Implementation Plan for Chapter 3:

Chlamydia, Acquired Immunity, and Expedited Partner Therapy

Aim: To develop a comprehensive modeling framework and set of parameters specific to expedited partner therapy to understand the individual- and population-level outcomes between this innovative strategy and the standard practices in chlamydia control, and to understand the consequences of treatment timing on the development of immunity and possible reinfection.

*Hypotheses:*

3a: By leveraging the transmission network in reverse, increases in EPT will not only reduce chlamydia transmission and reinfection more efficiently than increases in testing rates, but it will also more effectively reduce the racial disparities in prevalence.

3b: While EPT may initially increase the number of people with arrested immunity and lower herd immunity, the increases in the absolute number and pace of partner treatment balance out any increased susceptibility while current screening and treatment methods act to increase the vulnerability of populations.

Population: 15-44 year olds, but focus of analyses is 15-29 year olds

Important Features of model:

1. acquired immunity (see 2020 paper!)

2. racial groups – most CT models haven’t incorporated race b/c they are in London / Netherlands or more interested in the age dynamics

3. Increase acquisition risk of CT for adolescent women due to immature cervix cells? / decreased acquisition risk post-exposure

Questions to Address:

1. EPT and prevalence reduction efficiency
   1. Description: evaluate how quickly EPT can reduce incidence in subpopulations – idea here being that we can reduce incidence overall AND racial / age disparities since the intervention should be more effective in higher-prevalence scenarios
   2. Evaluation Metrics
      1. Incidence reduction over time
         1. By increasing EPT coverage (proportion of partners treated)
         2. By increasing EPT timing (decreasing time-to-treatment for partners)
         3. Compare to: increasing testing in certain groups or increasing testing among partners of chlamydia positive patients
      2. Rate of reduction among age and race groups over time
   3. Other Metrics
      1. How many people were treated but not infected over time and by EPT coverage
      2. Total number tested
      3. Total number treated
2. Treatment/EPT and Acquired Immunity
   1. Description: treatment of asymptomatic infections arrests the formation of temporary immunity to reinfection (problem for individual and future transmissions due to reinfection)
   2. Evaluation Metrics
      1. Proportion reinfected within X time post-treatment as treatment increases
      2. Avg number of forward transmissions per reinfection vs per asymptomatic case (post-avg time to treatment if asymptomatic?)
      3. Number of likely PID / infertility cases arising from long-term asymptomatic infections

Concerns of EPT: missed opportunity to test for GC and/or other STIs

What this model is NOT addressing:

1. Co-infection / transmission of gonorrhea or other STIs
2. Rectal chlamydia / Oral chlamydia

On relational prevalence by risk group – I think separating networks into relationship type already does this to an extent – i.e. those who form a cohab/marriage are less likely to have many casual relationships

*MM/SMG feedback 12.3.2020:*

*Don’t actually model race*

*Model different prevalence scenarios*

New strategy: three different setups that typify behavior over life course

Can alter initial prevalence in each scenario to mimic existing racial disparities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | “15-24” Profile | “25-34” | “35-44” |
| Casual |  |  |  |  |
|  | Degree |  |  |  |
|  | Concurrency |  |  |  |
|  | Sex per week |  |  |  |
|  | Condom use |  |  |  |
| Mar/Coh |  |  |  |  |
|  | Degree |  |  |  |
|  | Sex per week |  |  |  |
|  | Condom use |  |  |  |
| Screening in Females |  |  |  |  |