Incident Chlamydia and Gonorrhea Infections among People Vulnerable to HIV in Kenya, 2021-2024

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Background

- *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) infections can cause adverse health outcomes and facilitate HIV transmission.
- CT/NG rates in sub-Saharan Africa are increasing, with Kenya among the countries with the highest burden of HIV. However, recently estimated CT/NG rates are limited or biased.

Objectives

- Among adolescents and adults with behavioral risk for HIV in Kericho and Homa Bay, Kenya:
  - ✓ Estimate overall and anatomic site-specific CT/NG event rates by sex
  - ✓ Identify demographic and behavioral risk factors for CT/NG infection
  - ✓ Characterize concurrent infections across multiple sites and patterns of co-infections

Methods

Study and Data Collection

- The Multinational Observational Cohort of HIV and other Infections (MOCHI) is an HIV incidence cohort in Kenya, Uganda, and the Philippines.
- Enrolled people aged 15-55 years with ≥1 behavioral risks for HIV in the previous 24 weeks:
  - ✓ STI
  - ✓ Transactional sex
  - ✓ Condomless sex
  - ✓ Injection drug use
  - ✓ Anal sex with male partners
- Anorectal swabs, oropharyngeal swabs, and urine were tested using PCR-based Xpert® CT/NG every 12-24 weeks for up to 72 weeks.
- Behavioral surveys completed every 24 weeks.

Statistical Analyses

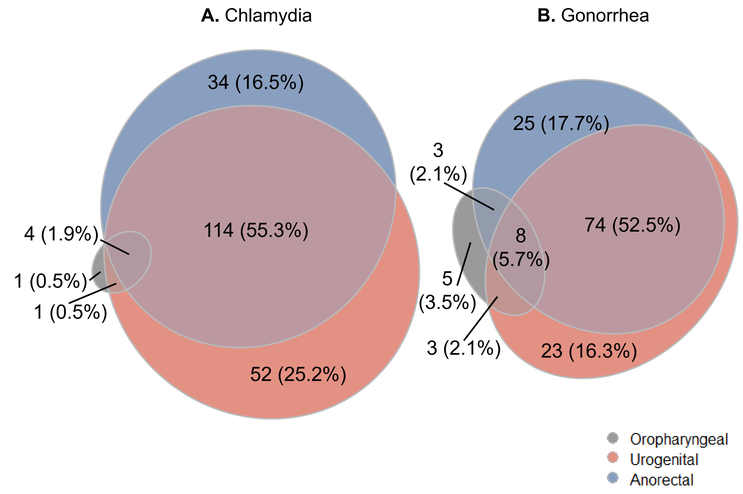
- Participants with prevalent CT/NG for whom incident infection could not be ascertained were excluded from the CT/NG analytic samples.
- Negative binomial regression models estimated event rates and 95% confidence intervals (CIs).
- Andersen-Gill models with robust standard errors and purposeful variable selection estimated adjusted hazard ratios (aHRs) for factors associated with incident CT/NG.

Table 1. Enrollment population characteristics.

Characteristics	N=407 n (%)	Incident CT Yes n=154 n (%)	Incident CT No n=212 n (%)	Incident NG Yes n=117 n (%)	Incident NG No n=255 n (%)
Sex					
Male	82 (20)	21 (26)	60 (74)	12 (15)	69 (85)
Female	325 (80)	133 (47)	152 (53)	105 (36)	186 (64)
Age					
15-24 years	326 (80)	136 (47)	152 (53)	95 (32)	199 (68)
>24 years	81 (20)	18 (23)	60 (77)	22 (28)	56 (72)
Education[1]					
<12 years	214 (53)	88 (47)	99 (53)	73 (38)	118 (62)
≥12 years	191 (47)	65 (37)	112 (63)	44 (25)	135 (75)
Inconsistent condom use[1,2]					
No	101 (26)	38 (41)	54 (59)	32 (34)	62 (66)
Yes	288 (74)	110 (43)	147 (57)	83 (32)	177 (68)
Number of partners[1,2]					
<5 partners	89 (23)	28 (35)	51 (65)	21 (26)	60 (74)
≥5 partners	297 (77)	117 (44)	151 (56)	93 (34)	177 (66)
Men who have sex with men[1]					
No	360 (89)	141 (44)	179 (56)	108 (33)	218 (67)
Yes	43 (11)	11 (26)	31 (74)	9 (21)	33 (79)
Sex work/transactional sex[1]					
No	76 (19)	21 (29)	52 (71)	17 (23)	57 (77)
Yes	319 (81)	130 (46)	151 (54)	99 (35)	187 (65)

[1]Missing: education (n=2); inconsistent condom use (n=18); number of partners (n=21); men who have sex with men (n=4); sex work/transactional sex (n=12). [2]In the past 12 weeks.

Figure 1. Euler diagram of infections by pathogen and anatomic site.



Overall event rates for chlamydia and gonorrhea were 56 per 100 person-years and 36 per 100 person-years, respectively. Our findings support a strategy of comprehensive screening for anorectal and urogenital chlamydia and gonorrhea in populations vulnerable to HIV in Kenya, regardless of self-reported sexual behaviors.

Figure 2. Cumulative hazard curves for CT/NG infections.

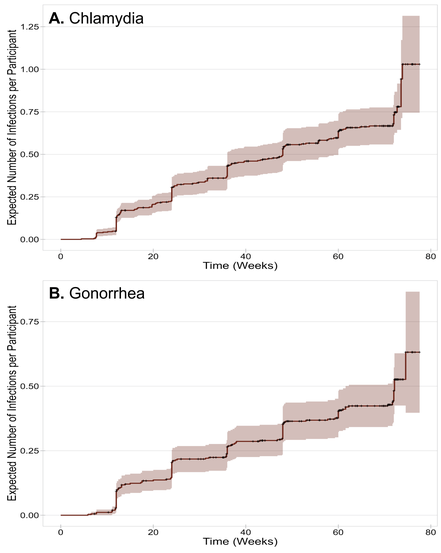
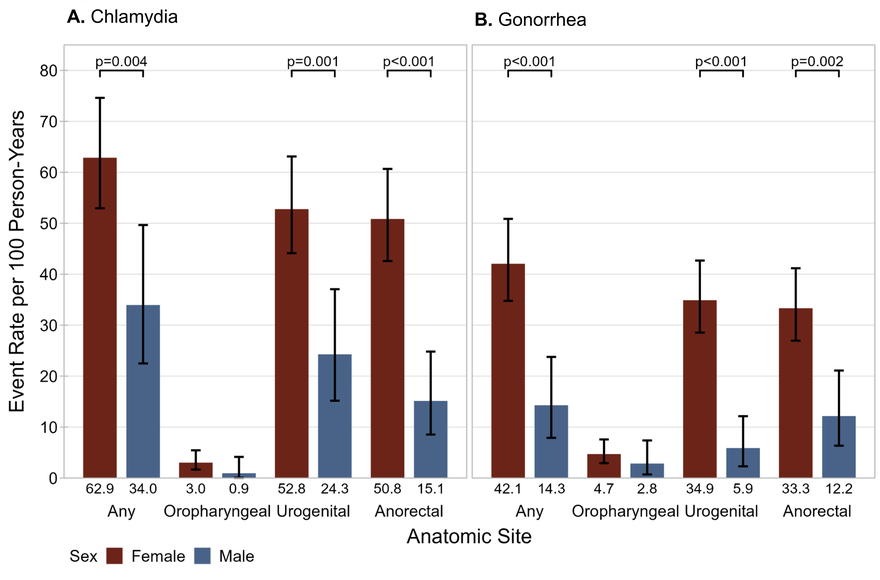


Figure 3. CT/NG event rates by pathogen, sex, and anatomic site.



Results

- 407 participants enrolled in 12/2021 – 4/2023 and followed through 9/2024 (**Table 1**).
- While concurrent infection at multiple sites was observed, 42% and 34% of CT and NG occurred only at the anorectal or urogenital site (**Figure 1**).
- CT/NG co-infection was uncommon (n=39).
- Incident and recurrent CT/NG infections observed, with generally higher rates of CT (**Figure 2**).
- **Chlamydia**
  - ✓ 154/366 (**42%**) had ≥1 CT infection
  - ✓ Overall event rate: **56/100PY** (95% CI 48-66)
    - Urogenital: 46/100PY (95% CI 39-55)
    - Anorectal: 43/100PY (95% CI 36-51)
    - Oropharyngeal: 3/100PY (95% CI 1-4)
  - ✓ Rates two-fold higher in females (**Figure 3a**)
  - ✓ Event rate was higher in participants aged 15-24 years (aHR [95% CI]: 2.5 [1.5-4]; ref >24)
  - ✓ Not associated with sex, education, distance
  - ✓ 14/167 (8%) anorectal CT infections were associated with reported receptive anal sex.
- **Gonorrhea**
  - ✓ 117/372 (**32%**) had ≥1 NG infection
  - ✓ Overall event rate: **36/100PY** (95% CI 30-43)
    - Anorectal: 29/100PY (95% CI 23-35)
    - Urogenital: 28/100PY (95% CI 23-35)
    - Oropharyngeal: 4/100PY (95% CI 3-6)
  - ✓ Rates three-fold higher in females (**Figure 3b**)
  - ✓ Urogenital rate six-fold higher in females
  - ✓ Not associated with sex, age, education, distance, or sex work/transactional sex
  - ✓ 12/116 (10%) anorectal NG infections were associated with reported receptive anal sex.

Conclusions

- Findings support a strategy of comprehensive, PCR-based screening for anorectal/urogenital CT/NG in vulnerable populations of both sexes, regardless of self-reported sexual behaviors.
- Findings do not support universal screening for oropharyngeal CT/NG in vulnerable populations.

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