



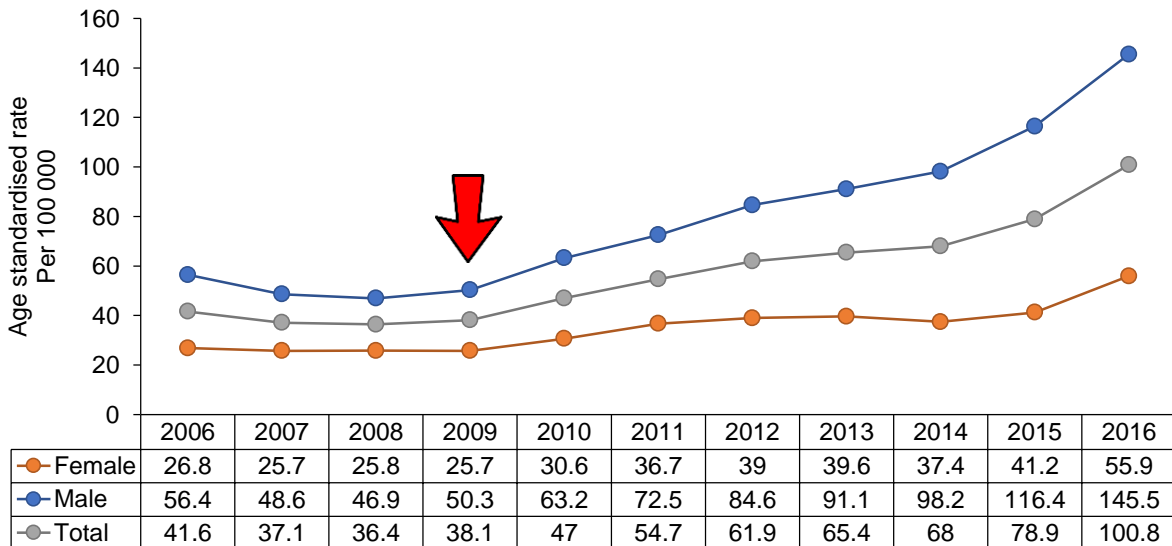
# Risk factors for gonorrhoea in heterosexuals

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Senior Research Fellow

2017 Australasian Sexual Health Conference | 8 November 2017

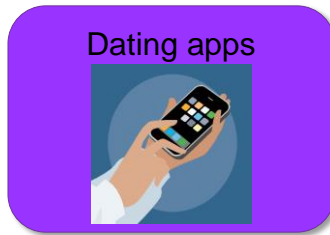


## Gonorrhoea notification rate by sex

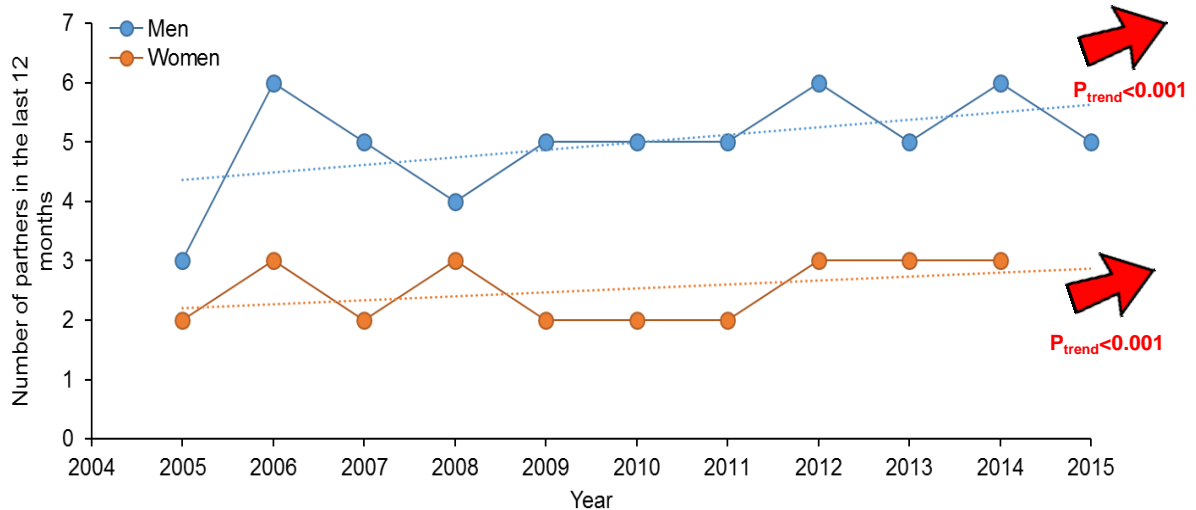


Sources: Australian National Notifiable Diseases Surveillance System

## Potential risk factors



## No. of partners, chlamydia +ve & aged ≤25

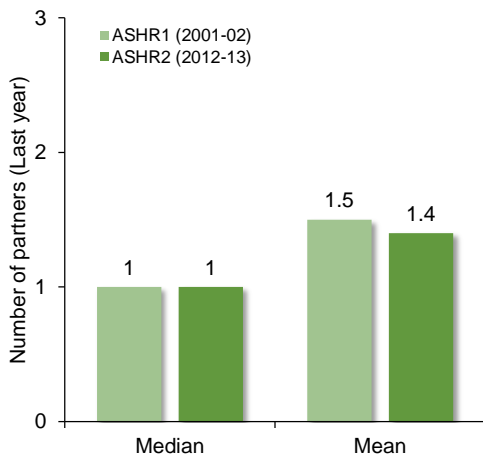


Sources: Chow (2015) Lancet ID. Chow (2017) Lancet ID.

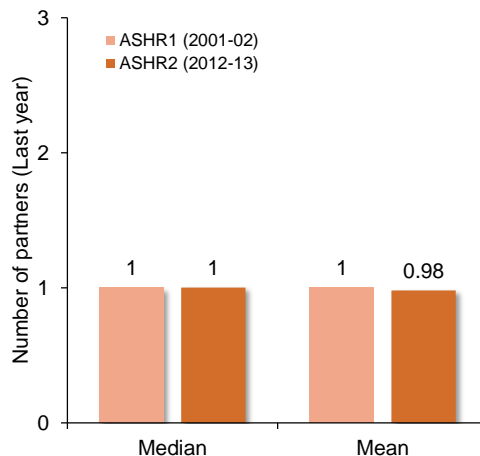
# Number of partners (Last 12 months)



## Heterosexual men

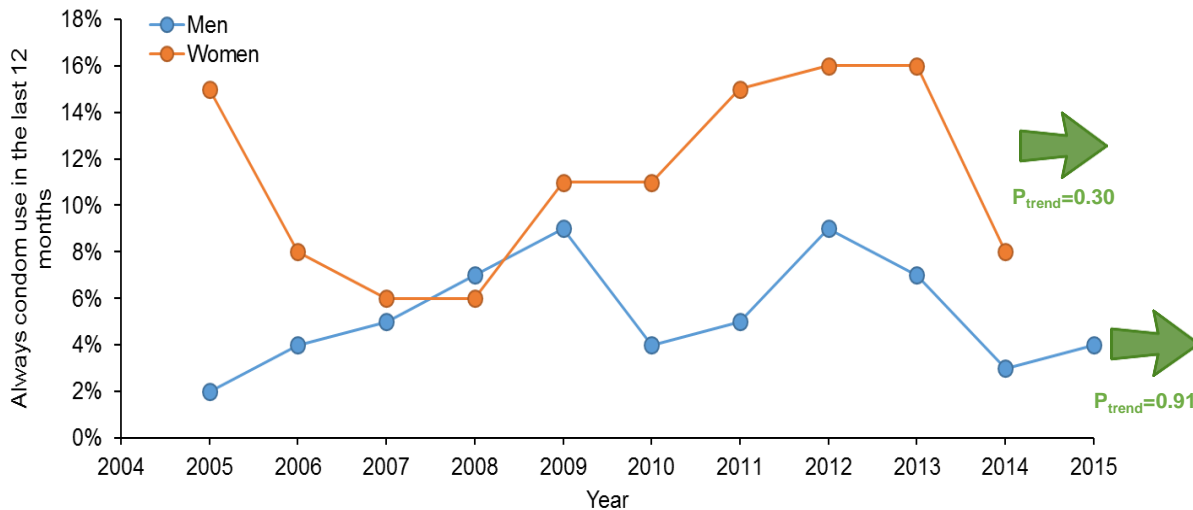


## Heterosexual women



Sources: Rissel (2014) Sexual Health. de Visser (2003) ANZJPH.

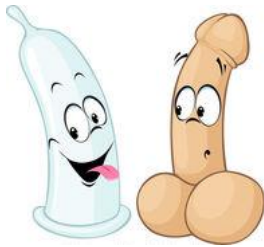
# Always condom use, chlamydia +ve & aged ≤25



Source: Chow (2015) Lancet ID. Chow (2017) Lancet ID.

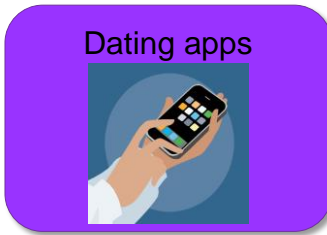
# Condom use

- Very limited data
- Most recent heterosexual encounters



Source: Rissel (2014) Sexual Health. de Visser (2003) ANZJPH.

# Potential risk factors



# Smartphone dating apps



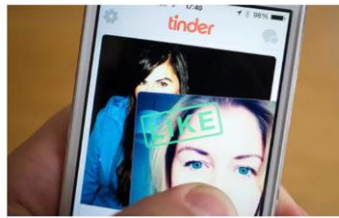
## Chlamydia, gonorrhoea and syphilis on the rise: Is Tinder to blame?

Date: June 9, 2016

Author: [Samantha Relich](#), [Maureen Taylor](#) & [Jill Konkin](#)



## Tinder users in the UK twice as likely to have an STI, study claims



Could you be twice as likely to contract an STI if you're on Tinder? credit: ALAMY



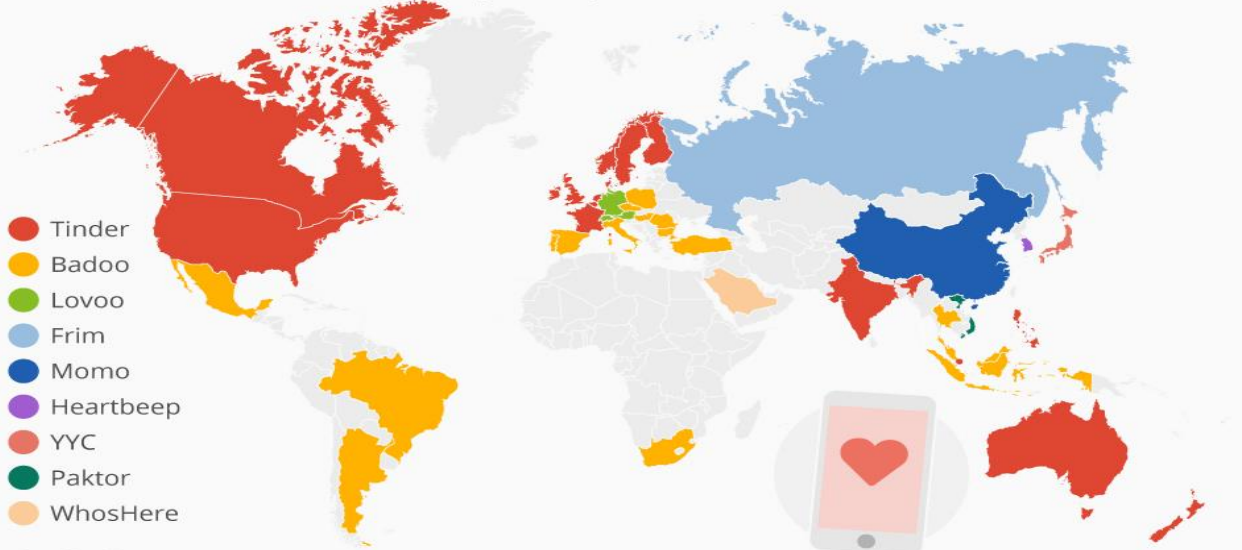
First girl I had sex with on tinder, got herpes. Decided to give tinder another chance and got genital warts. - Justin

4:00 PM - 14 May 2014



## The Dating App Worldmap

The most downloaded dating app by country 2015

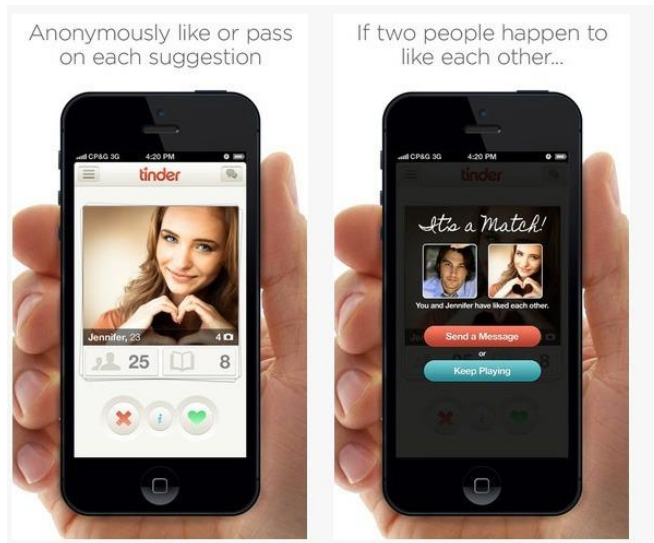


© StatistaCharts Sources: BBC News, App Annie, Statista Digital Market Outlook

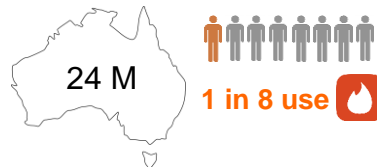
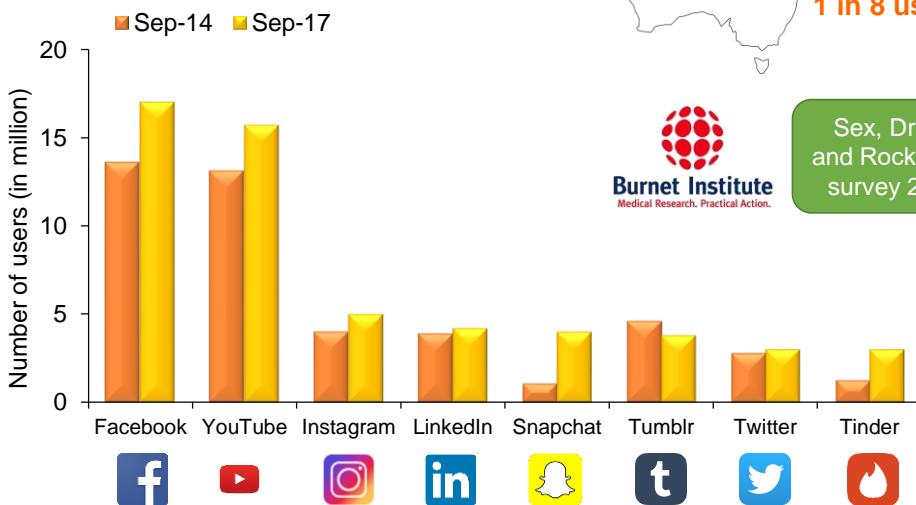


# Tinder

- Location-based dating apps
- Launched in late 2012, widely used since 2014
- One of the top 25 social networking apps
- Most research on gay dating apps e.g. Grindr
- Very limited research on apps for heterosexuals e.g. tinder

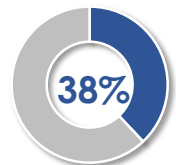


## Apps users in Australia



Sex, Drugs, and Rock'n'Roll survey 2015

15-29 years in VIC



Use in the last 12 months



Sources: <https://www.socialmedianews.com.au>  
[https://www.burnet.edu.au/projects/17\\_big\\_day\\_out\\_studies\\_sex\\_drugs\\_and\\_rock\\_n\\_roll](https://www.burnet.edu.au/projects/17_big_day_out_studies_sex_drugs_and_rock_n_roll)

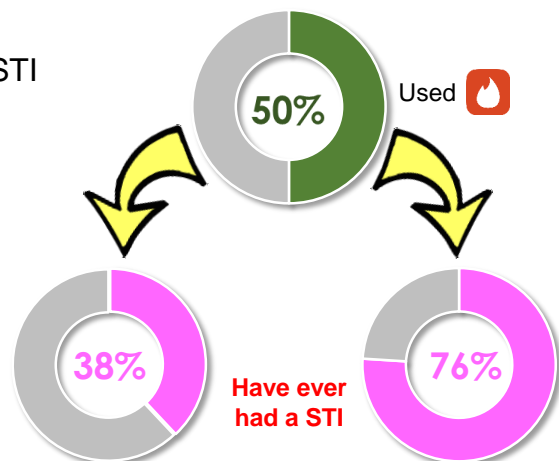
# Dating apps = rise in STI



## Dating apps use = STI?

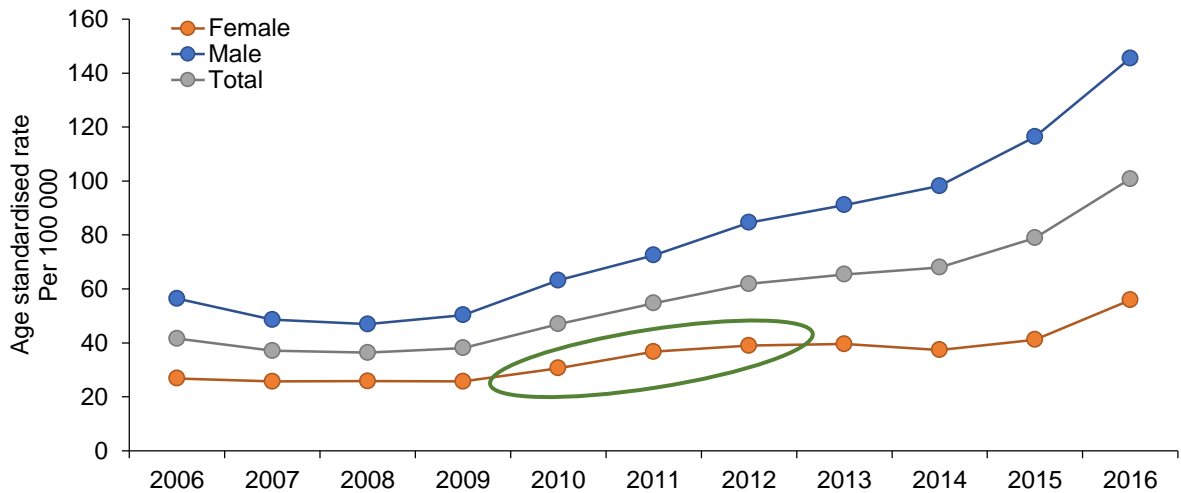


- UK online pharmaceutical company (MedExpress.co.uk)
- 2,899 adults
- Asked if they had used Tinder and had a STI
- Data not transparent enough
  - No published report & survey
  - Only media release
- Unclear variables
  - Ever had a STI → What does this mean?
- Cross-sectional survey
  - Impossible to infer causality





## Gonorrhoea notification rate by sex



Source: Australian National Notifiable Diseases Surveillance System

## Potential risk factors

Sexual partners  
Common use

Dating apps

Alcohol/drug

Travel

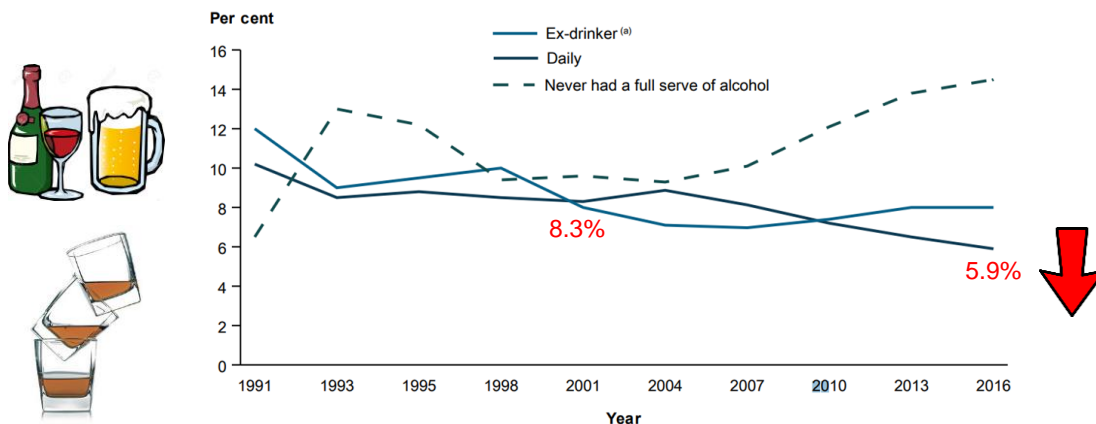
Bisexual men

Other unexplored factors





# National Drug Strategy Household Survey



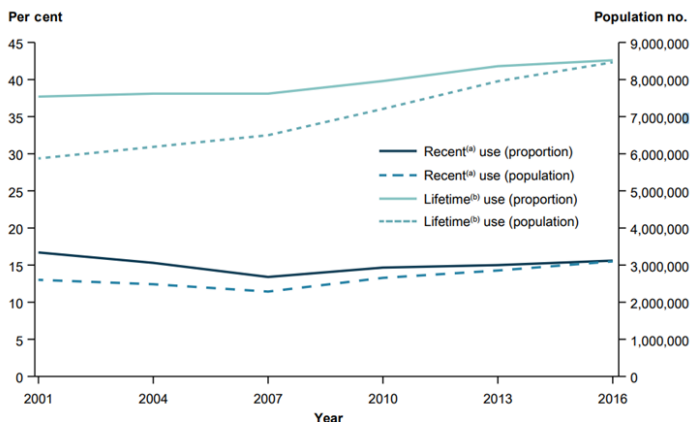
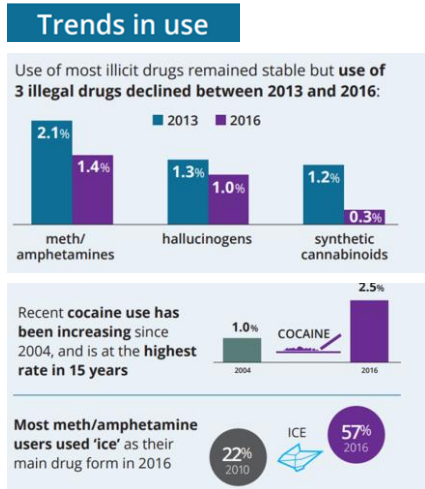
(a) Consumed at least a full serve of alcohol, but not in previous 12 months.  
Source: Table 4.1.

Figure 4.1: Alcohol drinking status, people aged 14 or older, 1991–2016 (%)



Source: AIHW (2016) National Drug Strategy Household Survey 2016.

# National Drug Strategy Household Survey



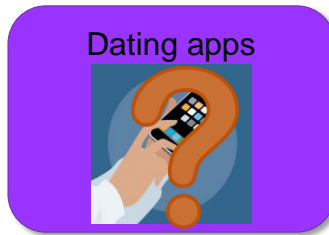
(a) Used at least 1 of 17 illicit drugs in 2016 in the previous 12 months—the number and type of drug used varied between 2001 and 2016.  
(b) Used at least 1 of 17 illicit drugs in 2016 in their lifetime—the number and type of drug used varied between 2001 and 2016.  
Source: Table 5.1.

Figure 5.2: Recent and lifetime use of any illicit drug, people aged 14 or older, 2001–2016 (% and population numbers)



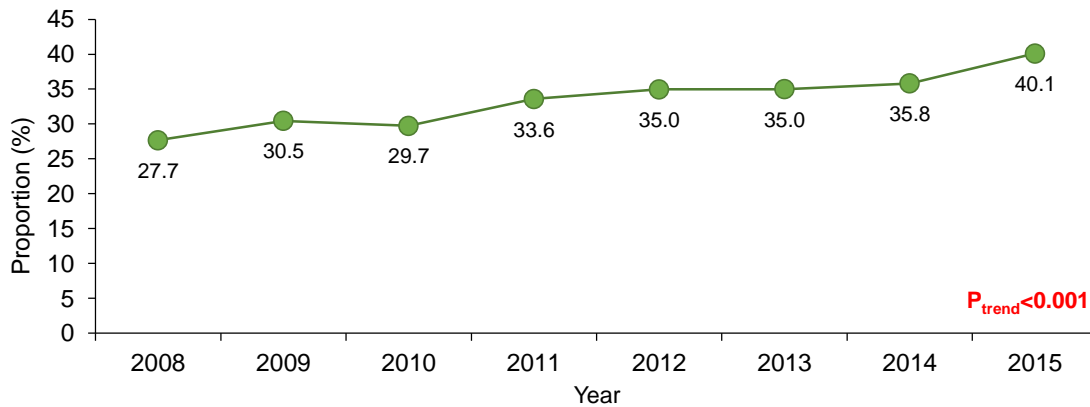
Source: AIHW (2016) National Drug Strategy Household Survey 2016.

## Potential risk factors



## Sex overseas

Proportion of women attending MSHC who reported having overseas contacts in the last 12 months



Source: MSHC unpublished data. Misson (Under Review)

# Where they had sex

## Higher-prevalence Countries

(i.e. gonorrhoea incidence rate > 100 per 100,000 females)



### Southeast Asia

- Brunei
- Cambodia
- East Timor
- Indonesia
- Laos
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Vietnam



### East Asia

- China

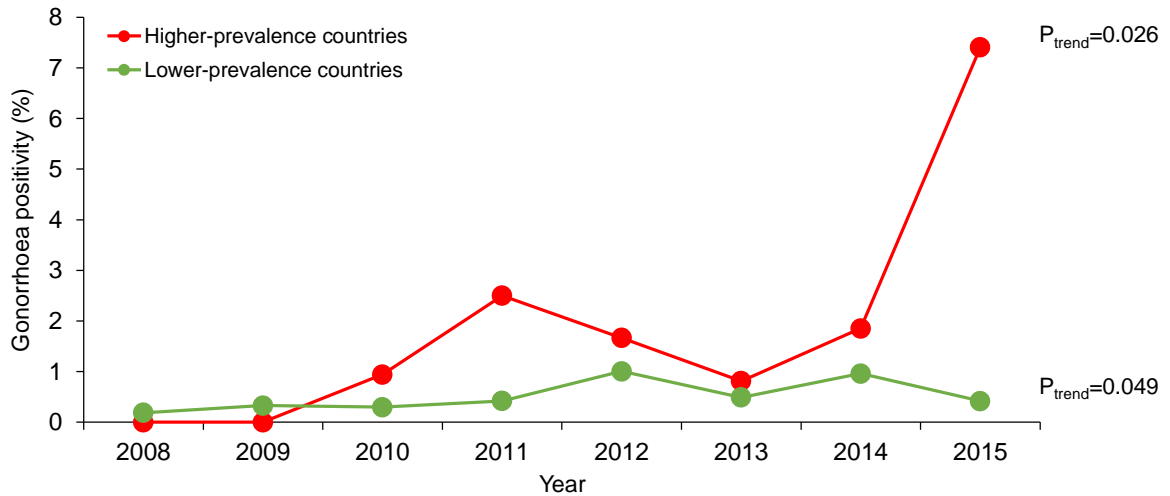
## Lower-prevalence Countries

All other countries



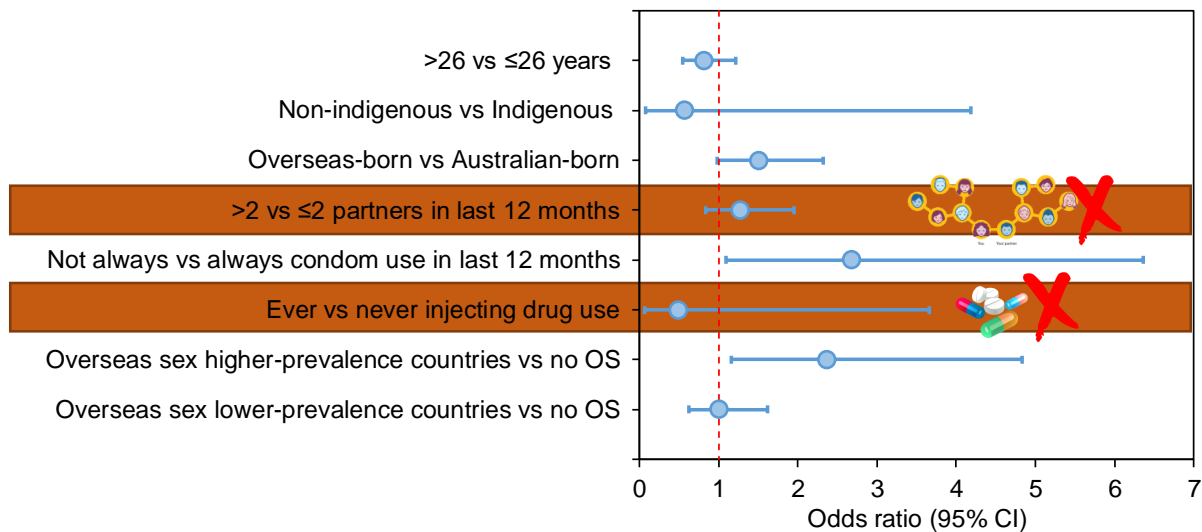
Source: MSHC unpublished data. Misson (Under Review)

# Gonorrhoea positivity trend

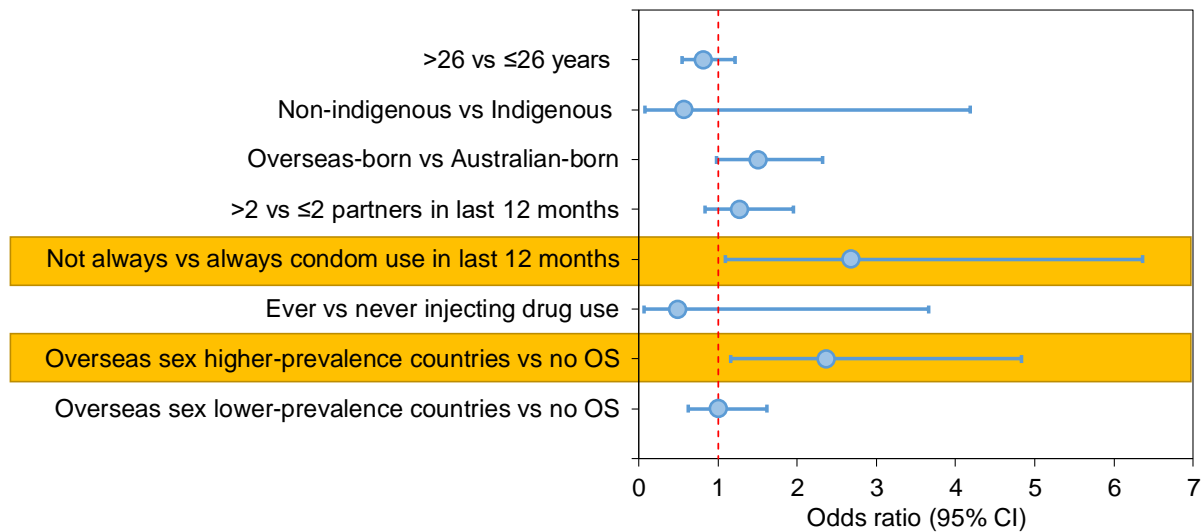


Source: MSHC unpublished data. Misson (Under Review)

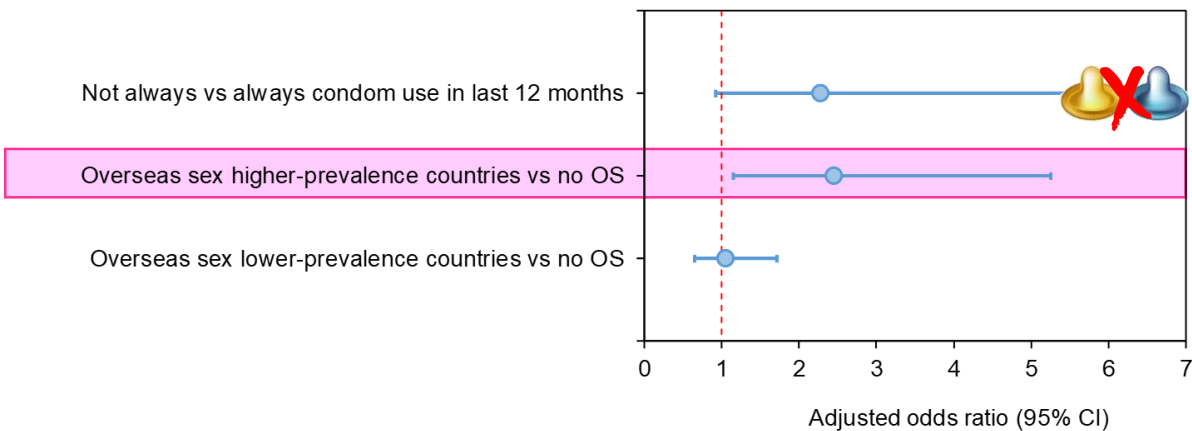
## Risk factors – females with gonorrhoea at MSHC



## Risk factors – females with gonorrhoea at MSHC



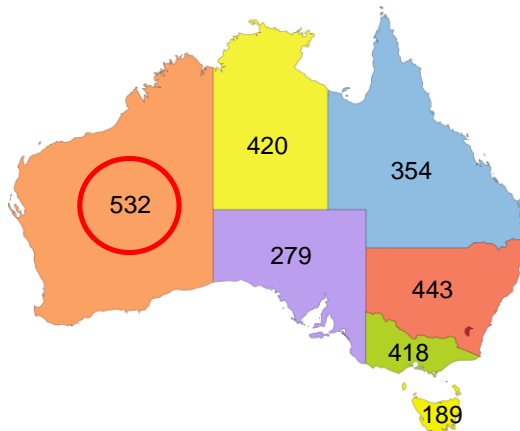
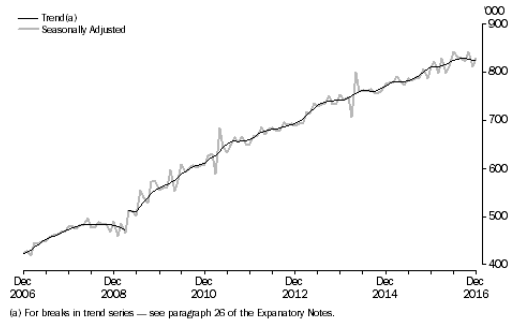
## Risk factors – females with gonorrhoea at MSHC



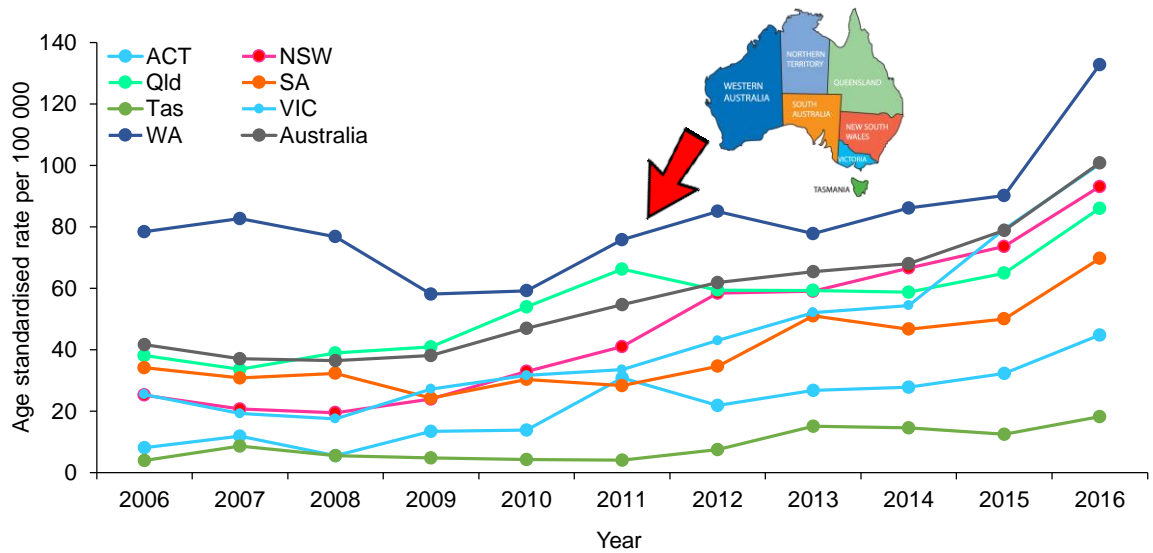
## Short-term resident departures



**Movement rate for short-term resident departures** = the number of movements per 1,000 state or territory population

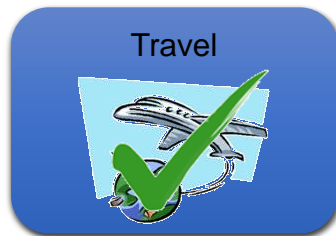
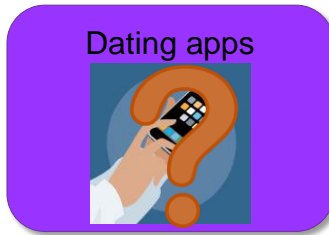


# WA has the highest gonorrhoea incidence rate



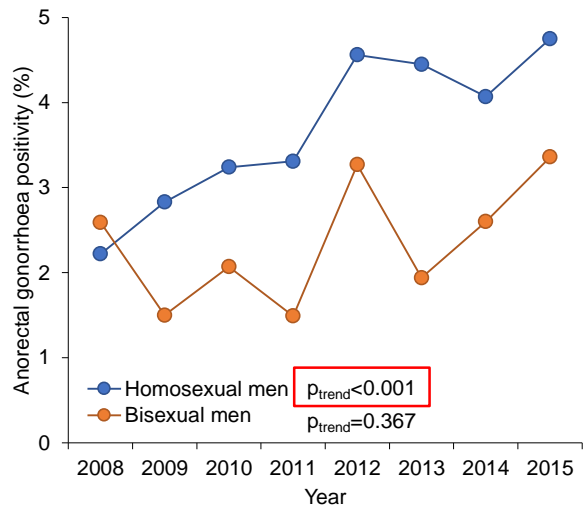
Source: Australian National Notifiable Diseases Surveillance System

## Potential risk factors



## Bisexual men

- High prevalence and incidence in MSM
- Transmission: from bisexual men to women, then from women to heterosexual men
- About 6% of MSM attending MSHC are bisexual
  - *Men who have sex with both men and women in the last 12 months*
- If we see rise in gonorrhoea in females, we will also see similar trend in bisexual men

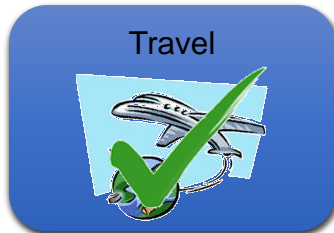
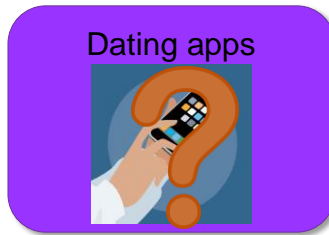


## Bisexual men? – Maybe

- Very difficult to answer this question from epidemiological studies
  - *Need to study women who had sex with bisexual men*
    - *How many women would know their male partners are bisexual or not?*
    - *How many bisexual men would disclose their bisexuality to their female partners?*
- Bioinformatics
  - *Genome Sequencing*



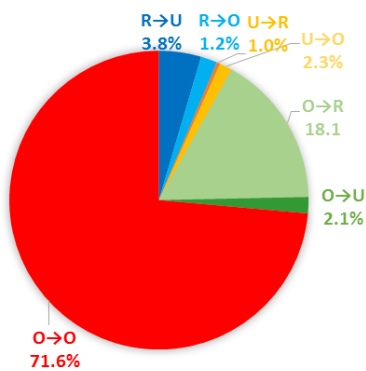
## Potential risk factors



## Is the oropharynx is the key site?

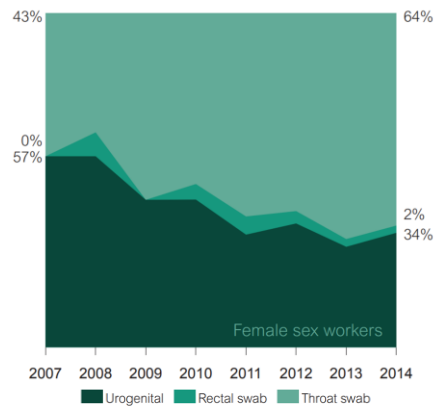
### MSM

Gonorrhoea incident cases by route of transmission



### FSW

Proportional breakdown of gonorrhoea diagnoses at sexual health clinics

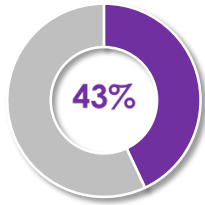


**33%** relative increase in oropharyngeal gonorrhoea

# Saliva



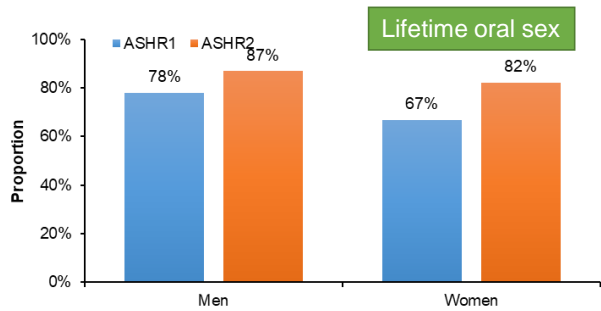
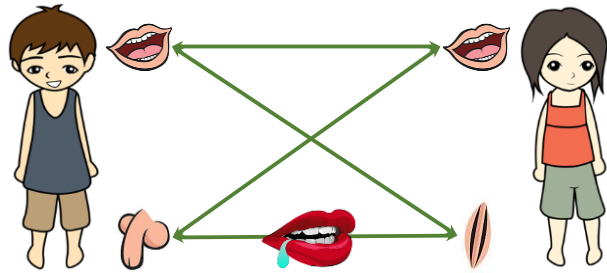
33 MSM with oropharyngeal gonorrhoea by culture



Positive in saliva by culture



Positive in saliva by NAAT

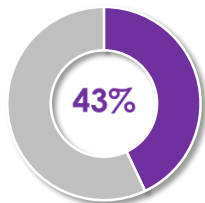


Sources: Chow (2016) STI, Fairley (2017) EID, Rissel (2014) Sexual Health, de Visser (2003) ANZJPH.

# Saliva



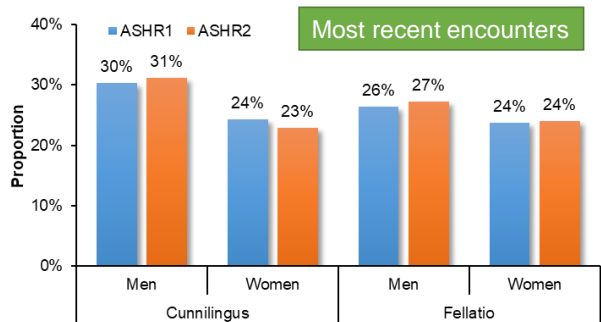
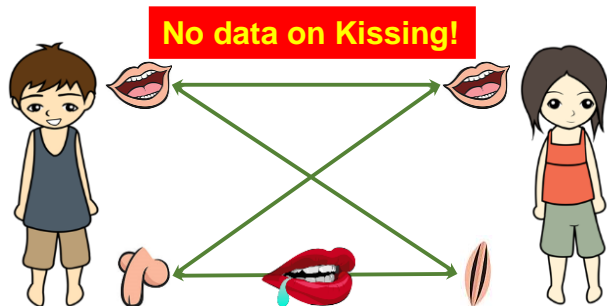
33 MSM with oropharyngeal gonorrhoea by culture



Positive in saliva by culture

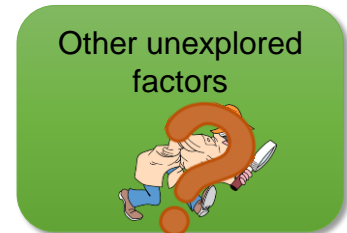
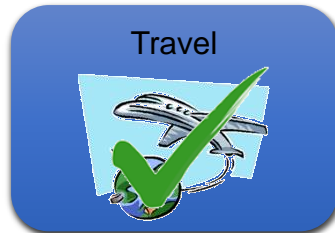
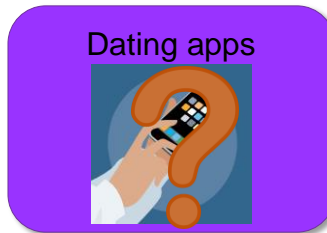


Positive in saliva by NAAT



Sources: Rissel (2014) Sexual Health, de Visser (2003) ANZJPH.

## Potential risk factors



## Conclusions

- Unlikely to explain the rise of gonorrhoea
  - *Number of partners, condom use, alcohol/drug*
- Possible factors
  - *Travel*
- Unknown factors
  - *Dating apps, bisexual men, kissing, saliva use*
- Very limited research in this area

# Acknowledgment

## Melbourne Sexual Health Centre



**Christopher Fairley**

## The Kirby Institute



**Rebecca Guy**

## Burnet Institute



**Megan Lim**



**Basil Donovan**



**Caitlin Douglass**