

# NZSHS Conference 2019

Lower Rates of Gonorrhoea culture in the NAAT  
era has implications for AMR Surveillance

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# Introduction

- Gonorrhoea is a potentially serious bacterial sexually transmitted infection due to *Neisseria gonorrhoeae* (NG)
- *NG* is particularly adept at acquiring genetic mutations that reduce its susceptibility to antibiotics
- This includes penicillin, tetracyclines, macrolides, fluoroquinolones and more recently extended spectrum cephalosporins
- Anti-microbial resistance surveillance (AMR) is critical to monitor susceptibility trends for NG and ensure that therapy remains effective
- Auckland Sexual Health is a sentinel site for gonococcal AMR surveillance in Auckland

# Introduction (2)

- In 2012 the service switched from predominantly culture based testing to nucleic acid amplification testing (NAAT) for NG (BD Viper™)
- After the switch to NAAT testing service guidelines still recommended gonorrhoea culture to be done in specific clinical scenarios in order to maintain AMR surveillance
- **However pharyngeal culture was discontinued due to low sensitivity**
- In October 2017 the method of taking cultures was switched from direct plating on to selective culture media to using transport swabs
- Shortly after an email was sent to staff in February 2018 advising that the viability of gonorrhoea isolates was *significantly compromised* if the specimens did not get to the laboratory within a few hours .
- Twice daily specimen collections and transport to the lab were instituted to reduce delay

# Audit Aims

Two successive audits of NG laboratory testing data were carried out to determine:

1. Whether the switch from direct plating to using transport swabs in 2017 had compromised culture sensitivity
2. Whether staff were following recommendations for collecting specimens for culture.
3. To see if new recommendations for culture that were introduced in 2018 following the first audit were being adhered to by staff

# Method

- Data was supplied by the Auckland hospital microbiology laboratory that does all the diagnostic testing for the service
- The 1st audit compared NG testing data from the 2nd quarter 2017 when direct plating was in use and the 4<sup>th</sup> quarter of 2017 when transport swabs were used
- The 2<sup>nd</sup> audit used laboratory data from the 1st quarter of 2019 following introduction of the new recommendations for culture.

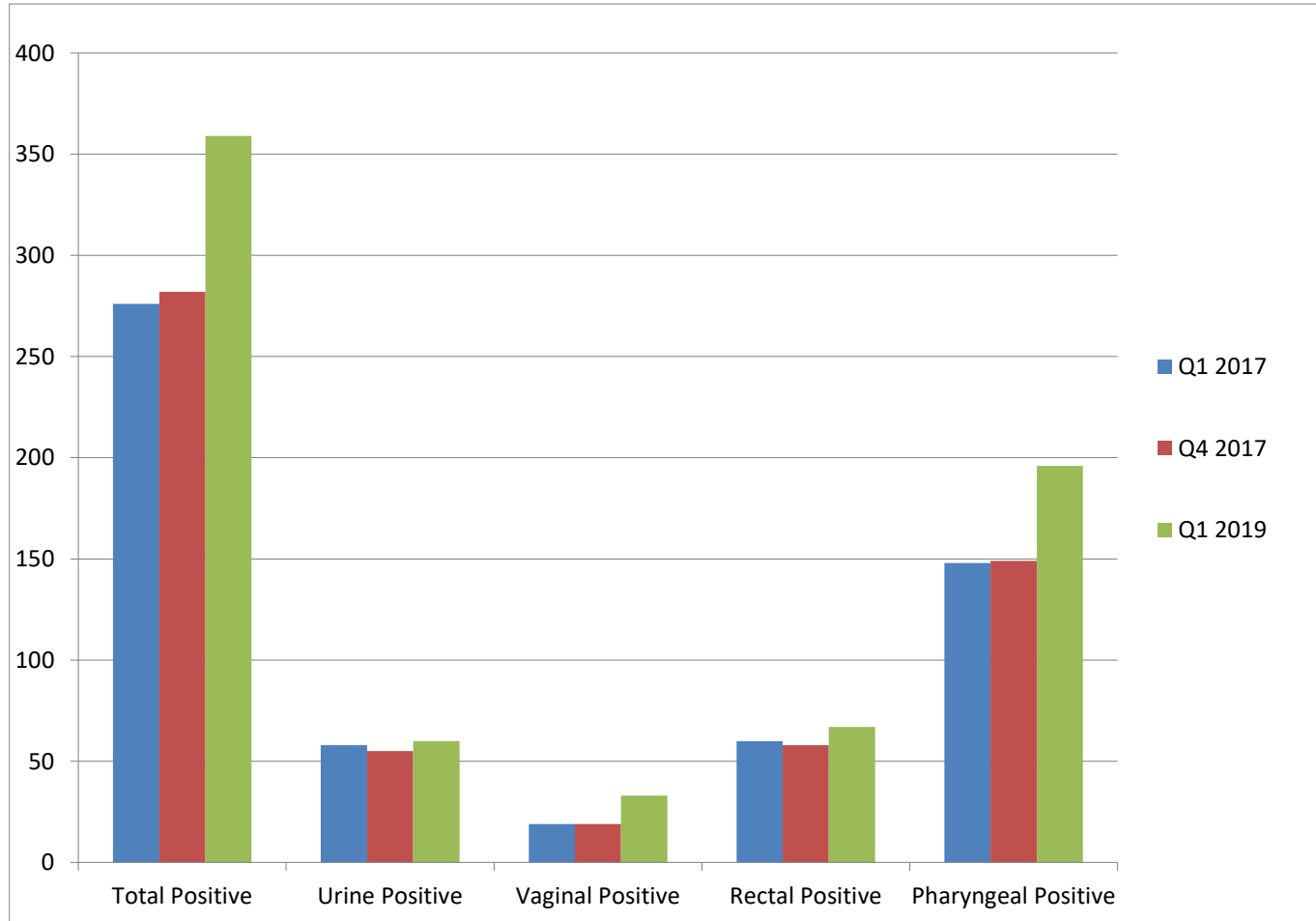
# Culture Recommendations

Culture Recommendations pre- 1 <sup>st</sup> Audit 2017	Revised Culture Recommendations July 2018
<ul style="list-style-type: none"><li>• Males with signs and symptoms of urethritis</li><li>• Women with clinical cervicitis or moderate to severe PID</li><li>• GBM with proctitis symptoms</li><li>• <b>All GBM undergoing rectal NAAT testing</b></li><li>• Patients who had been diagnosed with gonorrhoea in the previous 6 months.</li><li>• Sexual contacts of gonorrhoea</li></ul>	<ul style="list-style-type: none"><li>• Males with visible urethral discharge on examination</li><li>• Women with clinical cervicitis or moderate to severe PID</li><li>• GBM with proctitis symptoms</li><li>• <b>Females with positive vaginal NAAT tests when recalled for treatment</b></li><li>• <b>GBM with positive rectal NAAT tests when recalled for treatment</b></li><li>• Sexual contacts of gonorrhoea</li></ul>

# Gonorrhoea NAAT Results

Quarter 2 2017 No. of Patients = 2430				Quarter 4 2017 No. of Patients = 2496			Quarter 1 2019 No. of patients= 3369		
	Total N	Positive (%)	Negative N (%)	Total N	Positive N (%)	Negative N (%)	Total N	Positive n (%)	Negative
<b>Total</b>	4662	276 (5.9%)	4386 (94.1%)	5105	282 (5.5%)	4823 (94.5%)	6951	359 (5.1%)	6592
<b>Vaginal</b>	878	18 (2%)	867 (98%)	825	19 (2.3%)	806 (97.8%)	1120	33 (3.0%)	1087
<b>Pharyngeal</b>	1102	148 (13%)	954 (87%)	1304	149 (11.4%)	1155 (88.6%)	1782	196 (12.4%)	1586
<b>Rectal</b>	958	60 (6.2%)	898 (93.8%)	1142	58 (5%)	1084 (95%)	1625	67 (4.5%)	1558
<b>Urine</b>	1703	58 (3.4%)	1645 (96.7%)	1826	55 (3%)	1771 (97%)	2424	60 (1.8%)	2364

# Positive Gonorrhoea NAAT Results





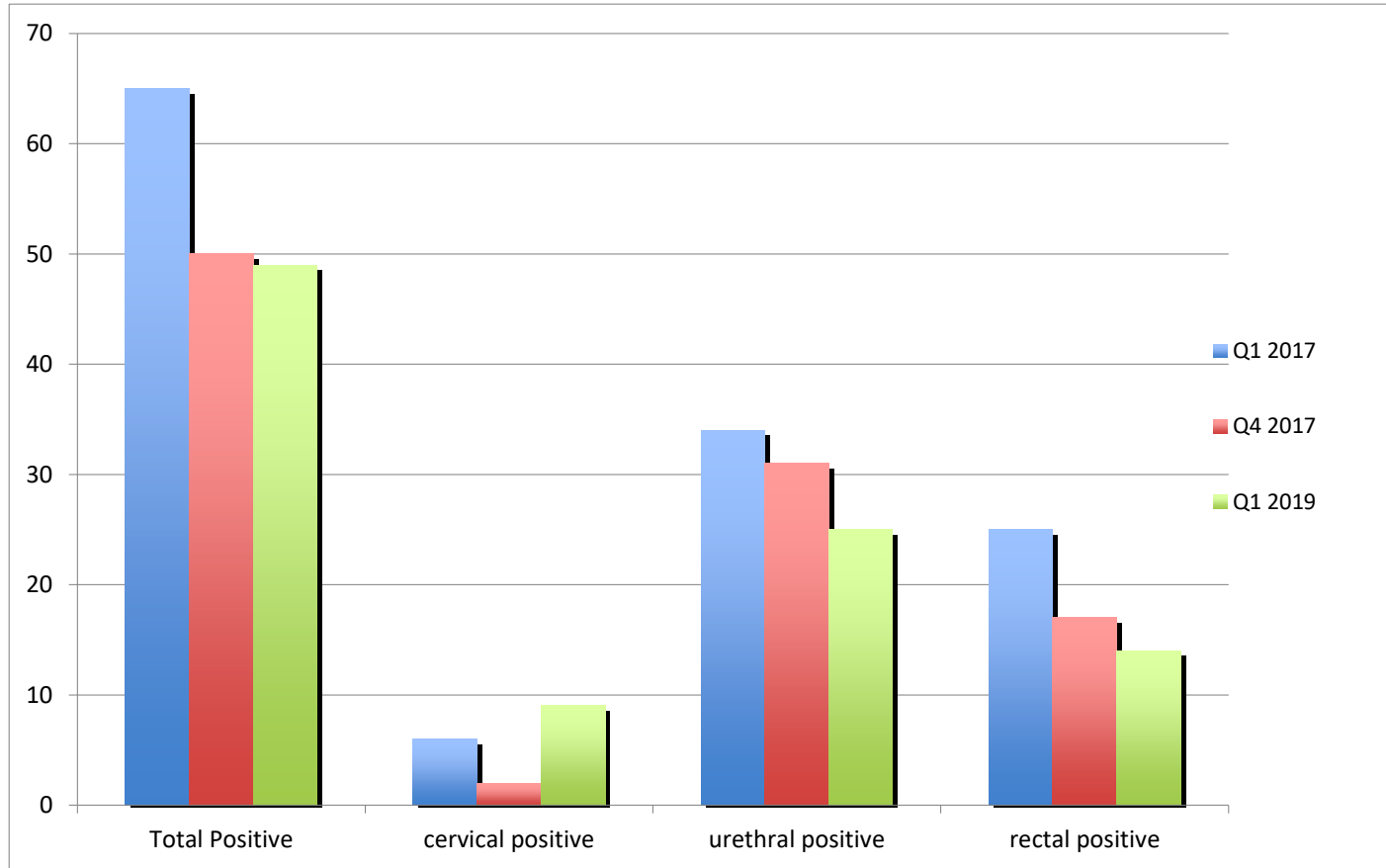
# Gonorrhoea Culture Results

Quarter 2 2017				Quarter 4 2017			Quarter 1 2019		
	Total	Positive (%)	Negative (%)	Total	Positive (%)	Negative (%)	Total	Positive (%)	Negative (%)
<b>Cultures</b>	714	65 (8.9%)	649 (91.1%)	840	50 (5.9%)	790 (94.1%)	119	49 (41%)	70 (59%)
<b>Urethral</b>	119	34 (29%)	85 (71%)	111	31 (28%)	80 (72%)	48	25 (53%)	22 (47%)
<b>Cervical</b>	31	6 (19%)	25 (81%)	27	2 (8%)	25 (92%)	20	9 (45%)	11 (55%)
<b>Rectal</b>	564	25 (4%)	539 (96%)	702	17 (2.6%)	685 (97.4%)	51	14 (27%)	37 (63%)
<b>Rectal<sup>I</sup></b>	32/60 (53%)	25/32 (78%)	7/32 (22%)	37/58	17/37 (46%)	20/37 (54%)	16/67 (24%)	11/16 (69%)	5/16 (31%)
<b>Cervical<sup>II</sup></b>	3/18 (22%)	3/3 100%	0/3 (0%)	5/19 (26%)	1/5 (20%)	4/5 (80%)	11/33 (33%)	9/11 (82%)	2/11 (28%)

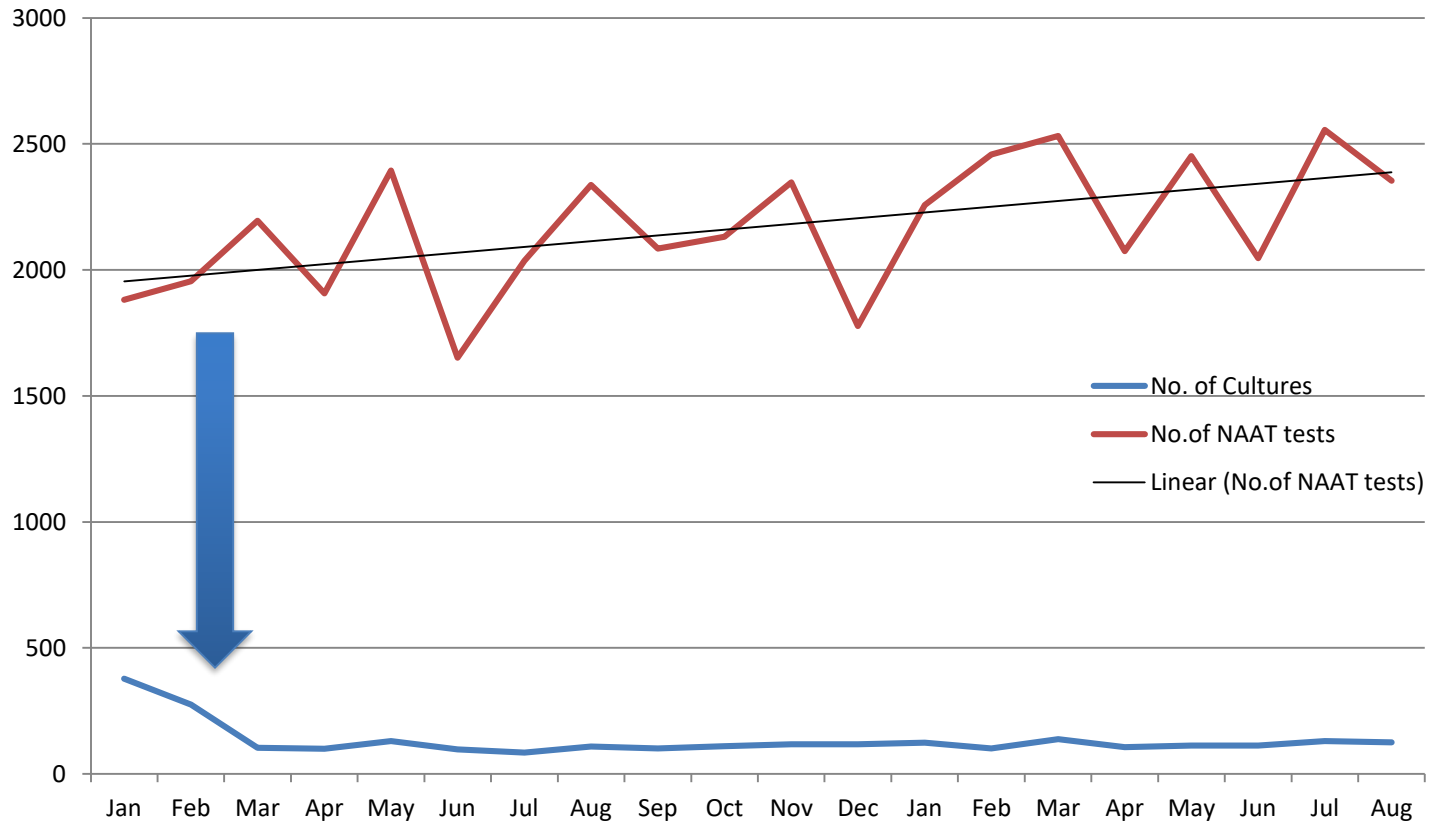
<sup>I</sup> Positive rectal NAAT

<sup>II</sup> Positive vaginal NAAT

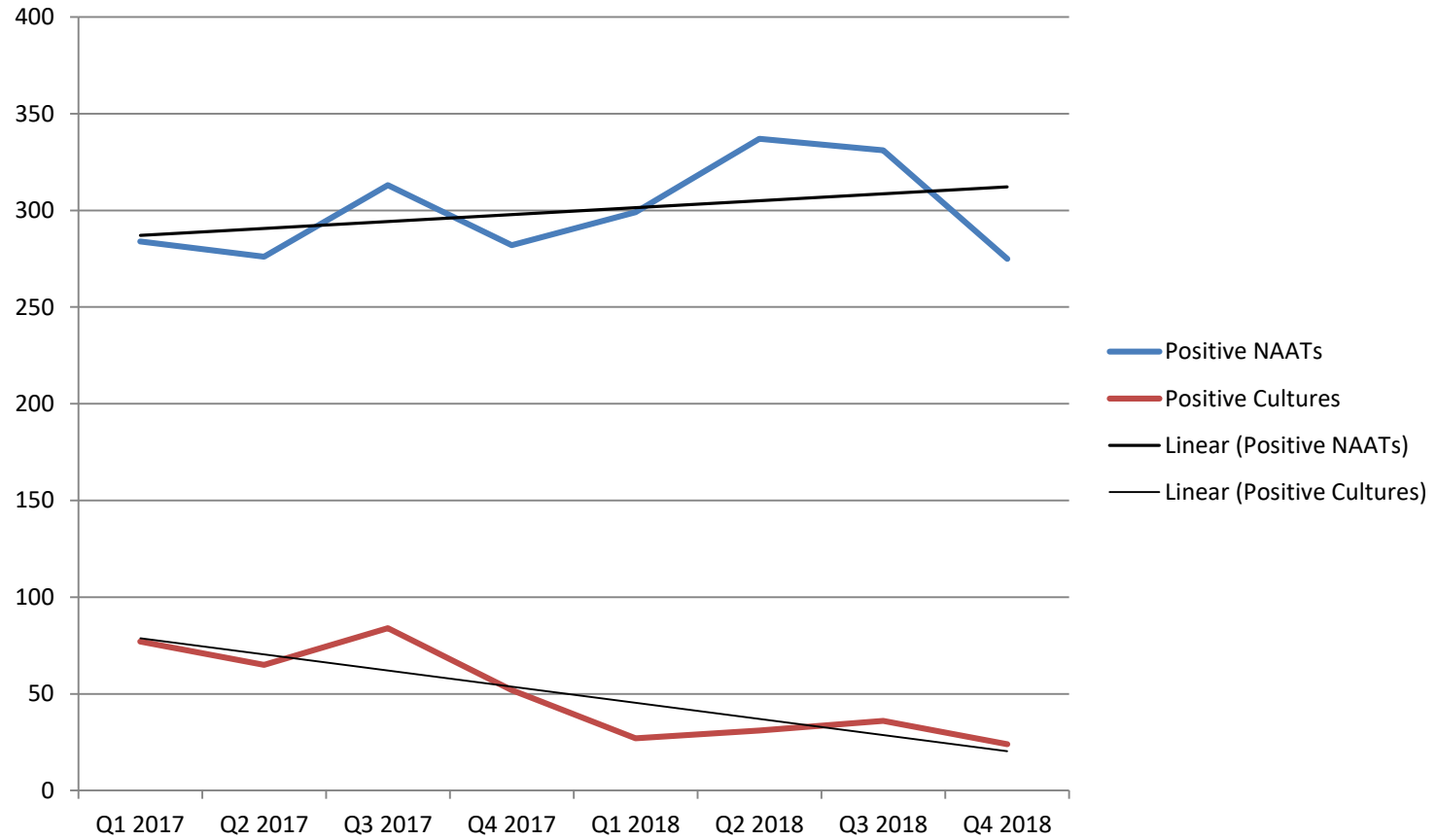
# Gonorrhoea Culture Results



# LabPlus Testing Data 2018/2019



# Sexual Health Clinic Lab Data



# Findings

- The sensitivity of culture dropped after the switch in methodology
- The more frequent lab transport times and more targeted approach to testing improved the sensitivity of culture
- There was a trend of decreasing numbers of positive gonorrhoea cultures over time despite an increase in the number of +ve NAAT tests

# Findings(2)

- Staff were not adhering to the new recommendations for culture
  - Only 24% of men with positive rectal NAATs and 33% of women with positive vaginal NAATs had had cultures taken and
  - Nine of the patients with positive rectal NAAT tests and 4 of the women with positive vaginal NAAT tests had been tested and empirically treated as contacts and none had had cultures taken at the time of treatment as recommended by the guidelines
- Sensitivity of rectal and cervical culture from NAAT positive patients was high( 69% and 82% respectively) therefore it would be relatively easy to increase yield of +ve cultures if guidelines are followed
- *The lack of pharyngeal culture is a concern given the high prevalence of pharyngeal infection and that this is the main site for NG acquiring resistance mutations*

# Discussion

- Current New Zealand guidelines recommend maintaining laboratory capabilities for gonorrhoea culture “to facilitate detection and management of antibiotic resistance”
- The last national audit of gonococcal AMR in 2014 and 2015 reported on NG isolates collected from laboratories throughout NZ
- 11 (2.6%) isolates had decreased ceftriaxone susceptibility (MIC  $\geq$ 0.06 mg/L)
- 8/11(73%) of these isolates were from the greater Auckland area indicating the importance of Auckland as a sentinel surveillance site
- This national audit highlighted the need for laboratories to maintain a level of gonococcal culture sufficient to monitor local resistance patterns.

# Conclusion

- The shift to NAAT testing for NG has resulted in reduced opportunities to obtain culture specimens for detection of AMR
- Auckland is an important sentinel surveillance site for gonococcal AMR so it is important to maintain adequate culture rates
- Processes need to be put in place to improve staff adherence to guidelines