The impact of screening on chlamydia transmission in Australia – a mathematical modelling study

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Chlamydia transmission model

- We developed an individual-based model to represent the sexual network and the transmission of chlamydia in the general Australian heterosexual population.
- Aims:
  - To assess the impact of the ACCEPt trial and other testing strategies on the prevalence of chlamydia infection over time
  - To estimate the impact of the strategies should they be carried out for the whole population

Individual based model

Model calibration and validation: data sources

- Sexual behaviour
  - ACCEPt baseline survey
  - Second Australian Study of Health and Relationships (ASHR2, Rissel et al. 2014)
  - British National Survey of Sexual Attitudes and Lifestyles, (Natsal-2, Althaus et al. 2012)
- Testing rate
  - ACCEPt data during trial
  - Medicare – Australian public medical insurance scheme that funds most chlamydia testing within Australia
- Duration of chlamydia infection, transmission probability, …
  - Published literature
  - Other modelling studies

Repeated chlamydia infection

- Could increase the incidence of serious adverse reproductive health outcomes such as pelvic inflammatory disease (PID), ectopic pregnancy, infertility
- In Australia, a cohort study on young women attending primary care clinics found 22% of those diagnosed with chlamydia had a repeat positive test within 12 months (Walker 2012)
- We are interested in two strategies that can reduce repeated chlamydia infection: retesting and partner treatment.

Retest index case

- Pros
  - Reduce transmission to partners
  - Detect repeat/persisting infection
- Cons
  - Loss to follow up
  - Susceptible again after treatment, if positive

Partner treatment

- Pros
  - Reduce transmission from partners
  - Detect undiagnosed infections in partners
- Cons
  - Difficult to do well
  - Affected by partnership splits
  - Negative consequence for relationships
Method

• A proportion of the modelled population is tested for chlamydia and treated annually according to preliminary data on the testing coverage achieved in ACCEPt.

• We investigate the reduction in chlamydia prevalence achieved through:
  • Retesting a proportion of individuals who were infected with chlamydia within 3 months of receiving treatment
  • Treating a proportion of the partners of infected individuals

Findings

• Both retesting and partner treatment would yield incremental reductions in chlamydia prevalence over simple screening of index cases.

• Retesting at around the rate achieved in ACCEPt is predicted to yield similar reductions in prevalence as would be achieved through partner treatment (in the absence of retesting).

• Partner treatment (with no retesting) at 60% is predicted to yield greater reductions in prevalence than retesting (with no partner treatment) at 60%.

Future work

• Our mathematical model will be used to investigate the potential population-level impact of chlamydia testing uptake, as achieved in ACCEPt, on chlamydia transmission in the Australian population.

• Other strategies to be considered
  • Increase clinic attendance/coverage
  • Changes to sexual behaviour, awareness
  • Different mix of testing and partner treatment rates

• Economic evaluations
  • Output from our model will inform an economic evaluation of ACCEPt to determine the cost-effectiveness of the chlamydia screening intervention.
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References


