

# Case studies: sex work, modelling and global health

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## Learning outcomes

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- to understand the concept of core groups in STI epidemiology
- to appreciate the value of different research methods in understanding STI epidemiology
- to understand how global health issues can impact on clinical and public health practice in London

## Overview

- Sexually transmitted infections (STI) are common and cause considerable morbidity and mortality in the world.

- In developing countries, STIs and their complications rank in the top five disease categories for which adults seek health care

- 4% of deaths worldwide (6.6% in LDCs) are due to unsafe sex

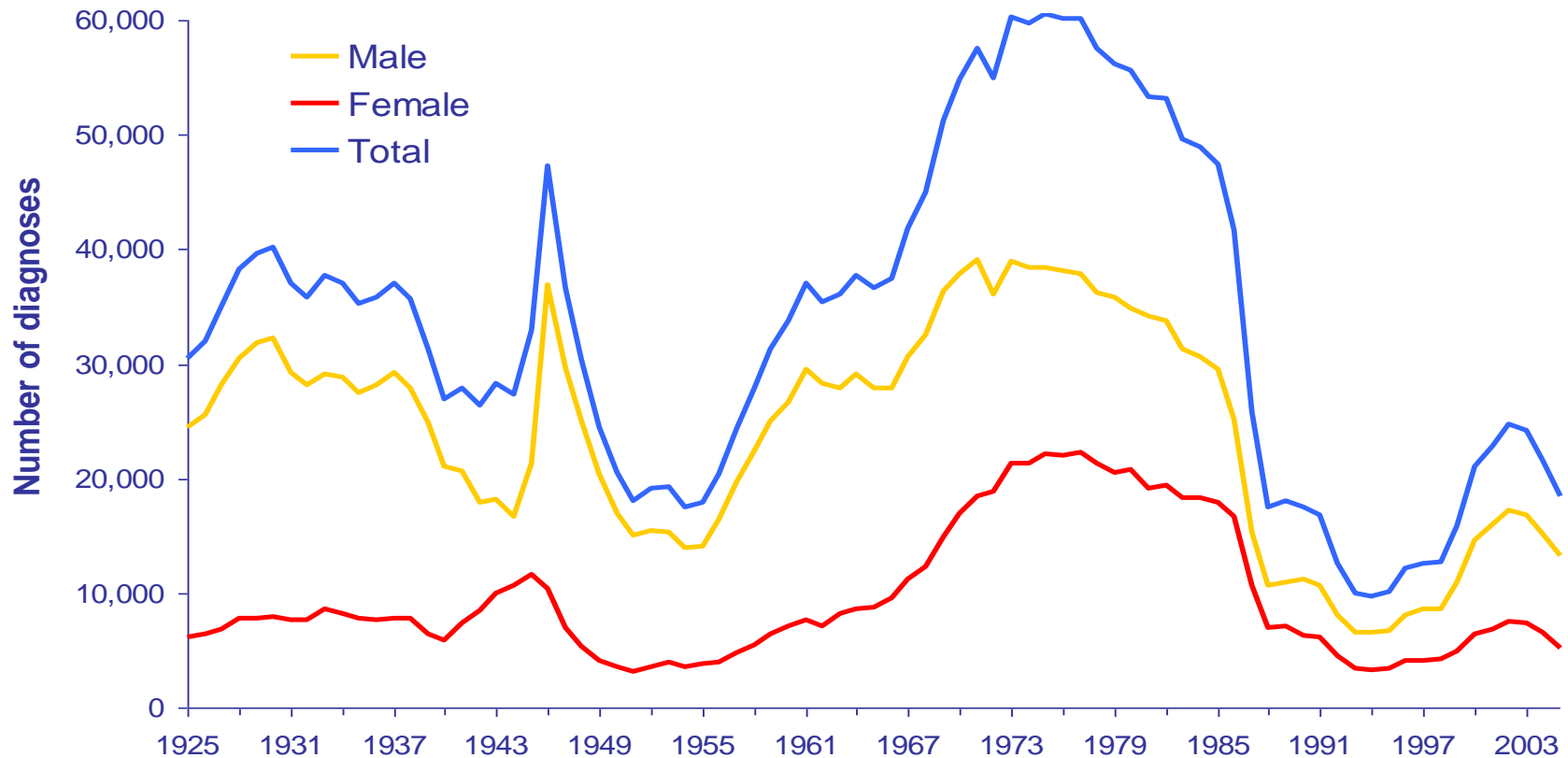
### Mortality

- Estimated 0.1 million deaths annually from STI other than HIV

### Morbidity

- primarily reproductive morbidity
- 5.1 million YLDs (Years lost due to disability) in women (2002)
- 1.9m in men

# Number of diagnoses of gonorrhoea by sex, GUM clinics, England and Wales\*: 1925 - 2005



\* Scotland & Northern Ireland data are excluded as they are incomplete from 1925 to 2003

Data source: KC60 statutory returns

## Understanding STI epidemic curves

Basic reproductive number,  $R_0$

This is the average number of secondary cases generated by a single primary case in a fully susceptible population

In an epidemic phase  $R_0$  must be greater than 1, i.e. each person infects more than one other on average

Key factors in this are numbers of contacts, transmissibility and duration of infection

## *The Basic Reproductive Number\**

$$R_0 = D c \beta$$

*Mean length  
of time infectious  
-Treatment* →

↑  
*Rate at which  
sexual contact  
occurs  
-Education*

← *Likelihood of  
transmission on  
a sexual contact  
-Condoms, virucides*

*\*More on this later from Geoff Garnett*

The threshold rate of sexual partner change  $C_t = 1/(\beta.D)$ :

<i>Infection</i>	<i>D (years)</i>	<i>b (per partnership)</i>	<i>C<sub>t</sub> per year</i>
<i>Neisseria gonorrhoea</i>	<i>No Treatment</i>	<i>0.5</i>	<i>4</i>
	<i>Treatment</i>	<i>0.15</i>	<i>13</i>
<i>Chlamydia trachomatis</i>	<i>1.25</i>	<i>0.2</i>	<i>4</i>
<i>Treponema pallidum</i>	<i>No treatment</i>	<i>0.5</i>	<i>7</i>
	<i>Treatment</i>	<i>0.25</i>	<i>13</i>
<i>HIV-1</i>	<i>8</i>	<i>0.15</i>	<i>0.83</i>

*After Brunham and Plummer, 1990.*

# Understanding persistence of STI

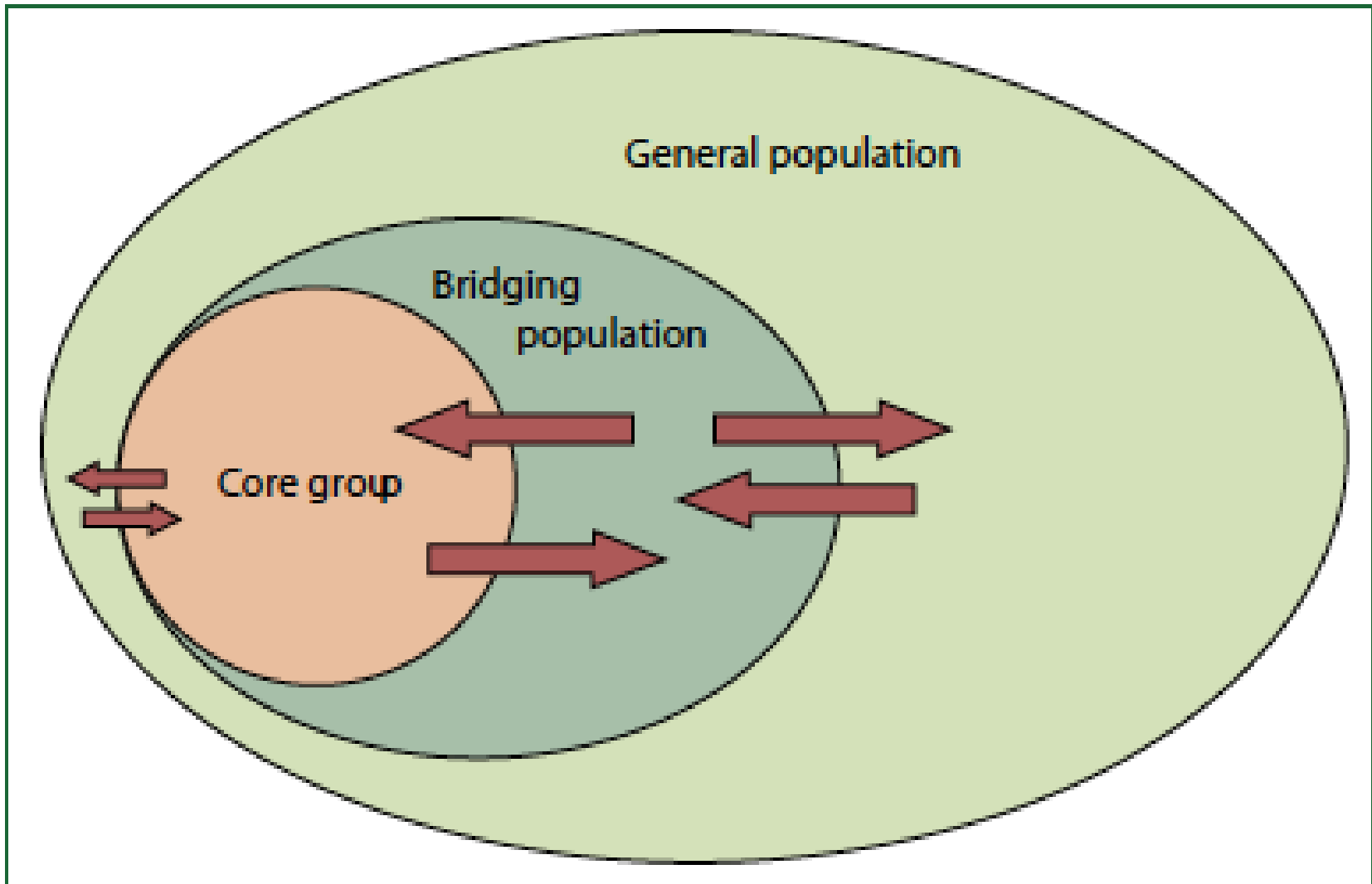
Average rates of partner change insufficient for  $R_0 > 1$

1970s, Yorke and Hethcote hypothesized persistence in sub-populations or core groups

Standard epidemiological models now based on this model



# Standard epidemiological model for STI in the population



## Broad risk factors

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Geographical area

Age (women aged 15 – 24, men aged 25 – 34)

Gender/ sexual orientation/ethnicity

Sexual behaviour

- Numbers and types of sexual partners
- Unprotected sex

## Spread and persistence of STI

Average rate of partner change not enough to sustain gonorrhoea

For example in the UK in 2009, GUM clinic patients (n = 2203) the proportion with 2 or more partners in last 3 months

- Men 41%
- Women 26%

General population samples show much lower rates of partner change

Not enough, leads to concept of core groups

## Core groups

Sub populations with higher rate of partner change that sustain transmission and persistence in the wider population

Who are these sub-populations?

- Young people?
- Urban?
- Sex workers?

Sex workers appear to be a likely group:

- More partners
- Linked to wider population through clients

## Core group images



## Core group?

“Historically, society has blamed prostitutes for spreading all kinds of disease. Syphilis was blamed on prostitutes. The plague was blamed on prostitutes. During World War One the government locked up prostitutes to protect enlisted men from VD . . .

We prostitutes knew that, sooner or later, AIDS would spread into the heterosexual community and that when it did not only would we be blamed but, if history was any guide, we would also be arrested, quarantined, and worse.”

Dolores French (1989), in “Working: my life as a prostitute”

## How do we know if sex workers a core group for HIV and STI?

Can think about constructing models to represent transmission  
But to be useful the models need to have good estimates of the parameters, e.g.:

- Numbers of partners, mixing patterns etc
- Transmissibility (condom use etc)
- Duration of infection





**Sex work in London**



## 1986 – what did we know?

HIV is sexually transmitted

Prostitutes had multiple partners

Early reports of high rates of HIV

- 1985: Rwanda, 87% HIV in sex workers<sup>1</sup>
- <sup>2</sup>1987: Nairobi, HIV increased from 4% to >60% (1981-5)
- 1987: USA: Some groups of sex workers in the US >50% HIV<sup>3</sup>

But what about London?<sup>4</sup>

1. *Van de Perre P et al. Lancet 1985;ii:524*
2. *Piot P et al. JID 1987;155:1108-1112*
3. *CDC. MMWR 1987; 36:157-161*
4. *Barton et al. Lancet 1985;ii:524*



## PRACED STREET PROJECT

Established 1985

Research into sex work and HIV/STI and health

- Baseline data from new participants, 1985 - 2009
- Cohort study 1985 to 1994
- Ethnographic work
  - » Interviews, mapping, fieldwork
- Long term cohort to 2002



*Started in a  
portakabin in this  
car park under the  
clinic*

*Early outreach to  
streets, local  
courts, escort  
agencies and  
saunas*



## Findings, 1986-7

- HIV prevalence 1.6%, 2 IDU, 1 infected by boyfriend
- Condom use increased
- Use varied by partner
  - highest with new clients
  - less with regular clients
  - even less with boyfriends

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### Prostitute women and public health

S Day, H Ward, J R W Harris

Prostitute women have been allotted a key role in models of heterosexual transmission of human immunodeficiency virus (HIV). Prostitutes are assumed to be especially exposed to infection with HIV because they have a greater than average number of sexual partners, and infected prostitutes may then play an important part in spreading the virus. Debates on public health initiatives reflect this concern with recommendations for registering and screening prostitutes.<sup>1</sup>

Though some findings from Africa confirm the importance of prostitutes in the heterosexual transmission of HIV, as in Nairobi,<sup>2</sup> sexual activity alone has not been described as the principal risk elsewhere in the world. The most important risk factor for prostitutes in the West is sharing needles and syringes for drugs.<sup>3</sup> We studied a cohort of prostitute women in London to assess their risks of infection with HIV.

A total of 187 prostitutes were tested with their consent for HIV-1. Three (1.6%) were positive for antibodies to HIV; two had shared needles in the past, and one had probably been infected by her boyfriend, who was positive for the virus. Infection in this woman, who did not use needles, may have been due to the general practice of unsafe sex at home. Information obtained from prostitutes in the cohort during interviews suggested that half of their boyfriends had other sexual partners, but possible risks associated with these men were unclear.

#### Comment

We did not find any evidence that prostitutes' fairly high rates of change of client were placing them at special risk of infection with HIV. Their safety at work depends partly on the extent to which condoms protect against infection with HIV<sup>4</sup> and also on the prevalence of HIV in the population of clients. Women in the cohort who used condoms all the time had notably fewer infections with common genital pathogens than inconsistent users (H Ward, unpublished observations). No client of a prostitute in London has been found to be positive for antibodies to HIV at the clinic (data not shown).

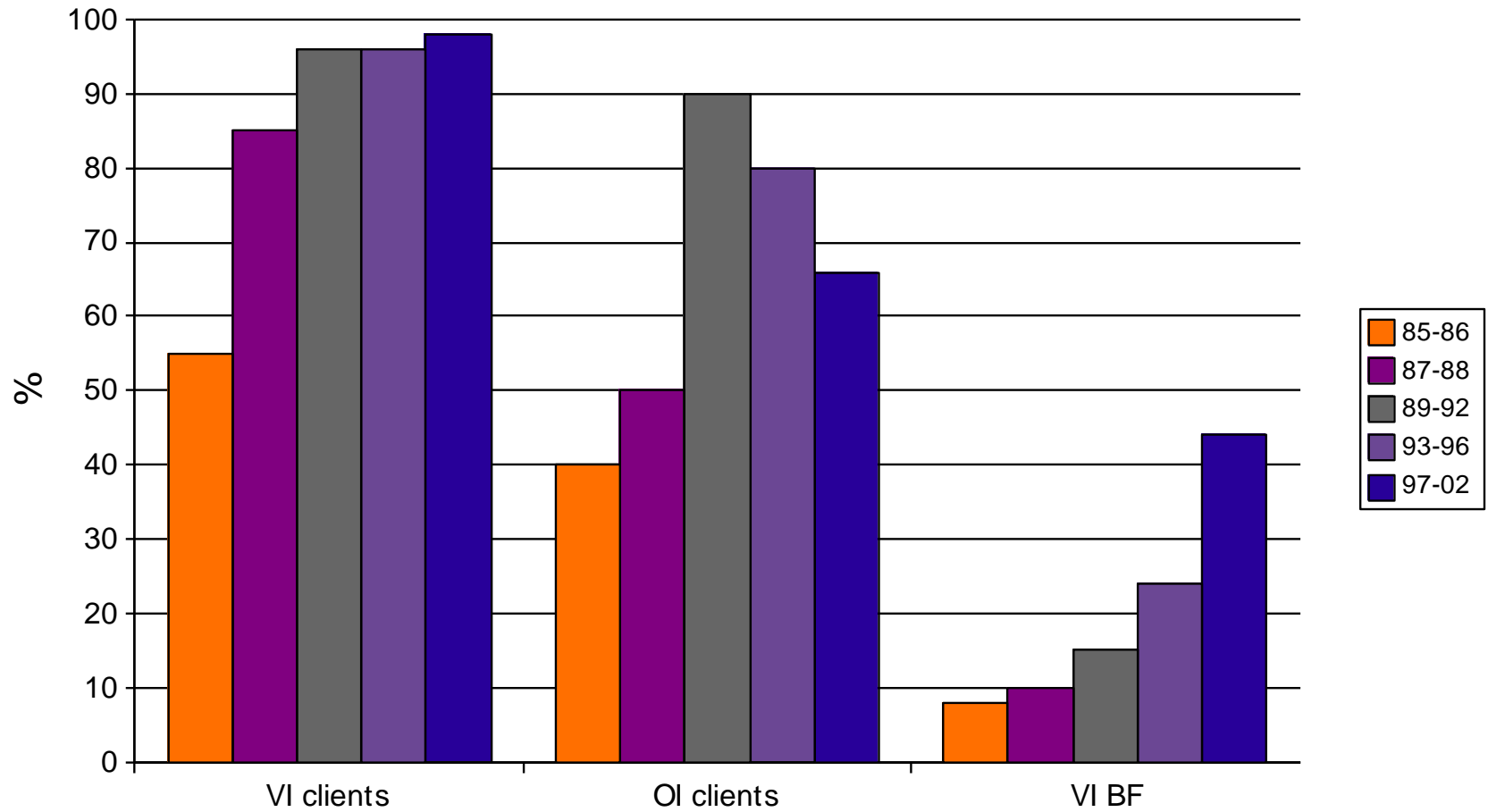
The current pattern of infection with HIV and the use of condoms in our cohort carry an important methodological implication. Risks of infection in pros-

## Responding to the threat of HIV

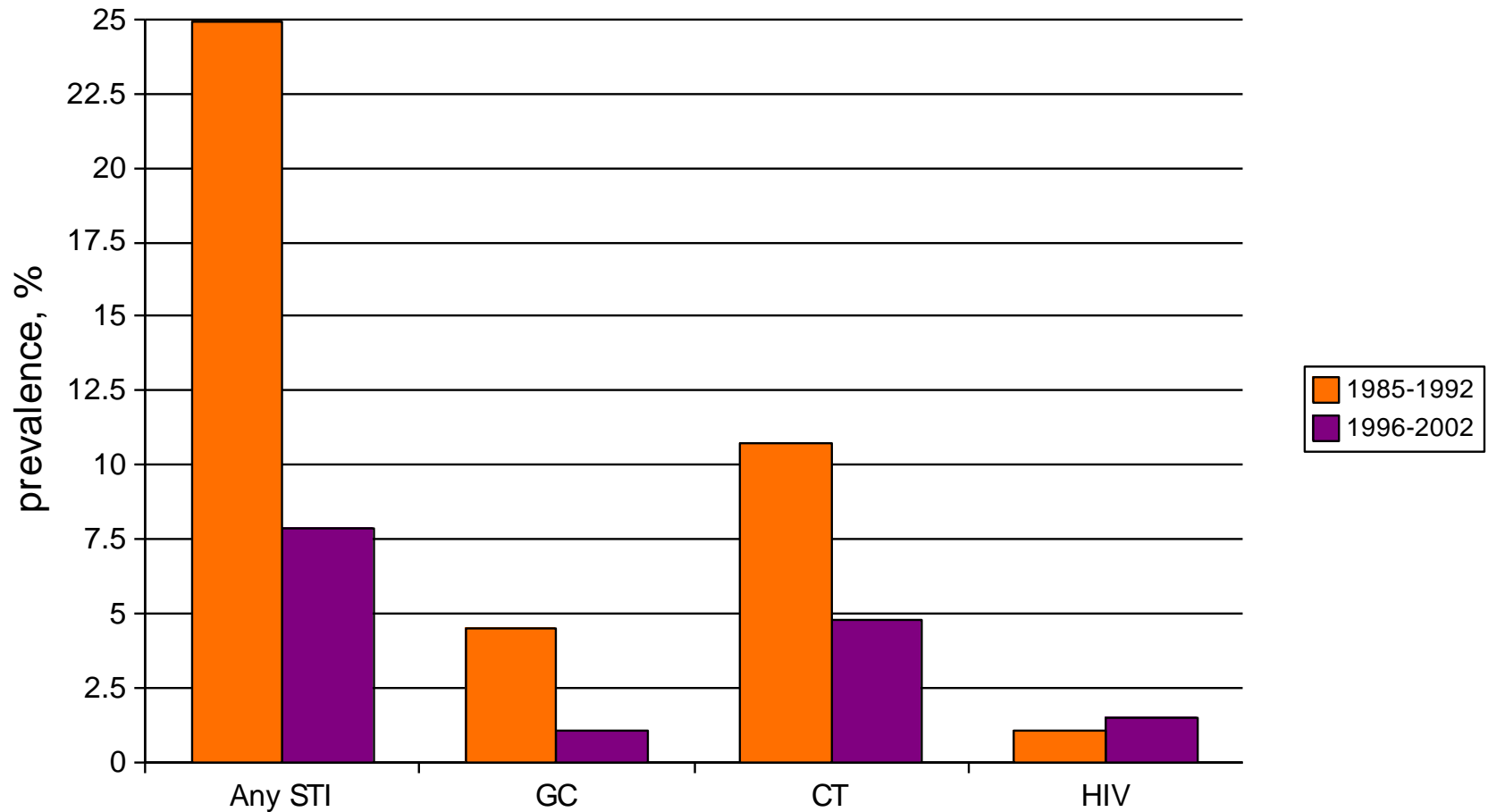
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- Sex workers were concerned  
Requested advice and testing  
Fear of HIV led to
- Rapid increase in condom use
  - Decrease in STI

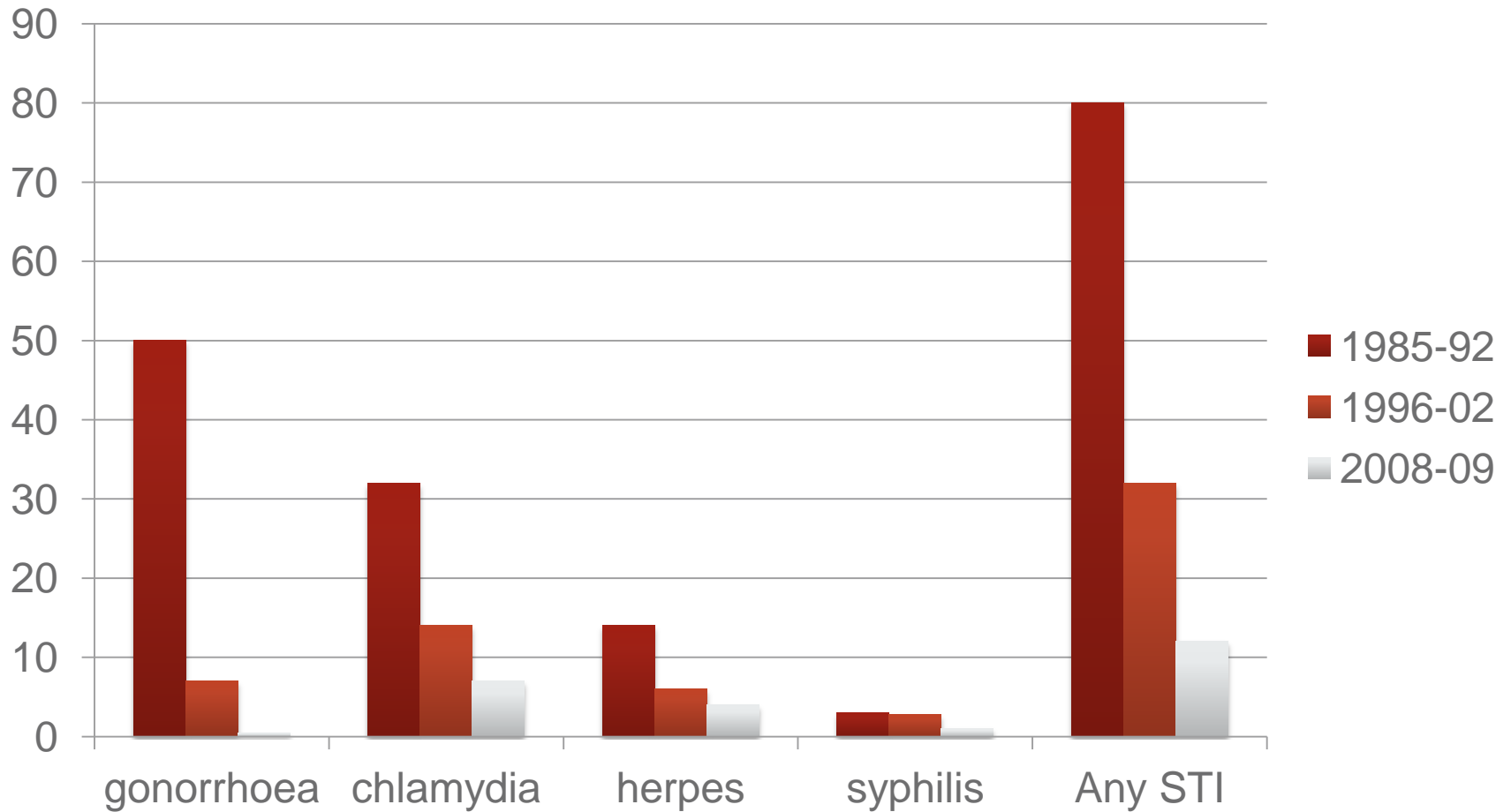
## Condom use, 1985-2002



# STI risk at baseline



## Past history of STI (self-report)





## Core group?

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Not much HIV

Increased condom use

But still at increased risk of other STI – eg gonorrhoea

WHY?

Risk factors for gonorrhoea included younger age, new to sex work and sex with non-paying partners

Were these boyfriends a “core within a core”?

## Want to know more? – possible research approaches?

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### **Molecular epidemiology**

Attempt to uncover links through tracking organisms in the population using genotyping

### **Qualitative research and ethnography**

Describe sexual networks

Understand how and why people mix sexually, what determines risk behaviour

## What did we find?

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Little evidence that sex work in London was major factor in STI or HIV transmission

Not a core group in general

Will vary in different places

Gonorrhoea appeared to be transmitted through informal networks, e.g. in Sheffield associated with certain clubs/music scene

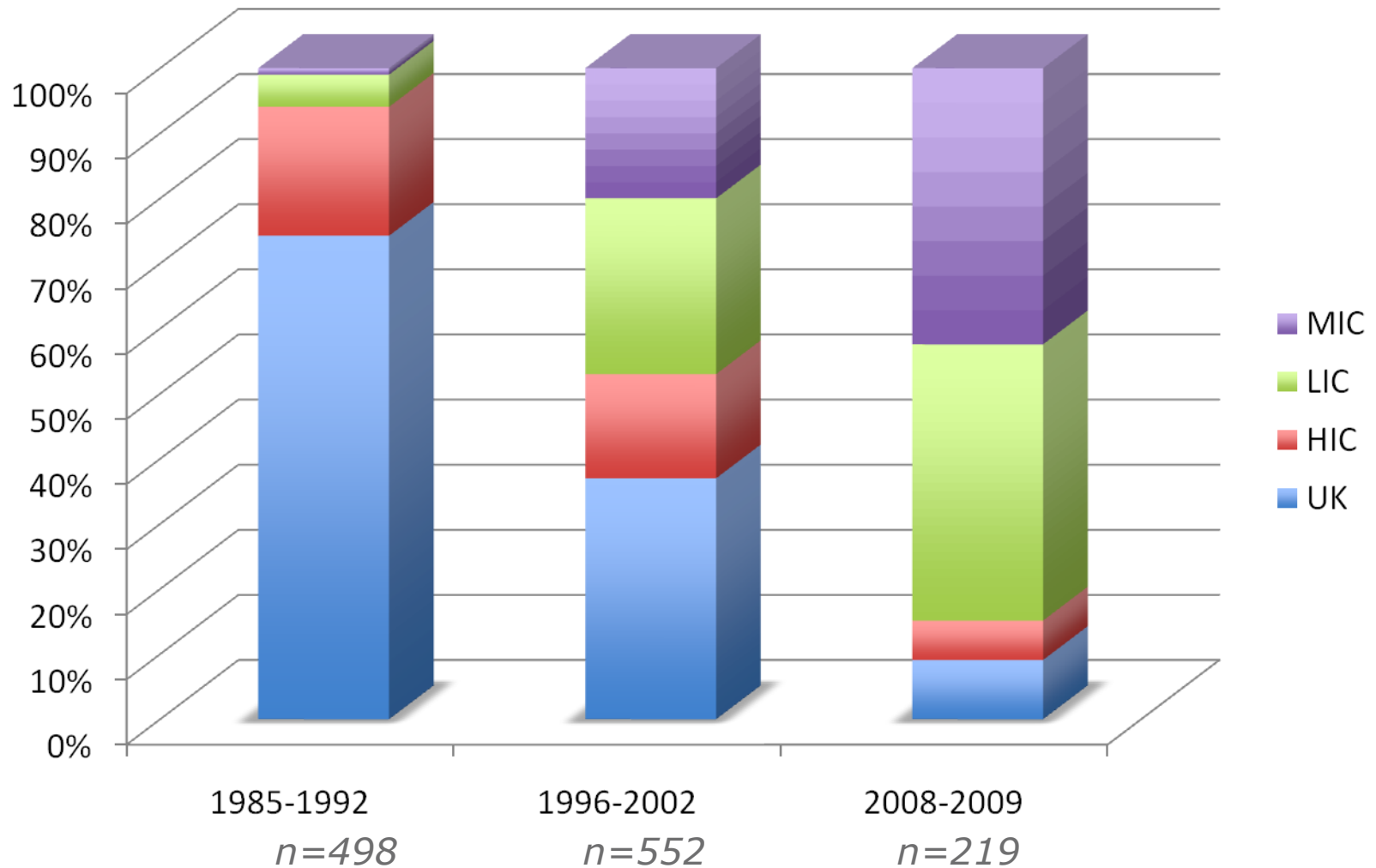
Sex workers included but not clients

# Global health in London

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What has this got to do with global health?

# Origin of sex workers, London, 1985 - 2009



**METROPOLITAN POLICE** Working together for a safer London

## LOCAL POLICE INFORMATION

Brothels are operating in this area  
The use of these premises supports organised crime  
Your local Police are actively seeking information about these premises  
If you have any information please contact the Mayfair & St James Safer Neighbourhood Team  
Tel: 020 8721 2419 or email: [safer@met.police.uk](mailto:safer@met.police.uk)



## Changes in local context





*Hustlers or victims – what  
do we know about migrant  
sex workers?*



## Moving for work

3 million undocumented migrants in European Union

Employment options limited

Informal economy

- Domestic work
- Agriculture
- Construction
- Sex work





## **Freed choice or coercion?**

- Captured and sold?
- Career?
- Need money?
- Want to travel?
- Few alternatives?
- Desperate?
- Inventive?

## Vera's story

“I graduated as an economist (in Russia). I lost my job and searched desperately for another job for six months. ..

I came to Turkey for a job two years ago. When I first came I started to work in a carpet shop...earning very little money. A woman friend told me that it was possible to earn more money as a prostitute...

After working as a prostitute for some time I went back to Kazakhstan and bought a house there for US\$1500 .”

## Russian woman in Moscow

“To return to the provinces and live as poorly as your parents would be like dying. So there is no choice!. You have to pay for your right to live in the capital, to have a good job and a flat..With your body . . . today thousands of girls are calmly and calculatedly selling themselves. The stupid ones do it just for money, those with more brains and bigger plans do it for a prestigious job and a place to live”

## **Think global – act local?**

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What are the implications for health? - discuss

## Conclusion

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Need multiple research methods to understand STI transmission

Global changes have big impact on health and on transmission risks

Always challenge received wisdom!

Thank you