

# Trends in and factors associated with having bacterial vaginosis and vulvovaginal candidiasis among women attending the Melbourne Sexual Health Centre, 2012-2021

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## Background

- Bacterial vaginosis (BV) and vulvovaginal candidiasis (VVC) are common vaginal infections that significantly impact on quality of life [1]
- Women are assessed for both infections if they present with a vaginal discharge, itch or odour, or if they require an examination for other symptoms
- Current first-line treatments are effective short-term but are inadequate for preventing recurrent infections [2]

**Aim: to determine the factors associated with BV and VVC to inform clinical care.**

## Methods

- Retrospective audit of BV and VVC positivity and recurrence among MSHC attendees between 1-Jan-2012 and 31-Dec-2021.
- The proportions of women with BV and VVC at their first-test during the study period were calculated with 95% confidence intervals (CI).
- Factors associated with BV or VVC infection at first-test compared to no infection detected were determined using logistic regression
- Factors associated with recurrence (defined as >1 positive result within 12-months) of BV or VVC compared to no recurrence were assessed using Poisson regression, accounting for multiple visits.
- Factors associated with infection positivity/recurrence in univariable analyses were included in multivariable models.

## Results

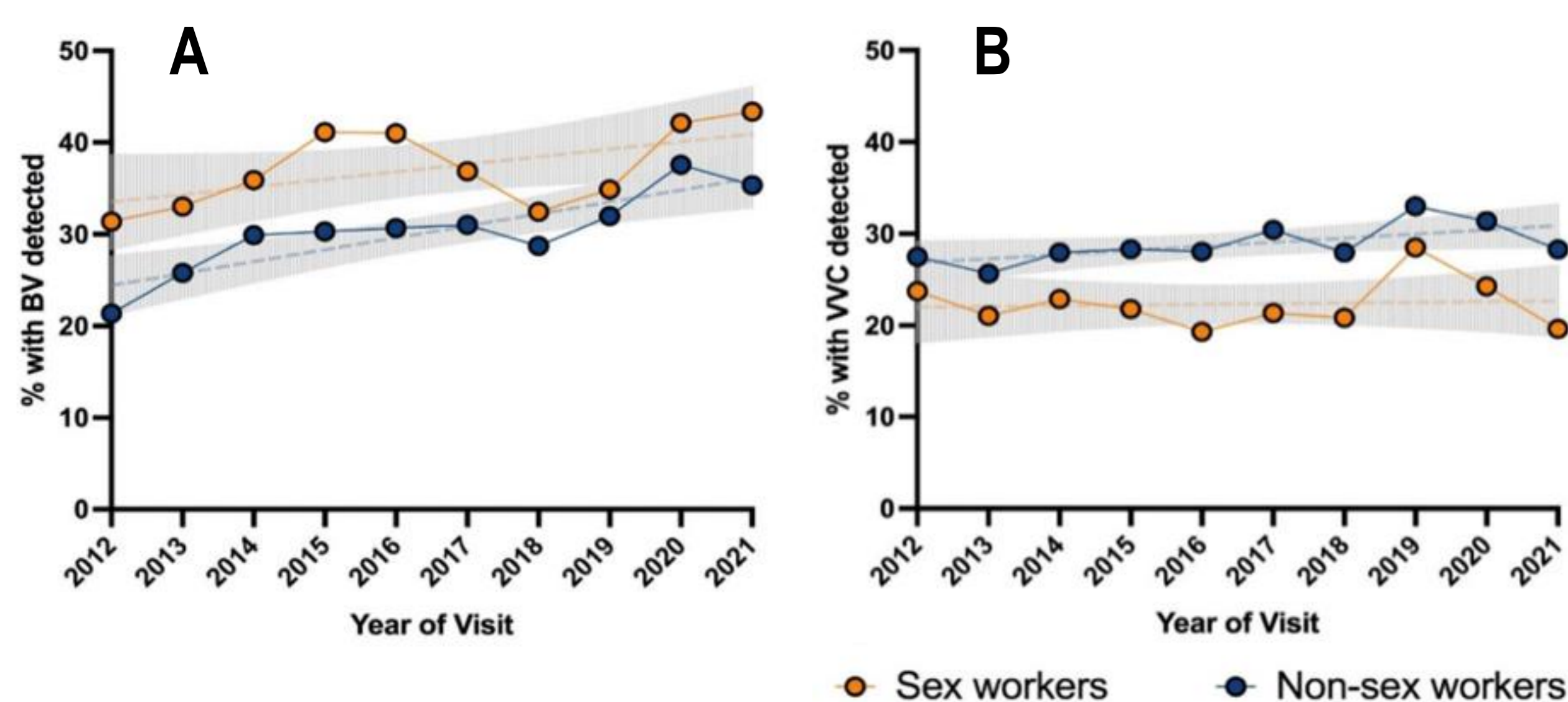
- Of 50,245 attendees over a decade, 6,975/22,769 (31%) had BV and 6,587/22,987 (29%) had VVC detected at their first-test, and the proportion of women with BV (**Fig 1A**) and VVC (**Fig 1B**) detected at their first-test increased over time ( $P_{\text{trend}} < 0.001$ )
- Of 8,436 women with BV detected at least once, the BV recurrence rate was 22/100 person-years
- Of 8,538 women with VVC detected at least once, the VVC recurrence rate was 17/100 PY

### Factors associated with BV or VVC at first-test

- Hormonal contraceptive-users (excluding intrauterine-device users) were less likely to have BV than women not using hormonal contraception (adjusted-odds-ratio[AOR]=0.73, 95%CI:0.68-0.82).
- Women reporting  $\geq 2$  male or  $\geq 1$  female partners in the last 3 months had higher odds of BV (AOR=1.33, 95%CI:1.23-1.42; AOR=1.86, 95%CI:1.50-2.30, respectively).
- The odds of VVC increased with age (AOR=1.02, 95%CI:1.02-1.03) and among those with  $\geq 2$  male partners in the last 3 months (AOR=1.11, 95%CI:1.04-1.19).

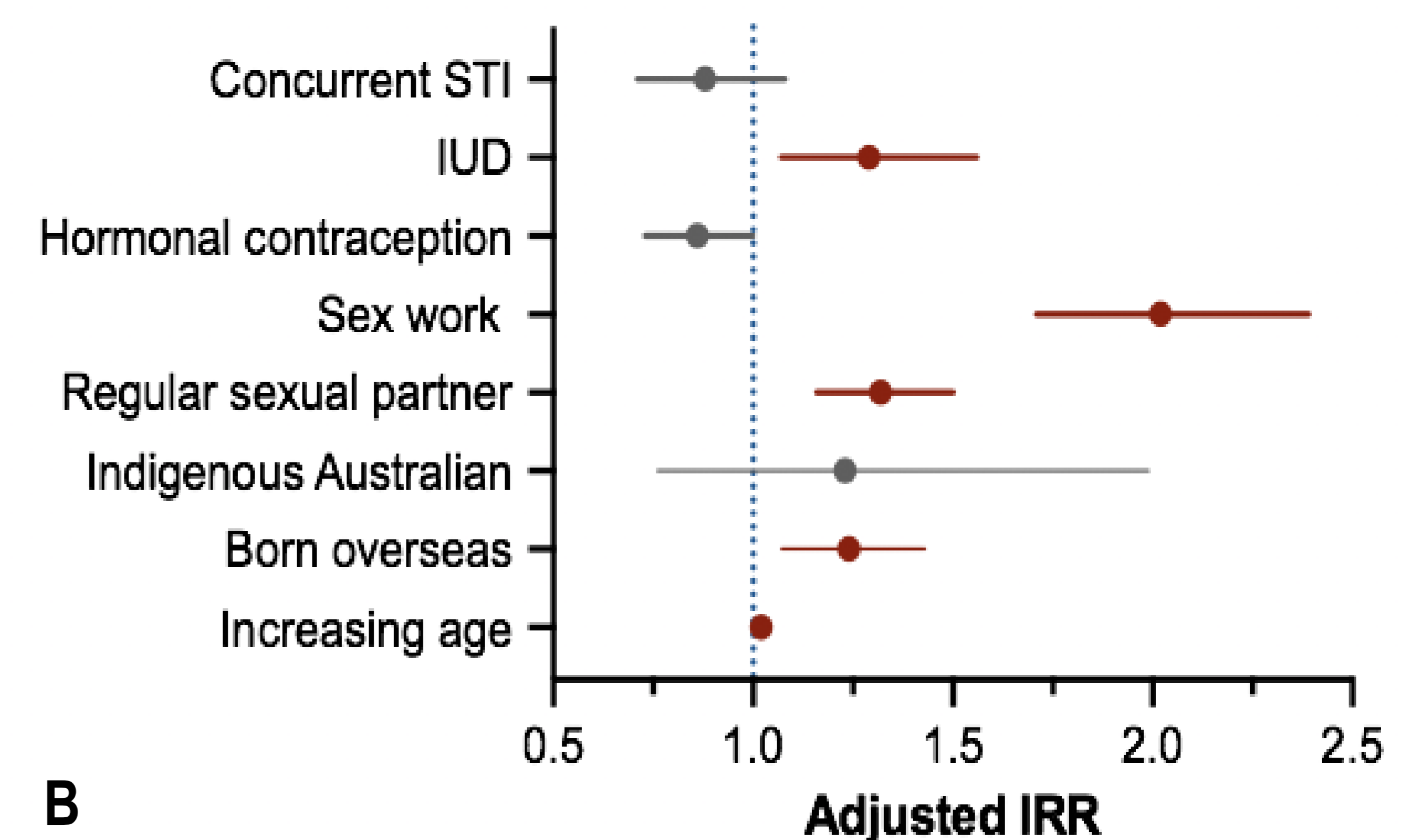
### Factors associated with BV or VVC recurrence

- Risk of BV recurrence was higher among women with a regular sexual partner (adjusted-incidence-rate-ratio[AIRR]=1.32, 95%CI:1.16-1.50), intrauterine-device users (AIIR=1.29, 95%CI:1.07-1.56), sex workers (AIIR=2.02, 95%CI:1.71-2.39), and those born overseas (AIIR=1.24, 95%CI:1.07-1.43), **Fig 2A**
- Risk of VVC recurrence was higher among sex workers (AIIR= 2.00, 95%CI 1.55-2.59,  $p < 0.0001$ ) and those with a regular sexual partner (AIIR=1.25, 95%CI:1.06-1.46,  $p = 0.007$ ). Women with increasing age had a decreased risk of recurrent VVC (AIIR=0.99, 95%CI: 0.97-1.00,  $p = 0.029$ ), **Fig 2B**

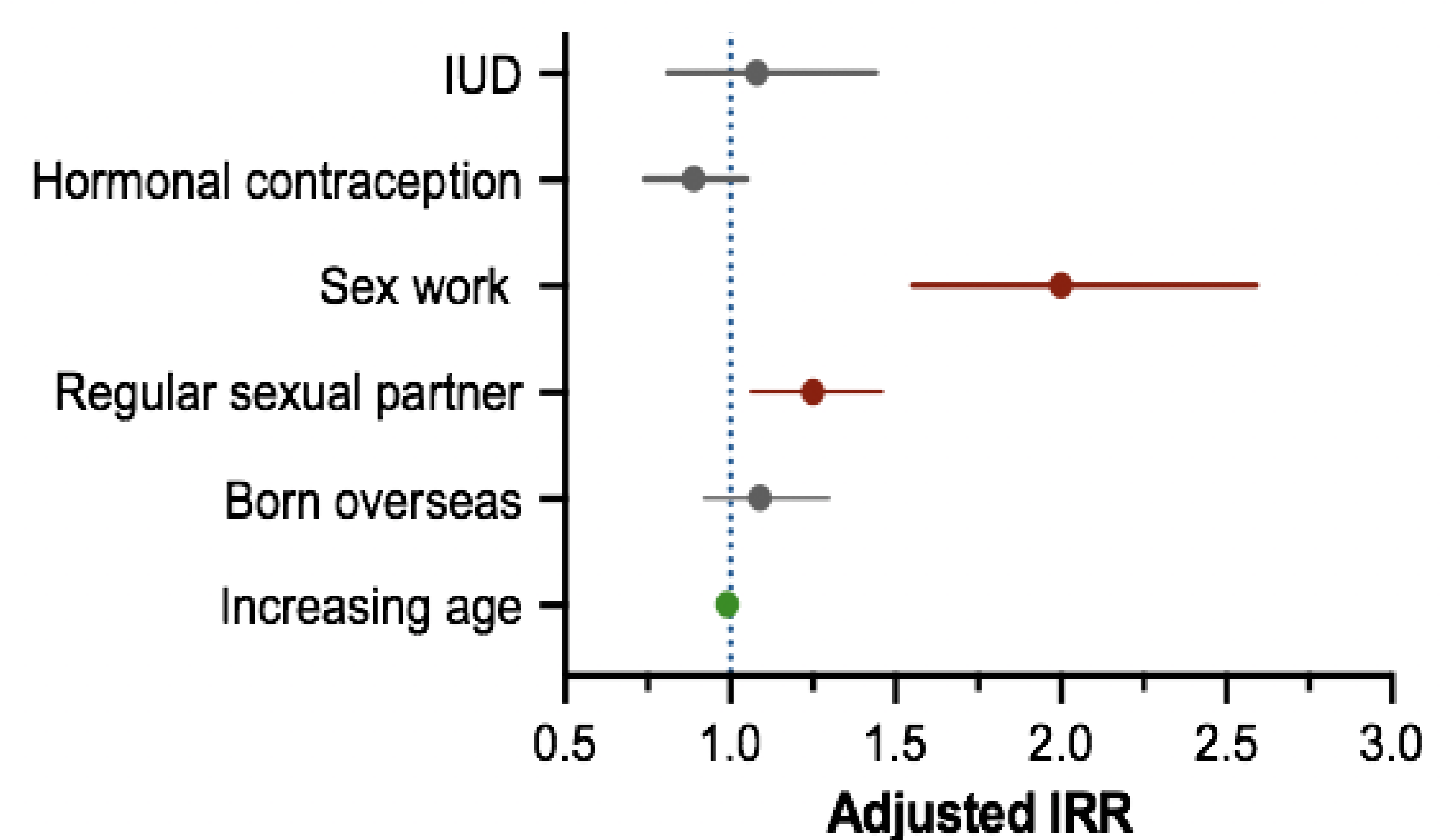


**Figure 1.** The proportion of women per annum who had [A] BV detected or [B] VVC detected, stratified by sex worker status. 95% confidence intervals for the line of best fit is represented by shading. Proportions calculated using result at first test for BV or VVC per annum.

## A



## B



**Figure 2.** Incidence rate ratio (IRR) plots for (A) recurrent BV and (B) recurrent VVC among women who attended the MSHC 2012-2021. IRR and 95% confidence intervals (CI) calculated using Poisson regression, adjusted for all other variables listed in the associated plot. Variables associated with increased risk of BV or VVC recurrence shown in red ( $p < 0.05$ ), and decreased risk shown in green ( $p < 0.05$ ).

## Conclusions

- Among >50,000 women attending MSHC over a decade, both infections were commonly detected: 31% had BV and 29% had VVC at their first test
- There were different demographic and behavioural practices associated with the initial and recurrent presentation of these two infections.
  - BV was strongly associated with high-risk sexual behaviours, typical of other STIs, and the use of an IUD, while use of other non-IUD hormonal contraceptive methods was associated with reduced odds of BV, as shown previously [3].
  - Risk of BV recurrence was associated with ongoing exposure to the same regular sexual partner (RSP), sex work and IUD use
  - VVC was associated with having a greater number of male partners and younger age and recurrent VVC was associated with sex work and having an RSP.
- Understanding the different drivers behind these vaginal conditions is integral to promoting their long-term cure.**