ORIGINAL SCIENTIFIC PAPER

SHORT REPORT

# Chlamydia trachomatis screening in pregnancy in New Zealand: translation of national guidelines into practice

**Michelle R Wise** MD, MSc, FRANZCOG;[1] **Lynn Sadler** MBChB, MRANZCOG, MPH;[2] **Alec Ekeroma** MBBS, DipObs, FRANZCOG, FRCOG, MBA[3]

## ABSTRACT

**INTRODUCTION:** *Chlamydia trachomatis* (*C. trachomatis*) is a common sexually transmitted infection (STI), and routine antenatal screening to reduce the risk of vertical transmission is recommended in New Zealand (NZ).

**AIM:** To determine the proportion of pregnant women who have been screened for *C. trachomatis* in selected hospitals since the 2008 NZ Ministry of Health Chlamydia Management Guidelines were published, and to examine variation by age and ethnicity.

**METHODS:** Clinical audits were undertaken at four NZ hospitals, using electronic databases to determine if *C. trachomatis* screening had occurred.

**RESULTS:** Only 24%, 31%, 35% and 61% of pregnant women were screened in Tauranga (2010), Auckland (2013), Waikato (2013) and Middlemore (2011) hospitals, respectively.

**DISCUSSION:** Despite increases in the proportion of pregnant women screened in Auckland and Middlemore compared to pre-2008, and higher proportions of young women and Māori women screened, overall antenatal screening for *C. trachomatis* remains suboptimal. Several strategies are presented to support universal screening in pregnancy, as recommended by the NZ Ministry of Health.

**KEYWORDS:** Chlamydia trachomatis; mass screening; medical audit; pregnancy

[1] Department of Obstetrics and Gynaecology, Faculty of Medical and Health Sciences, The University of Auckland, Auckland, New Zealand and Department of Obstetrics and Gynaecology, Auckland District Health Board, Auckland, New Zealand

[2] Women's Health, Auckland District Health Board, Auckland

[3] Pacific Women's Health Research Unit, Department of Obstetrics and Gynaecology, Faculty of Medical and Health Sciences, The University of Auckland, Auckland and Department of Obstetrics and Gynaecology, Counties Manukau District Health Board, Auckland

## Introduction

The 2012 annual surveillance report of sexually transmitted infections (STIs) in New Zealand (NZ) found that genital *Chlamydia trachomatis* (*C. trachomatis*) infection was the most commonly reported STI (1071 per 100 000 women).[1] The highest test-positive rate was in the 15–19 years age group (6050 per 100 000).

Untreated *C. trachomatis* in pregnancy is associated with preterm labour and preterm rupture of membranes.[2] Infants born vaginally to infected mothers can be infected during delivery, resulting in neonatal conjunctivitis or pneumonia. Rose et al. reported a 7.7% prevalence of *C. trachomatis* in NZ women referred for termination of pregnancy in 2003, and advocated for mandatory *C. trachomatis* screening for pregnant women.[3] In 2008, the NZ Ministry of Health (MOH) Chlamydia Management Guidelines included pregnant women in the list of people who should routinely be offered testing for *C. trachomatis* infection.[4] These guidelines followed a 2006 report that found *C. trachomatis* infection as a suitable candidate for screening, meeting many of the accepted screening criteria using the NZ National Health Committee framework.[5] One element of the framework is cost-effectiveness, and the report concluded that the most cost-effective scenario modelled was screening all pregnant women.

In NZ, pregnancy care and antenatal screening is provided by registered lead maternity carers (LMCs) who can be midwives (either self- or hospital-employed), private obstetricians, or

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**CORRESPONDENCE TO:**
**Michelle Wise**
Department of Obstetrics and Gynaecology, Faculty of Medical and Health Sciences, The University of Auckland, PB 92019, Auckland 1142, New Zealand
m.wise@auckland.ac.nz

general practitioners (GPs). For midwives, national leadership is provided by the NZ College of Midwives (NZCOM). NZCOM guidance states that the pregnant woman determines her risk factors following a discussion on the risks of STIs during pregnancy, and then makes the decision whether to undertake screening based on full and culturally appropriate information.[6] The Royal Australian and NZ College of Obstetricians and Gynaecologists (RANZCOG) recommends that antenatal testing for *C. trachomatis* be considered selectively for those who may be at increased risk (e.g. women younger than 25 years).[7] GPs may follow the NZ Sexual Health Society (NZSHS) guidelines, which recommend routine screening only in high-risk women (e.g. women younger than 25 years).[8]

This study sought to answer the question of how many pregnant women in NZ have been screened for *C. trachomatis* since publication of the 2008 MOH guideline.

## Methods

This quality improvement project was undertaken by medical students at The University of Auckland, as part of their clinical placement in Obstetrics and Gynaecology (at one of eight hospitals associated with the University). Students choose topics of interest to them or their supervisors. Since the quality improvement project was incorporated into the medical school curriculum, this particular topic was chosen by various students, with different supervisors and different methodologies and different time periods, by convenience. Audits were undertaken in four hospitals: Auckland, Middlemore, Waikato, and Tauranga. These hospitals provide secondary and tertiary maternity facilities in which 7781, 6806, 3535, and 2179 births occurred, respectively, in 2010.[9] In 2010, community-based LMC registrations in the Middlemore and Auckland hospital catchment areas accounted for 60–75% of births,

*Table 1. Quality improvement student projects on antenatal chlamydia screening*

| Period | Year performed | Hospital | Maternal age (years) | Sample size | Screening rate (%) | Positive test rate (%) |
|---|---|---|---|---|---|---|
| **Pre-guideline** | 2004 | Auckland† | All ages | NA | NA | NA |
| | | | ≤ 25 | 174 | 36 | 13 |
| | 2006 | Auckland | All ages | NA | NA | NA |
| | | | ≤ 25 | 169 | 48 | 13 |
| | 2007 | Middlemore* | All ages | 1943 | 24 | 8 |
| | | | < 25 | 650 | 29 | 14 |
| **Post-guideline** | 2009 | Middlemore*† | All ages | 405 | 74 | 13 |
| | | | < 25 | 263 | 79 | 16 |
| | 2010 | Tauranga | All ages | 1000 | 24 | 10 |
| | | | < 25 | NA | 38 | NA |
| | 2011 | Middlemore | All ages | 1125 | 61 | 13 |
| | | | < 25 | NA | NA | NA |
| | 2011 | Auckland | All ages | 194 | 51 | 9 |
| | | | < 25 | 44 | 61 | NA |
| | 2013 | Auckland | All ages | 200 | 31 | 10 |
| | | | < 25 | 22 | 68 | NA |
| | 2013 | Waikato | All ages | 100 | 35 | 0 |
| | | | ≤ 25 | 32 | 50 | 0 |

NA Data not available

* Included women delivering at birthing units associated with Middlemore Hospital, located in Auckland (Counties Manukau District Health Board)

† Limited to women under the care of hospital midwives

and for 75–90% in Waikato and Tauranga hospital catchment areas.[10]

Pregnant women were identified from hospital coding data or specific maternity databases where all births are recorded. A sample was identified which included either all births within a limited time frame, or a random sample of a more extended time interval.

Data on whether screening for *C. trachomatis* had occurred were obtained from a search for the woman's national unique identifier in the laboratory database. All datasets included maternal age, but only some included ethnicity or LMC type. Clinical notes were not accessed, so it was not possible to obtain more detailed demographic information about the women. Ethical approval was not required for this audit project.

## Results

Between January 2004 and August 2013, 10 audits were performed. The proportion of women screened in all of the 10 audits at all the hospitals is presented in Table 1 and Figure 1.

In order to address the research question, only the most recently completed project from each hospital's own audit after 2008 are summarised below. The year in brackets refers to the year the audit was performed; the data it pertains to may have been from an earlier date, as the data collection was retrospective.

### Middlemore Hospital (2011)

All women who gave birth at Middlemore Hospital in April and May 2010 (N=1125) were included. The age distribution of these women was: 5% <19 years, 23% 19–23 years, 28% 24–28 years, 25% 29–33 years, and the remainder, 34 years and older; ethnicity distribution was 64% Māori/Pacific, 18% NZ European, and the remainder other ethnicities.

The proportion of women screened was 61% and was associated with age (74% of women <19 years were screened compared to 67% of women 19–23 years, 65% of women 24–28 years, and 57% of women 29–33 years), and associated with ethnicity (66% of Māori/Pacific women were screened compared to 51% of NZ European women). Of the women tested, 13% were positive for *C. trachomatis*.

### Auckland Hospital (2013)

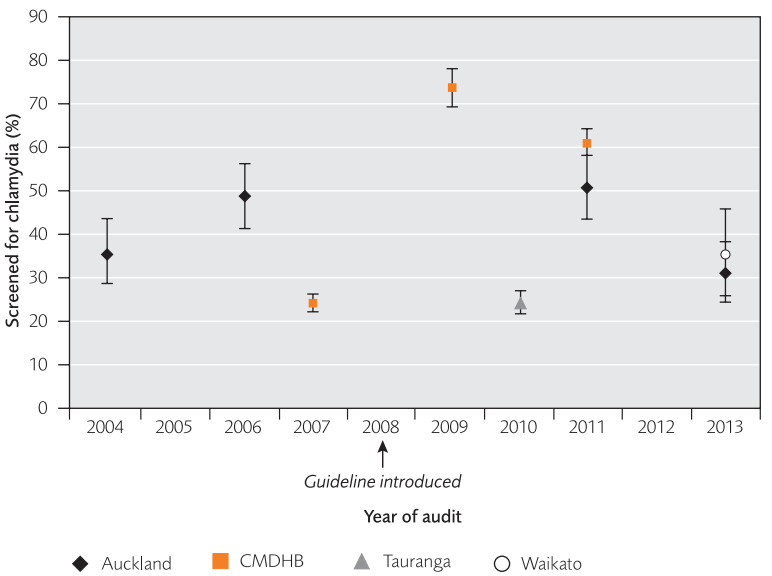
A consecutive block sample of 200 of the 617 women who gave birth at Auckland Hospital in March 2013 was included. In 2012, of all women giving birth at Auckland Hospital, 15% of women were <25 years old. The ethnicity distribution was 7% Māori, 13% Pacific, 35% NZ European; 47% had self-employed midwives attend their birth, 24% private obstetricians, and the remainder hospital midwives.

## WHAT GAP THIS FILLS

**What we already know:** *C. trachomatis* is the most commonly diagnosed sexually transmitted infection in NZ. *C. trachomatis* management guidelines introduced in 2008 recommend routine testing of all pregnant women.

**What this study adds:** Audit of current practice in four NZ hospitals indicates suboptimal screening of *C. trachomatis* in pregnancy. Several strategies to address this issue are presented.

*Figure 1. Rate of antenatal screening for* Chlamydia trachomatis *over time, by hospital or district health board*




CMDHB Counties Manukau District Health Board, Auckland
Error bars indicate 95% confidence intervals

The proportion of women screened was 31% and was associated with age (68% of women <25 years were screened compared to 26% of women ≥25 years); ethnicity (65% of Māori women were screened compared to 48% of Pacific women and 26% of NZ European women); and type of LMC (61% of women under the care of a hospital midwife compared to 38% of women under the care of a self-employed midwife, and 12% under the care of a private obstetrician). Of the women tested, 9.7% were positive for *C. trachomatis*.

### Waikato Hospital (2013)

A block sample of 100 women from a random sample of 500 women who gave birth to singletons at Waikato Hospital between January 2011 and March 2013 was included. The sample was reflective of the ethnicity distribution in the Waikato region based on Census data, and the median age was 28.7 (range 19–42) years.

The proportion of women screened was 35% and was associated with age (50% of women <25 years were screened, compared to 25% of women ≥25 years), but not with ethnicity. None of the women tested positive for *C. trachomatis*.

### Tauranga Hospital (2010)

A consecutive block sample of 1000 women who gave birth at Tauranga Hospital from August to December 2009 was included. The sample was reflective of the ethnicity distribution in the Bay of Plenty region based on Census data (24% Māori, 2% Pacific, 66% NZ European, and the remainder other ethnicities), and the mean age was 28.9 (range 16–46) years.

The proportion of women screened was 24% and was associated with age (38% of women <25 years were screened compared to 18% of women ≥25 years) and ethnicity (34.5% of Māori women were screened compared to 21% of NZ European women). Of the women tested, 9.7% were positive for *C. trachomatis*.

## Discussion

In recent audits, only 24%, 31%, 35% and 61% of pregnant women were screened for *C. trachomatis* in Tauranga, Auckland, Waikato and Middlemore hospitals, respectively. Even in younger women, *C. trachomatis* testing was still less than optimal (performed in 38%, 68% and 50% of women <25 years in Tauranga, Auckland and Waikato hospitals, respectively). Of note, at the two hospitals where audits were performed before and after the MOH guideline was published, the proportion of women screened did increase (see Table 1). However, overall, it appears that the message for all pregnant women to be offered *C. trachomatis* testing is not being translated into practice.

The main limitation of these audits is that whether the test was offered and declined was unable to be determined. It is possible in a shared decision-making model that the low rate of testing was due to a high decline rate. However, we would assume the uptake would be as high as for routine HIV screening during pregnancy, which was over 99% in these four hospitals in 2012, with little variation by age group, ethnicity, or requestor type (midwives, GPs and obstetricians).[11] A future clinical audit could assess the true standard, which is the proportion of women offered screening for *C. trachomatis* (rather than proportion screened), and future research could assess women's and LMC knowledge and attitudes towards routine screening.

The aim of universal screening is that the test is offered in a routine manner, rather than the LMC or the woman needing to assess individual risk. The main reason the MOH concluded that *C. trachomatis* screening should be routine in pregnancy is that it meets specific screening assessment criteria. These criteria are: the condition is an important health problem; there is a suitable test; there is an effective treatment; the health care system can cope with the screening programme; screening is acceptable to health professionals and the public; and the test has cost-benefit.[4,5]

One possible reason for the low screening rate is that studies specifically assessing the impact of routine screening on perinatal morbidity have not been done.[12] This is an area for future research where pregnant women could be randomised to universal versus selective screening programmes, and maternal and neonatal outcomes assessed. Another possible reason is the discrepancy between

the MOH recommendation and the risk-based approach to *C. trachomatis* screening, as advocated by other professional bodies.[6–8] A recent survey of obstetricians and hospital managers in Australia found that only 6% of respondents reported that they offered universal screening to all pregnant women, and 21% offered screening to women <25 years. The authors concluded that there was a low uptake of *C. trachomatis* screening of young pregnant women, highlighting the need for national clinical leadership in this area.[13] This could be a contributing factor in Auckland Hospital, for example, where there is a greater proportion of women under the care of an obstetrician as their LMC, and a smaller proportion of women <25 years giving birth overall. Lastly, there is fragmentation of care provided to pregnant women in NZ, in that pregnancy testing can be sought at Family Planning clinics, and some women may not see their GP during their entire pregnancy.

This report also highlights the high prevalence of *C. trachomatis* in pregnant women who were offered and accepted the test (10% in Auckland, 10% in Tauranga, and 13% in Middlemore; the authors were unable to check the 0% test positive rate in Waikato after discussion with local clinicians, suggesting these data may be incorrect). However, this cannot be automatically interpreted as a high prevalence in the whole pregnant population giving birth at these hospitals.

This latter question may be better addressed using sensitivity analyses of the data presented. For example, at Middlemore, the most recent audit was 61% screened and a test positive rate of 13%. If all women were screened and the rate in the remainder was 0%, then the overall test positive rate would be 7.9%. If 5% of the remainder were positive, the overall test positive rate would be 9.7%. At Auckland, where 31% were screened and 10% positive; if the remainder were all negative the overall rate would be 3%, and if 5% of the remainder were positive the overall rate would be 6.5%. At Tauranga, where 24% were screened and 10% positive, if the remainder were all negative the overall rate would be 2.4%, and if 5% of the remainder were positive the overall rate would be 6.2%.

Thus, the prevalence in the pregnant population is estimated to be at a minimum double, but likely considerably higher, than that of the estimated rate in the general female population of NZ from national surveillance data (1.1%).[1]

To put this in perspective, the total number of cases in women in NZ in 2012 of other infections routinely screened for and associated with vertical transmission was as follows: hepatitis B (14 cases), hepatitis C (15 cases), HIV (28 cases), rubella (0 cases), syphilis (5 cases), in a birthing population of approximately 60 000.[14,15] In the Auckland region alone, there were 10 757 cases of *C. trachomatis*.[1] A high prevalence of disease is a fundamental requirement for an effective screening programme, and provides the rationale for adding *C. trachomatis* to the list of recommended tests in pregnancy.

The following recommendations are presented to attempt to address the low screening rate:

1. Consensus building between MOH, NZCOM, NZSHS and RANZCOG to decide on the standard of care
   a. NZSHS could add pregnant women to their list of who to test
2. Better dissemination of the MOH recommendation
   a. MOH to add *C. trachomatis* screening to the Pregnancy and Newborn screening programme of the National Screening Unit, which includes screening for HIV and Down syndrome[16]
   b. MOH to develop a free patient pamphlet on *C. trachomatis* in pregnancy, as is done for rubella in pregnancy[17]
3. Education
   a. of LMCs on the high prevalence of *C. trachomatis* infection, reiterating that 70% of women with *C. trachomatis* are asymptomatic, that MOH recommends all pregnant women be offered testing, and that testing is easy, reliable and acceptable to women
   b. of pregnant women, such as through patient advocacy groups[18]
   c. through local champions, which has been shown to improve local outcomes,[19] and likely contributed to the higher rates of screening at Middlemore Hospital in 2009

4. Tools to enable C. trachomatis screening by LMCs
a. including *C. trachomatis* in the 'first antenatal screening' tick box on laboratory requisitions
b. adding *C. trachomatis* screening to the national antenatal record (under development)
c. encouraging testing on self-collect vulvo-vaginal[20] and midstream urine[21] specimens

## Conclusion

The authors support *C. trachomatis* testing for all pregnant women regardless of age or perceived risk. *C. trachomatis* is the most prevalent of all infections currently screened for in pregnancy and the most common STI in NZ. Despite MOH clinical guidelines that *C. trachomatis* screening is offered to all pregnant women, current analysis of the proportion of pregnant women screened in the hospitals studied indicates that screening has not yet become universal. Screening can occur in the context of pregnancy care already provided in the health care system, but is challenging due to fragmentation. Conflicting recommendations from multiple professional groups is also a barrier. Several strategies are recommended aimed at midwives, GPs, obstetricians, politicians, advocacy groups and women, with the potential to effect change.

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**COMPETING INTERESTS**
None declared.