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| Is this output project related? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | If yes, provide the project number | PFHJTRA |
| Title | Social Determinants of Spatial Clustering of HIV Infections in South Africa. | | | | | |
| Authors | Shisana, O, Wabiri, N., Zuma, K. and Freeman, J. (2013). | | | | | |
| Type of output | Select the appropriate output type from the list below | | | | | |
| Monograph/book* | | | | | | |
| <input type="checkbox"/> | Peer reviewed | | | | | |
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| | The 11th International AIDS Impact Conference in Barcelona, Catalonia, Spain on 29th September 2013 to 2nd October 2013 | | | | | |
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| | | | | | <input checked="" type="checkbox"/> | |
| Submitted by: | | N Wabiri | | | | |
| Submission date: | | 21 Feb 2014 | | | | |

RESEARCH OUTPUT

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SOCIAL DETERMINANTS OF SPATIAL CLUSTERING OF HIV INFECTIONS IN SOUTH AFRICA

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HUMAN SCIENCES RESEARCH COUNCIL

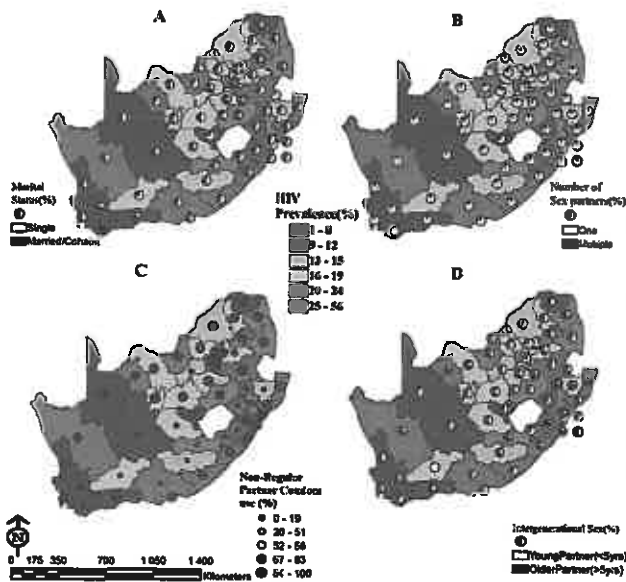
OBJECTIVES

To investigate the social behavioural determinants of spatial clustering of HIV in South Africa, and the association with HIV prevention services.

METHODS

Data is from the 2008 national HIV population-based household survey. The "District Municipality" in South Africa is the spatial mapping unit. The Dependent variable: district weighted HIV prevalence data (HIV). Independent variables: district weighted proportion data of- singles (PropSingle); condom use with non-regular partner (PropNonregCondom); older (>5 years) sexual partners (PropOldSexpartner); females (PropFemale); Black Africans (PropAfrican); 25-49years (Prop25-49 and the district Social Economic Quintiles (SEQ).

Figure 1: Geographical distribution of HIV Prevalence by social Determinants across Districts in South Africa. A. Marital Status; B. Sexual Partnerships; C. Intergenerational sex; D. Non regular partner condom use; Three HIV zones: endemic (green: <=10% prevalence), epidemic (orange: 11-19%) and hyper-epidemic (red: >= 20%), 56% in ILembe and 1-3% in the Cape Winelands.



A social behavioural geographically weighted regression model
 $HIV_i(x) = \beta_0(x) + \beta_1 PropSingle_i(x) + \beta_2 PropOldSexPartner_i(x) + \beta_3 PropNonregCondom_i(x) + \epsilon_i$

And a background geographically weighted regression model
 $HIV_i(x) = \beta_0(x) + \beta_1 SEQ_i(x) + \beta_2 PropFemale_i(x) + \beta_3 PropAfrican_i(x) + \beta_4 Prop25-49_i(x) + \epsilon_i$

Where, ϵ_i indicate the set of parameters, β estimated at each District with the control coordinates given by vector x_i represent each district. $\beta_0(x)$, $\beta_1(x)$, $\beta_2(x)$, and $\beta_3(x)$ the estimation residual at district i . A fixed kernel was used to calibrate the model to account for spatial structure. Districts near district i have a stronger influence in the estimation of local parameters than Districts further from i . The Akaike Information Criterion (AIC) was used to assess GWR model complexity. The significance of the local parameter was assessed using smoothed map of Pseudo-t values, overlaid on the map of the parameters estimate. The Pseudo-t values >1.96, indicating areas where change in local parameters does not cause significant change in HIV prevalence were marked out while significant Pseudo-t values were made transparent in order to visualize significant parameters.

RESULTS

Districts with high HIV prevalence districts have homogeneous population characterized by: Black African origin, high proportion of females, low SEQ, low marriage rates, multiple sexual partners, and intergenerational sex.

Having an older sexual partner exposes one to significant increase (a range of 0-14-0-30) in HIV prevalence. Increase in singlehood significantly exposes one to 0-17 increases in HIV prevalence (Figure 2B). A unit increase in those aged age 25-49 years significantly increase the odds of HIV prevalence (Figure 3B).

Figure 2: Geographically Weighted Regression Parameters for HIV prevalence, for Behavioural Determinants, across Districts in South Africa. A. Intergenerational Sex (Partners>5yrs), and B. Single across districts in South Africa; White indicates districts with non-significant estimates at 5%.

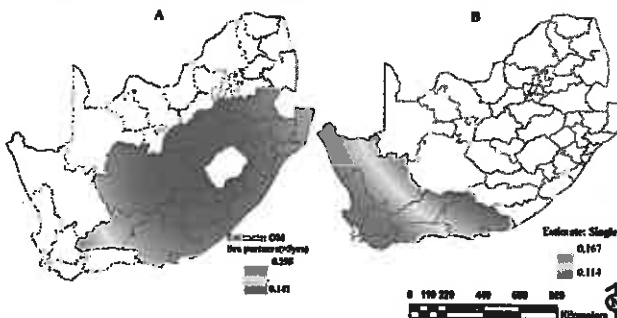
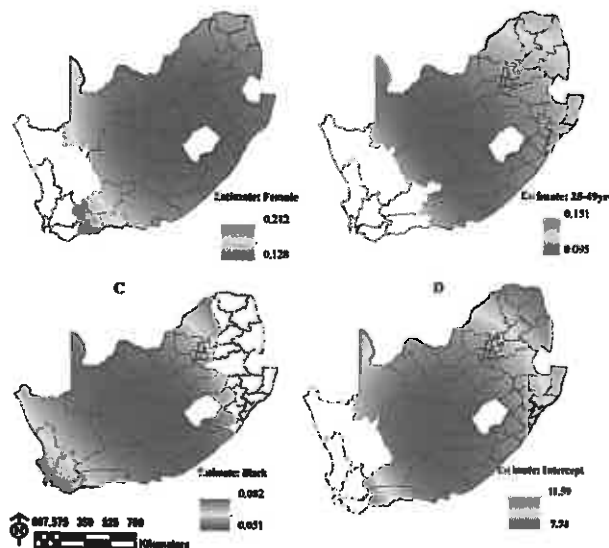


Figure 3: Geographically Weighted Regression Parameters for HIV prevalence, for Demographic Determinants, across Districts in South Africa. A. Females; B. 25-49 years old; C. African; and D. intercept across districts in South Africa. White indicates areas/districts non-significant estimates.



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