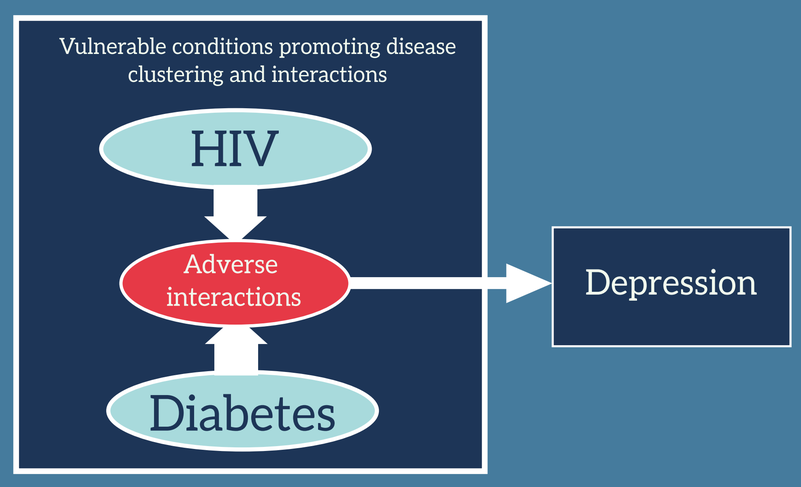
From co-morbidity to syndemic

An analysis of synergistic epidemics in Eswatini

Niels Bal [1], Christopher Pell, Michaela Theilmann, Katja Polman, Trynke Hoekstra, Bongekile Thobekile Cindzi, Ntombikile Ginindza, Sijabulile Dlamini, Lisa Stehr, Harsh Vivek Harkare Ria Reis, Frank van Leth

[1]: Department of Health Sciences, Faculty of Science, Vrije Universiteit Amsterdam

When two epidemics **co-occur** more frequently within a vulnerable **context**, their effects may **exacerbate** negative health outcomes **beyond** what we would expect from their individual effects. These **synergistic epidemics** driven by their **interaction with context** are called **'syndemics'.**



Introduction

In Eswatini, a third of the population is HIV positive, while non-communicable diseases are on the rise. A syndemic analysis can help prioritize targets for upscaling of healthcare in Eswatini. A large portion of empirical studies on syndemics use incompatible methodologies to model disease and context interaction.

Methodology

- Nationwide household survey ~4500 participants above 40 years
- HIV status by self-report or rapid test, diabetes by self-report and fingerprick, depression measured with PHQ-9 cut-off >= 4
- Contextual factors measured by self-report
- GLM with quasi-Poisson link and three-way interaction
- Relative Excess Risk due to Interaction (RERI) as a measure of interaction for different categories of contextual factors

Results

We found additive interaction between HIV and diabetes with regard to depression, across all three contextual factors, indicated by a positive RERI. The strongest interaction was found among those being the only household member aged 30 and above RERI: 0.46 [012; 0.80].

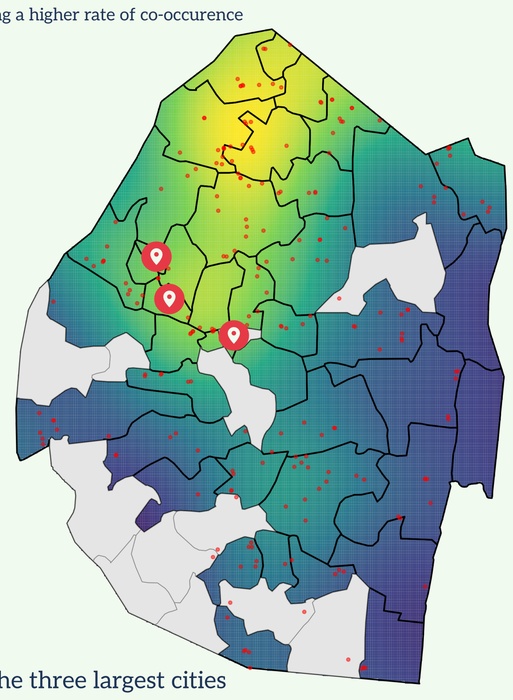
Discussion

The observed variation in additive interaction suggests that HIV and diabetes exhibit syndemic properties with respect to depression in Eswatini. HIV and diabetes are biologically linked and both conditions are also surrounded by stigma and there is low access to care. We show that syndemics can be modelled with three-way interaction and RERIs. Integration of outpatient care is recommended for early detection.

The RERI is a statistic that shows the excess risk on the **additive** scale due to an interaction, estimated using relative risks instead of absolute risk differences. This statistic shows which subgroups can benefit the most of potential interventions.

Figure 1: Geospatial distribution of HIV- diabetes comorbidity

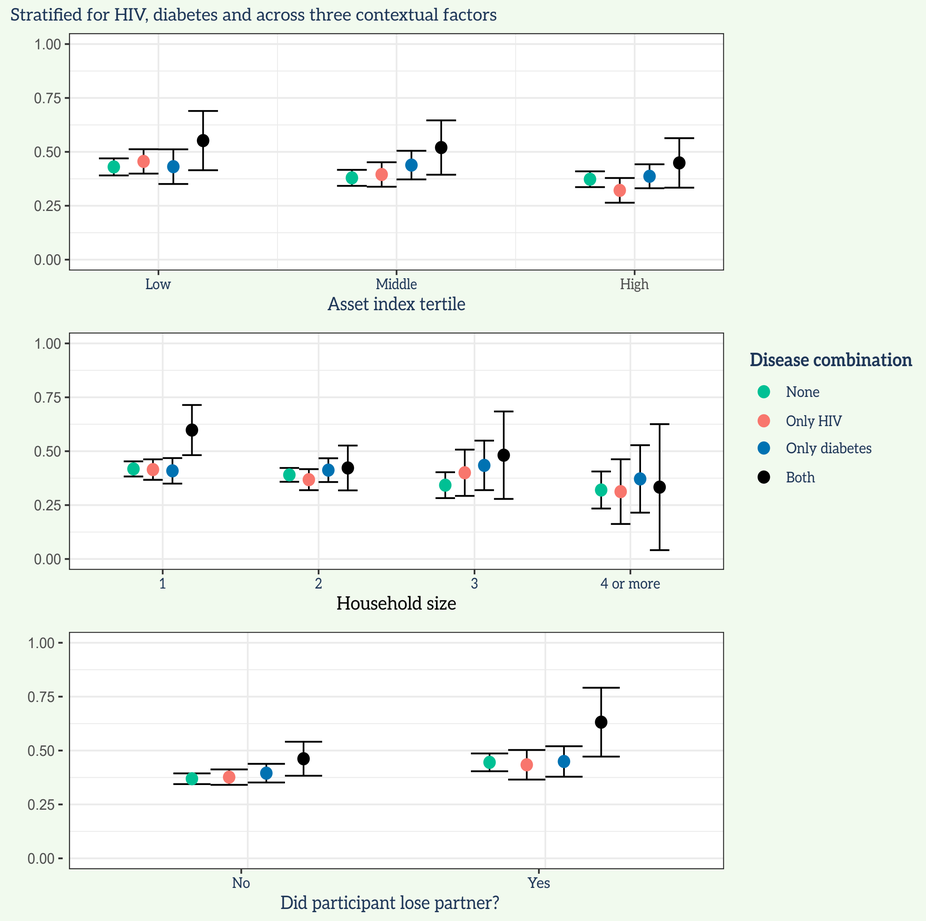
Yellow colors indicating a higher rate of co-occurence



* Pins indicate the three largest cities

Figure 2: predicted marginal mean rates on depression

Stratified for HIV, diabetes and across three contextual factors



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