ASSESSING THE MULTI-LEVEL DETERMINANTS OF HIV AMONG ADOLESCENT GIRLS AND YOUNG WOMEN IN ESWATINI

APPLICATION OF THE PC CAUSAL DISCOVERY ALGORITHM

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Funding: R36MH132489

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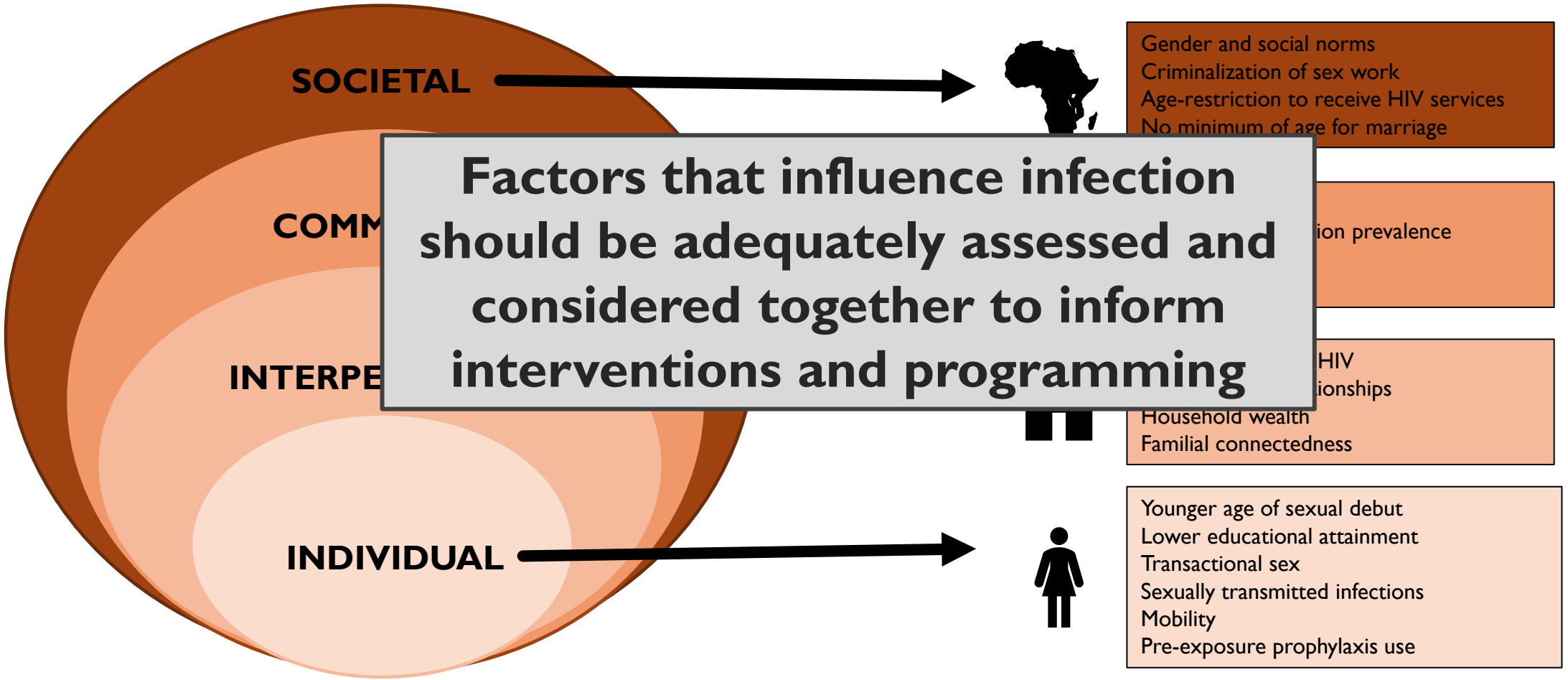
CENTER *for* COMMUNICABLE DISEASE DYNAMICS

ADOLESCENT GIRLS AND YOUNG WOMEN AND HIV

Adolescent girls and young women (AGYW; 15 to 24 years of age)

- **20%** of HIV infections globally
- **77%** of all new infections among adolescents and young adults in sub-Saharan Africa
- Nearly **50%** of new HIV infections in Eswatini

SOCIOECOLOGICAL MODEL FOR HIV RISK OF AGYW



Factors that influence infection should be adequately assessed and considered together to inform interventions and programming

STUDY OBJECTIVE

To characterize and graphically depict the pathways among individual, interpersonal, community, and societal risk factors of HIV among AGYW in Eswatini using the PC causal discovery algorithm

METHODS

CAUSAL DISCOVERY

- Exploits patterns of associations among multiple variables to depict the underlying causal structure as supported by observational data via a directed acyclic graph (**DAG**)
  - Adept at handling large amounts of data
  - Applied to characterize underlying disease pathways of multiple disease conditions and epidemiologic phenomena
  - Provided new and expanded insight into the relationship between variables
- **Constraint-based algorithms**
  - Peter-Clark (PC) algorithm

METHODS: DATABASES AND VARIABLES

Datasets

SHIMS 2
SWAZILAND HIV INCIDENCE MEASUREMENT SURVEY

2020 World Population and Housing Census Programme

United States Census Bureau International Database: World Population Estimates and Projections

UNAIDS World Health Organization Laws and Policies Analytics

Domains

Individual AGYW	HIV status, demographics, sexual and reproductive health, sexual activity, transactional sex, and HIV testing behavior
Impersonal Household; sexual relationships	Household wealth, family medical history, household food insecurity, external economic support, household transportation, and sexual partnerships
Community Enumeration area*	HIV prevalence, viral load suppression prevalence, antiretroviral treatment prevalence, and urbanicity
Societal Sub-national administrative region*; country	Gender parity indices, national HIV testing policies and prevention services, punitive laws, and legal protections

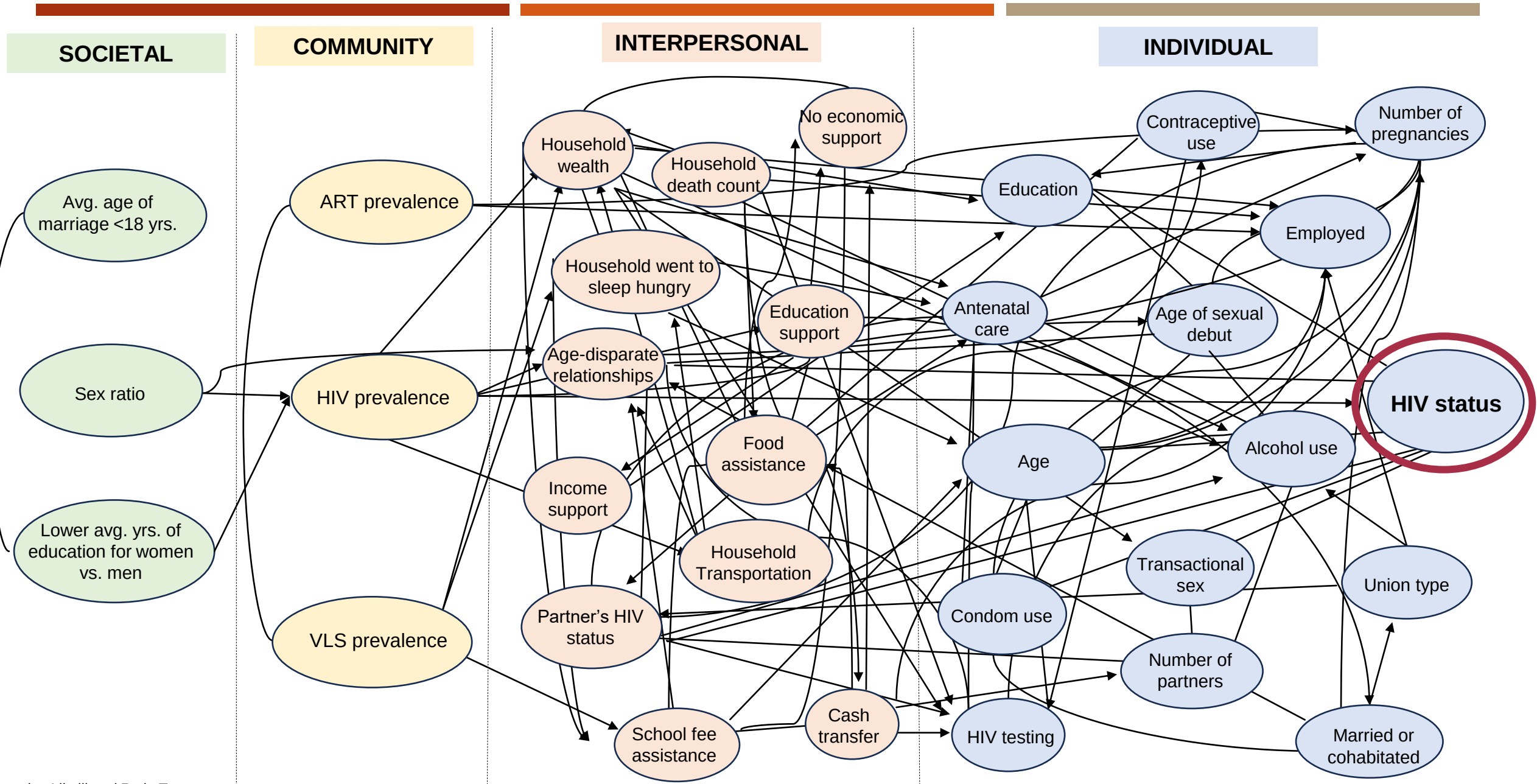
* Enumeration Area: a geographic unit characterized by a single census person can canvas during a census period; Sub-national administrative region: a geographic unit defined by country-specific government for administrative and governance purposes (similar to a state)

RESULTS

DEMOGRAPHIC AND SEXUAL BEHAVIOR CHARACTERISTICS

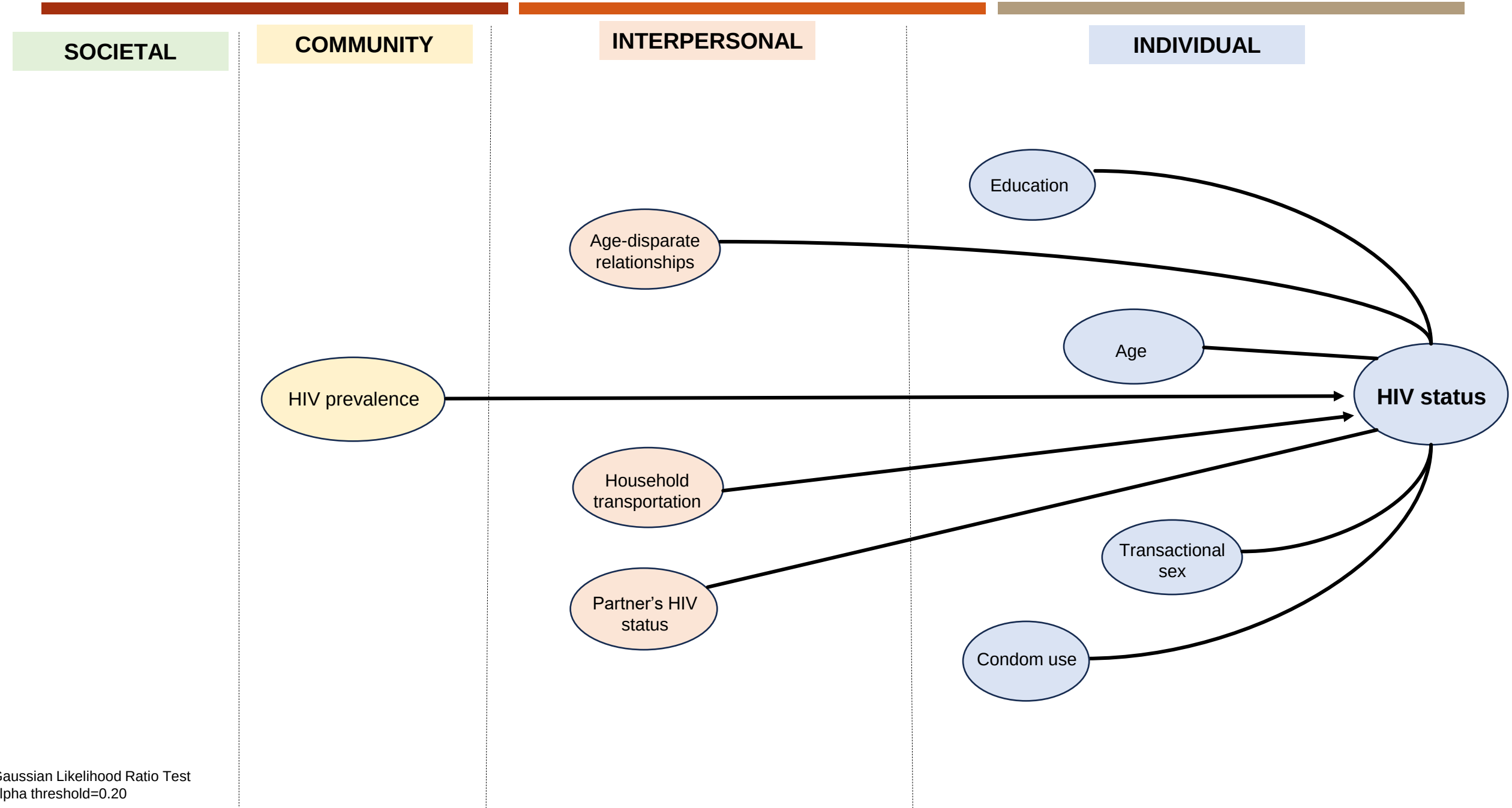
Count per Unit, N	
AGYW	1,112
Households	979
Enumeration Areas	269
Sub-national Administrative Regions	4
Sociodemographic and Sexual Behavior Characteristics, n (%)	
HIV Positive	232 (21%)
Completed Secondary Education	882 (80%)
Not Married or Cohabitated	861 (77%)
Age-disparate and Intergenerational Relationships	550 (50%)
Enumeration Area, % (95% Confidence Interval)	
Average HIV Prevalence	24% (23%-25%)
Average Antiretroviral Prevalence	74% (63.2%-69.4%)
Average Viral Suppression Prevalence	74% (72%-76%)
Sub-national Administrative Region, Mean (SD)	
Average Years of Education for Women	8 (0.9)
Average Age of Marriage	23 (0.6)

Eswatini



Gaussian Likelihood Ratio Test
alpha threshold=0.20

Eswatini: Direct Paths



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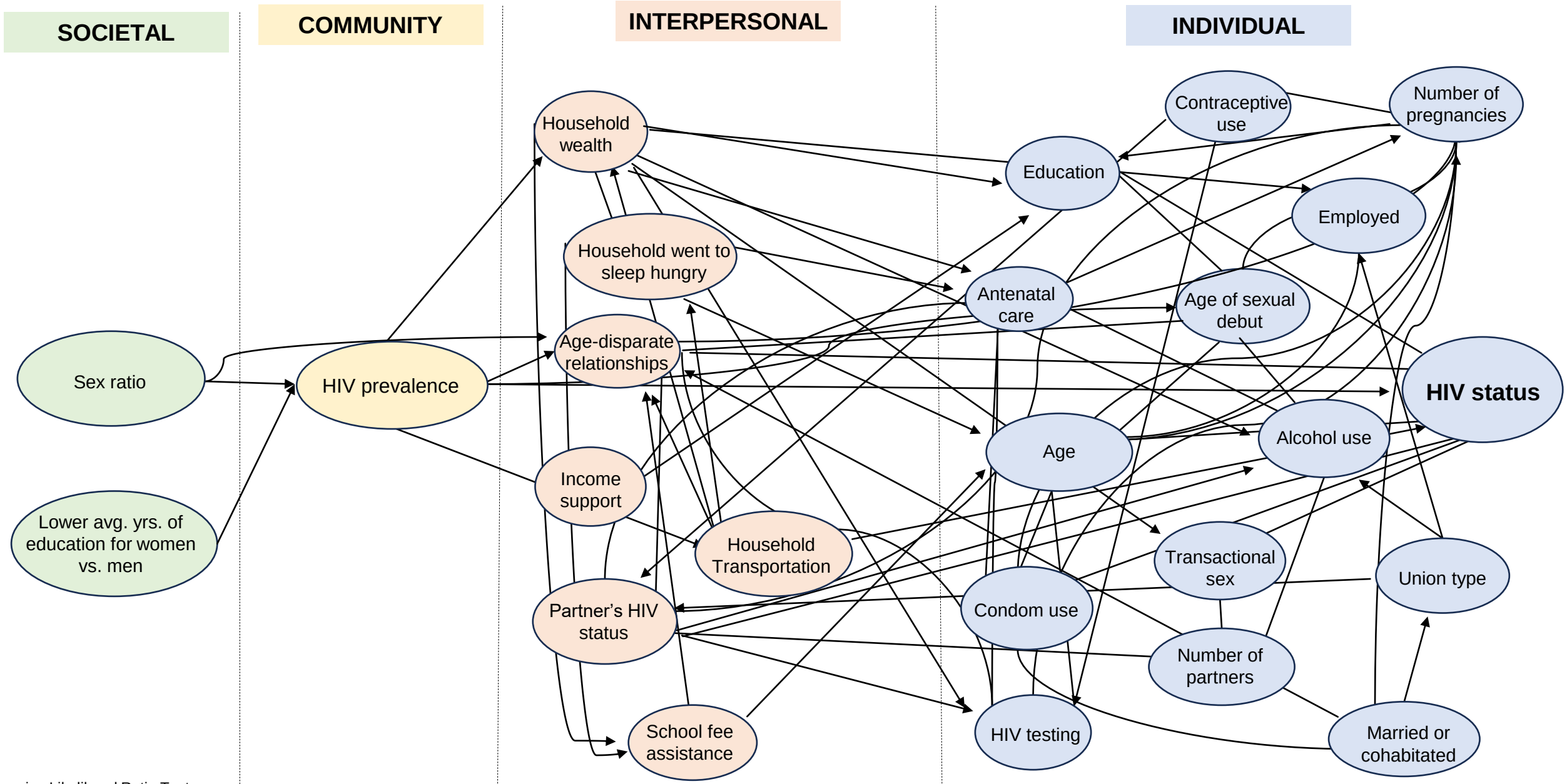
Eswatini: Indirect Paths



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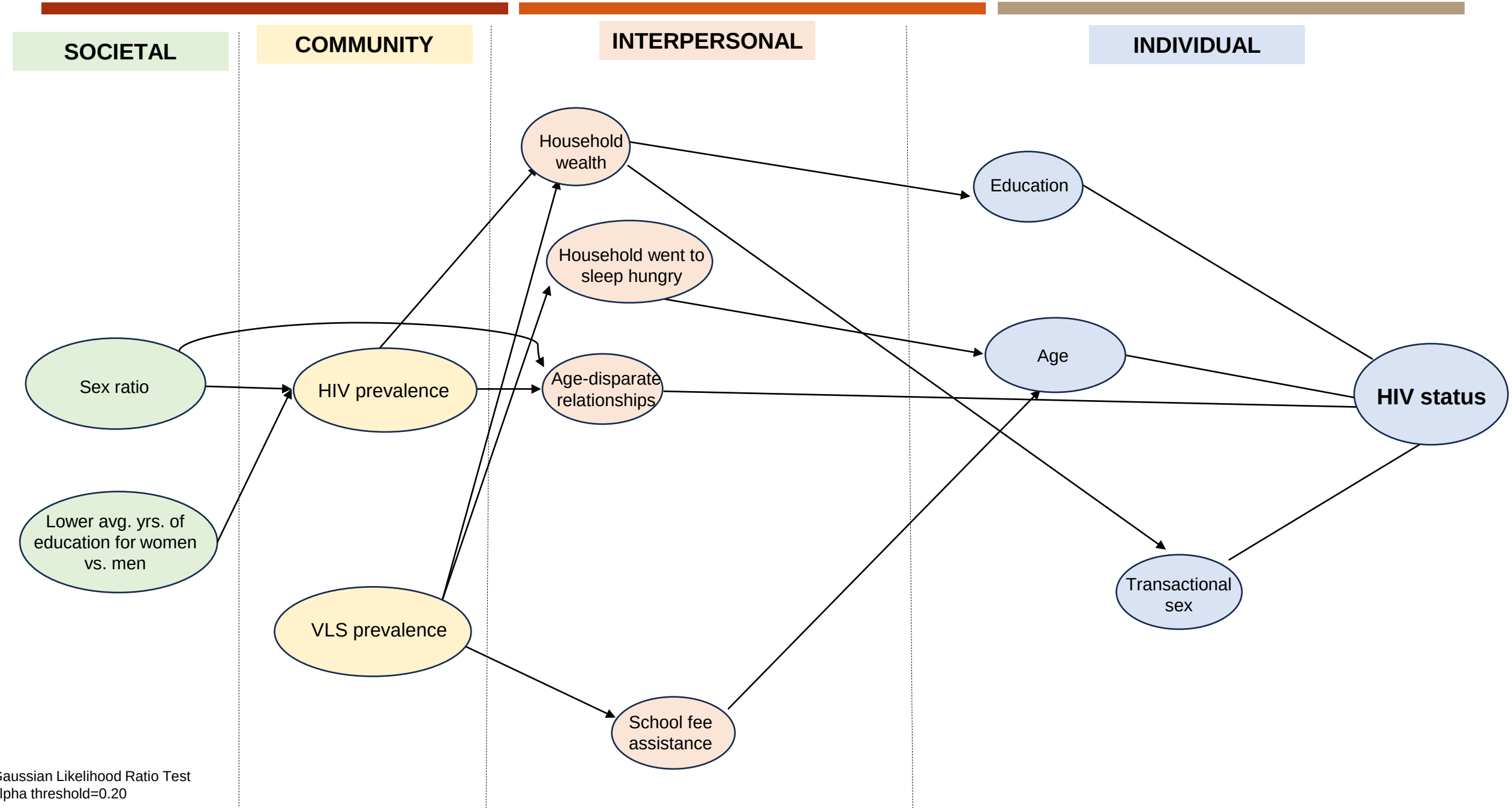
Eswatini: Full Paths



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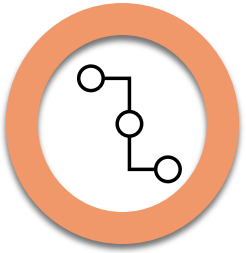
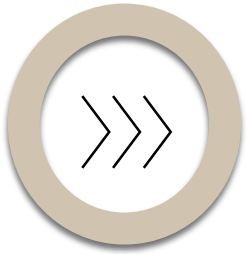
DISCUSSION



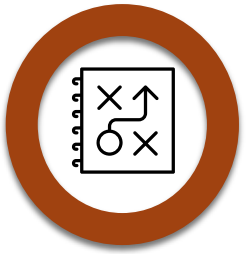
The relationship between individual, interpersonal, community, and societal factors is complex and interconnected

- Causal discovery is a useful tool



Patterns

- Societal and community factors
- Household factors
- Age-disparate relationships and partner's HIV status
- HIV status as an antecedent or undirected path to individual factors



Limitations to PC algorithm

- Error
- Assumptions
- HIV is rare

THANK YOU!

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