

**Treatment as prevention (TasP)**  
***Can treatment reduce the transmission of  
HIV: Experience from the UK***

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# Outline

## ○ Brief overview

- Science, models, ecological data, scale up

## ○ UK Experience

- Epidemiology, access to care, recent modeling work on MSM

## ○ Challenges of scale up

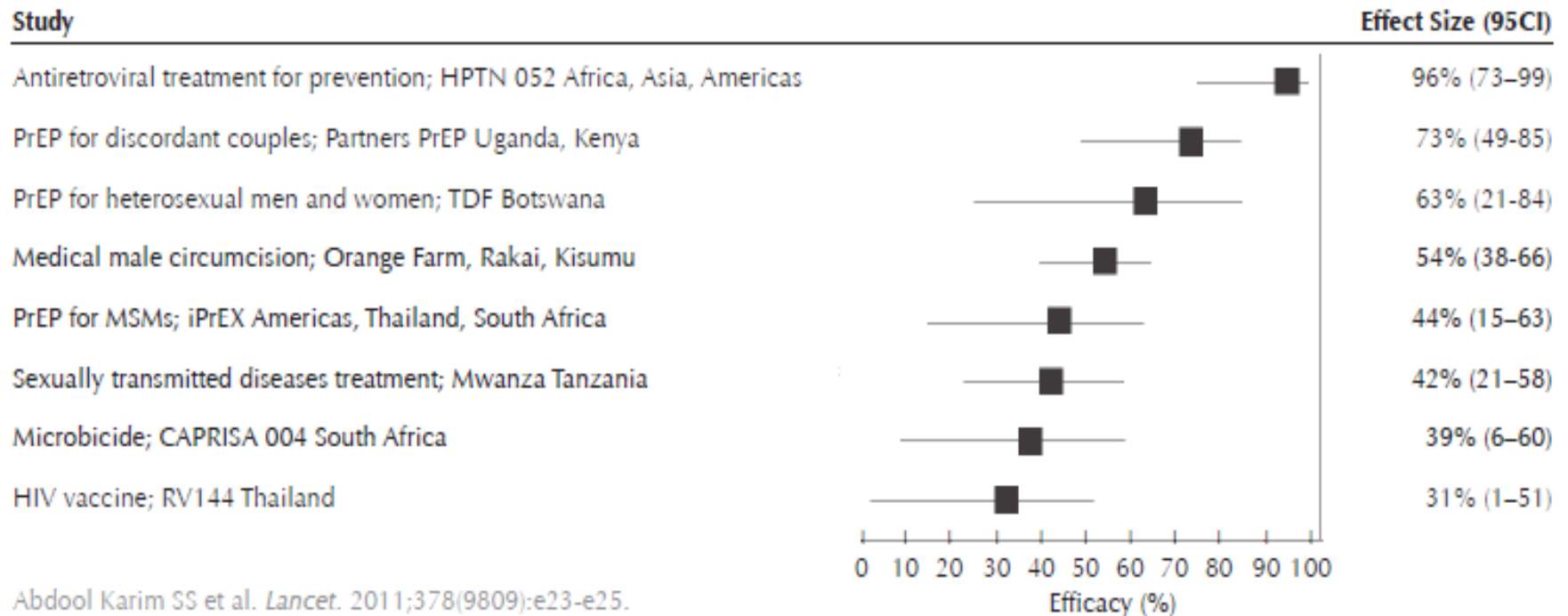
## ○ Conclusions and way forward



# TASP THE EVIDENCE

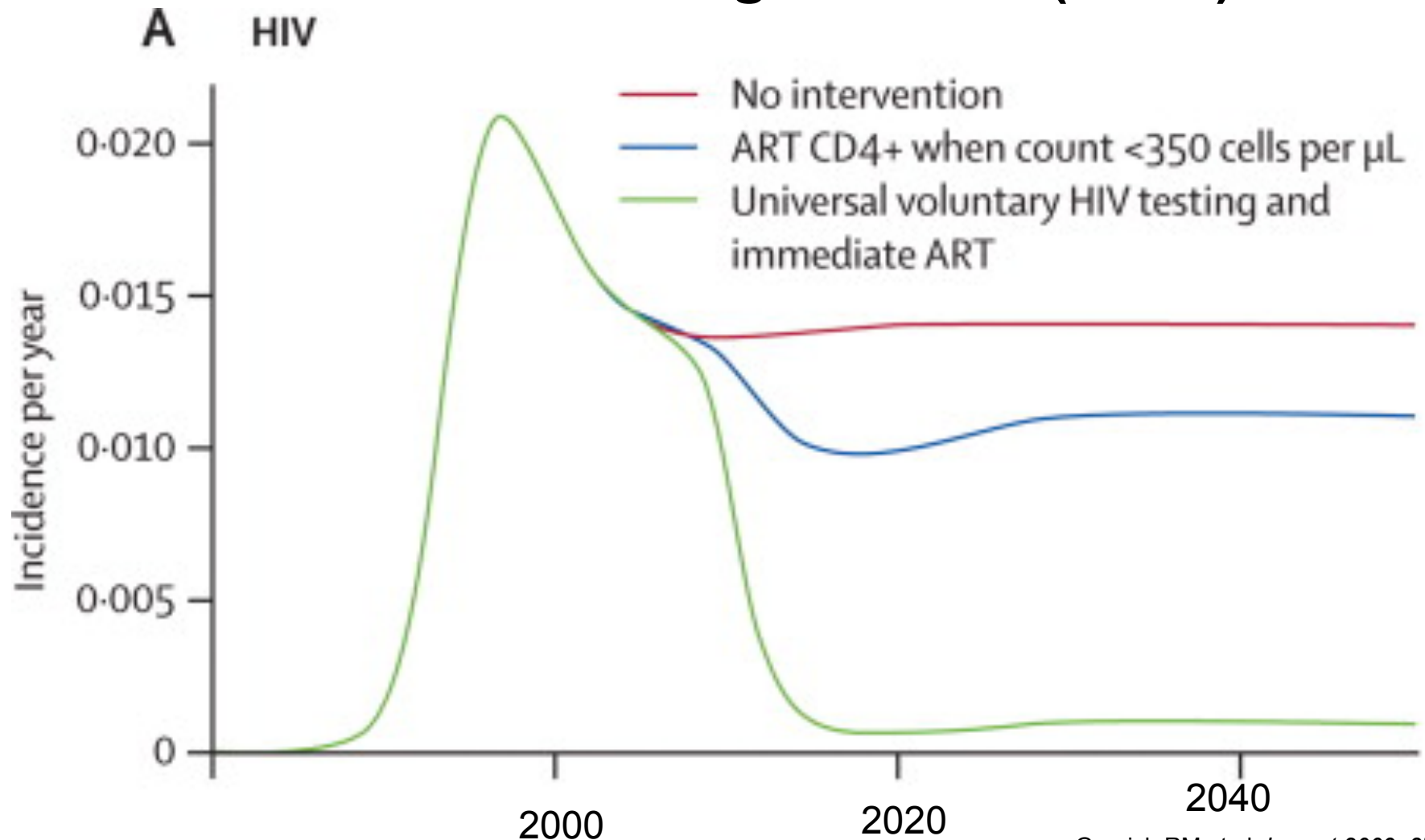
# RANDOMISED CLINICAL TRIALS

# HIV Prevention Technologies Shown to Be Effective in Reducing HIV Incidence in Randomized Clinical Trials



# THE MODELS

# HIV incidence Model: World Health Organisation (WHO)

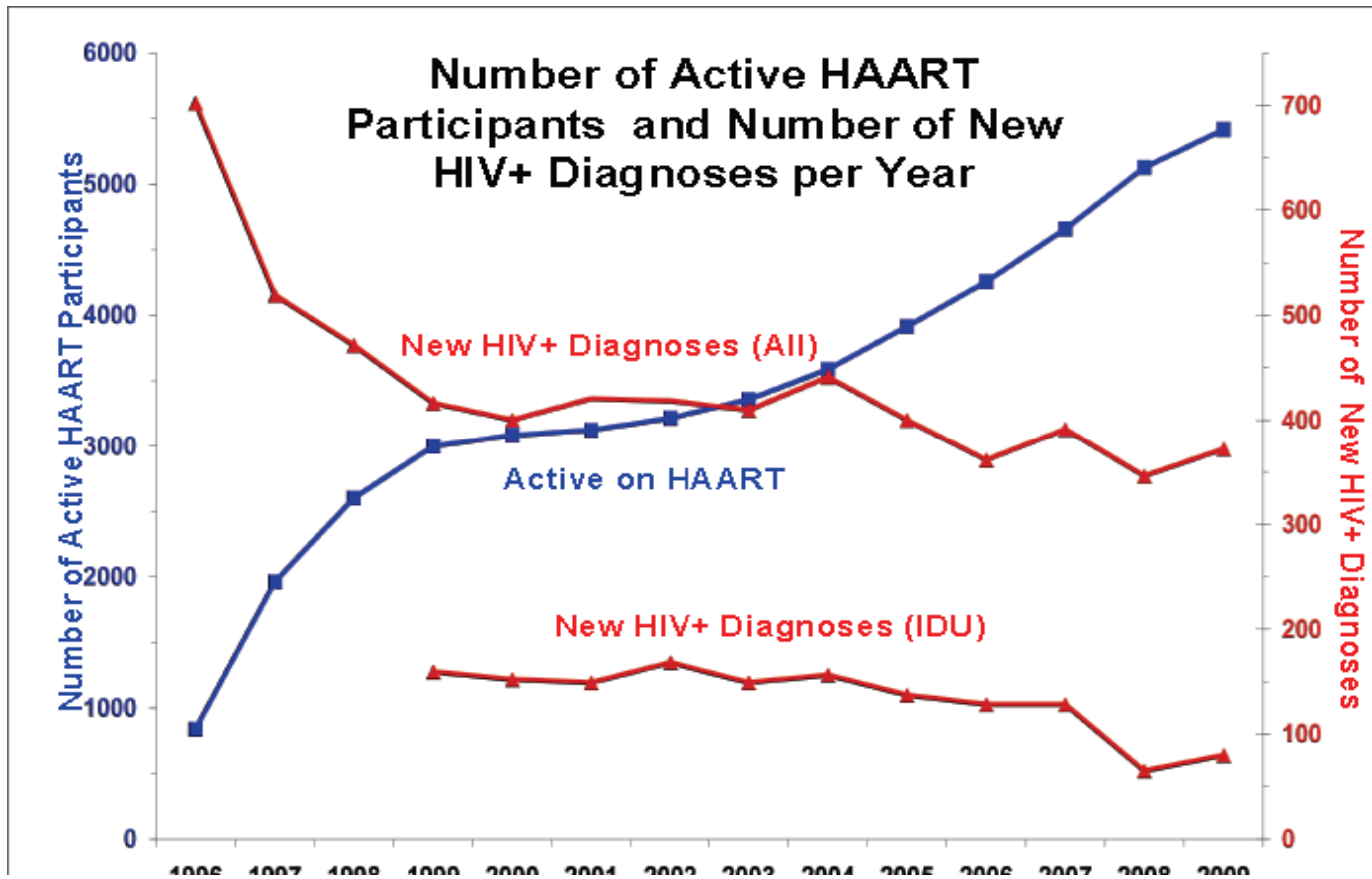


Granich RM et al, *Lancet* 2009; 373:  
48-57

# ECOLOGICAL STUDIES



# British Columbia, Canada: *Montaner et al (2010)*

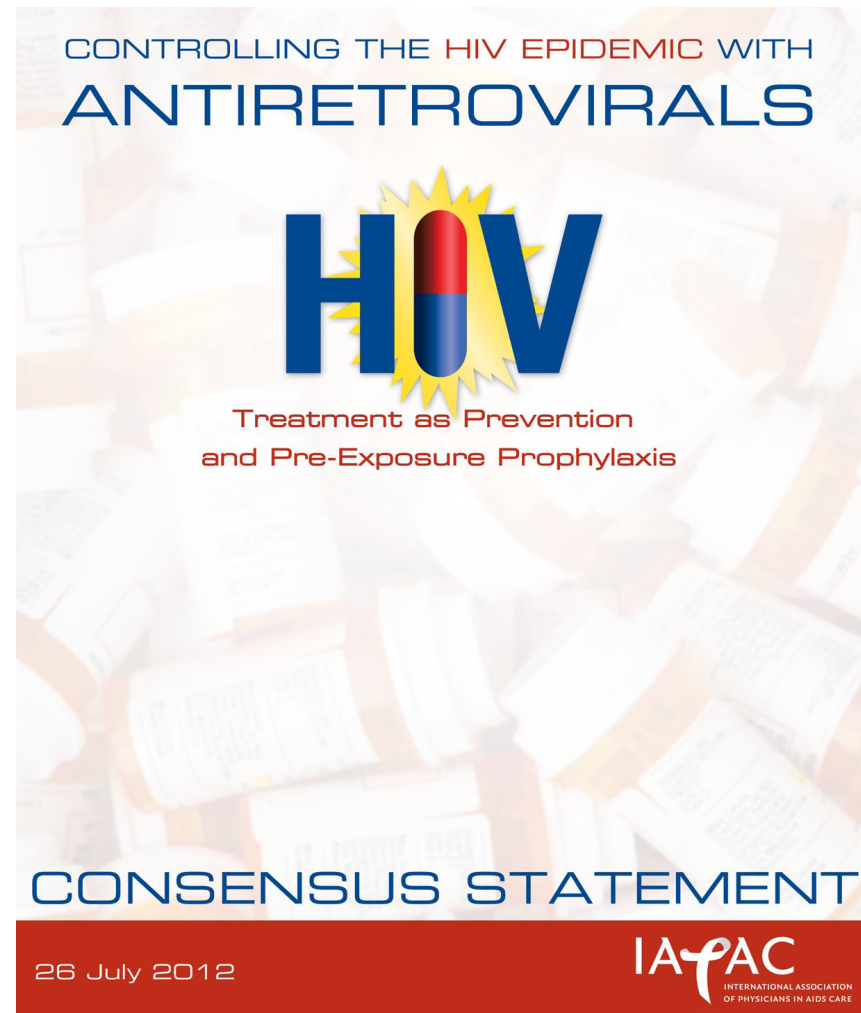


# Position statements 2012



**TECHNICAL REPORT**

**Evaluating HIV treatment  
as prevention in the  
European context**



**International Association of Physicians in AIDS Care  
(IAPAC)**

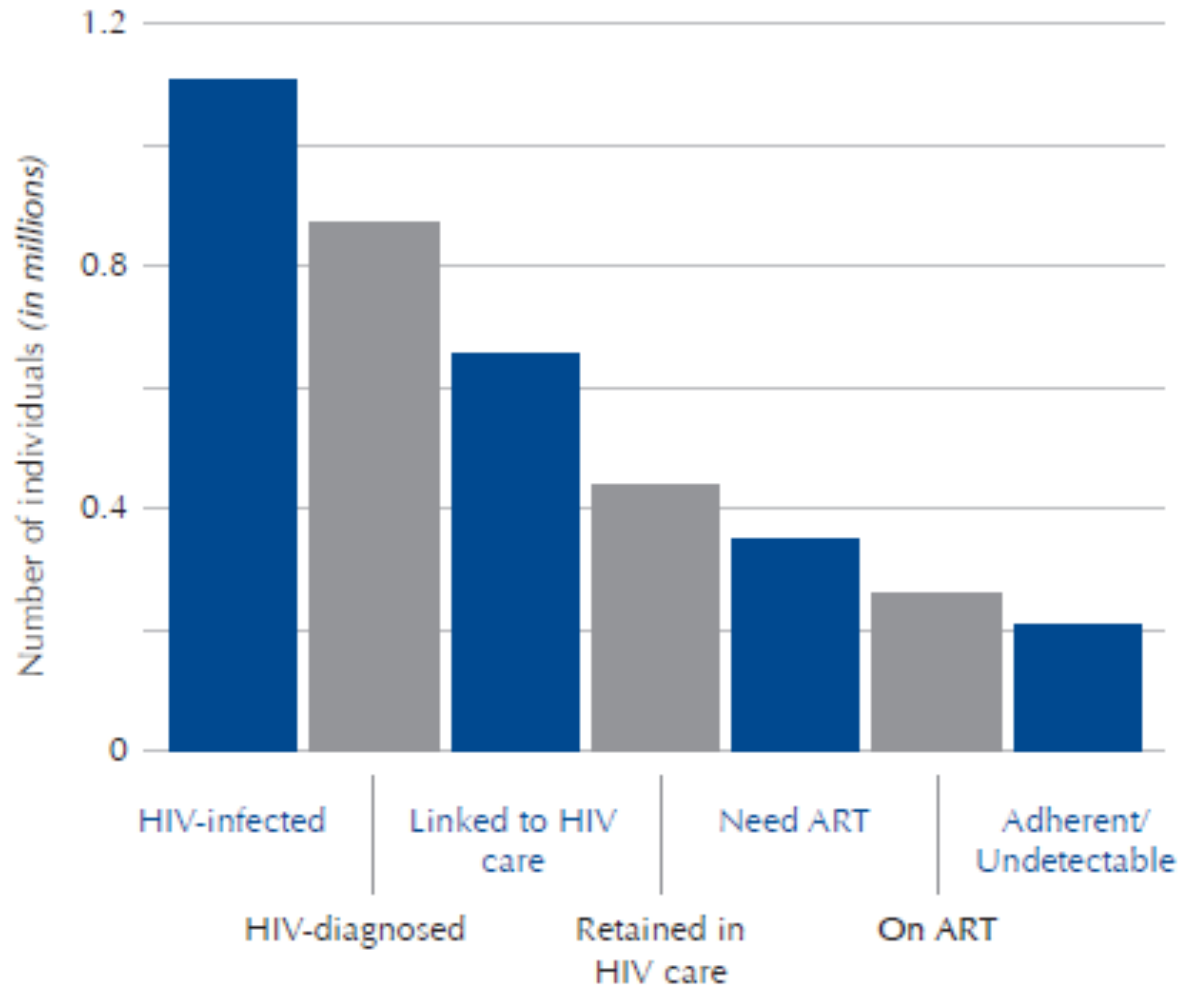


# SCIENCE VERSUS THE REAL WORLD CHALLENGES IN SCALE UP

# Concerns about “roll-out or scale up” of TasP

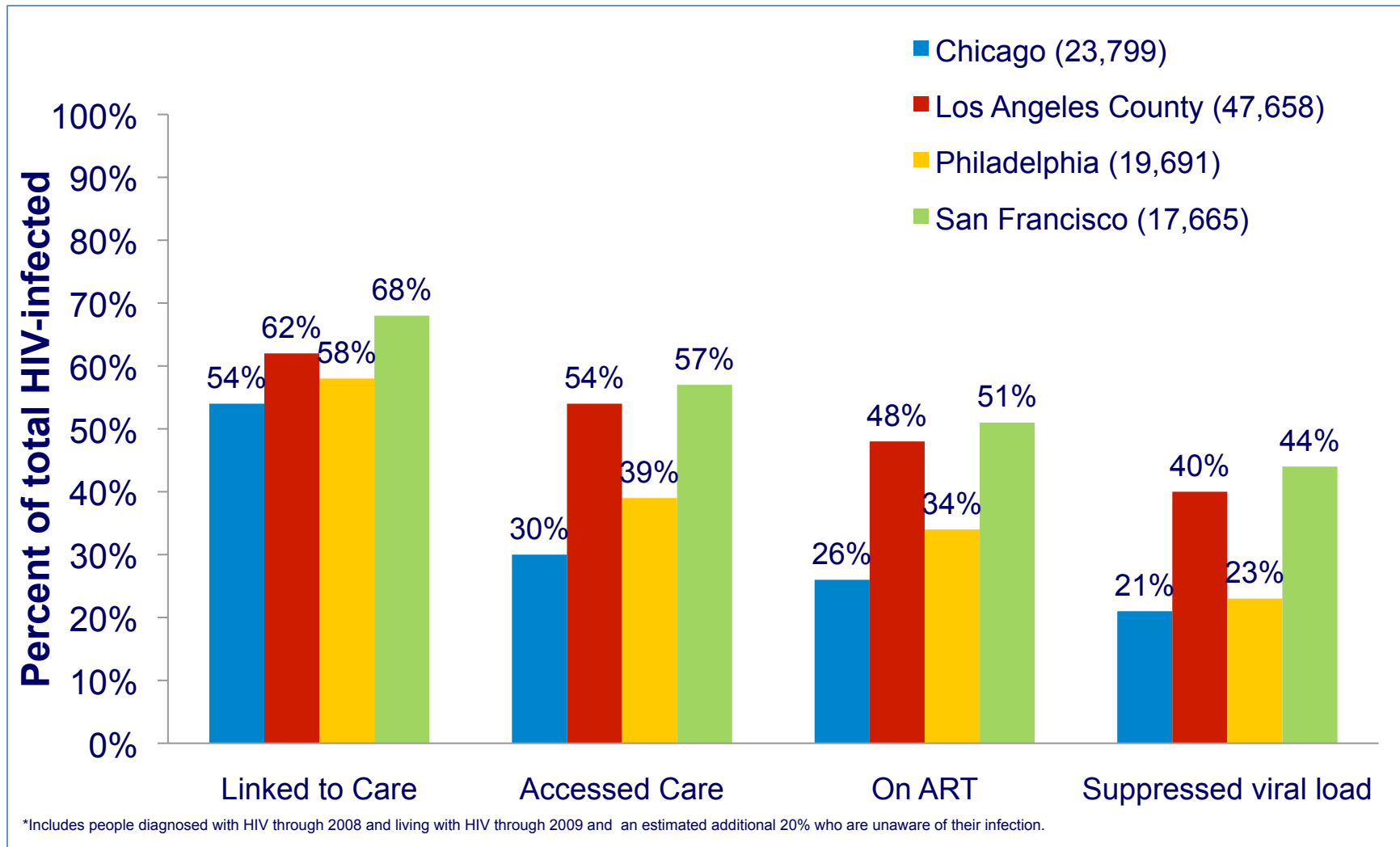
- Efficacy versus effectiveness
  - Individual versus public health benefit
- Feasibility and acceptability of patients
- Ethics/ human rights issues
- Resistance and toxicity
- Role of undiagnosed HIV in transmission
- Role of primary HIV infection in transmission
- Role of different epidemics eg MSM vs heterosexual epidemics in the UK
- Linkage to care and access to ART

# Number of HIV-Infected Persons Engaged in Selected Stages of the Continuum of HIV Care – United States



Gardner EM et al. *Clin Infect Dis.* 2011;52(6):793-800.

## Percentage of estimated number of HIV-infected persons\* in stages of continuum of HIV care in four large United States cities through December 2009



# THE UK EXPERIENCE CAN TASP REDUCE INCIDENCE IN MSM

# BHIVA guidelines, 2012

## Treatment to reduce transmission

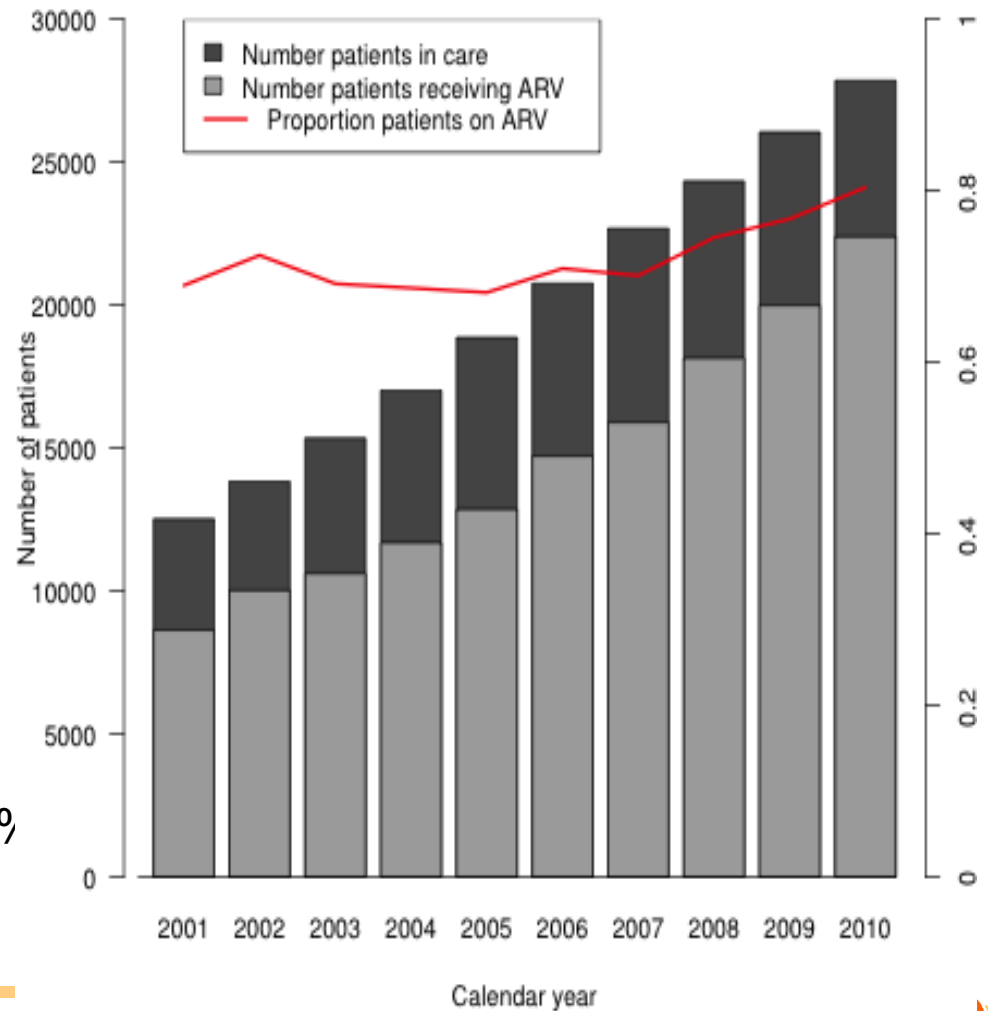
### Recommendations (4.4)

- We recommend the evidence that treatment with ART lowers the risk of transmission is discussed with all patients, and an assessment of the current risk of transmission to others is made at the time of this discussion
- We recommend following discussion, if a patient with a CD4 cell count  $>350$  cells/mL wishes to start ART to reduce the risk of transmission to partners, this decision is respected and ART is started



# HIV epidemic in MSM, UK

- 500,000+ MSM  
(3.4% of the adult male population aged 15-44)
- 40 000 MSM living with HIV, 26% undiagnosed
  - 9% prevalence in London,
  - 3% outside
- 80% of diagnosed MSM on ART
- (84% of MSM with CD4<350)
- Access to & retention in care >95% throughout period



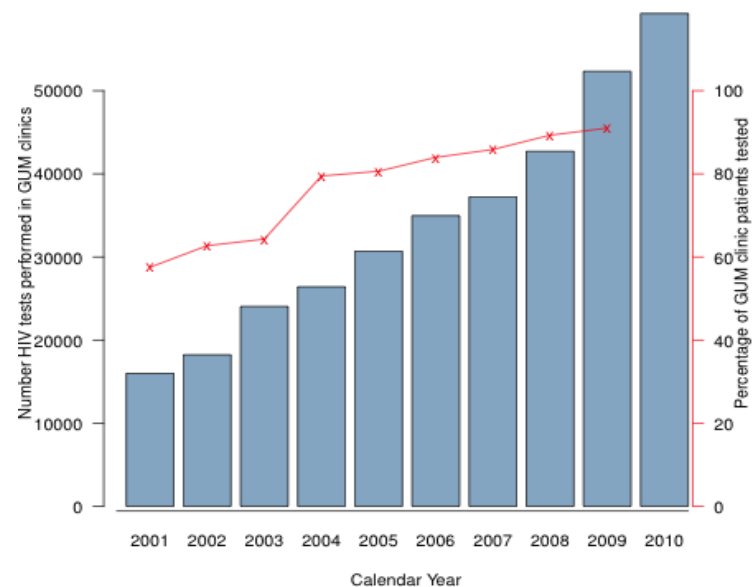
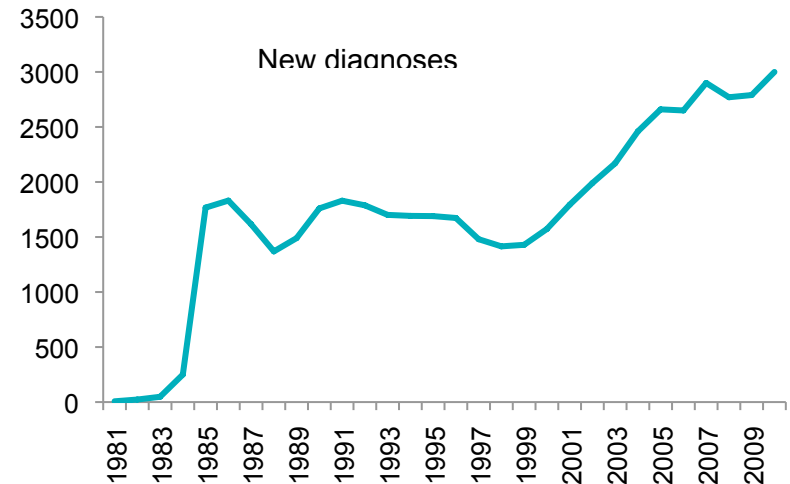
# HIV epidemic in MSM, UK

Despite high ARV coverage and retention in care

- Year on year increase in new diagnoses
- >3,000 in 2010, >25% are recently acquired (RITA)

Impact of testing??

- 3.7 fold increase in STI clinics last 10 years BUT only 60,000 in 2010
- So in 2010, estimated 15 - 25% of all MSM aged 15-59 tested

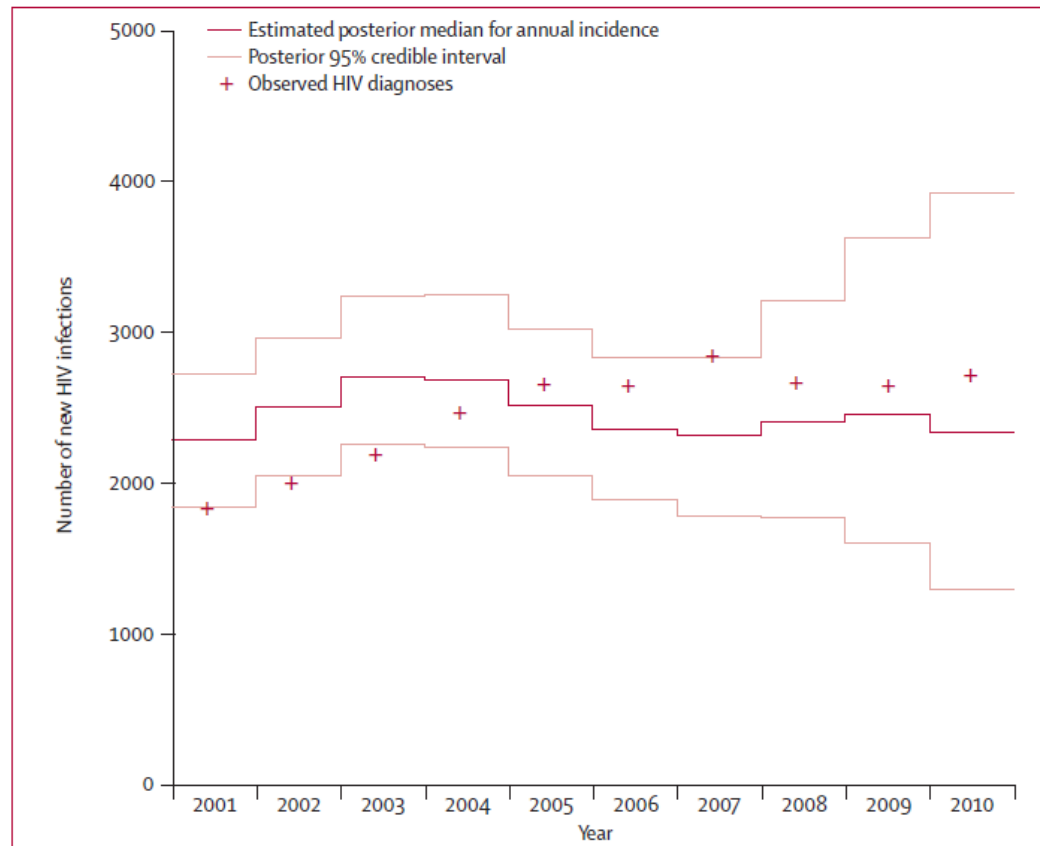


# Incidence models (1)

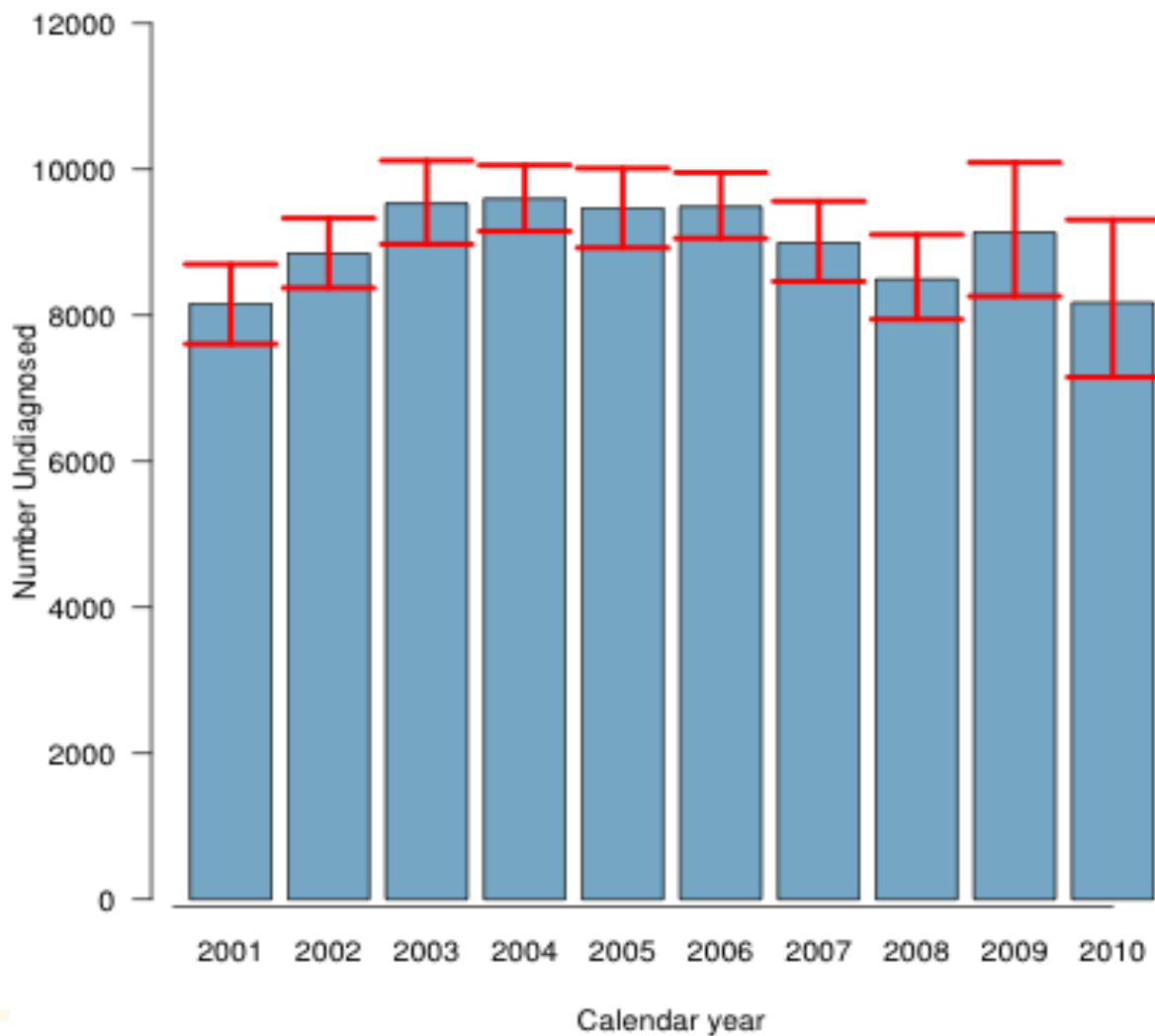
## no evidence of a decline in HIV incidence

*Birrell et al Lancet Inf diseases 2013*

Annual HIV incidence in MSM, 2001- 2010,  
England & Wales



# Sustained high level of undiagnosed infections in MSM; Birrell et al

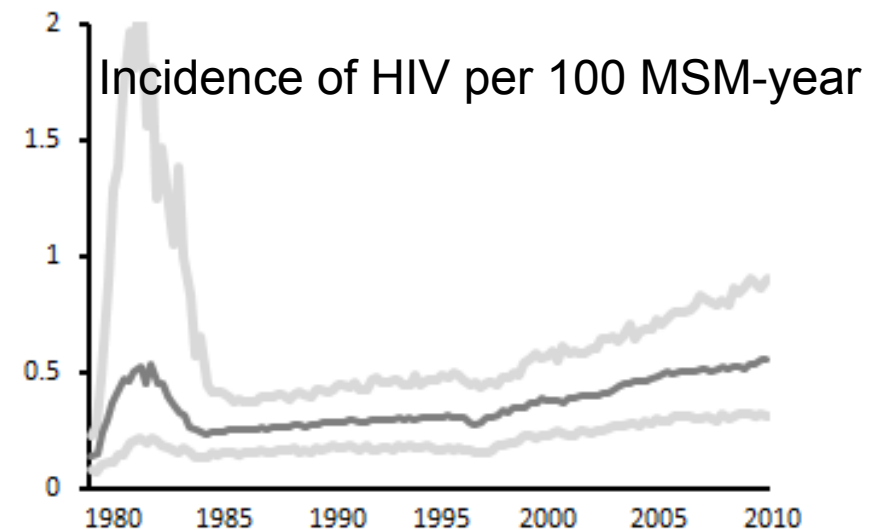
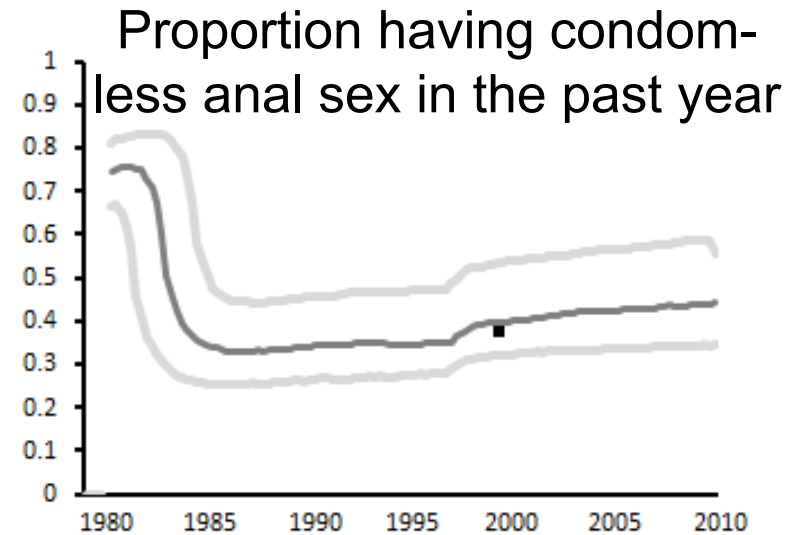


# Incidence of HIV in MSM, *Phillips et al Plos One 2013*

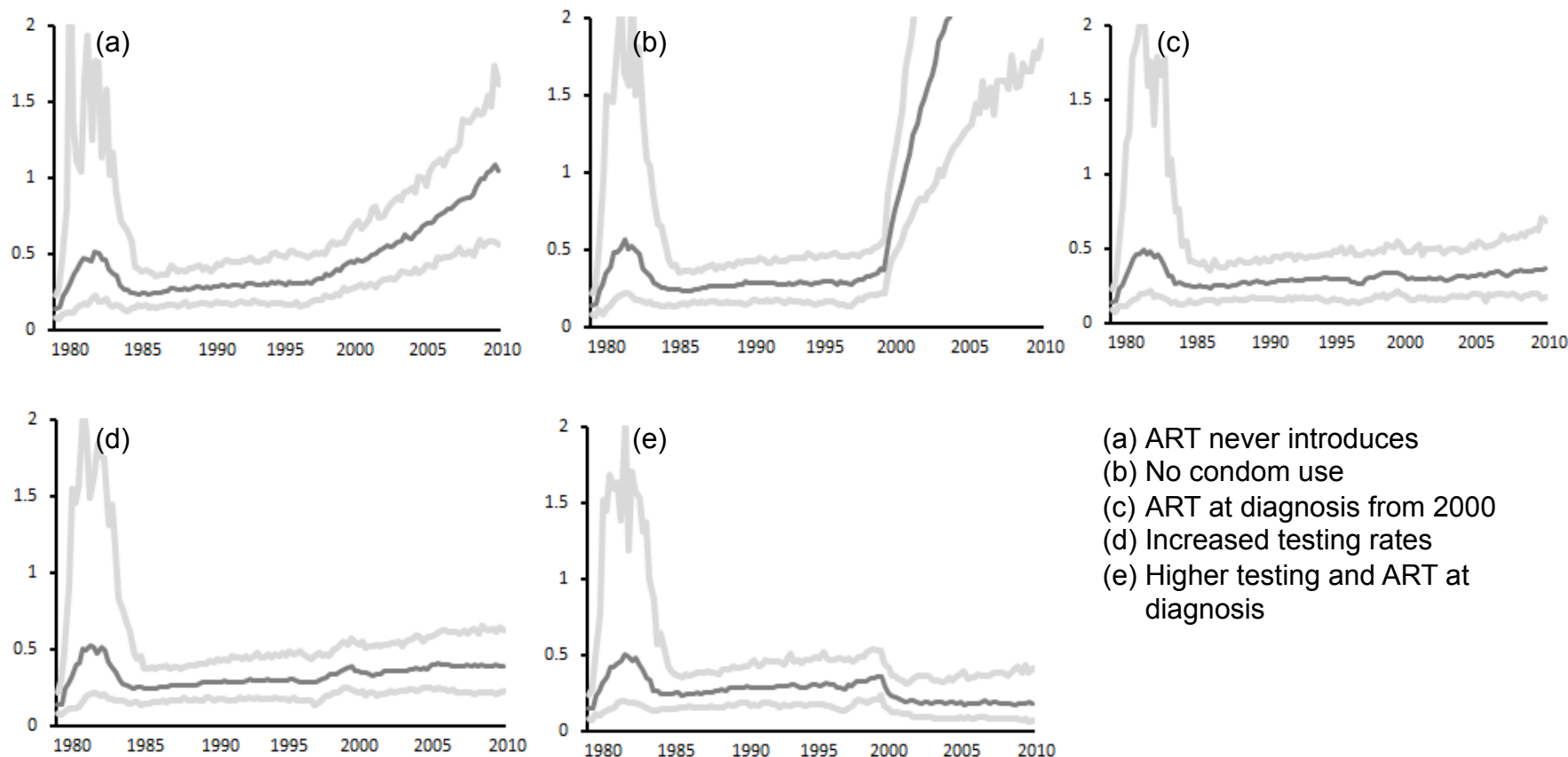
- High incidence in early 1980s with a decline in response to condom use
- Incidence increased after the introduction of ART due to a modest rise in 'condomless' sex (26%)

In 2010:

- 48% (34-64) of new infections were acquired from undiagnosed men in primary infection,
- 34% other undiagnosed,
- 10% diagnosed ART naïve,
- 7% ART experienced



# Counter – factual scenarios

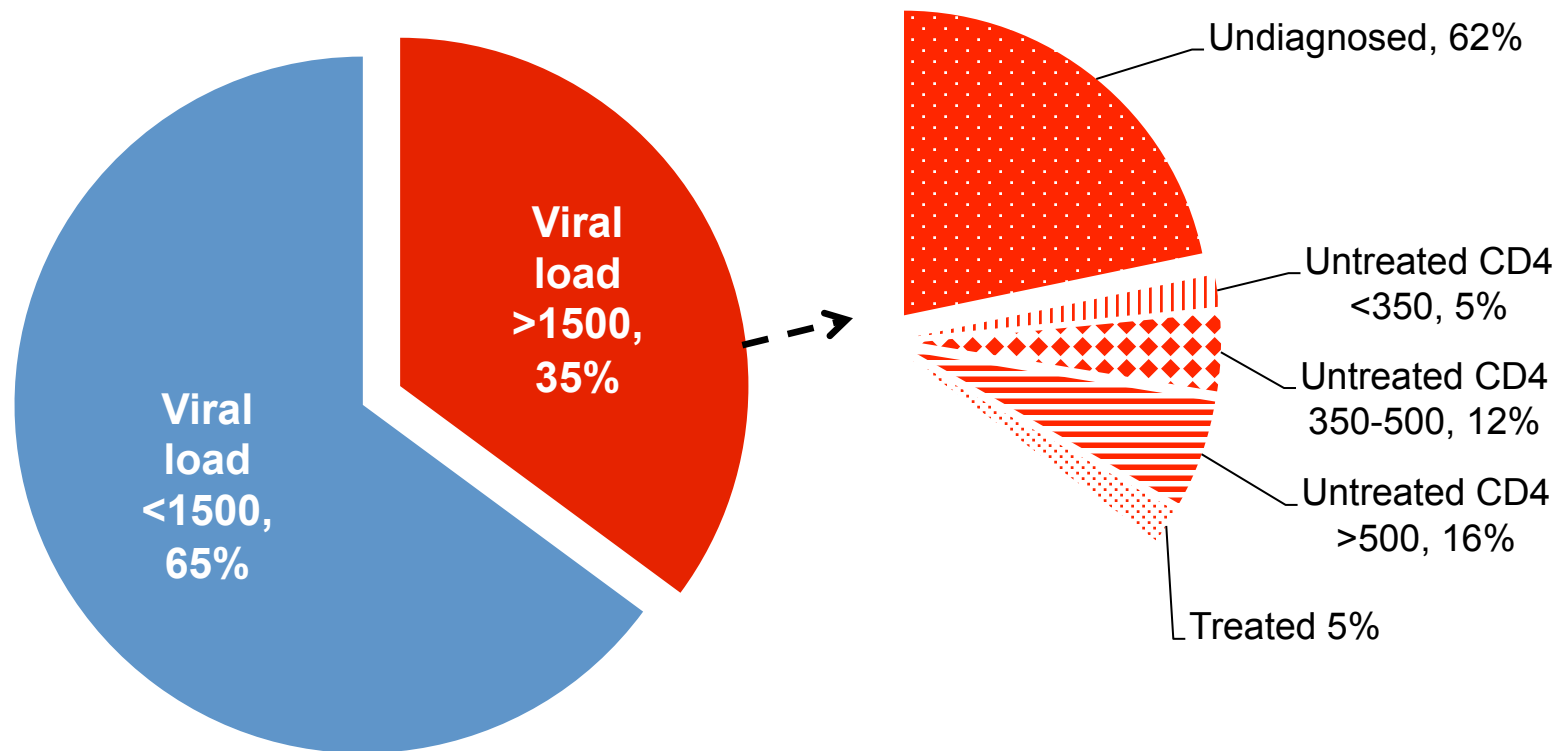


## NOTE

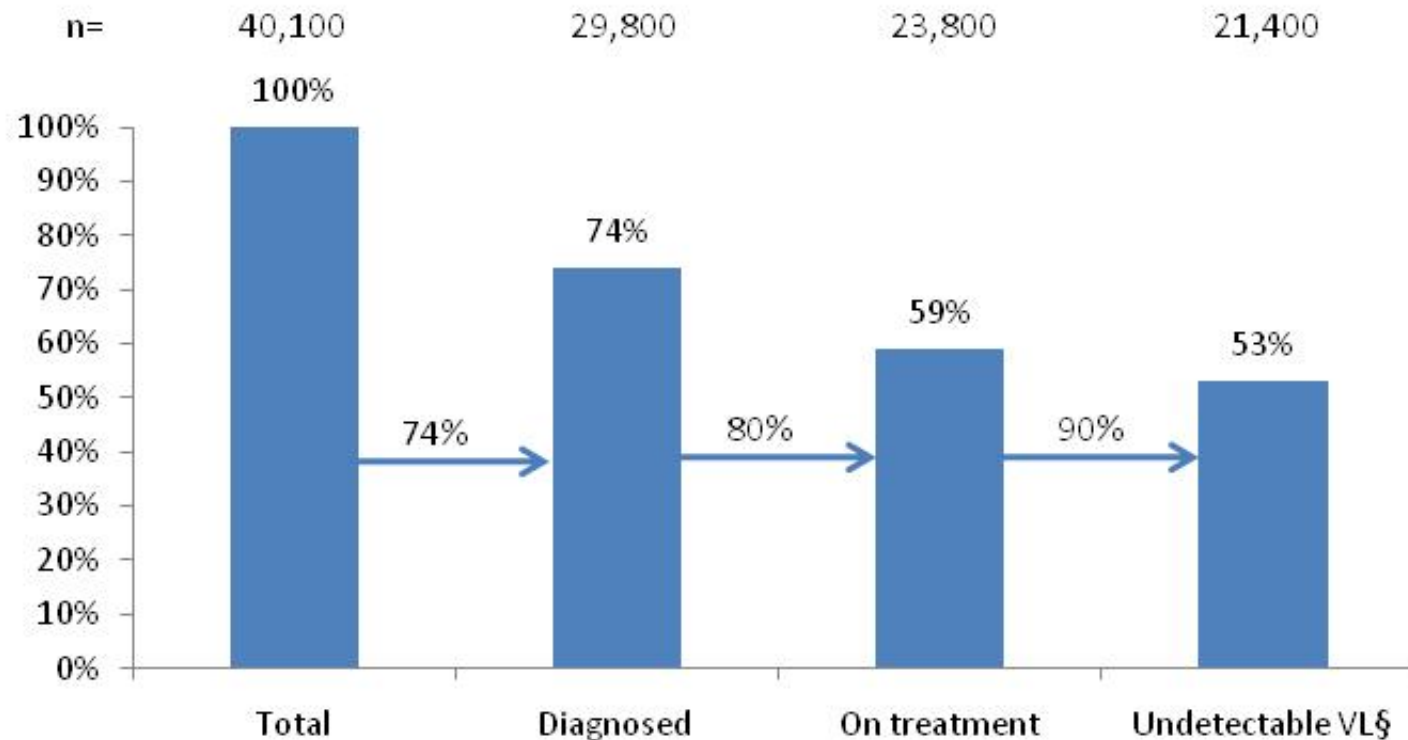
- (b) Cessation of all condoms in 2000 would have resulted in a 400% increase in incidence
- (e) A policy of higher (68% testing yearly) testing and immediate ART would have resulted in a 62% lower incidence

# Distribution of HIV infected MSM with a viral load >1500 copies/mL, UK: 2010

*Brown et al*



# MSM living with HIV by diagnosis, treatment and viral load status: UK, 2010



\* Numbers were adjusted by missing information and rounded to the nearest 100.  
§ Viral load <50 copies/ml after HIV treatment initiation in the year of initiation.



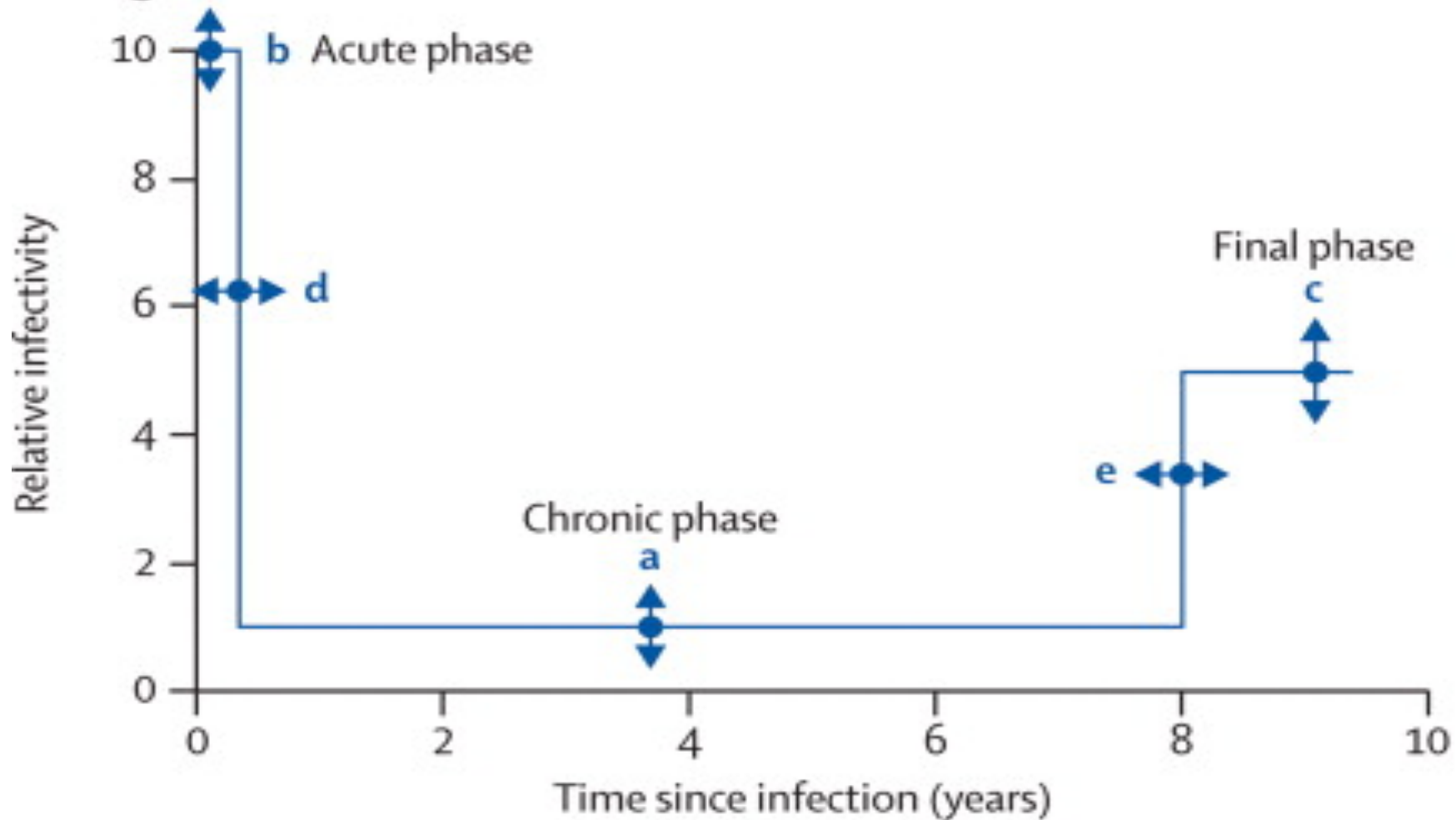
# Failure of TasP among MSM in the UK?

- Despite substantial progress of 'test and treat' prevention policies over the past decade in the UK, there is no evidence of a reduction in the incidence of HIV infection in MSM

## *Reasons*

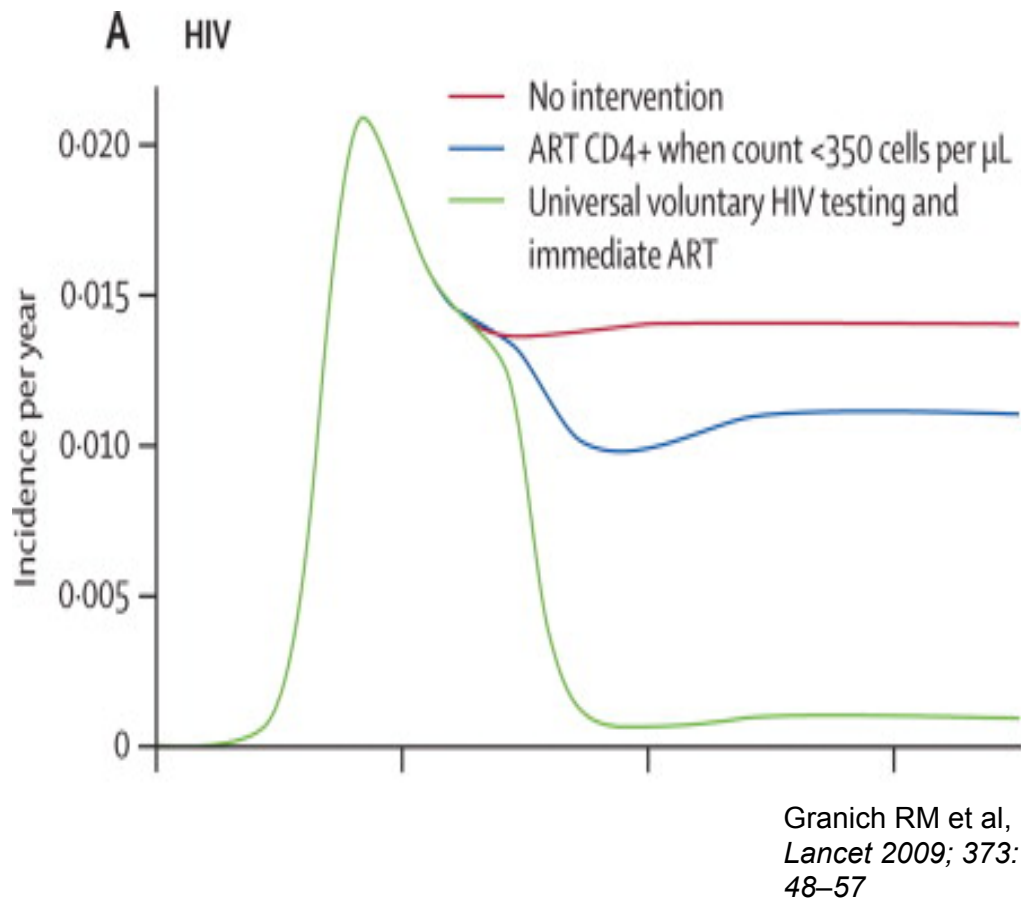
- Declines in safer sex with the introduction of ART
- Continued high rates of undiagnosed
- Low testing rates
- ?High rates of STIs

Theoretical basis for the stochastic and deterministic transmission models - Schematic diagram of the change in infectivity with time in a person who survives for 10 years. The infectivity during all three phases (a–c) can be varied, as can the duration of the acute and final phases (d and e).



Granich RM et al, *Lancet* 2009; 373: 48–57

# WHO deterministic transmission model



## Assumptions

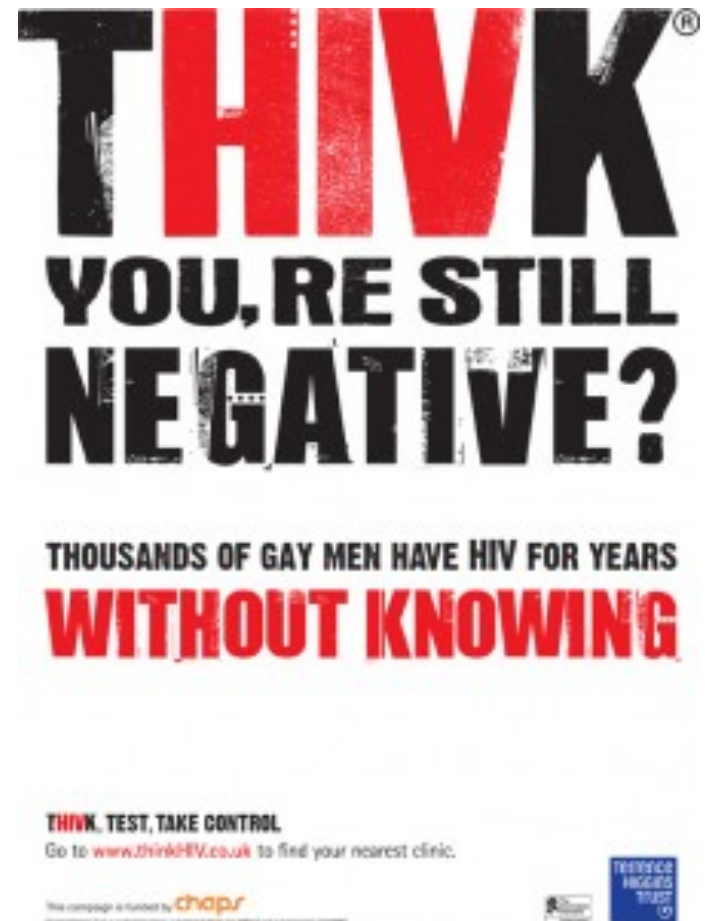
- Based on South Africa
- Test whole population every year
- Immediate ART treatment
- Irrespective of CD4 count
- High retention & adherence
- Eliminate incidence within (<1/1,000 persons per year)

# Models of ART and transmission

San Francisco	Katz, Am J Pub Health, 2002	Increase in risk behaviour in MSM will outweigh benefit of ART
Australia	Clements, JAIDS, 2004	ART benefits outweighed by increased risk in MSM
South Africa	Bertran, JAIDS, 2004	WHO guidelines: 12% reduction in incidence US guidelines: 72%
Amsterdam	Bezemer, AIDS, 2008	Benefits of ART outweighed by increased risk behaviour in MSM
British Columbia	Lima, JID, 2008	67% reduction in incidence if 100% treated at CD4 <350
Australia	Wilson, Lancet, 2008	ART rather than condoms may increase incidence 4 fold
WHO	Granich, Lancet, 2009	Annual testing and universal ART could reduce prevalence of HIV to <1%

# Conclusions

- Strong evidence that TasP works for some serodiscordant couples
- More research required for some groups
- Role of TasP in reducing population level incidence is unclear
- Undiagnosed remain source of 60%-80% transmissions and half of these during primary infection
- frequent testing is required
- Health promotion and prevention remains key



# Conclusions from IAPAC tasp Statement, 2012

No further trials are considered necessary to demonstrate TasP's efficacy... BUT

'...more research into its effectiveness on the population level as well significant will, new resources, community involvement, provider support and individual commitment to provide the increased levels of HIV testing, linkage to and retention in care, access to quality treatment and adherence – all of which are critical to achieving TasP's promise'

# Thank-you

 [www.hpa.org.uk](http://www.hpa.org.uk)

