Imperial College London

# Research methods: case studies of STI

Helen Ward and Sophie Day,

3 November 2011

Imperial College London

# Learning outcomes

- to reflect on the use of the concept of core groups in STI epidemiology

- to appreciate the value of different research methods in understanding STI epidemiology

Imperial College 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

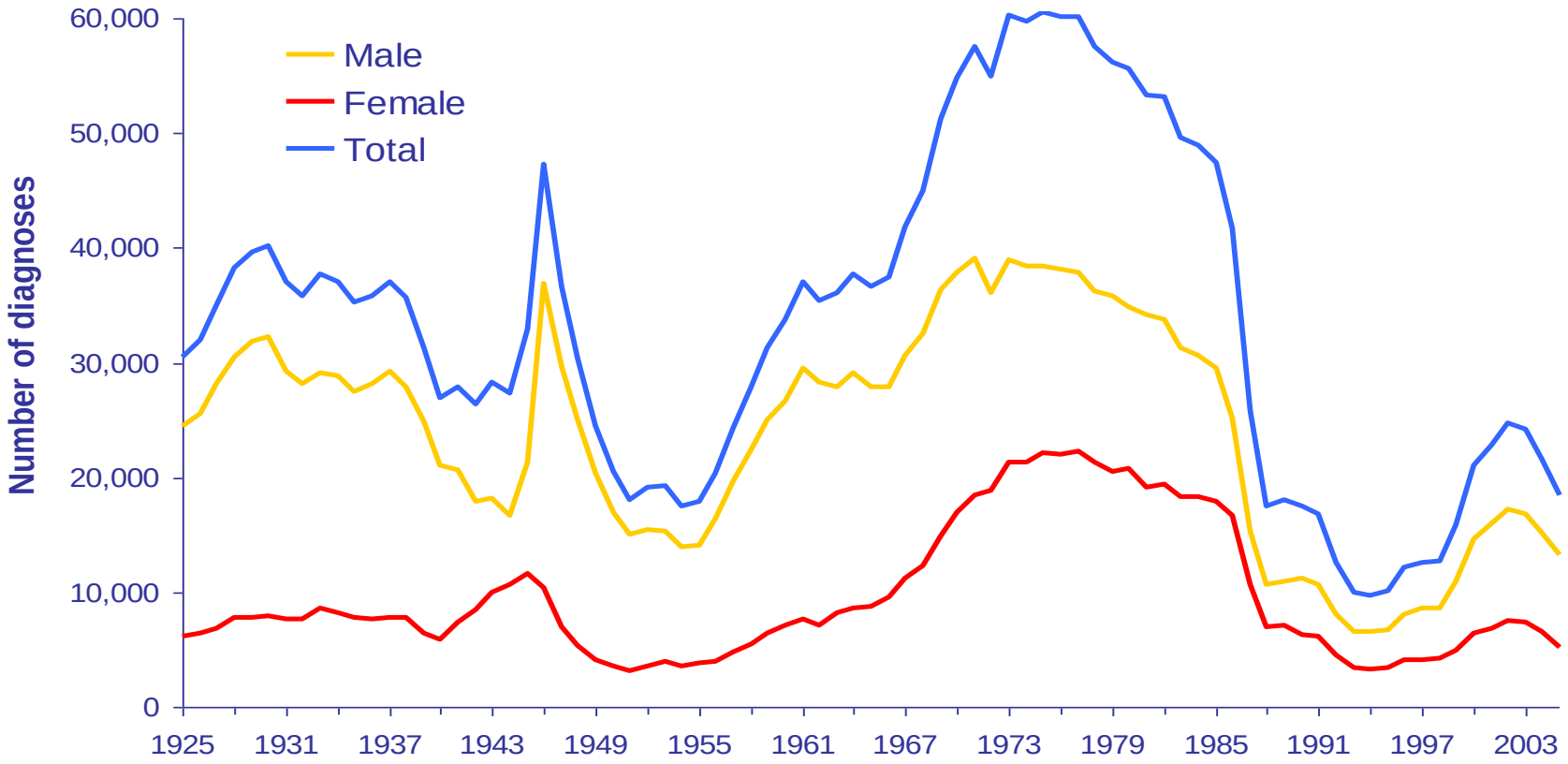
- Estimated 0.1million deaths annually from STI other than HIV

## Morbidity

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

Imperial College London

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




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

*Data source: KC60 statutory returns*

Imperial College London

# 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

Imperial College London

# 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*

Imperial College London

# 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?

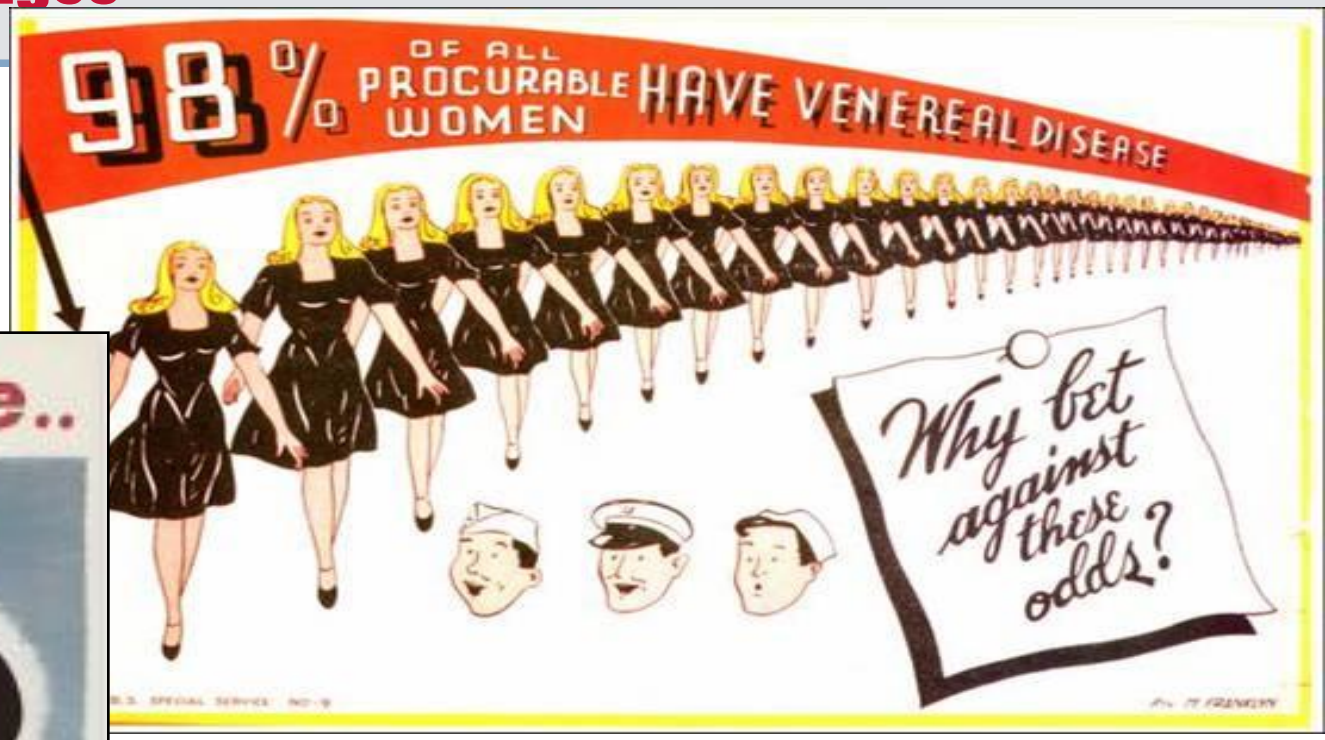
- Young people?
- Urban?
- Sex workers?

Sex workers appear to be a likely group:

- More partners
- Linked to wider population through clients

Imperial College London

# Core group images

Imperial College
London

# World War Two poster

Imperial College London

## Contagious Diseases Acts

1860s-1870s

(repealed 1880s)

to regulate gonorrhoea and syphilis

via inspection of 'public women' in garrison towns

and, where necessary, lock-up until cured

**The Selfish Slaves of Doses of Disease and Death.**

# 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"

Imperial College London

# 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

Imperial College London

# HIV infection

1981 AIDS recognised

1984- first reports of AIDS in African prostitutes (eg D'Costa et al 1985)

1986 Backbenches call for regulation (UK)

Imperial College 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[1]
- 1987: Nairobi, HIV increased from 4% to >60% (1981-5)[2]
- 1987: USA: Some groups of sex workers in the US >50% HIV[3]

But what about London?[4]


1. *Van de Perre P et al. Lancet 1985;ii:524*
2. *Piot P et al. JID1987;155:1108-1112*
3. *CDC. MMWR 1987; 36:157-161*
4. *Barton et al. Lancet 1985;ii:524*

# PRAED 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*

Imperial College London

# 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

## Prostitute women and public health

S Day, H Ward, J R W Harris

**Department of Anthropology, London School of Economics and Political Science, London WC2**
S Day, MA, *research officer*

**Academic Department of Community Medicine, St Mary's Hospital, London W2**
H Ward, MB, *research fellow in epidemiology*

**Praed Street Clinic, St Mary's Hospital, London W2**
J R W Harris, FRCP, *senior consultant in genitourinary medicine*

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.[1]

Though some findings from Africa confirm the importance of prostitutes in the heterosexual transmission of HIV, as in Nairobi,[2] 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.[3] We studied a cohort of prostitute women in London to assess their risks of infection with HIV.

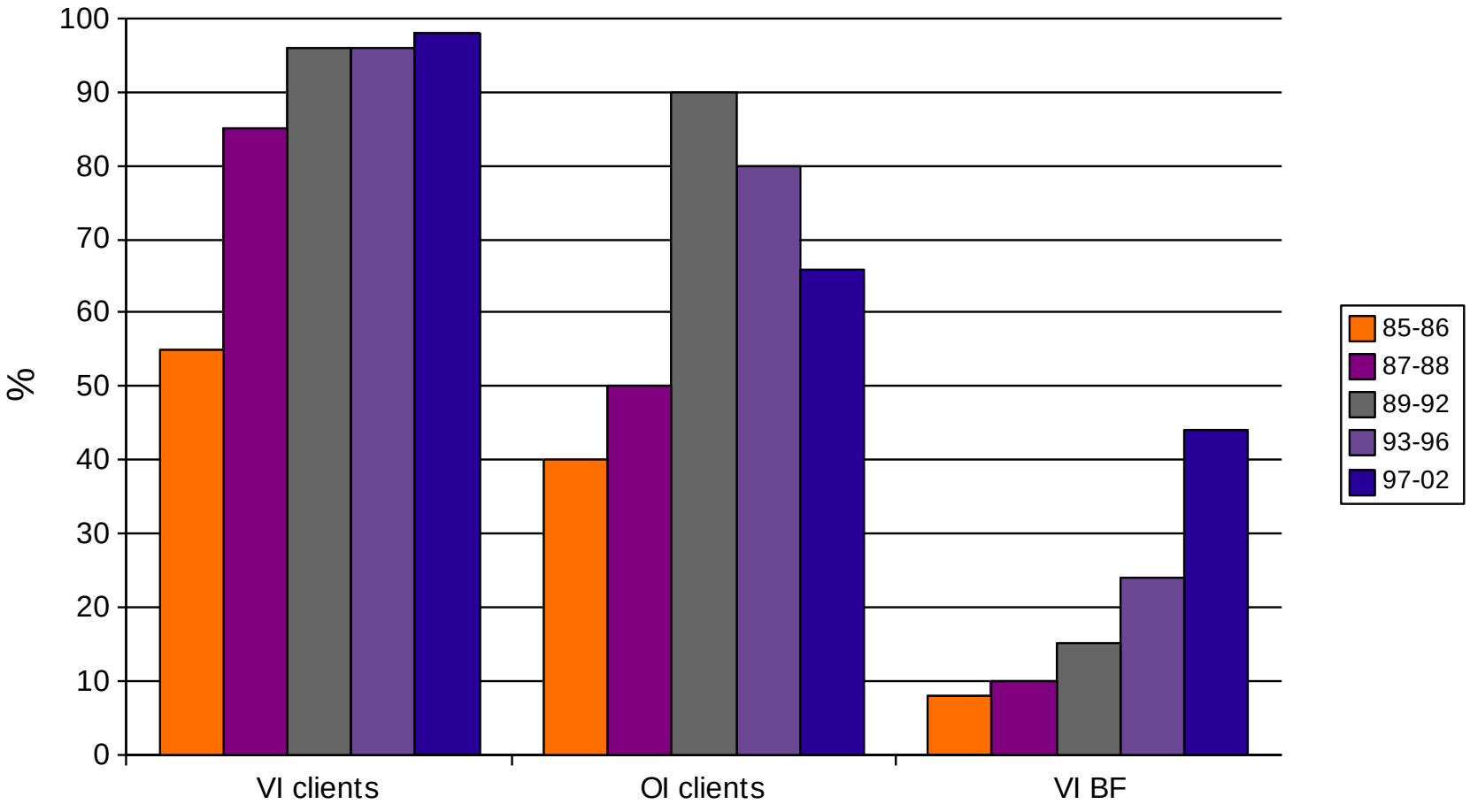
A total of 187 prostitutes were tested with their consent for HIV-1. Three (1·6%) were positive for antibodies to HIV; two had shared needles in the past, and one had probably been infected by her boyfriend, who was positive for the virus. Infection in this woman, who did not use needles, may have been 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[4] 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-

# Condom use, 1985-2002



Imperial College London

# Core group?

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”?

Imperial College London

# Want to know more? – possible research approaches?

**Molecular epidemiology**

Attempt to uncover links though 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

Imperial College London

# What did we find?

- 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
- Health not just about STI

Imperial College London

# Work history (cohort)

median year started sex work: 1985

73/124* (59%) currently in sex industry

nearly half had other jobs or studies

* 6 had died - murdered (2), with AIDS (2) & liver disease (1), accidental death (1)

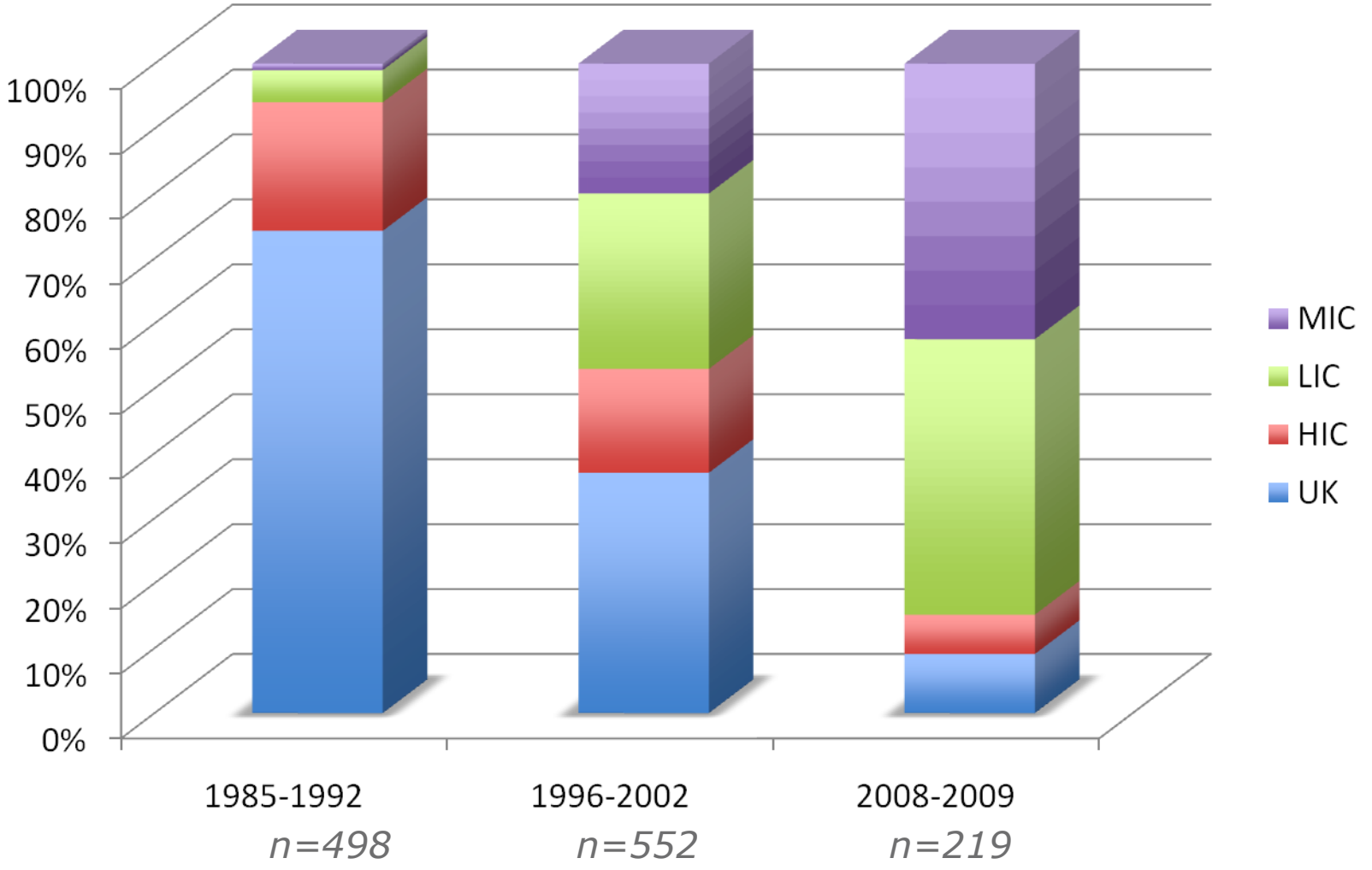
Imperial College London

# Global health in London

What has this got to do with global health?

Imperial College London

# Origin of sex workers, London, 1985 - 2009



Imperial College London

# Movement between countries

Group 1 1985-1992

45% had worked (sex work) in other countries

Group 2 1996 – 2002

<20% had worked (sex work) in other countries

Imperial College London

# Reading

**On Sex work, Praed Street Project**

**Book**

- Day, S. On the Game, Pluto Press 2006

**Articles**

- Ward H. The safety of migrant and local sex workers: preparing for London 2012. Sex transm Infect 2011 87:368-369
- Cooper K, Day S, Green A, Ward H. Maids, migrants and occupational health in the London sex industry. *Anth and Med* 2007;14(1):41-54
- Ward H, Aral SO. Globalisation, the sex industry and health. *Sex Transm Inf* 2006;82(5):345-347
- Ward H, Day S. What happens to women who sell sex? Report of a unique occupational cohort. *Sex transm inf* 2006;90:413-417
- Ward H, Day S, Green A, Cooper K, Weber J. Declining prevalence of STI in the London sex industry, 1985 to 2002 *Sex Transm Inf* 2004;80(5);374-379
- Ward H, Day S, Weber JN. Risky business: health and safety in the sex industry over a nine year period. *Sexually Transmitted Infections* 1999;75(5):340-343 http://sti.bmjjournals.com/cgi/reprint/75/5/340
- Ward H, Day S, Mezzone J, Dunlop L, Donegan C, Farrar S, Whitaker L, Harris JRW, Miller DL. Prostitution and risk of HIV: female prostitutes in London. *BMJ* 1993;307(6900):356-8.
- Day S, Ward H, Perrotta L. Prostitution and risk of HIV: male partners of female prostitutes. *BMJ* 1993;307(6900):359-361.
- Day S, Ward H, and Harris JRW. Prostitute women and public health. *BMJ* 1988;297:1585.

**On core groups/networks**

- Ward H. Prevention strategies for sexually transmitted infections: the importance of sexual network structure and epidemic phase *Sex Transm Inf* 2007;83: i43 - i49

***On the Game, Sophie Day, Pluto 2006***