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1 Where We Are?

Based on our literature review, we have identified a series of key variables (not exhaustive) influencing vulnerability to injection initiation :

- Non-Injection Illicit Drug Use (Except Marijuana)

- Homelessness/Street-Involvement

- Sex Work

- History of Abuse

- Geographic Environment (ie Vancouver Eastside)

- Social Proximity to PWID

We have considered creating a model where non-injection illicit drug use is assumed as a necessary component of vulnerability, but, it appears that there is no evidence which supports this. Unfortunately, the studies which examine PWID and injection initiation tend not to dichotmize non-injection illicit substance use as a single variable, instead opting to report non-injection heroin use, non-injection crystal meth use, etc etc, which makes it hard to determine if any respondents reported zero types of non-injection illicit drug use. Findings from Bluthenthal determined that among a cohort of SF and LA PWID, approximately half had never used the drug they first injected before they injected it. This suggests a very real pathway in which folks are "initiated first". A study from Morris et al (Strathdee) looked at a population of PWID in Tijuana that reported illicit drug use initiation at the same age as injection initiation...unfortunately based on the measures it is impossible to determine if the participants reported that they truly were "injection first" or if there transition was simply very quick.

2 Two Model Ideas

Here I'll present two model ideas, a primary one and an interesting alternative that I think has merit, which I just want to get on paper but we don't really need to dig into this one.

2.1 Primary Model

In this primary model, we will stratify the vulnerable population based on non-injection drug use, homelessness/street-involvement, and sex work. In regards to other variables identified as important: history of abuse likely confounds these first three variables (see alternative model); geographic factors should be included in location specific models but in a generalized model it is unclear how to apply it or if it even should be; social proximity to PWID is being accounted for within the transition (infection) function.

A question, to simplify the model, is do we want to create an umbrella variable for street-involvement where homelessness and sex work are both categorized as one variable. This would reduce our vulnerability compartments from 9 to 4. Here is the model schematic, sans equations because I think it would be good to confirm the schematic first. For the sake of not making a total mess, I have excluded all of the "death" arrows (S stands for street-involved (including sex work?), D stands for NIDU):
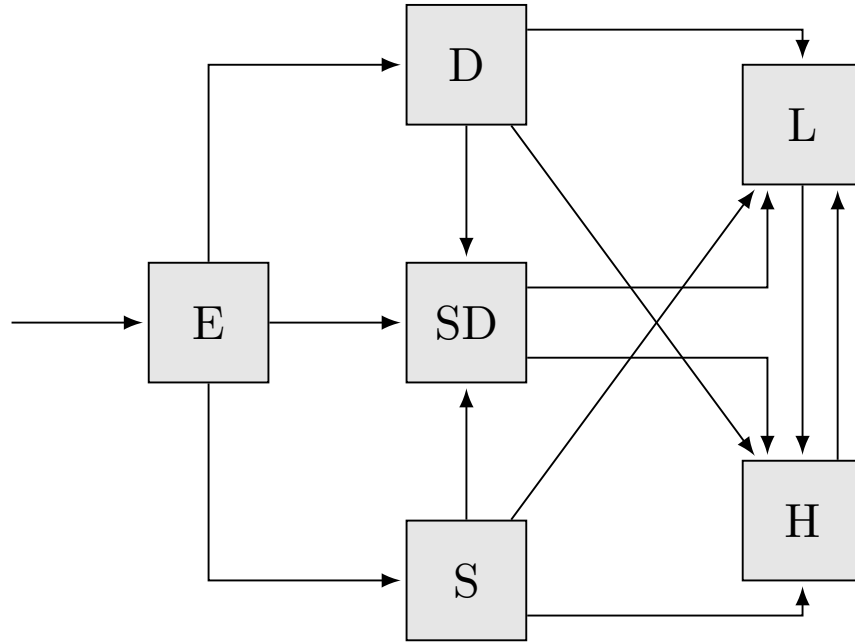
2.2 Alternative Model : Trauma-Based

In this alternative model, we consider vulnerability to be based on history of trauma. The literature indicates childhood trauma as being a risk factor across sites and studies for initiation...childhood trauma is understood to be correlated with risk of non-injection drug use, street-involvement, sex work, the risk factors we identified in our previous model. ACES (Adverse Childhood Experiences

Scale) provides an interesting metric with which to define a model. I just wanted to get this idea out on paper to start a discussion...I'm happy to formalize it more if desired.