recently identified genetic mutations in the apolipoprotein-1 gene (APOL1) have linked a disproportionately high risk for CKD in African Americans who have hypertension, HIV infection, auto-immune disease. These same mutations have been identified in South Africa, in those with HIV infection and kidney failure from HIV. In this study, we will conduct population-based screening for APOL1 mutation associated with increased risk for kidney failure. We will also screen for traditionally associated risk factors for CKD, namely hepatitis B and HIV infection, hypertension, diabetes, obesity.

In summary, this study is the first of its kind in South Africa. It will make a significant contribution to determining the prevalence of CKD and accurate methods for measuring kidney function. It will also contribute substantially to the understanding of the unique role that phenotypic and genotypic risk factors play in the pathogenesis of CKD in South Africans. Through extensive collaborative efforts with researchers for the ARK study in Uganda and Malawi, we will contribute to the understanding of CKD for sub-Saharan Africa and inform future research and public health policy, so critically needed for the region.