A Validation Study of the Cepheid Xpert® CT/NG for Detecting *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in rectal samples

Cosentino LA[1], Danby CS[2], Rabe LK[1], Priest CL[1], Damare KC[1], Macio IS[1], Meyn LA[1], Wiesenfeld HC[1,2], Hillier SL[1,2]

[1]Magee-Womens Research Institute, and [2]University of Pittsburgh Department of Obstetrics, Gynecology and Reproductive Sciences, Pittsburgh, PA, USA

Background

- Nucleic acid amplification testing (NAAT) is the optimal method for detection of the two most common sexually transmitted diseases (STIs), *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (GC).
- Current FDA-approved NAAT for detection of CT/GC in genital swab specimen include:
  - Cepheid Xpert® CT/NG (Xpert) test is a qualitative in vitro real-time PCR test.
  - Gen-Probe® Aptima Combo 2 ® (AC2) test utilizes target capture Transcription-Mediated Amplification (TMA) and Dual Kinetic Assay (DKA) technology.
- No commercial NAAT is currently cleared by the US Food and Drug Administration (FDA) for CT/GC detection from extragenital specimens.
- Validation of these tests is required to provide data to support the use of NAAT for anorectal swab samples.

Objective

- To validate and compare rectal swab specimens for the detection of CT and GC using the Cepheid Xpert CT/NG (Xpert) test and the Gen-Probe Aptima Combo 2 (AC2) test.

Methods

- 399 participants (224 men and 175 women) aged 18 – 62 years reporting a lifetime history of receptive anal intercourse (RAI).
- Swabs were collected by clinicians; order of collection was randomized.
- *CT/GC Testing*: Xpert and AC2 tests per insert.
- *True positive controls*:
  - Both Xpert and AC2 positive or
  - Either Xpert or AC2 positive **AND** the Aptima CT or GC alternate primers were positive.

Results

- *CT/GC Prevalence*: CT was detected in 59 (14.8%) and GC in 30 (7.5%) participants, prevalence of rectal GC was significantly higher in men vs women (Table 1).
- *NAAT Discrepancy rates* - Xpert vs AC2: CT - 9/59 GC - 2/30
- *NAAT performance*: Xpert had numerically higher sensitivity than AC2 for GC and CT (Tables 2 and 3); Xpert and Aptima performance was similar for both pathogens.

Table 1. Prevalence of Rectal STI's Stratified by Sex

Pathogen	Men (n=224)	Women (n=175)	p
C. trachomatis	39 (17.4%)	20 (11.4%)	0.12
N. gonorrhoeae	26 (11.6%)	4 (2.3%)	<0.001

Table 2. Performance of Xpert and Aptima in the Detection of CT from Rectal Specimens

Test Method	True +	False -	Sensitivity (95% CI)	Specificity (95% CI)
Xpert	56	3	94.9% (85.9%, 98.9%)	99.7% (98.4%, 99.9%)
AC2	54	5	91.5% (81.3%, 97.2%)	100% (98.9%, 100%)

Table 3. Performance of Xpert and Aptima in the Detection of GC from Rectal Specimens

Test Method	True +	False -	Sensitivity (95% CI)	Specificity (95% CI)
Xpert	30	0	100% (88.4%, 100%)	100% (99.0%, 100%)
AC2	28	2	93.3% (77.9%, 99.2%)	100% (99.0%, 100%)

Conclusions

- Rectal GC and CT infections were common among people reporting a history of RAI, and rectal testing for STIs should be expanded.
- Rectal infection with CT was equally common among men and women but rectal GC infection occurred more often among men.
- Both Xpert and AC2 NAATs demonstrated a high degree of sensitivity and specificity for detection of CT and GC from rectal swab samples.

Acknowledgements: Reagents for CT/GC testing were provided for by Cepheid and Hologic.

The Microbicide Trials Network is funded by the National Institute of Allergy and Infectious Diseases (UM1AI068633, UM1AI106707), with co-funding from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development and the National Institute of Mental Health, all components of the U.S. National Institutes of Health.