

# Treatment as prevention

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[www.aidsmap.com](http://www.aidsmap.com)

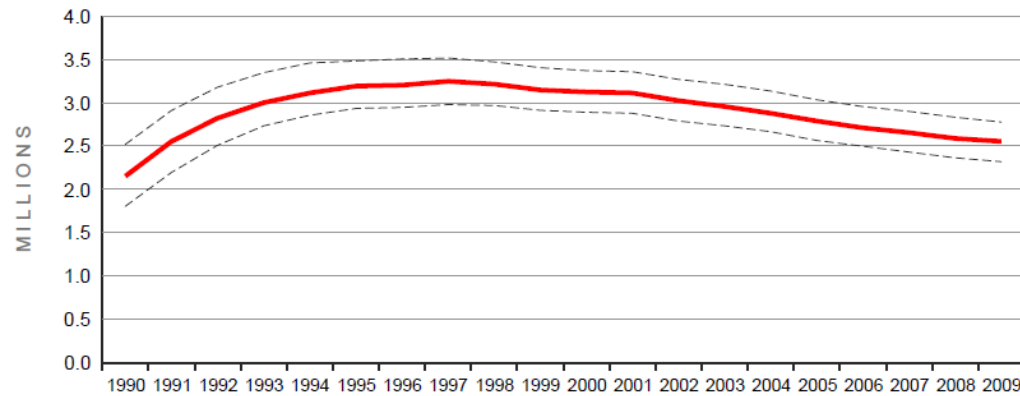


# HIV infections global - declining

## GLOBAL REPORT

Figure 2.1

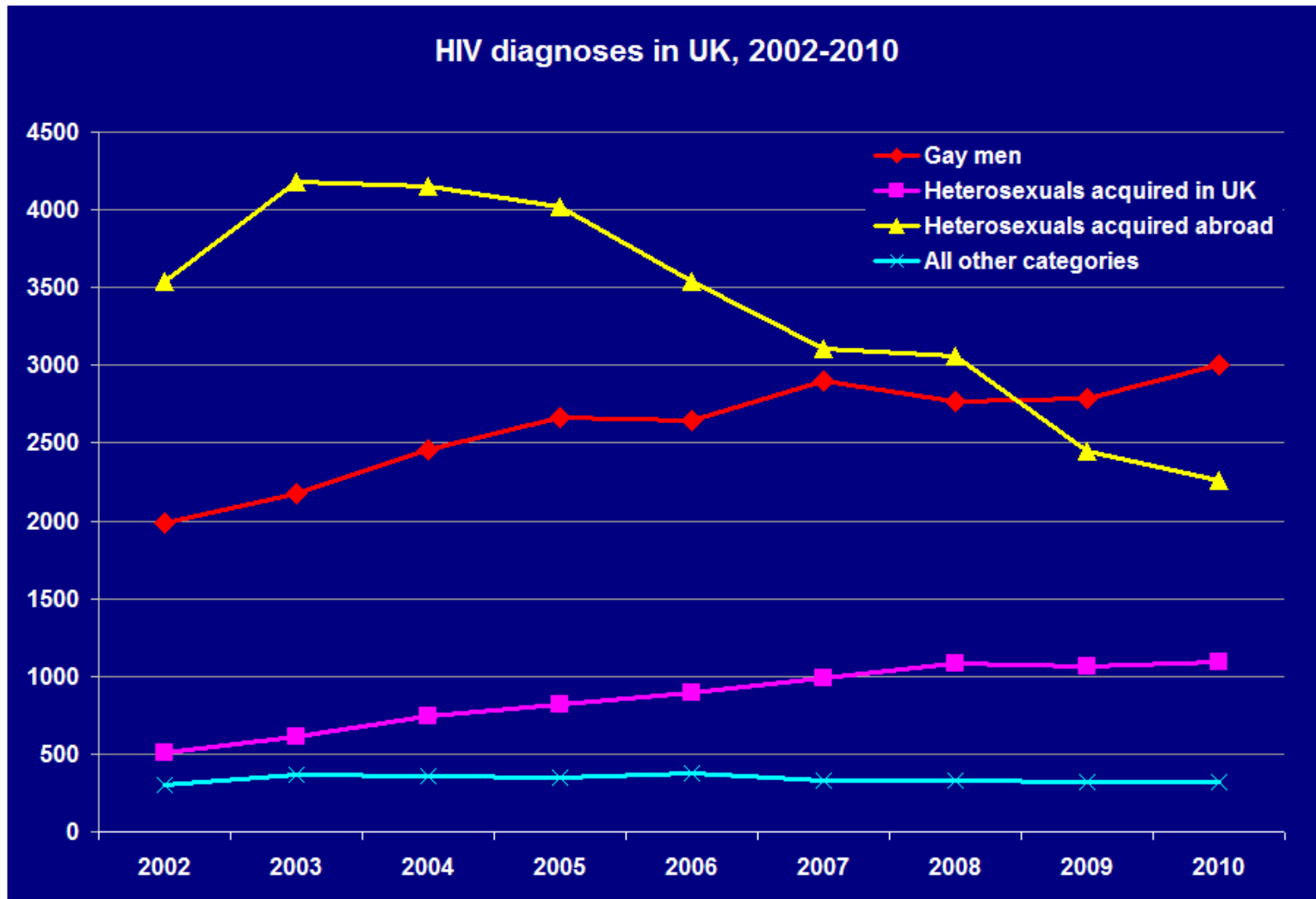
### Number of people newly infected with HIV



Dotted lines represent ranges, solid lines represent the best estimate.



# HIV infections caught in UK - increasing

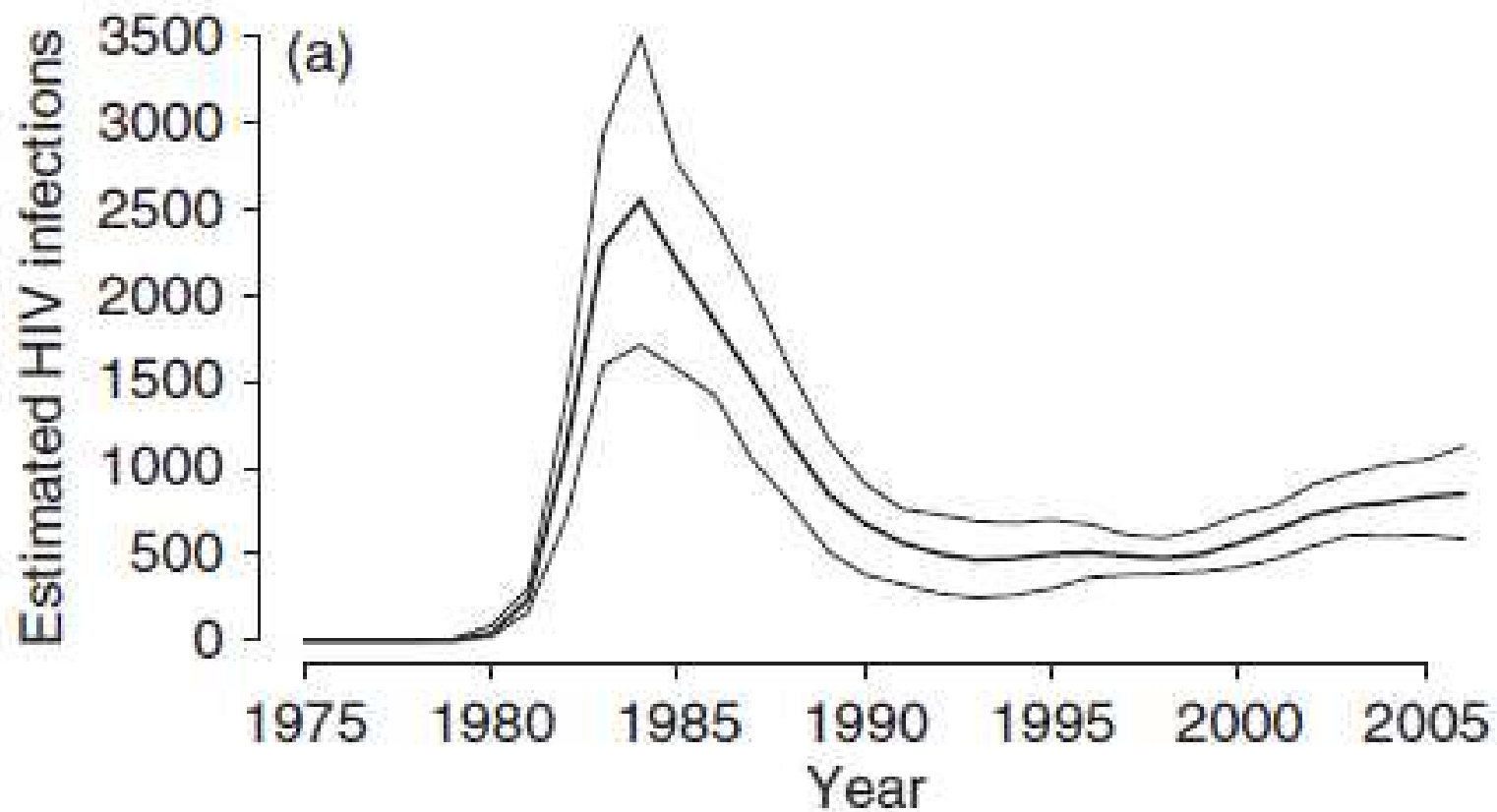


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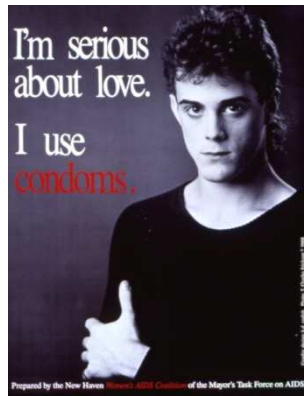
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# In Australia too, despite >90% testing

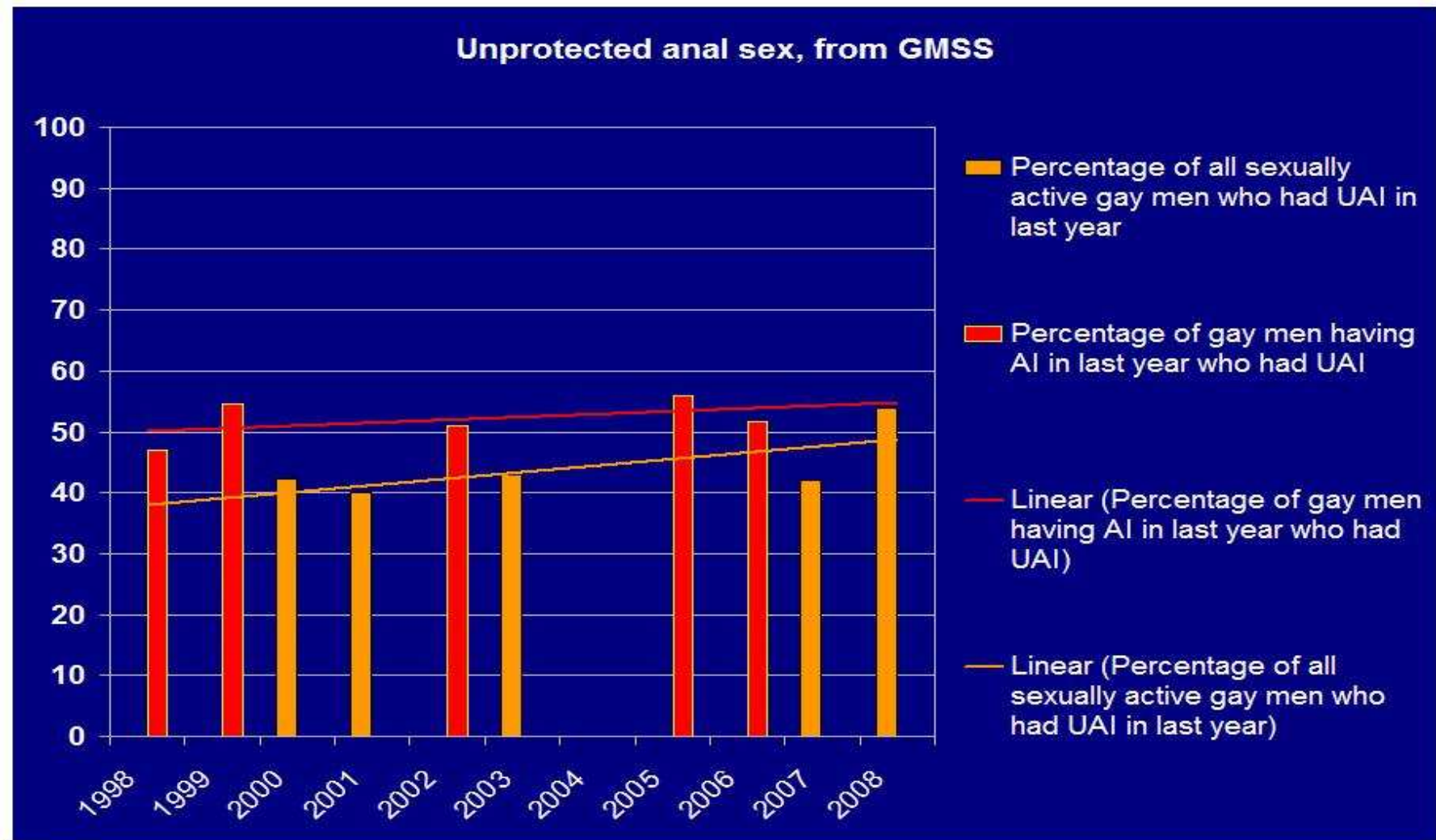


# HIV prevention used to be (relatively) simple...



iv regional

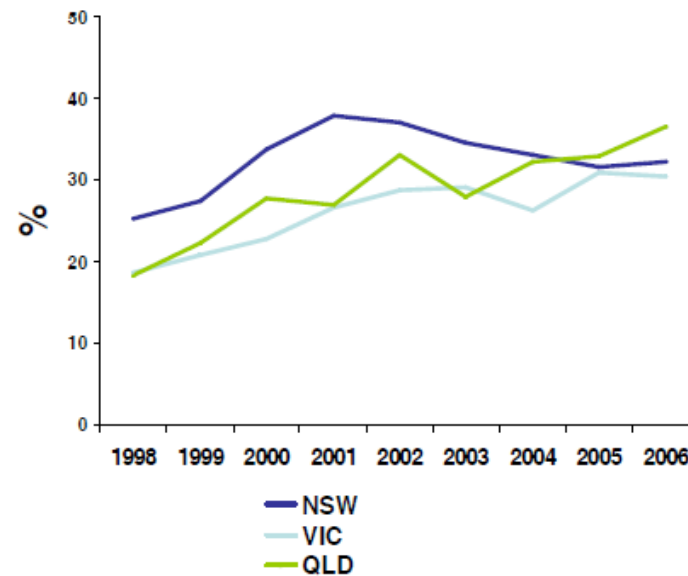
# Unprotected sex, UK gay men



# And in Australia

## Unprotected sex with casual partners (UAIC)

Note: the sample includes only men who had sex with casual partners

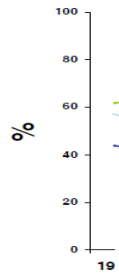


Source: NSW, VIC and QLD Periodic surveys, 1998-2006, men aged 30-49



# Is 'barebacking' actually serosorting?

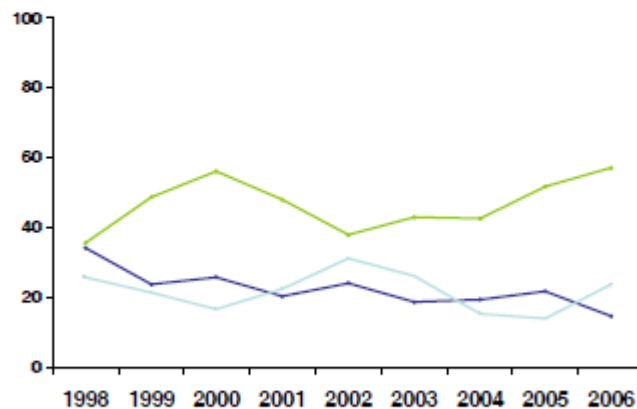
Men who reported UAIC and never disclosed serostatus



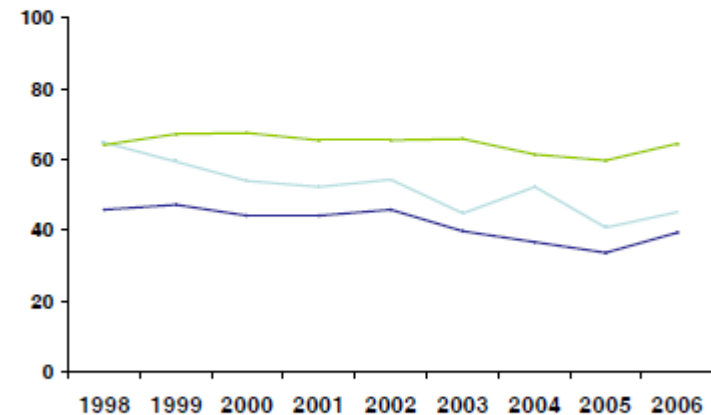
Source: NSW, VIC and QLD  
NCHSR

## Men who never disclosed serostatus in the context of UAIC, by serostatus

HIV positive men

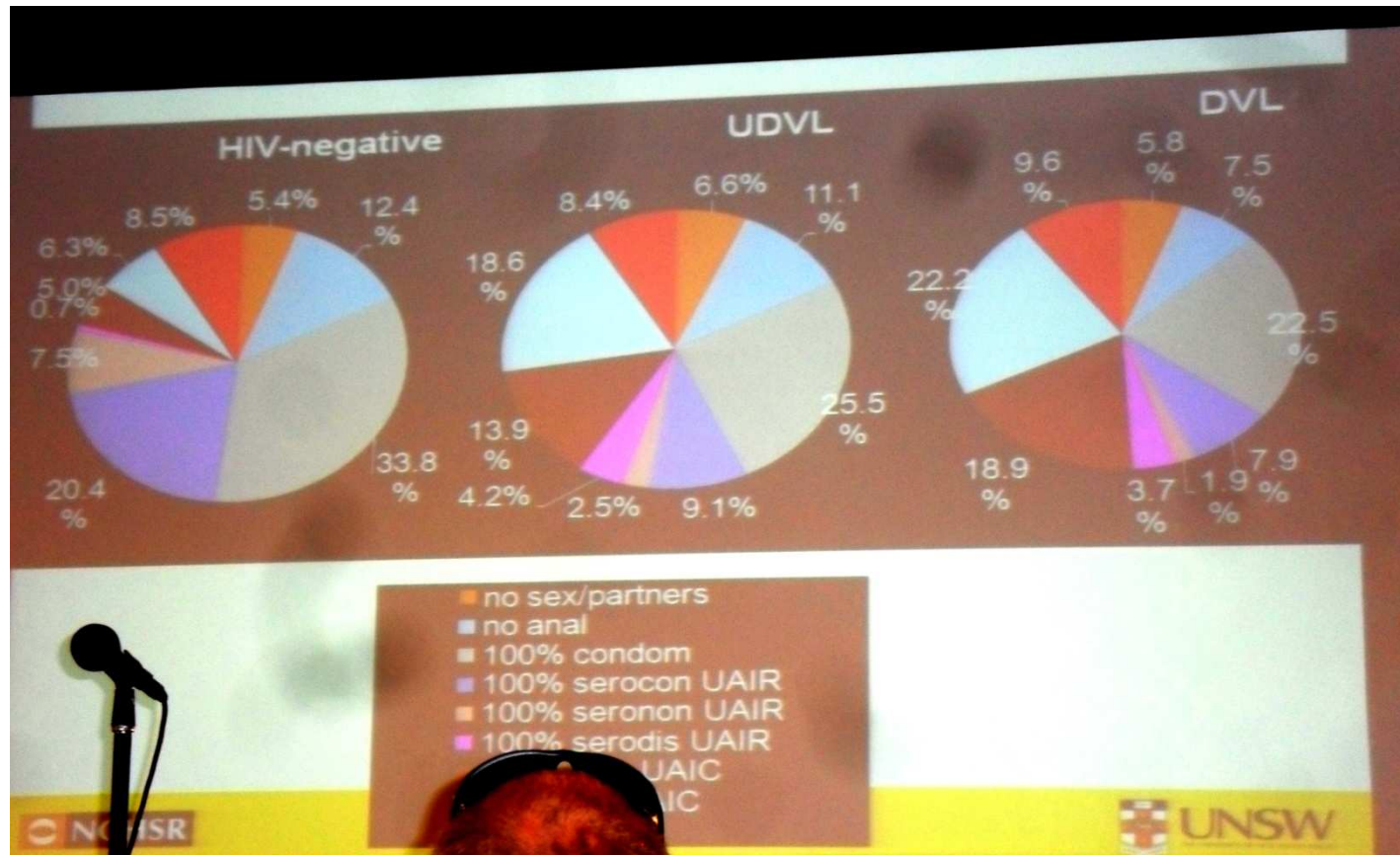


HIV negative and unknown-serostatus men



— NSW — VIC  
— QLD

# Complex choices (recent Oz study)



# This means:

- About 6% of gay men (HIV±) didn't have sex
- C 10% didn't have anal sex
- A third of HIV- and a quarter of HIV+ guys used condoms 100%
- 28% of HIV- and 15% of HIV+ used 'negotiated safety' = no condoms ONLY in main relationship
- 11% of HIV-, 32% of HIV+ with undetectable viral load, and 41% of HIV+ with detectable viral load 'serosorted' = no condoms only with partners known *or thought* to be of same HIV status
- 9% of gay men (HIV±) had no strategy

for hiv information

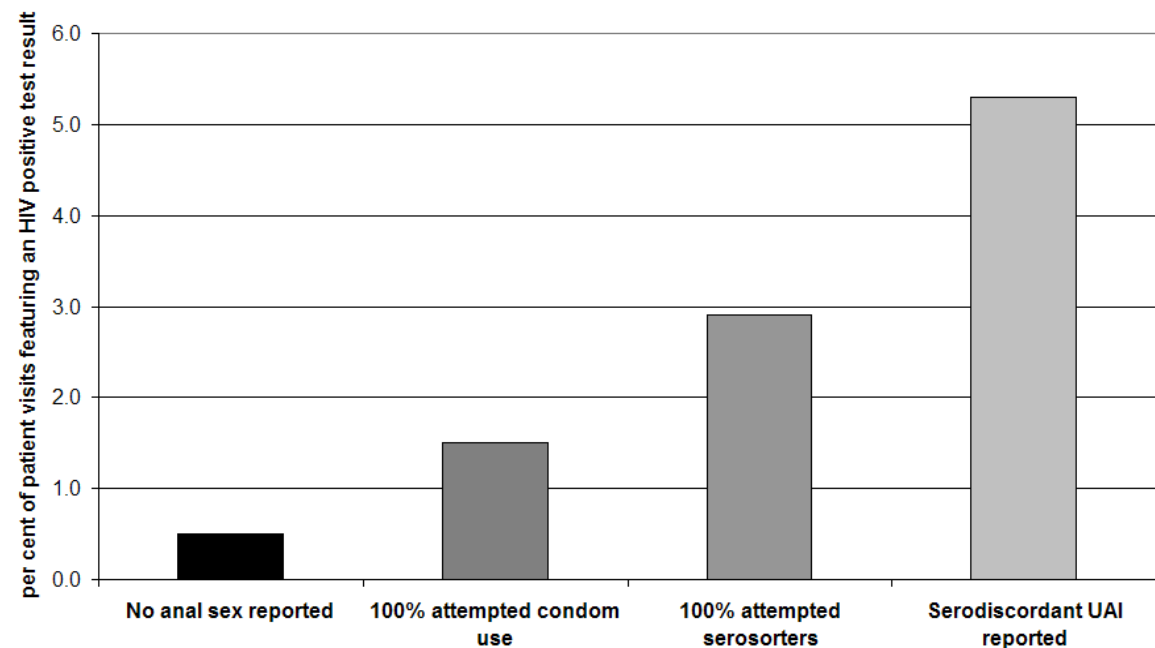


# People's choices do make a difference...

	n	Incidence (per 100PY)	HR	95% CI	P value
No UAI	7	0.34	1	---	<0.001
Of RRBs*	27	0.99	3.01	1.31-6.92	
Other patterns of UAI	13	3.56	10.83	4.31-27.17	

\* Negotiated safety, sero-sorting, strategic p

HIV diagnosis rates in MSM attending Seattle HIV clinic, 2002-2007



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# But is a lot of it guesswork?

Do people really know their partners' status – or try to guess it?

In one Oz study 25% of the HIV-positive men and 40% of the negative men who said they 'knew' their HIV partner's HIV status had in fact guessed it.

# Behaviour change: works, but...

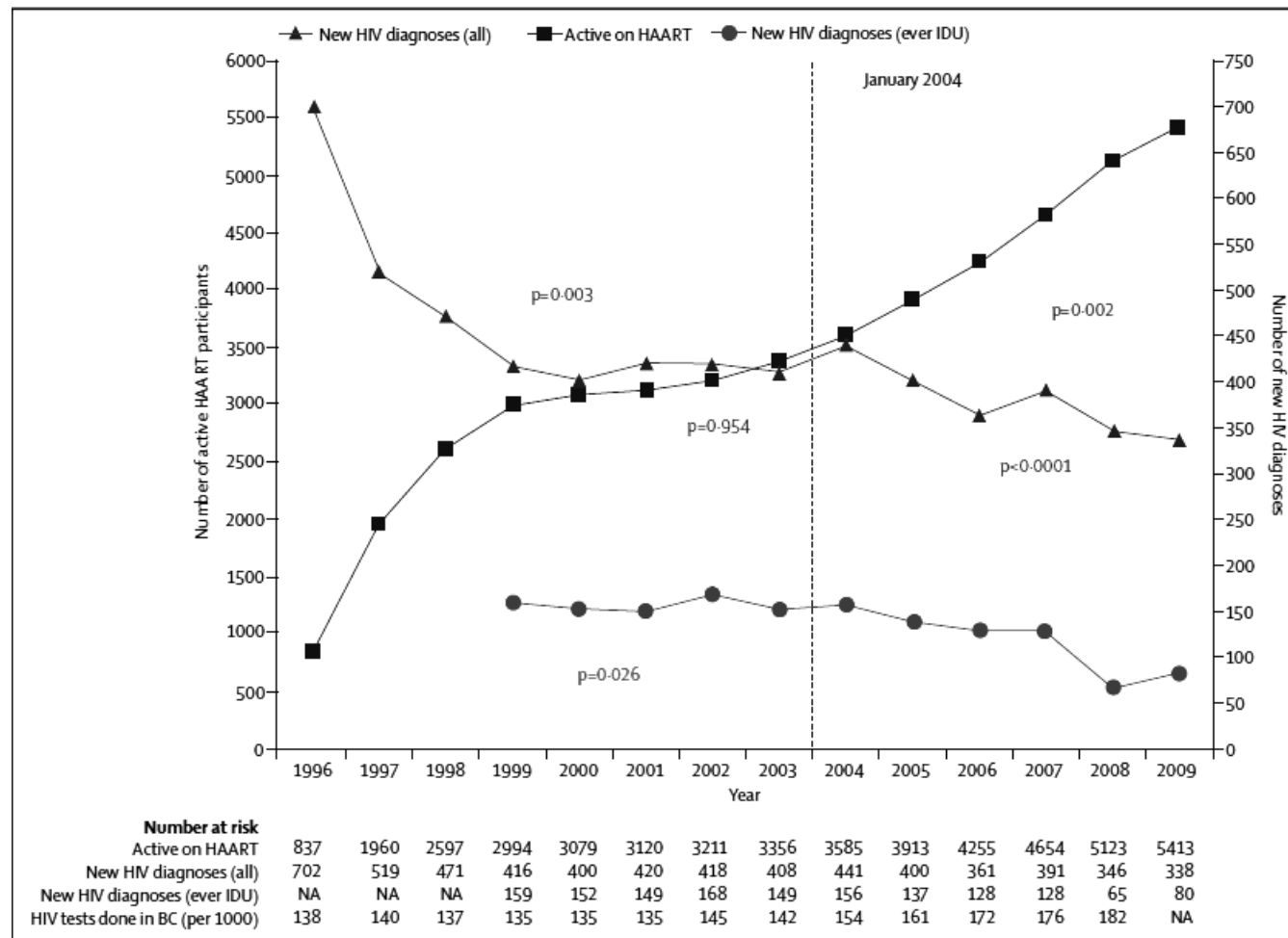
- Averaged over all interventions and all risk groups, HIV-prevention programmes show a consistency of success, with increases in safer sex/condom use in the order of 25%.
- Programmes report slightly more success in increasing condom use than in reducing unprotected sex.
- Too few trials have measured HIV incidence to generate really key evidence.
- 'Active' programmes that get people to practise behavioural skills work about three times better than passive programmes that just deliver information.
- Programmes that encourage positive behaviours and develop self-efficacy work better than normative programmes (appeals to social responsibility), though the latter have worked well for young people and heterosexual African-Americans.
- Programmes that use 'scare tactics' and the threat of AIDS have significantly negative effects.
- There has been very little randomised controlled research into the efficacy of mass-media, HIV-prevention initiatives.
- Programmes usually work best if delivered by experts in clinical settings or by organisations that already offer services to people with HIV, though young people and African Americans have responded well to peer educators.

From *Preventing HIV* - see [www.aidsmap.com/Summary-of-findings/page/1768259/](http://www.aidsmap.com/Summary-of-findings/page/1768259/)

# Compare (reductions in HIV):

- FemPREP study: 0%
- Behaviour change programmes (indirect): 25%
- RV144 vaccine: 31%
- Male circumcision *for women*: 30-60% (may be less if man has high viral load)
- Caprisa 004 microbicide: 39%
- IPrEx PREP: 43%
- 100% attempted serosorting: 55-60%
- TDF2 PrEP: 62%
- Male circumcision for men (ave 3 studies): 65%
- Partners PrEP: 73%
- IPrEx PrEP in men reporting 100% adherence: 73%
- 100% attempted condom use (CDC): 85%
- Treatment as prevention **in serodiscordant heterosexual couples: 92%**

# Treatment as prevention: evidence?



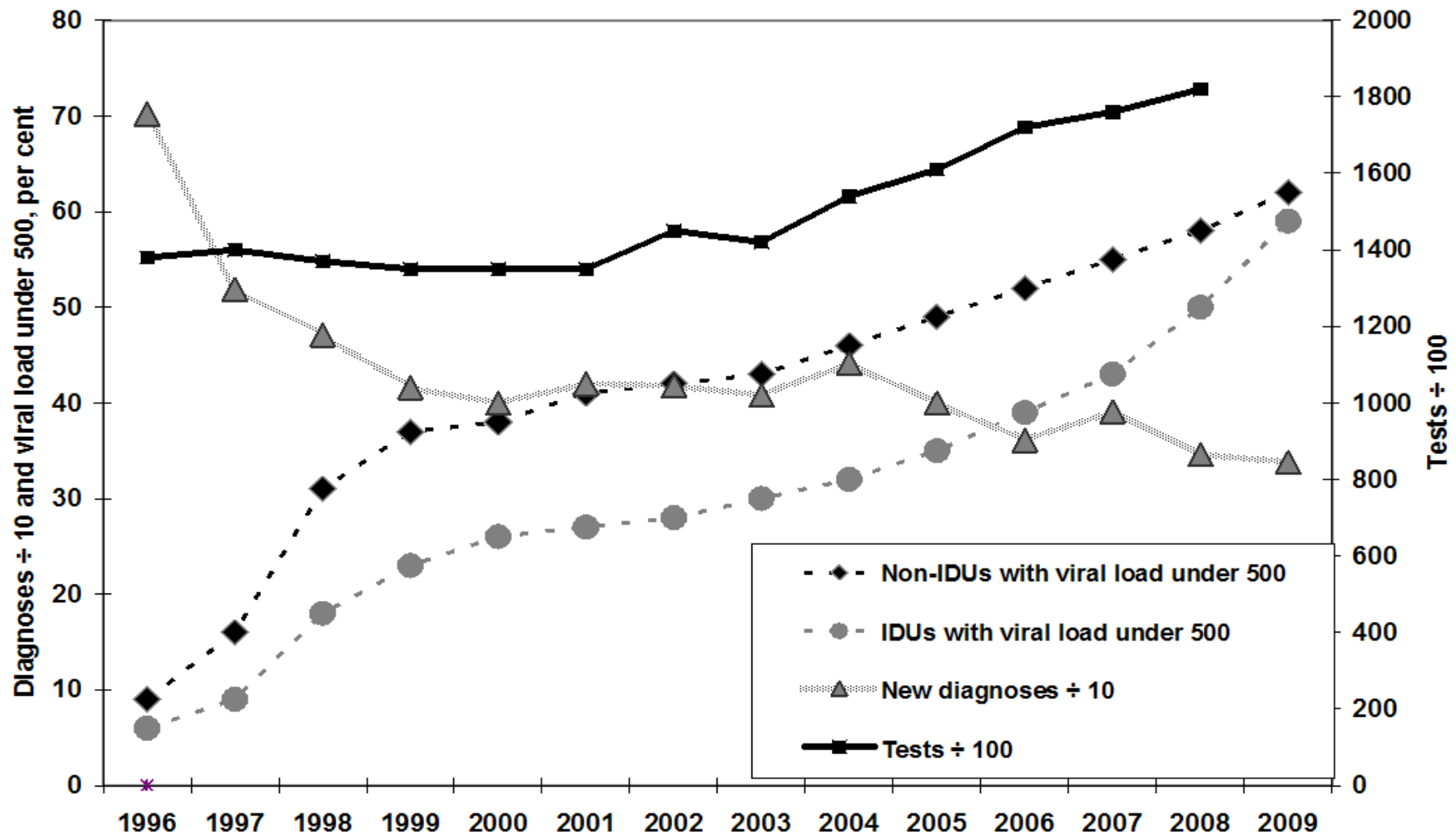
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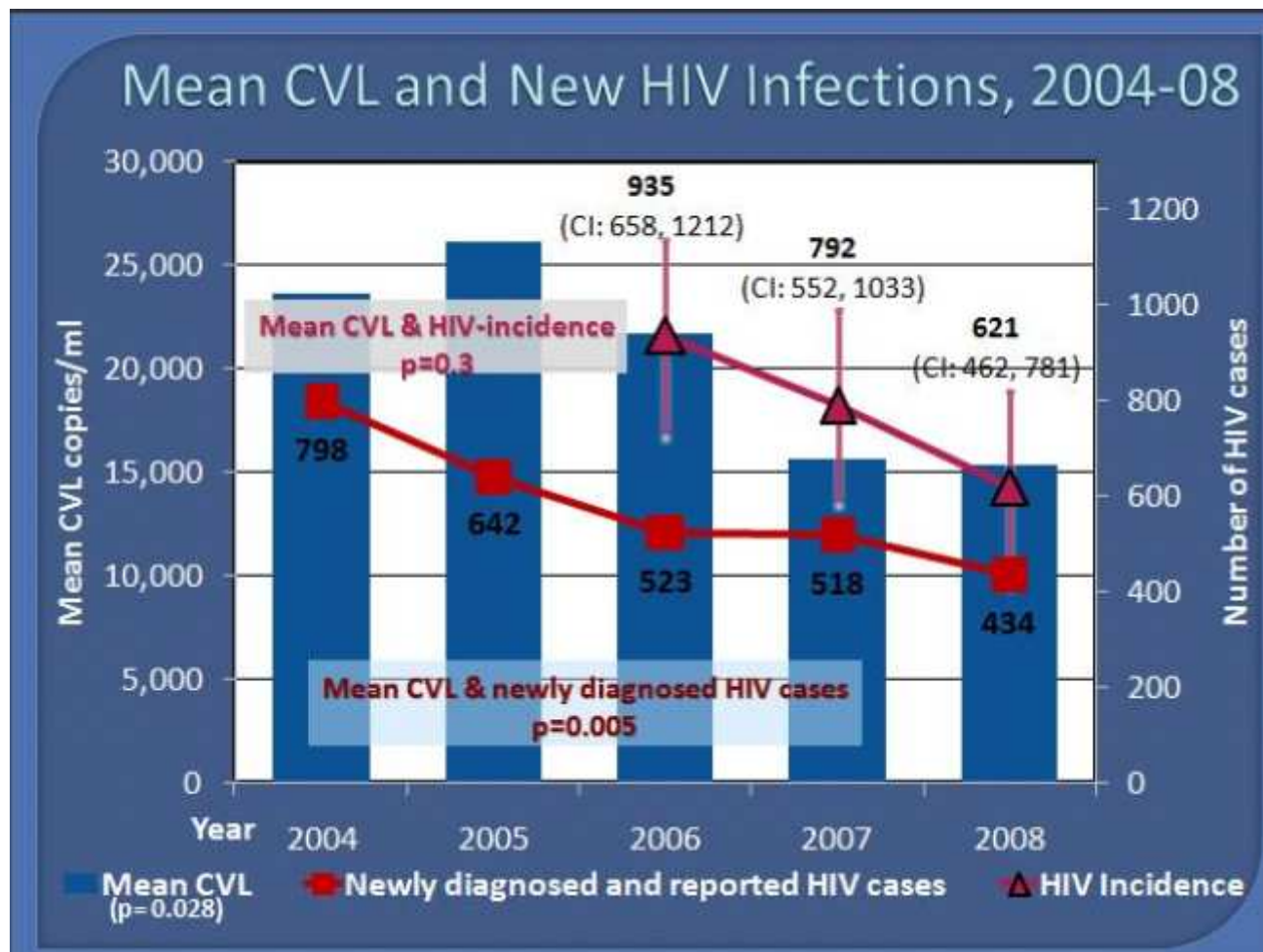


# BC study again

British Columbia: HIV tests, new diagnoses and viral suppression



# San Francisco

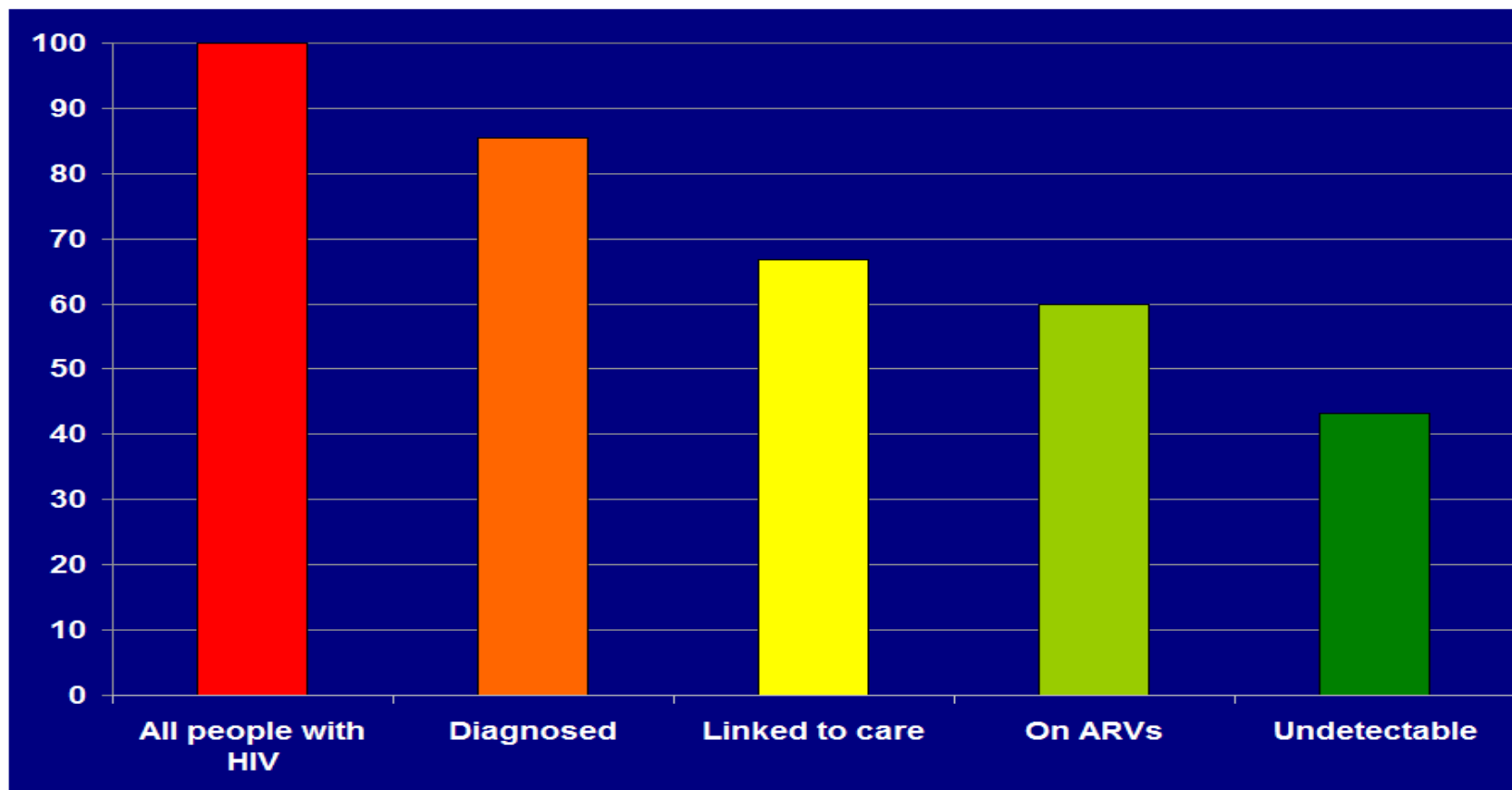


Das-Douglas, CROI 2010, abstract #33

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## How many undetectable in San Francisco?

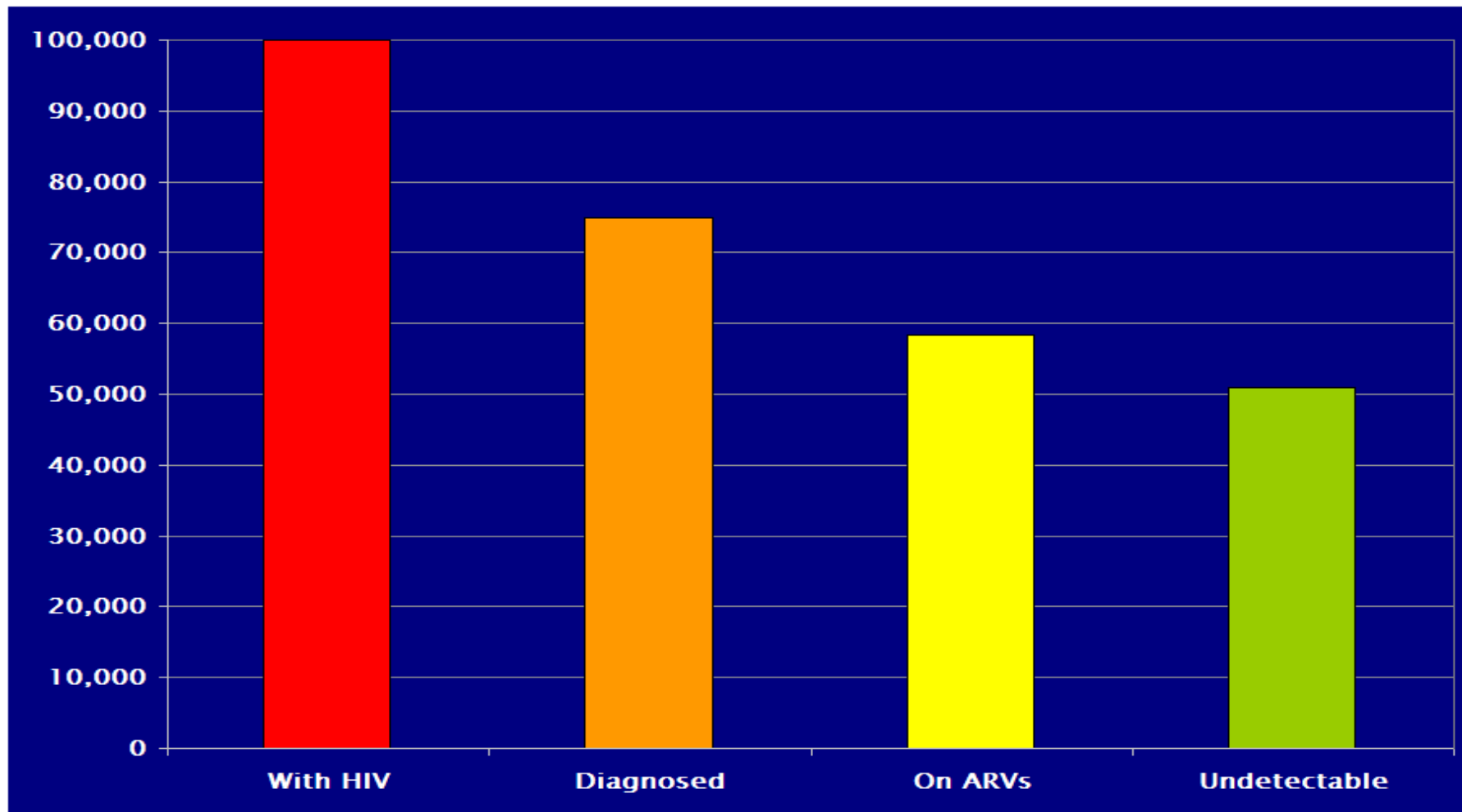


- In San Francisco 85.5% are diagnosed of whom 78% are linked to care of whom 90% are on ARVs of whom 72% are undetectable = 43.2% of people with HIV in San Francisco have an undetectable viral load (due to treatment)

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# And the UK?



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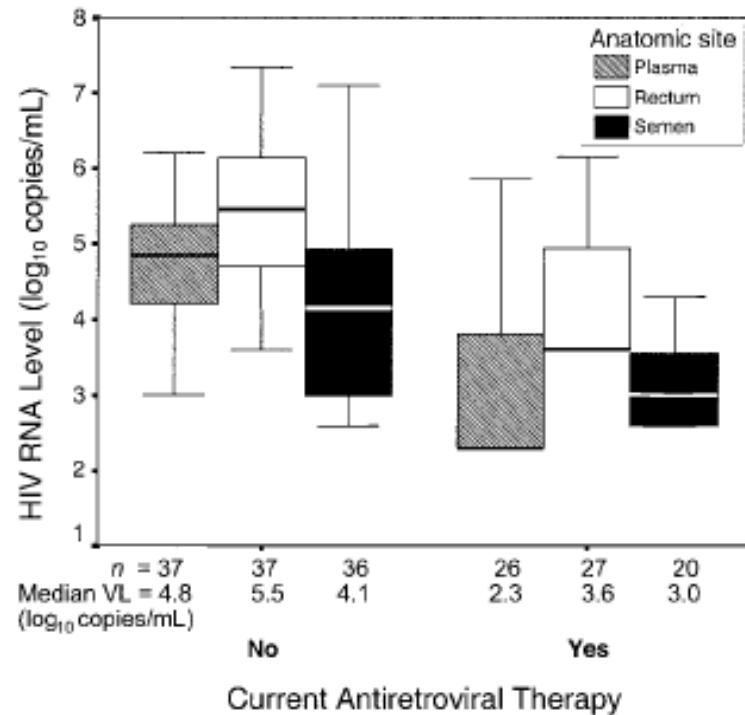
# Why isn't T as P working already?

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# 1. It's transmission while undetectable



- HIV often detectable in semen though not in blood: STI's implicated
- ?More in rectum?
- Brighton phylogenetic study in gay men: 1114 subjects
- 2 transmissions on “fully-suppressive” HAART during 3556 person years follow-up
  - *1 likely to have occurred whilst viral load declining*

## 2. It's mainly the undiagnosed

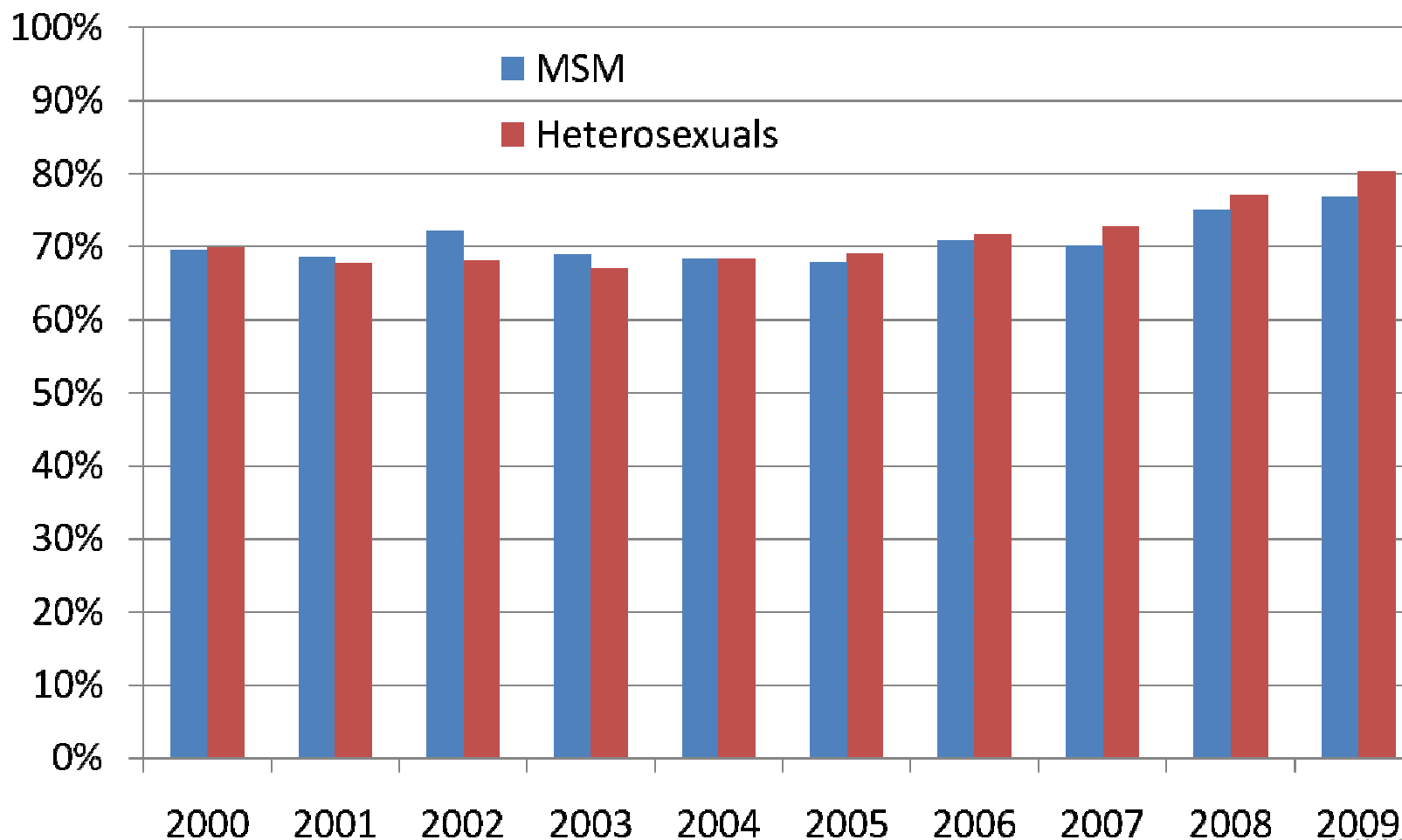
### Undiagnosed HIV:

- US: 54% of new infections come from 25% undiagnosed  
*Marks, AIDS 2006*
- Amsterdam: 90% from 24%  
*Bezemer, AIDS 2008*
- Brighton: 76% from 30%  
*Fisher, AIDS 2010*

### Primary HIV Infection:

- High viral load
- Infectivity increased ? 10-100x
- PHI accounts for 10-50% of onward infections

### 3. It's people not on ARVs



## 4. Treatment isn't working

- 91% of London patients on ARVs have a viral load under 50 copies/ml and **99%** under 200 in the period 6m-15m after starting treatment
- US study documents high rates of viral suppression, even in homeless/disadvantaged

# Should we change guidelines?

- BHIVA says treat below 350 CD4s: assessing evidence for change now
- US guidelines say (with some dissent) treat below 500 CD4s
- Recent study shows  $\frac{1}{2}$  of people would need ARTs within a year of infection if CD4 threshold = 500 and  $\frac{1}{3}$  if 350\*
- **Why not just give everyone ARVs?**

\*Lodi S et al. *Time from human immunodeficiency virus seroconversion to reaching CD4+ cell count threshold <200, <350, and <500 cells/mm<sup>3</sup>: assessment of need following changes in treatment guidelines.* Clin Infect Dis: 53: 817-25, 2011

# Imperial College mathematical model

- Getting 80% of people with CD4 under 350 on treatment would be enough to reduce transmission by >90% if:
- Lower-risk pops tested every 2-3 years
- High-risk pops test every 6m
- Dodd PJ, Garnett GP, Hallett TB. *Examining the promise of HIV elimination by 'test and treat' in hyperendemic settings.* AIDS 24: 729-735, 2010

# Can we afford it?

Death rate ~ 5.2 per 1000 person years

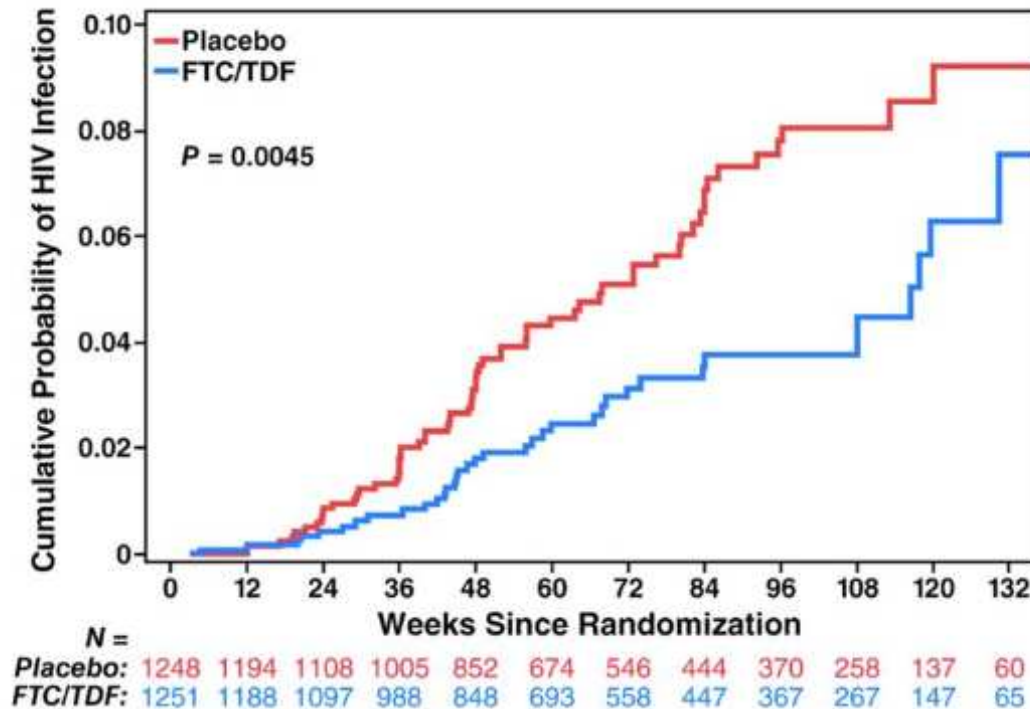
If early ART reduces risk by 50% =>  
risk reduction 2.6 / 1000 person years

1 death averted per 385 person years of ART. Clinically cost-effective??

- Will initiation of ART in people with CD4 count > 350 / 500 be funded ?
- Assessment of cost-effectiveness requires a model that takes account of reductions **in incidence**
- **i.e. we can afford it if we take the effect on preventing HIV into account**

# The wild card: PrEP

Efficacy (MITT) 43.8% (15.4-62.6%)  
Infection Numbers: 64 – 36 = 28 averted



- iPrEx study
- *Potentially* 70-90% efficacy: cf condoms
- Treatment-as-prevention? Or ARVs as prevention?
- Practical? Affordable? Applicable? Dangerous?
- Could it mop up high genital viral loads? Transmission via undiagnosed?
- How can we implement it if we can't even afford ARVs for treatment?
- Giving ARVs to HIV- people: more stringent safety?
- Will people who don't use condoms bother with taking PrEP?
- Pilot studies starting or proposed

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