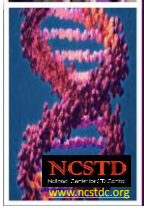


The Power of Knowing: Pursuing Improved Pathways to Better Patient Solutions

Diagnostics for chlamydial and gonococcal infections in China: Current status and future perspectives

Xiang-Sheng Chen, MD & Yue-Ping Yin, PhD
National Center for Sexually Transmitted Disease Control of China CDC
Institute of Dermatology of Chinese Academy of Medical Sciences
Nanjing, CHINA

World STI & HIV Congress, Brisbane, 14 September 2015

Outline

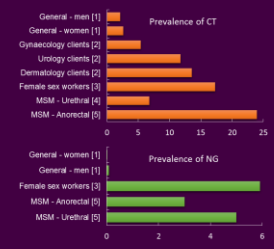
Focus on three questions:

1. Why are the diagnostics for CT & NG infections important?
2. What diagnostics for CT & NG are currently available and used in clinical services?
3. What are the future perspectives for CT & NG diagnostics?

NCSTD

Why diagnostics?

- **High CT/NG prevalence & disease burdens**



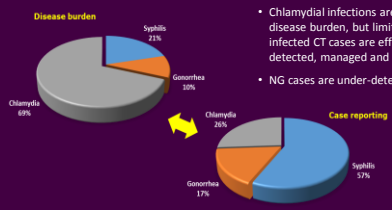
→ >10 million people infected with CT
>1.5 million people infected with NG

[1] Parish WL, et al. JAMA. 2003; 289:1265. [2] Lu Q, et al. Chin J AIDS STDs. 2013; 19:760. [3] Chen XS, et al. BMC Public Health. 2013; 13:121. [4] Wang BX, et al. China Mega Project, 2010. [5] Li JH, et al. Jpn J Infect Dis. 2011;64:141.

NCSTD

Why diagnostics?

- **Low proportion of these infections detected**



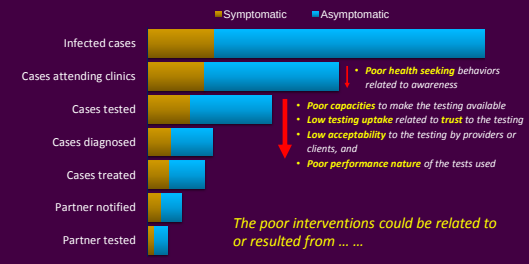
- Chlamydial infections are majority of STI disease burden, but limited part of the infected CT cases are efficiently tested, detected, managed and reported.
- NG cases are under-detected as well.

Data source: *STD sentinel surveillance programme, NCSTD*

NCSTD

Why diagnostics?

- **High disease burdens but low detection for interventions**



- ***Poor health seeking*** *behaviors related to awareness*
- ***Poor capacities*** *to make the testing available*
- ***Low testing uptake*** *related to* ***trust*** *to the testing*
- ***Low acceptability*** *to the testing by providers or clients, and*
- ***Poor performance nature*** *of the tests used*

The poor interventions could be related to or resulted from … …

NCSTD

What implication?

Poor detection of these infections for interventions has potentially contributed to increasing & high prevalence of infertility.

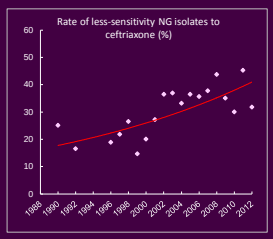
11.4% of women aged 27-32 years were infertile

11.4% of women aged 27-32 years were affected with infertility

NCSTD

What implication?

Poor detection of these infections for interventions has potentially contributed to increasing & high rate of drug resistance, and further transmission.

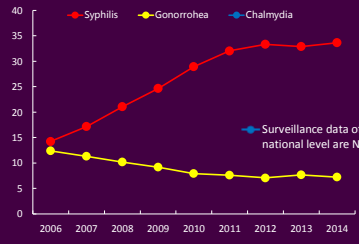


Data source: NCSTD, China CDC

NCSTD

What implication?

Poor detection and case-reporting of these infections has made the interpretation of the national surveillance data more challenging.



NCSTD

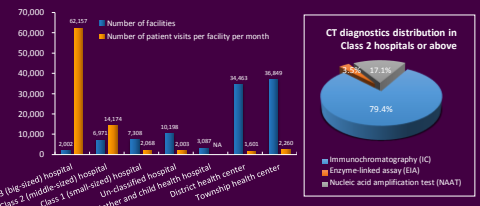
What diagnostics available?

- China is a country with a lot of local companies pursuing the development and production of diagnostics for CT and/or NG.
- An increasing number of diagnostics for CT or NG produced locally or imported from outside have been commercially available:
  - >10 diagnostics based on detection of CT antigen
  - >5 diagnostics based on detection of NG antigen
  - >10 diagnostics based on detection of DNA of CT or/and NG cobas®
- Performance reported by the company is usually good but methods used to validate the performance vary widely.

NCSTD

What diagnostics used?

- Class 3 or Class 2 hospitals account for <10% of all medical facilities but serve >50% of patients[1].
- CT/NG testing is usually not available in Class 1 (small-sized) hospitals or below (health centers).
- Less doctors and physicians are willing to request/conduct culture examination for NG.
- A survey in 257 Class 2 hospitals or above indicates antigen-based tests for CT is most widely used[2].



1. Statistics of medical facilities in China by May 2015.

2. NCSTD. A survey among 257 hospitals in sentinel surveillance sites in China, 2014.

NCSTD

Poor performance of ag-based assay

- More than 50% CT infections could not be identified by the current antigen-based assays.

RAPID DIAGNOSTICS

Clinic-based evaluation of Clearview Chlamydia MF for detection of *Chlamydia trachomatis* in vaginal and cervical specimens from women at high risk in China

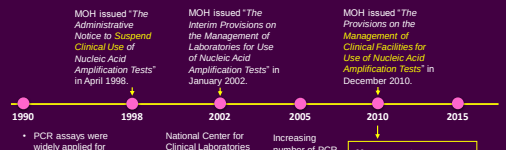
Y-P Yin, E W Peeling, X-S Chen, K-L Gong, H Zhou, W-M Gu, H-P Zheng, Z-S Wang, G Yang, W-L Cao, M-Q Shi, W-H Wei, X-Q Dai, X Gao, Q Chen, D Mabey

Source and type of specimens	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)
FRC (n = 587)		
Vaginal swab	24.2* (14.9 to 36.6)	99.4 (98.2 to 99.9)
Cervical swab	44.4 (32.1 to 57.4)	99.4 (98.2 to 99.9)
STDC (n = 839)		
Vaginal swab	36.8* (28.2 to 46.2)	98.9 (97.7 to 99.5)
Cervical swab	52.6 (43.1 to 61.9)	96.7 (95.0 to 97.8)
SEV (n = 71)		
Vaginal swab	38.9 (18.3 to 63.9)	100.0 (91.6 to 100)
Cervical swab	50.0 (26.8 to 73.2)	100.0 (91.6 to 100)
Total (n = 1497)		
Vaginal swab	32.8** (26.5 to 39.9)	99.2 (98.4 to 99.6)
Cervical swab	49.7 (42.6 to 56.9)	97.9 (96.9 to 98.6)

NCSTD

From Ag-based to NAAT-based assay

- Quality NAAT-based diagnostics have been recommended as assays for improving identification of patients with these infections in clinical practice.



NCSTD

Future perspectives?

NAAT-based diagnostics to improve

- CLINICAL SERVICE
- DIS SURVEILLANCE
- SCI RESEARCH

What diagnostics expected?

A = Affordable
S = Sensitive
S = Specific
U = User-friendly
R = Rapid and robust
E = Equipment-free
D = Deliverable

ASSURED test[1]

NAAT-based diagnostics to improve

ASPIRED test[2]

A = Affordable
S = Sensitive and specific
P = Procedure-simple
I = Invasion-free
R = Rapid and robust
E = Environment-adapted
D = Deliverable

- CLINICAL SERVICE
- DIS SURVEILLANCE
- SCI RESEARCH

1. Peeling RW, et al. Sex Transm Infect 2006; 82(Suppl V):v1–v6.
2. Chen XS. Presentation at National STD Workshop, 2015.

Affordable diagnostics

A = Affordable
S = Sensitive and specific
P = Procedure-simple
I = Invasion-free
R = Rapid and robust
E = Environment-adapted
D = Deliverable

- *Affordable by patient seeking health-care services: During Jan and May 2015, the outpatient expenses per clinic visit were US$ 45 in public Class 3 (big-sized) hospitals and US$ 29 in public Class 2 (middle-sized) hospitals in China[1].*
- *Affordable by the public health programme: affordable and cost-effective investment of interventions (e.g. active screening among young people and/or outreach screening at HR groups).*

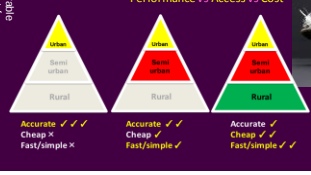
1. Statistics of outpatient expenses in state hospitals in China by May 2015, NHFPC.

Accurate diagnostics

A = Affordable
S = Sensitive and specific
P = Procedure-simple
I = Invasion-free
R = Rapid and robust
E = Environment-adapted
D = Deliverable

Desired accuracy?
Development of the target product profile (TPP) for each of the assays laying out the desired performance is under plan.

Performance vs Access vs Cost



Simple & easy-to-use diagnostics

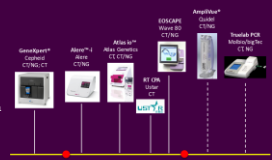
A = Affordable
S = Sensitive and specific
P = Procedure-simple
I = Invasion-free
R = Rapid and robust
E = Environment-adapted
D = Deliverable

AUTOMATION

Automation system including self-contained quality control can save human resource, reduce mistakes, favor standardization, and improve service quality.

Point of Care

POC Tests for CT & NG: Available and Pipeline[1]



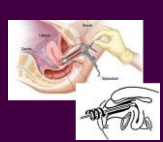
1. Murtagh MM. Presentation of POC tests, 2015.

Diagnostics using non-invasive sample

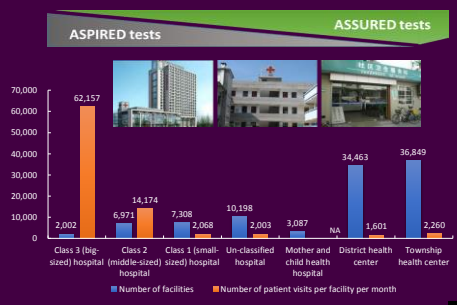
A = Affordable
S = Sensitive and specific
P = Procedure-simple
I = Invasion-free
R = Rapid and robust
E = Environment-adapted
D = Deliverable

Non-invasive sampling manner can improve patient acceptability and simplify sample collecting procedure, representing real advantages in clinical care, outreach services and epidemiological surveys.

BUT, performance of the diagnostic should NOT be compromised by sampling manner.



Introduction of diagnostics



Pursuing improved care of STIs

- **Ensure quality of diagnostics:**
  - TPP for R&D of innovative diagnostics
  - Protocols for independent validation of new diagnostics and evidence-based regulatory process of the diagnostics
  - Regular post-market evaluation of commercially available diagnostics and data dissemination and sharing through publication or website
  - … …
- **Ensure quality to use the diagnostics:**
  - Guidelines and SOPs for use of diagnostics in clinical services, and surveillance programme.
  - Quality assurance through proficiency panels, site observation, and competency assessment
  - Training programmes including pre-service and in-service training
  - … …

Conclusions

- China has high disease burdens of chlamydial and gonococcal infections but has these infections poorly detected for treatment and interventions.
- China expects the diagnostics having ASSURED or ASPIRED characteristics for improving the medical care in health facilities at different levels, strengthening the surveillance programme, and assisting the scientific research.
- China needs to create quality assurance system to ensure the quality of diagnostics and ensure the quality to apply the quality diagnostics.

Acknowledgements

National Reference Sexually Transmitted Disease Laboratory

Guangdong Center for Prevention and Control of Skin Diseases and Sexually Transmitted Diseases