

# Do we need to worry about sexually transmissible infections (STIs) in older women in Australia? An investigation of STI trends between 2000 and 2018

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**Abstract.** *Background:* This study examined trends in chlamydia, gonorrhoea and syphilis diagnosis, and chlamydia testing and positivity, among older women in Australia between 2000 and 2018. *Methods:* Using national notifiable disease data and Medicare data, diagnosis rates were calculated for each sexually transmissible infection (STI), as well as testing and positivity rates for chlamydia. Data were compared between two older groups (55–64 and 65–74 years) and two younger groups (15–24 and 25–34 years). Poisson regression examined trends for 2000–18 and 2014–18 separately. *Results:* Rates for all STIs increased across all age groups and were highest in the two youngest age groups. From 2014 to 2018, chlamydia rates increased the most among those aged 55–64 years [incidence rate ratio (IRR) = 1.06; 95%CI: 1.02–1.10] and declined in those aged 15–24 years (IRR = 0.99; 95%CI: 0.99–0.99). Gonorrhoea rates increased the most among those aged 65–74 years (IRR = 1.47; 95%CI: 1.23–1.77) and least in those aged 15–24 years (IRR = 1.12; 95%CI: 1.10–1.13). Syphilis rates increased the most among those aged 55–64 years (IRR = 1.58; 95%CI: 1.25–1.99) and least in those aged 15–24 years (IRR = 1.29; 95%CI: 1.23–1.35). Chlamydia test positivity declined among younger women but remained stable in older women. *Conclusions:* In general, STIs are increasing among older women in Australia at a faster rate than among younger women. Although the greatest burden is among younger women, STIs need to be considered and monitored among older women.

**Keywords:** chlamydia, gonorrhoea, sexually transmissible infections (STIs), syphilis, women.

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## Introduction

Stereotypes of the asexual older person persist,<sup>1</sup> despite evidence showing that older adults continue to be sexually active into their later decades.<sup>2</sup> Studies in Australia<sup>3–5</sup> and other Western countries<sup>6–10</sup> show that many older adults continue to engage in both partnered and solo sexual activities, and that older adults see sex as an important part of their lives, which contributes to their wellbeing.<sup>5,7,8,10–16</sup> Although sexual frequency commonly reduces over time, complete retirement from sexual activity is more often due to health problems or the lack of an available partner, rather than because of ageing.<sup>1,7,9,17,18</sup>

Although recent years have seen increases in sexually transmissible infections (STIs) in younger age groups, there have also been increases among older age groups in Australia,<sup>19</sup> the UK,<sup>20</sup> the US,<sup>21</sup> as well as in other countries,<sup>22,23</sup> indicating

that prevention and testing for older adults may need more attention. STI rates are significantly higher among younger people, and the potential health consequences are more severe (e.g. infertility, ectopic pregnancy), but an infection at any age can lead to health complications, discomfort and distress. In addition, an STI infection increases a person's vulnerability of acquiring other STIs, including HIV.<sup>24,25</sup> Postmenopausal women may also be more susceptible to infections because of physical changes including thinning of the vaginal wall, reduced lubrication, changing vaginal pH and vulnerability to abrasions.<sup>26</sup>

Older Australians' knowledge about STIs is variable; in general, they are not as well informed as younger people,<sup>27</sup> and older men may be less informed than older women.<sup>28</sup> Importantly, older adults may not perceive themselves at risk of STIs.<sup>27</sup> Self-reported condom use is lower among Australian

older adults than among younger people,<sup>27,29–31</sup> and one study found that women over 40 years were less likely to refuse sex without a condom than women under 40 years.<sup>32</sup> Post-menopausal women, no longer needing to protect against unplanned pregnancy, may be less concerned about condom use. In the qualitative study by Fileborn *et al.*,<sup>33</sup> women over the age of 60 years who used condoms initially with new partners, did not necessarily continue to do so, and STI testing was not routinely part of that progression. The authors also found that having previously contracted or been exposed to an STI motivated some women to insist on condom use.<sup>33</sup>

The purpose of the present study was to examine STI trends among older Australian women to determine whether diagnosis and testing for common bacterial STIs are changing among this group and how they compare with younger age groups. This study focuses on women only as these data give an overview of heterosexual transmission more generally among this age group. Women of all sexual orientations are included in the data as it was not possible to differentiate; however, same sex sexual activity among women is low (in Australia, it was ~2% in the previous year<sup>34</sup>) and STI rates are similar when compared with women who only have sex with men.<sup>35,36</sup> Men who have sex with men often have a different sexual risk profile from heterosexual men and from women of all orientations. For this reason, men have not been included in the present study because available STI diagnoses and testing data do not differentiate between heterosexual and same-sex transmission.

## Methods

Analyses of diagnosis rates were undertaken for three notifiable bacterial STIs among women in Australia – *Chlamydia trachomatis* (chlamydia), *Neisseria gonorrhoea* (gonorrhoea) and *Treponema pallidum* (syphilis). Chlamydia, gonorrhoea and syphilis (infectious syphilis) diagnosis data were obtained from the National Notifiable Diseases Surveillance System<sup>37</sup> for the years 2000–18 for chlamydia and gonorrhoea and 2004–18 for syphilis, and population denominators for each year were obtained from the Australian Bureau of Statistics.<sup>38</sup> For each year, we calculated annual diagnosis rates for two older age groups (55–64 and 65–74 years) and two younger age groups (15–24 and 25–34 years). Age brackets were based on the stratification used by Medicare. Age groupings were chosen based on the following criteria: the two older age groups represent women immediately post-menopause and the two younger age groups were used for comparison as they represent the ages when STIs are the most common in women.<sup>19</sup> Other age groups were not included as the purpose was to highlight the situation for older women, rather than to review STI trends across the lifespan. In addition, we collated chlamydia testing data from Medicare (item numbers 69316, 69317, 69319; [http://medicarestatistics.humanservices.gov.au/statistics/mbs\\_item.jsp](http://medicarestatistics.humanservices.gov.au/statistics/mbs_item.jsp), accessed 12 February 2020) and calculated age-specific chlamydia testing rates (for 55–64, 65–75, 15–24 and 25–34 years) and chlamydia test positivity rates (number of diagnoses divided by number of tests) for each year from 2009 to

2018. This timeframe was chosen for testing data because Medicare item numbers were consistent over this time unlike earlier years. Testing data are only available for chlamydia.

First, we generated figures showing STI diagnosis rates over time and then we used Poisson regression to assess changes, with ‘year’ fitted as a continuous explanatory variable. Separate models were generated for each age group. We also conducted an additional regression for each STI and age group to investigate rates over the most recent 5-year period from 2014 to 2018 in order to reflect contemporary trends in sexual health in each age group. All analyses were conducted using Stata 16 (StataCorp, College Station, TX, USA).

## Results

Figures 1 to 3 show that STI rates have increased across all age groups during the time periods studied and were at least 2-fold higher in younger age groups for each STI.

For chlamydia, rates increased by 302% among 15- to 24-year-olds [from 511.87 to 2056.98 per 100 000; incidence rate ratio (IRR) = 1.06; 95%CI: 1.06–1.06], 368% among 25- to 34-year-olds (from 179.92 to 841.80 per 100 000; IRR = 1.07; 95%CI: 1.07–1.07), 473% among 55- to 64-year-olds (from 3.12 to 17.87 per 100 000; IRR = 1.11; 95%CI: 1.10–1.12) and 720% among 65- to 74-year-olds (from 0.44 to 3.61 per 100 000; IRR = 1.07; 95%CI: 1.05–1.10) (Fig. 1; Table 1). From 2014 to 2018, rates increased the most among those aged 55–64 years (IRR = 1.06; 95%CI: 1.02–1.10) and declined in those aged 15–24 years (IRR = 0.99; 95%CI: 0.99–0.99). There was a non-significant increase in those aged 65–74 years (IRR = 1.09; 95%CI: 0.97–1.22) (Table 1).

For gonorrhoea, rates increased by 146% among 15- to 24-year-olds (from 85.70 to 210.80 per 100 000; IRR = 1.05; 95%CI: 1.05–1.06), 372% among 25- to 34-year-olds (from 32.40 to 152.90 per 100 000; IRR = 1.10; 95%CI: 1.09–1.10), 727% among 55- to 64-year-olds (from 1.04 to 8.60 per 100 000; IRR = 1.14; 95%CI: 1.12–1.16) and 222% among 65- to 74-year-olds (from 0.74 to 2.38 per 100 000; IRR = 1.10; 95%CI: 1.06–1.14) (Fig. 2; Table 1). From 2014 to 2018, rates increased the most among those aged 65–74 years (IRR = 1.47; 95%CI: 1.23–1.77) and least in those aged 15–24 years (IRR = 1.12; 95%CI: 1.10–1.13). The increase was similar between those aged 25–34 years (IRR = 1.22; 95%CI: 1.21–1.24) and 55–64 years (IRR = 1.21; 95%CI: 1.13–1.30) (Table 1).

For syphilis, rates increased by 267% among 15- to 24-year-olds (from 4.31 to 15.81 per 100 000; IRR = 1.12; 95%CI: 1.11–1.13), 473% among 25- to 34-year-olds (from 2.45 to 14.05 per 100 000; IRR = 1.17; 95%CI: 1.15–1.19), 542% among 55- to 64-year-olds (from 0.19 to 1.22 per 100 000; IRR = 1.11; 95%CI: 1.05–1.17) and 21% among 65- to 74-year-olds (from 0.29 to 0.35 per 100 000; IRR = 1.06; 95%CI: 0.96–1.18) (Fig. 3; Table 1). From 2014 to 2018, rates increased the most among those aged 55–64 years (IRR = 1.58; 95%CI: 1.25–1.99) and least in those aged 15–24 years (IRR = 1.29; 95%CI: 1.23–1.35). There was a non-significant increase among those aged 65–74 years (IRR = 1.44; 95%CI: 0.92–2.38) (Table 1).

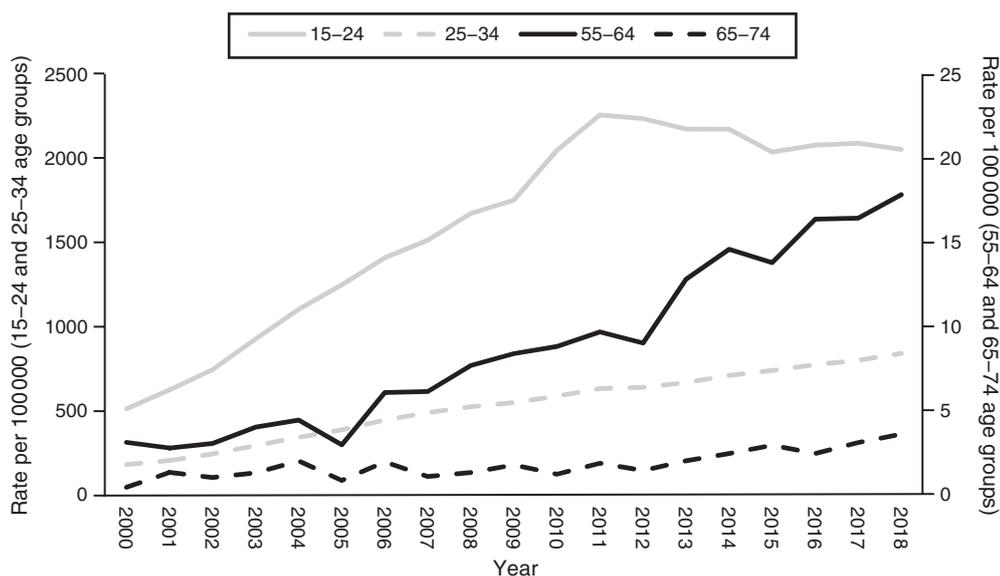


Fig. 1. Chlamydia trends among women in Australia, 2000–18.

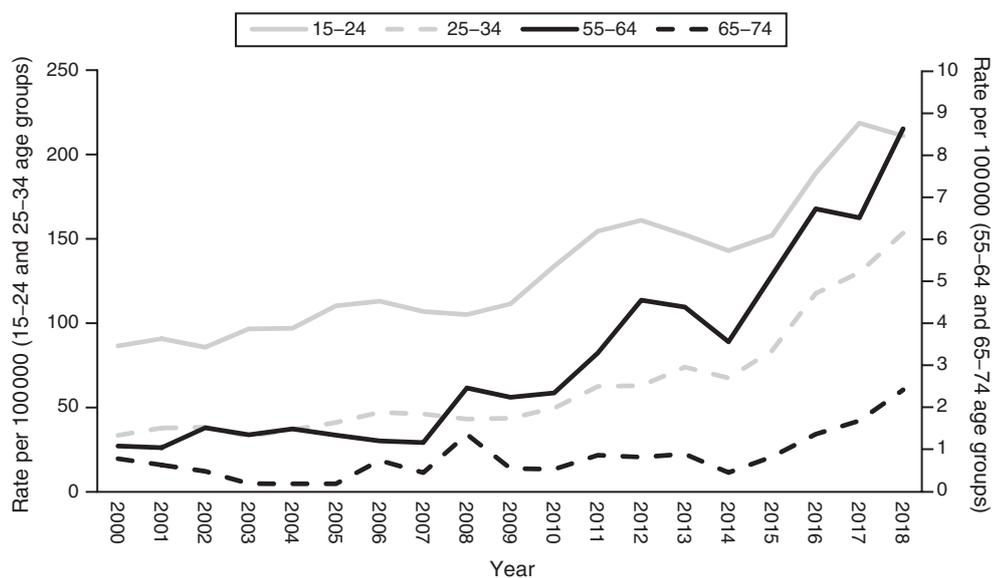


Fig. 2. Gonorrhoea trends among women in Australia, 2000–18.

### Chlamydia testing and positivity

Chlamydia testing rates increased by 44% among 15- to 24-year-olds (from 14551.95 to 21024.58 per 100 000; IRR = 1.03; 95%CI: 1.03–1.03), 86% among 25- to 34-year-olds (from 11212.35 to 20802.92 per 100 000; IRR = 1.07; 95%CI: 1.07–1.07), 147% among 55- to 64-year-olds (from 706.80 to 1747.62 per 100 000; IRR = 1.10; 95%CI: 1.10–1.11) and 161% among 65- to 74-year-olds (from 244.99 to 639.31 per 100 000; IRR = 1.12; 95%CI: 1.12–1.12) (Fig. 4a; Table 1). From 2014 to 2018, testing rates increased across all four age groups, but increased the

most among those aged 55–64 years (IRR = 1.09; 95%CI: 1.08–1.09) and least in those aged 15–24 years (IRR = 1.02; 95%CI: 1.01–1.02) (Table 1).

Chlamydia test positivity rates declined by 19% among 15- to 24-year-olds (from 12.06% to 9.78%; IRR = 0.97; 95% CI: 0.97–0.97), 17% among 25- to 34-year-olds (from 4.89% to 4.05%; IRR = 0.98; 95%CI: 0.97–0.98), 14% among 55- to 64-year-olds (from 1.19% to 1.02%; IRR = 0.99; 95%CI: 0.97–1.01) and 22% among 65- to 74-year-olds (from 0.73% to 0.57%; IRR = 0.99; 95%CI: 0.94–1.04) (Fig. 4b; Table 1). From 2014 to 2018, positivity decreased among those aged 15–24 years (IRR = 0.97; 95%CI: 0.97–0.98) and

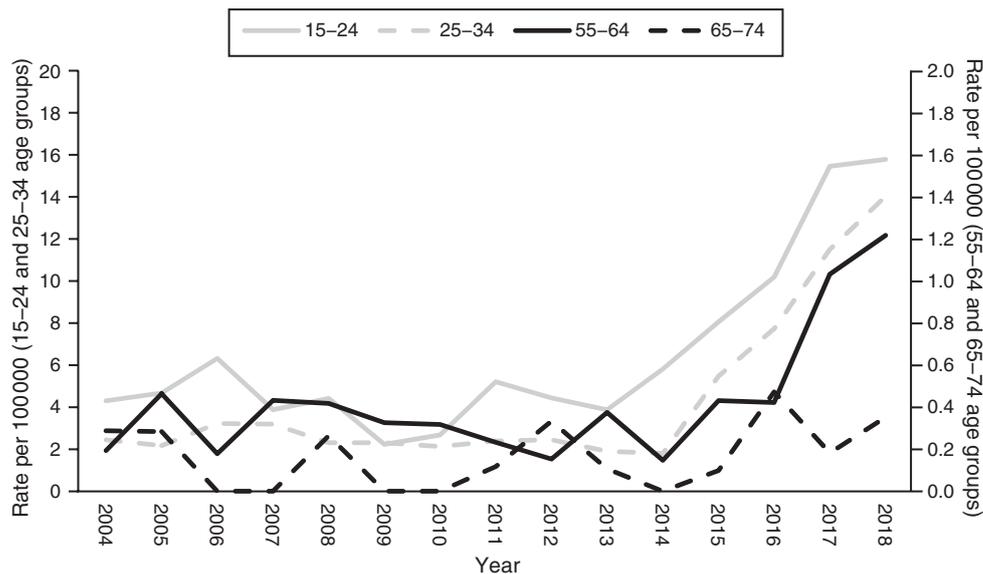


Fig. 3. Syphilis trends among women in Australia, 2004–18.

Table 1. Trends in sexually transmissible infection (STI) diagnosis rates over time  
IRR, incidence rate ratio

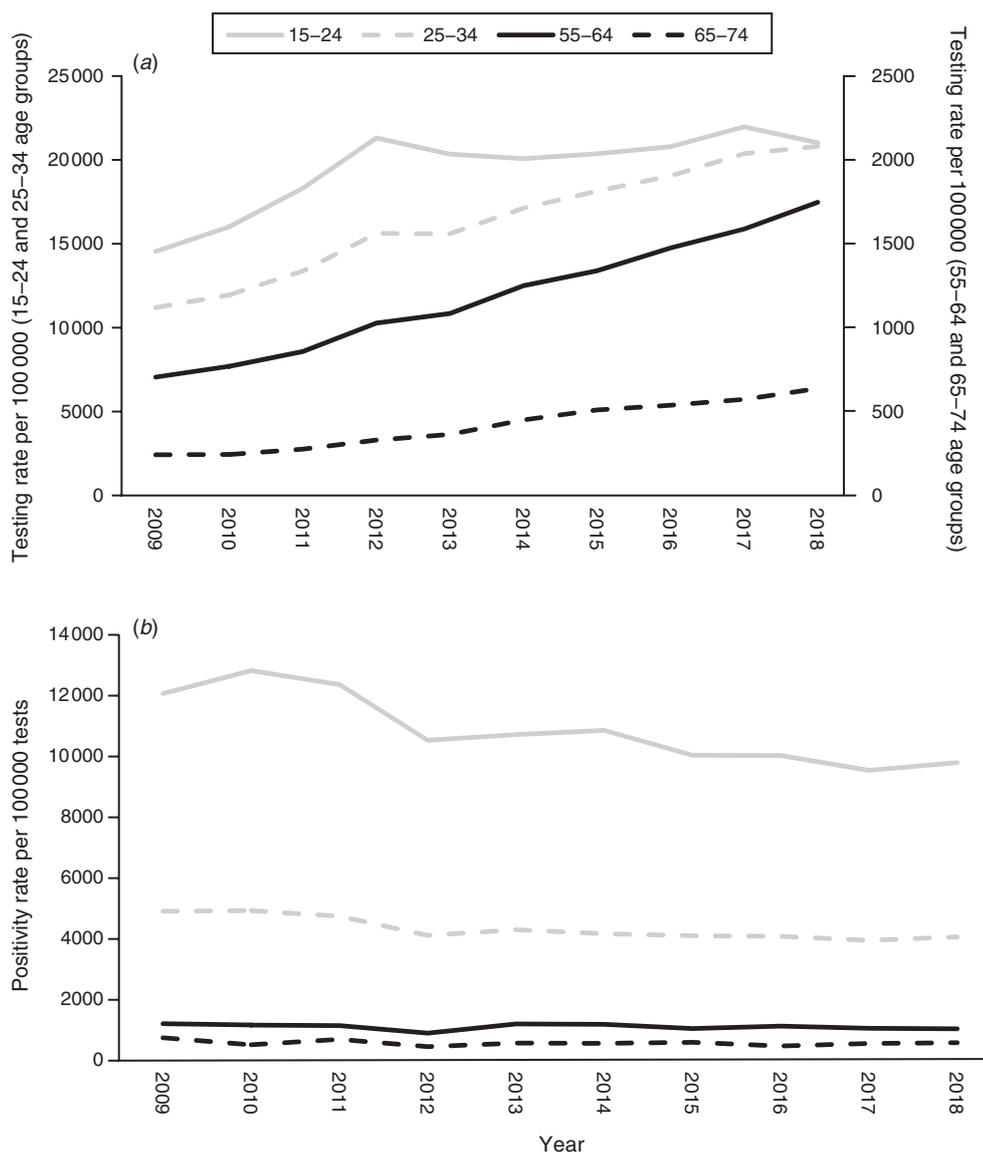
Analysis		15–24 years	25–34 years	55–64 years	65–74 years
Chlamydia	IRR (95%CI) 2000–18	1.06 (1.06–1.06) $P < 0.001$	1.07 (1.07–1.07) $P < 0.001$	1.11 (1.10–1.12) $P < 0.001$	1.07 (1.05–1.10) $P < 0.001$
	IRR (95%CI) 2014–18	0.99 (0.99–0.99) $P < 0.001$	1.04 (1.04–1.05) $P < 0.001$	1.06 (1.02–1.10) $P < 0.006$	1.09 (0.97–1.22) $P = 0.131$
Gonorrhoea	IRR (95%CI) 2000–18	1.05 (1.05–1.06) $P < 0.001$	1.10 (1.09–1.10) $P < 0.001$	1.14 (1.12–1.16) $P < 0.001$	1.10 (1.06–1.14) $P < 0.001$
	IRR (95%CI) 2014–18	1.12 (1.10–1.13) $P < 0.001$	1.22 (1.21–1.24) $P < 0.001$	1.21 (1.13–1.30) $P < 0.001$	1.47 (1.23–1.77) $P < 0.001$
Syphilis	IRR (95%CI) 2004–18	1.12 (1.11–1.13) $P < 0.001$	1.17 (1.15–1.19) $P < 0.001$	1.11 (1.05–1.17) $P < 0.001$	1.06 (0.96–1.18) $P = 0.216$
	IRR (95%CI) 2014–18	1.29 (1.23–1.35) $P < 0.001$	1.49 (1.41–1.58) $P < 0.001$	1.58 (1.25–1.99) $P < 0.001$	1.44 (0.92–2.38) $P = 0.107$
Chlamydia testing	IRR (95%CI) 2009–18	1.03 (1.03–1.03) $P < 0.001$	1.07 (1.07–1.07) $P < 0.001$	1.10 (1.10–1.11) $P < 0.001$	1.12 (1.12–1.12) $P < 0.001$
	IRR (95%CI) 2014–18	1.02 (1.01–1.02) $P < 0.001$	1.05 (1.05–1.05) $P < 0.001$	1.09 (1.08–1.09) $P < 0.001$	1.08 (1.07–1.09) $P < 0.001$
Chlamydia positivity	IRR (95%CI) 2009–18	0.97 (0.97–0.97) $P < 0.001$	0.98 (0.97–0.98) $P < 0.001$	0.99 (0.97–1.01) $P = 0.252$	0.99 (0.94–1.04) $P = 0.617$
	IRR (95%CI) 2014–18	0.97 (0.97–0.98) $P < 0.001$	0.99 (0.99–1.00) $P = 0.002$	0.97 (0.93–1.01) $P < 0.219$	1.01 (0.90–1.12) $P < 0.915$

those aged 25–34 years (IRR = 0.99; 95%CI: 0.99–1.00), but did not change among those aged 55–64 years (IRR = 0.97; 95%CI: 0.93–1.01) or aged 65–74 years (IRR = 1.01; 95%CI: 0.90–1.12) (Table 1).

## Discussion

Chlamydia, gonorrhoea and infectious syphilis rates increased in all four age groups over the time periods studied and were significantly higher in the younger age groups. Between 2014 and 2018, the largest increases in STI rates were among the older age groups, and for 15- to 24-year-olds, chlamydia diagnosis rates actually declined. Chlamydia testing rates increased across all age groups, but the increase was greatest in the older age groups, and although chlamydia test positivity declined in the younger age groups, it remained stable in the older age groups. STI diagnoses are considerably lower for older women than for younger women, but the sharper increase in older women more recently indicates that STIs are a growing concern in these older age groups and should be monitored.

This analysis has two key limitations. First, the notification data for all three STIs studied will likely underestimate the true extent of STI infections as it only captures those who were tested. It is unknown what proportion of infections may have been missed, particularly as these STIs are often asymptomatic in women.<sup>39,40</sup> Mathematical modelling suggests that as many as 77% of chlamydia cases remain undiagnosed.<sup>41</sup> Second, the chlamydia testing and positivity analysis relied on Medicare rebate information and thus excludes testing from settings where Medicare was not utilised (including some hospitals and sexual health clinics); however, as most STI testing occurs in general practice, where Medicare is used, the proportion of missed data is estimated to be small.<sup>42,43</sup> It is unknown whether missing data is comparable across the four age groups. However, given available screening guidelines, which recommend regular testing for young adults,<sup>44</sup> general practitioners (GPs) are more likely to target young people for screening. Further to this, most available sexual health promotion messaging targets younger adults, making them more aware of the need for testing. In contrast, the sexual health needs of older women are largely unacknowledged,<sup>45</sup> so



**Fig. 4.** (a) Chlamydia testing rates for women in Australia, 2009–18. (b) Chlamydia test positivity for women in Australia, 2009–18.

GPs are less likely to offer them testing, and as they receive minimal targeted sexual health promotion, they remain unaware that they need testing.

The trends of increasing STIs among the older age groups were comparable with those reported in other Western countries that have found STIs rising among their older citizens.<sup>20–22,26</sup> Unsurprisingly, as observed in other settings, STI rates are much higher among the younger age groups,<sup>21,23,46,47</sup> underlining that young people should continue to be the primary focus of sexual health promotion and STI screening. However, the rise in STI diagnosis among older women in Australia potentially indicates changes in sexual behaviour over the last two decades and suggests that the sexual health needs of this demographic are not being met.

This study provides a snapshot of STI rates among Australian baby boomer women in their older adulthood. Baby boomers have led a raft of social changes over the past half century, not the least of which was the ‘sexual revolution’ of the 1960s and 70s. It is probable that, instead of moving into the asexual old age attributed to previous generations, they have brought the ideas and practices of the sexual freedom from their youth into their later years.<sup>12,32,33</sup> With divorce now commonplace,<sup>48,49</sup> the advent of online dating,<sup>32,50</sup> as well as the availability of erectile dysfunction medications,<sup>51,52</sup> today’s older adults are operating in a different sexual landscape from that of previous older generations. Rising STI rates potentially reflect different sexual behaviours, such as more unprotected sex, more partners or different sexual networks.

Thinking about sexual risk among older age groups may be increasingly necessary, as well as STI testing for those at increased risk.

Our analysis showed that chlamydia testing rates have increased for women across all the age groups studied. Although the numbers of tests conducted were several-fold lower in the older age groups, testing rate increases were greatest among older women (1 in 60 women aged 55–64 years was tested vs. 1 in 5 of those aged 15–24 years in 2018). Chlamydia testing rates increased among people aged under 30 years largely in response to national strategies and State-based screening policies that were in place over this time period.<sup>44</sup> However, there are not, and never have been, any STI screening guidelines for older age groups.<sup>45,53</sup> The trends in chlamydia positivity in our analysis showed declines among the younger age groups and no change in positivity over time among the older ages. This suggests that in the younger age groups, as testing rates increase, testing is now reaching women at a lower risk of infection. Conversely, among older women, the stable test positivity implies that women of a similar risk profile are being tested as testing rates increase, raising the possibility that there remain women at increased risk of infection in the population who are not being tested. For this reason, discussing sexual health, assessing STI risk and, where appropriate, recommending STI testing, may be of increasing importance among older women.

When older women are tested for STIs, it is most often with their usual GP;<sup>42,43,54</sup> however, accessing testing relies either on the patient requesting it or the GP initiating sexual health discussions, and these conversations are not occurring consistently or comprehensively within primary care.<sup>54–59</sup> Older patients may delay seeking help for genital symptoms that may suggest an STI,<sup>60</sup> citing embarrassment and fear of judgement for not being more forthcoming with sexual concerns,<sup>16,54,56</sup> and healthcare providers may not broach sexual health topics due to lack of time, precedence of other health issues, concern for patients' privacy or lack of appropriate training.<sup>57,58,61,62</sup> Although patients generally prefer GPs to initiate sexual health discussions,<sup>15,16,56</sup> GPs prefer the responsibility to rest with the patient,<sup>16,57,58,63</sup> and with this stalemate, discussions about sexual health and STI testing are not routinely taking place. The rise in STI rates among older women highlights the need for sexual health conversations, sexual history taking and discussion of STI testing to be more mainstreamed between older patients and their GPs in general practice. Researchers have called for further training for healthcare providers so that they are better equipped to address the sexual health concerns of their older patients.<sup>61,62,64–67</sup>

Low uptake of testing among older adults may also be attributable to limited knowledge of safer sex and STIs and not regarding themselves as at risk of infection.<sup>15,28,32,43</sup> Some older Australians do actively seek out sexual health information;<sup>4</sup> however, many have not recently done so and many have never done so.<sup>68,69</sup> In light of this, researchers have also advocated greater access to sexual health promotion materials that are relevant to older adults to improve knowledge of STIs among this age group.<sup>23,28,29,42,67</sup>

## Conclusion

We found that STIs are increasing among older women in Australia at a faster rate than among younger women. Although the greatest burden is among younger women, our findings suggest that STIs do need to be considered among older women and monitored more closely. This research contributes to the growing conversation around the sexual health needs of older adults. Increasing STI rates among older women in Australia show that the sexual health needs of older adults may be changing and may not be met by current approaches. Sex continues to be important as people age, and many people remain sexually active into their later years; sexual activity at any age can put a person at risk of acquiring an STI. Although young people must continue to be the focus of sexual health service provision, STI risk is not limited only to the young and steps should be taken to ensure relevant and accessible health services are available for people of all ages.

Given the high usage of primary care by older adults, general practice is well positioned to meet their sexual health and STI testing needs. Healthcare providers may need to be more receptive to both initiating and continuing sexual health discussions with older Australians to ensure appropriate sexual health care for this cohort.

## Conflicts of interest

The authors declare no conflicts of interest.

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