

Syndemic processes between non-communicable diseases and HIV within the Kingdom of Eswatini

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Synergy and epidemics

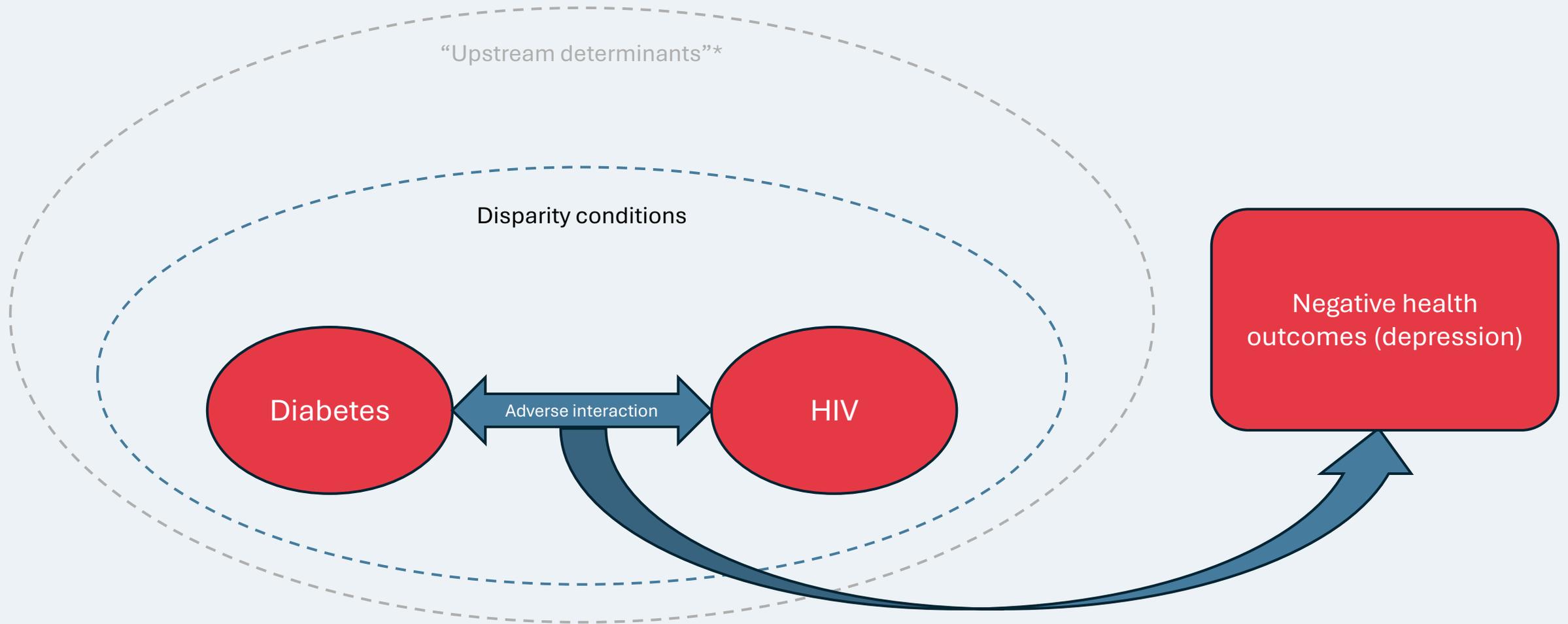


Figure 1: Model for a syndemic ¹

Empirical syndemic studies²

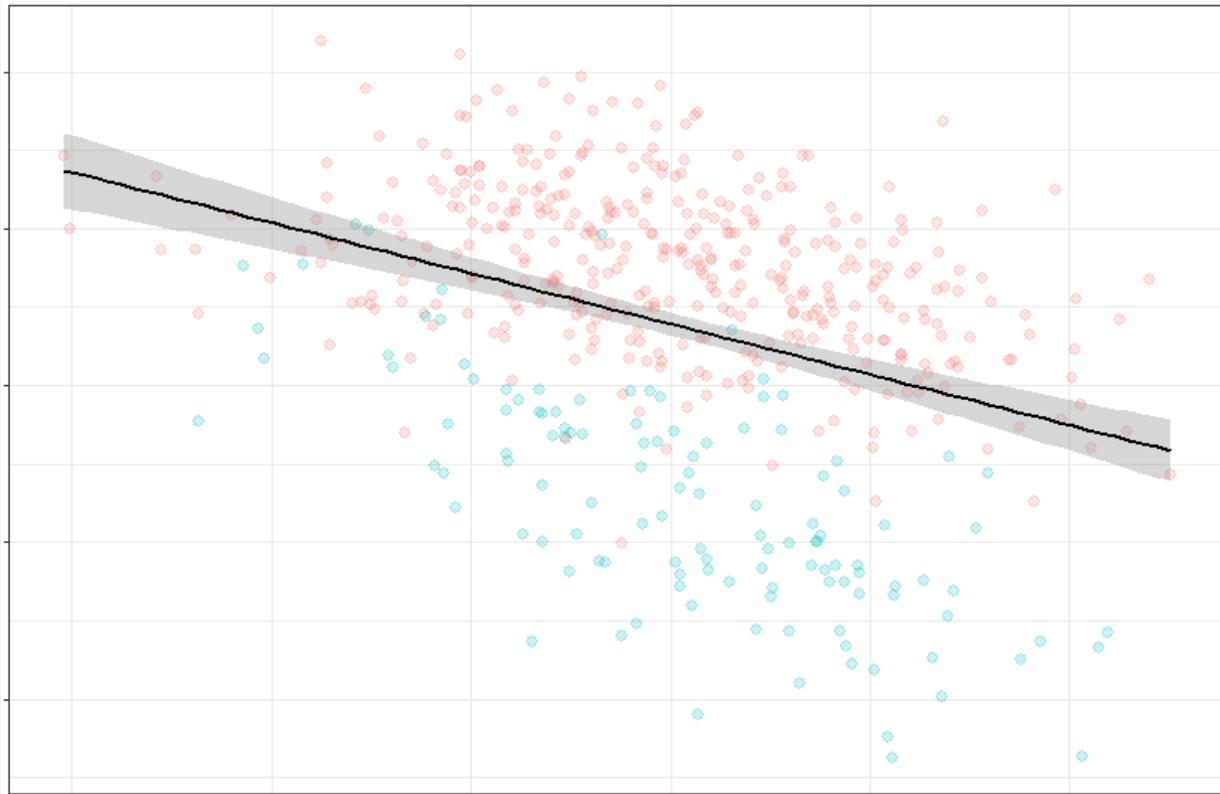


Figure 1: Simplification of sum-score approach

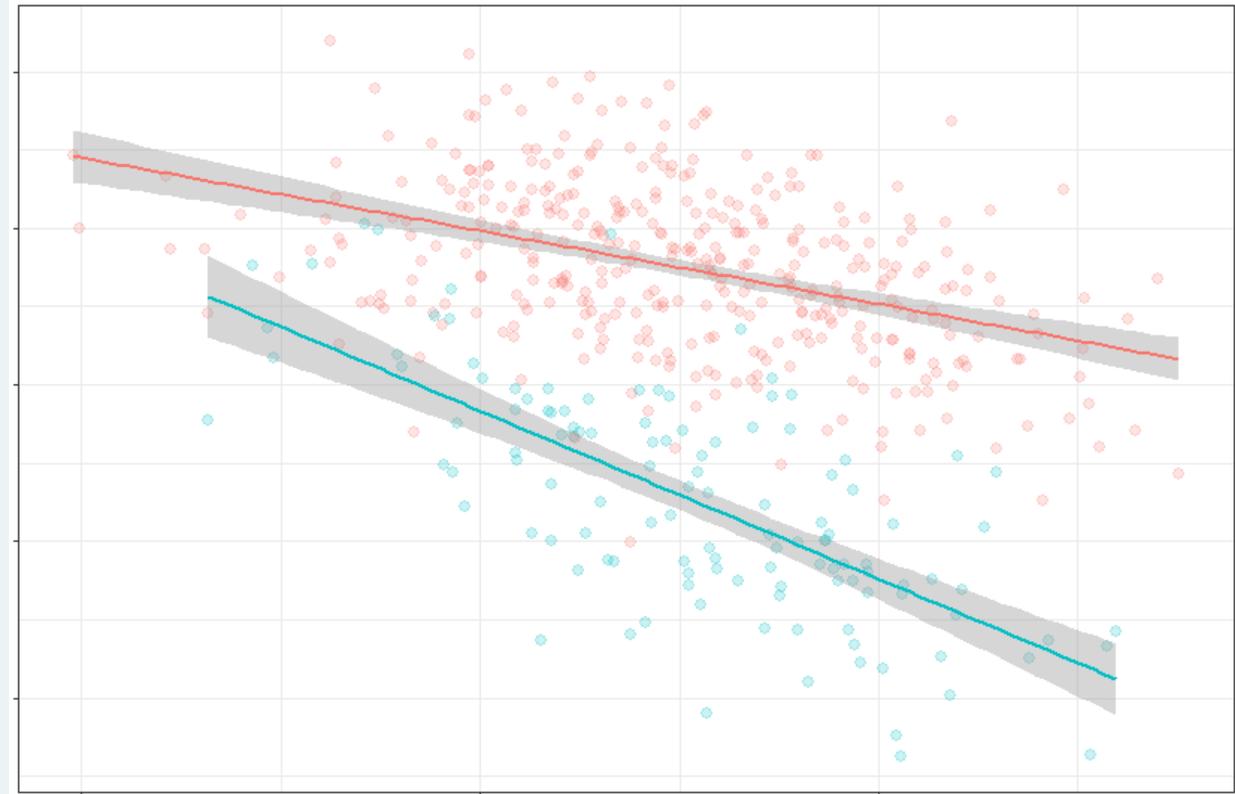


Figure 2: Simplification of analysis of interaction

WHOPEN@Scale³ in Eswatini

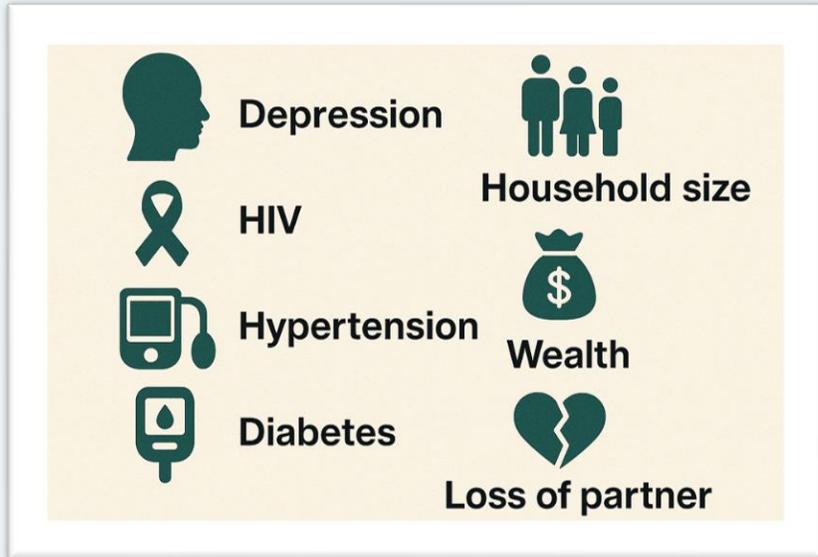


- 1 in 3 living with HIV⁴
- Rising incidence of NCD's
- Budgetary constraints

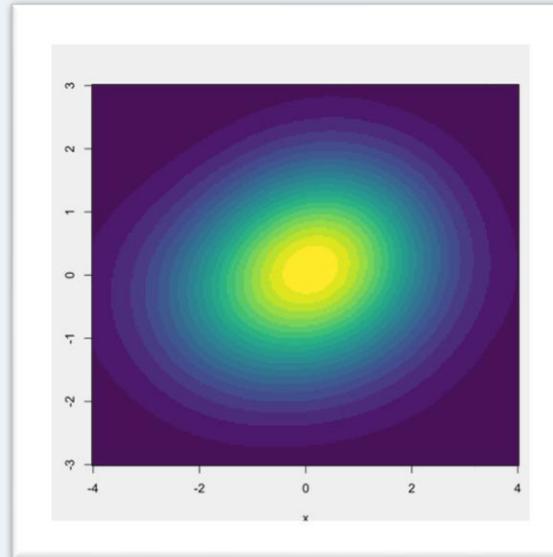


- Strengthening NCD care
- Household survey > 40 y/o
- Syndemic work package

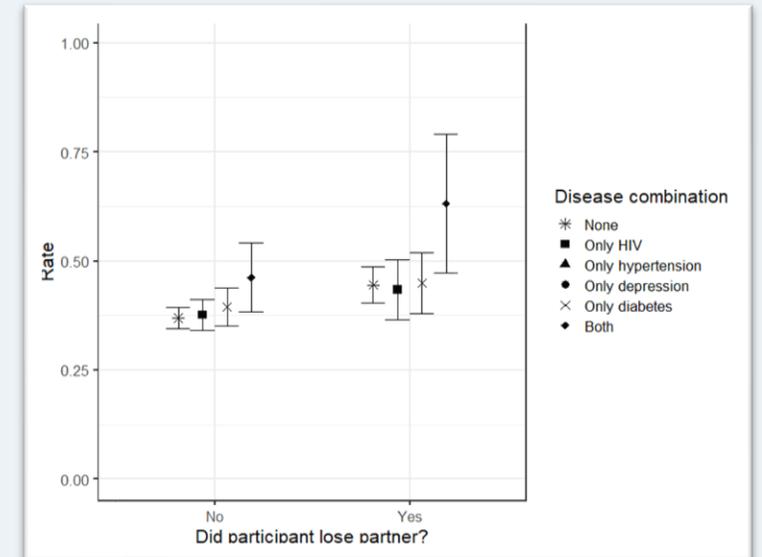
Methodology



- Four health conditions
- Three factors of context



- Geospatial clustering
- 2D kernel estimation

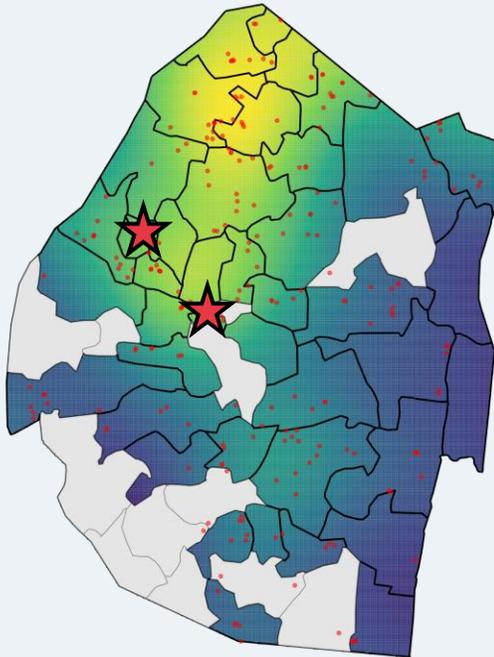


- Three-way interaction
- Conditional RERI ⁵

Results of syndemic analyses

Table 1: Syndemic analyses involving household size

HIV and diabetes

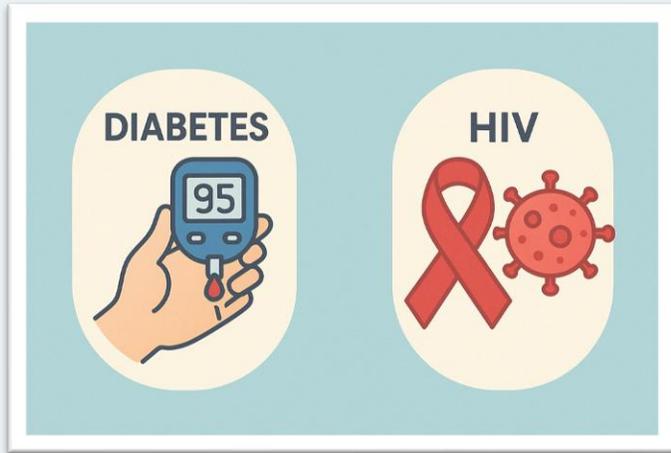


*Stars indicate the two largest cities

		Contextual factor: household size			
		One	Two	Three	Four or more
		RR (CI95%)	RR (CI95%)	RR (CI95%)	RR (CI95%)
HIV - diabetes (Outcome: depression)					
HIV negative	No diabetes	1	0.93 (0.82; 1.04)	0.82 (0.66; 0.98)	0.77 (0.55; 0.98)
	Diabetes	0.98 (0.81; 1.14)	0.99 (0.83; 1.14)	1.04 (0.75; 1.33)	0.89 (0.51; 1.27)
HIV positive	No diabetes	0.99 (0.85; 1.13)	0.88 (0.74; 1.02)	0.96 (0.69; 1.23)	0.75 (0.38; 1.11)
	Diabetes	1.43 (1.13; 1.73)	1.01 (0.75; 1.27)	1.15 (0.66; 1.65)	0.80 (0.10; 1.50)
Interaction	RERI	0.46 (0.12; 0.80)	0.08 (-0.25; 0.42)	-0.03 (-0.80; 0.74)	-0.10 (-1.27; 1.08)

$$RERI(X_1, X_2 | X_3 = 0) = 1.43 - 0.99 - 0.98 + 1 = 0.46$$

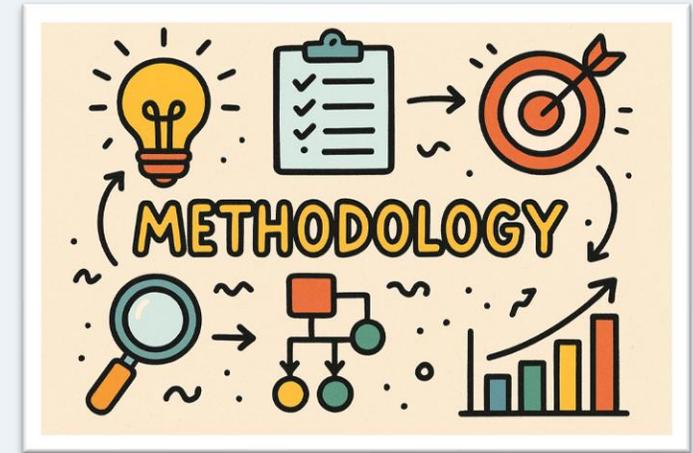
Interpretation



- Diabetes and HIV
- Most common in the North
- Results in line with synergism

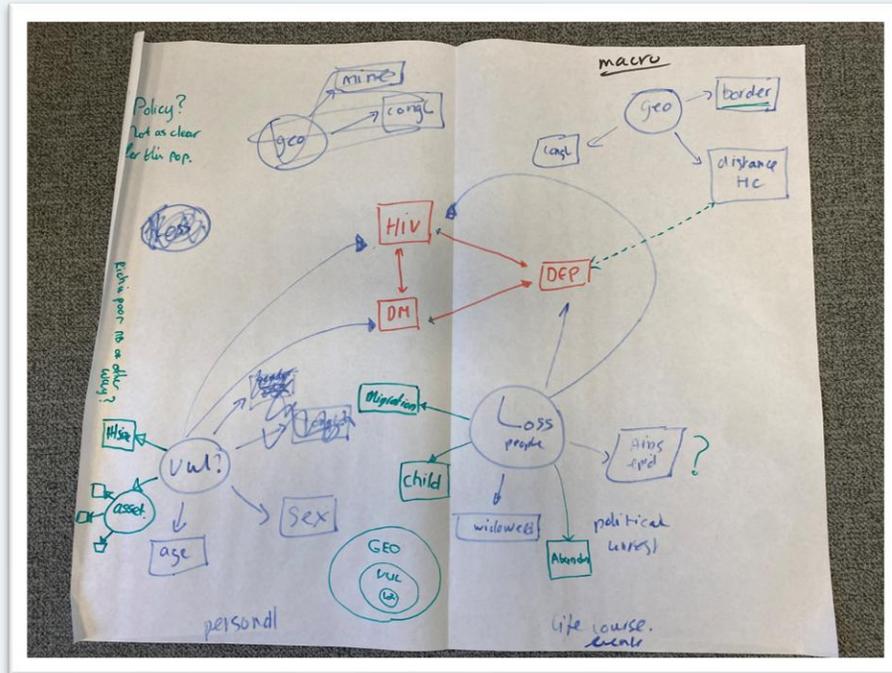


- Lifelong chronicity
- Persistent stigma ⁶
- Social support as context

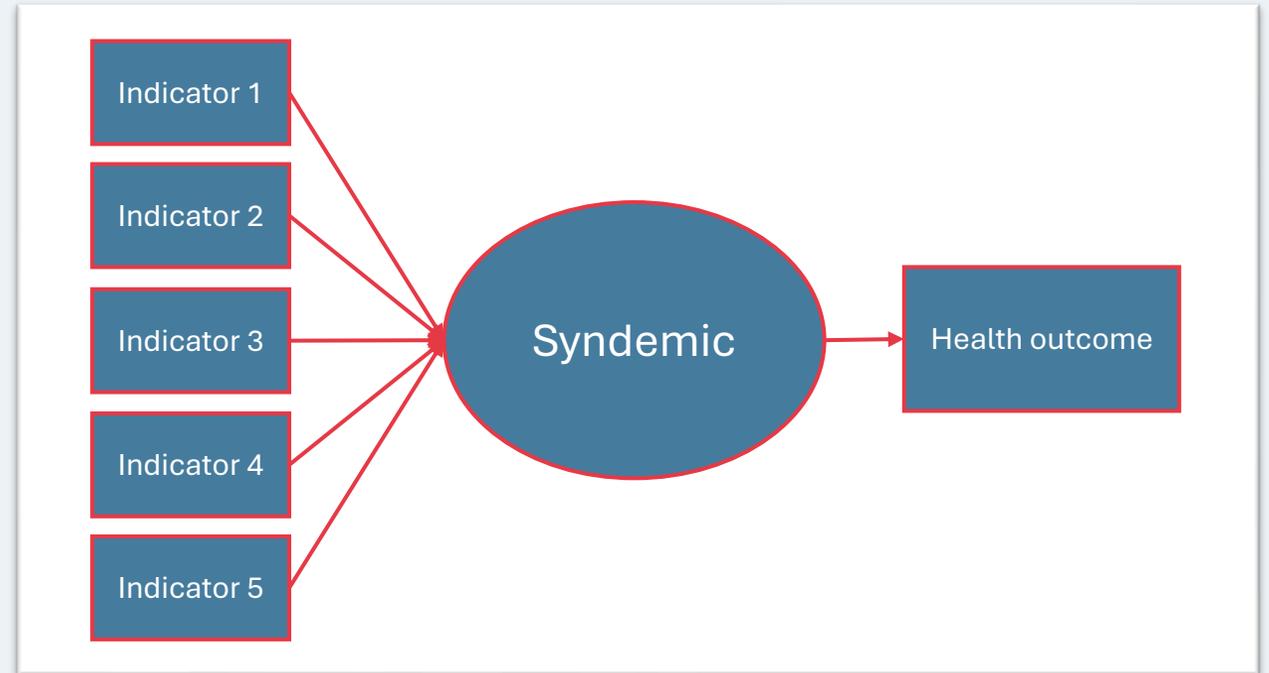


- Three-way RERI
- Sample size
- Operationalization of context

Way forward



- Latent Variable Analysis
- Involvement of context



- Does not 'solve' modelling interaction
- Single 'syndemic component'

Want to know more?



<https://jech.bmj.com/content/early/2025/07/28/jech-2025-223753.long>



<https://www.linkedin.com/in/niels-b/>



<https://research.vu.nl/en/persons/niels-bal>



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