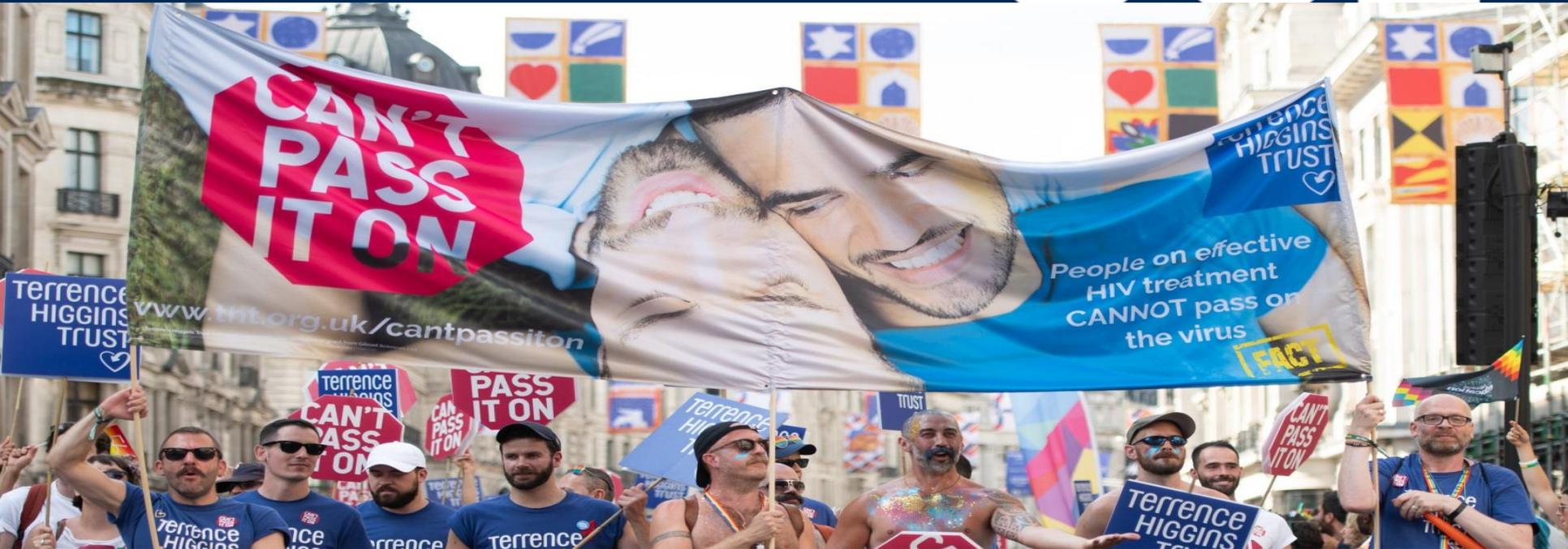




# UCL



## The Evidence Behind U=U

Valentina Cambiano,  
University College London

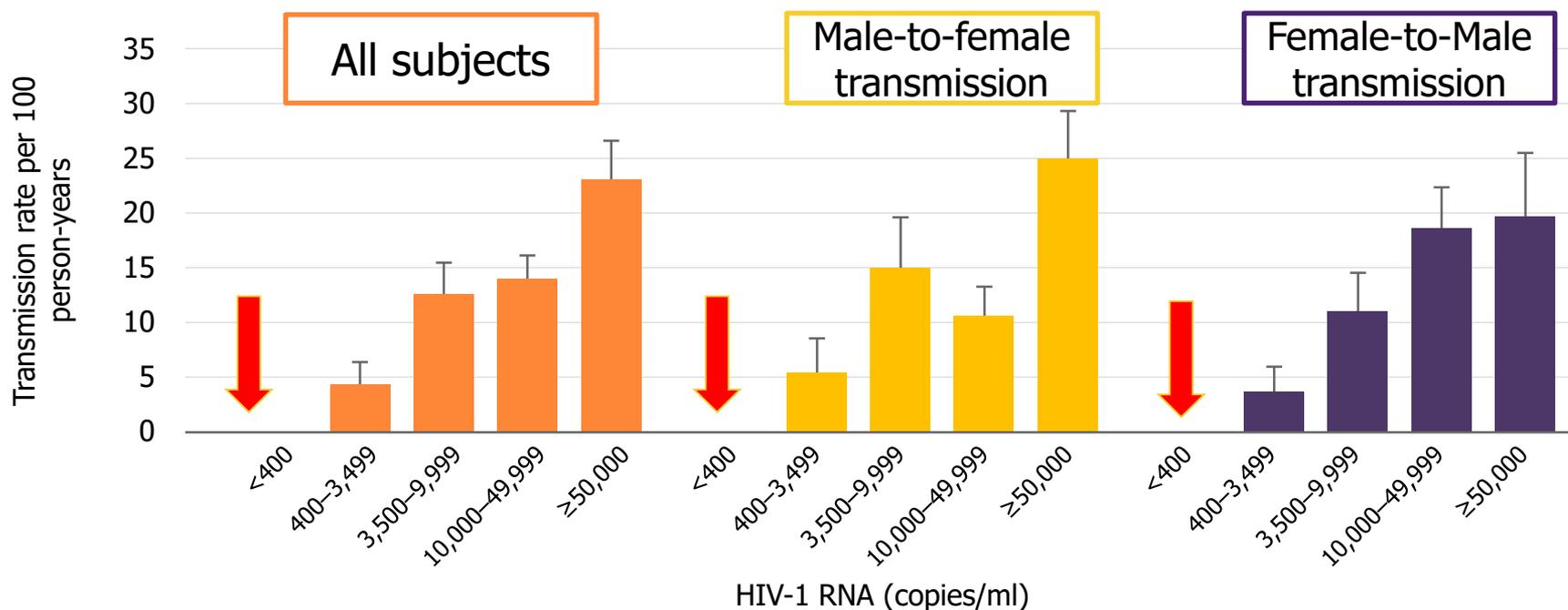


**“A person living with HIV who has undetectable viral load does not transmit HIV to their partners”**

# 2000: The First Observational Study

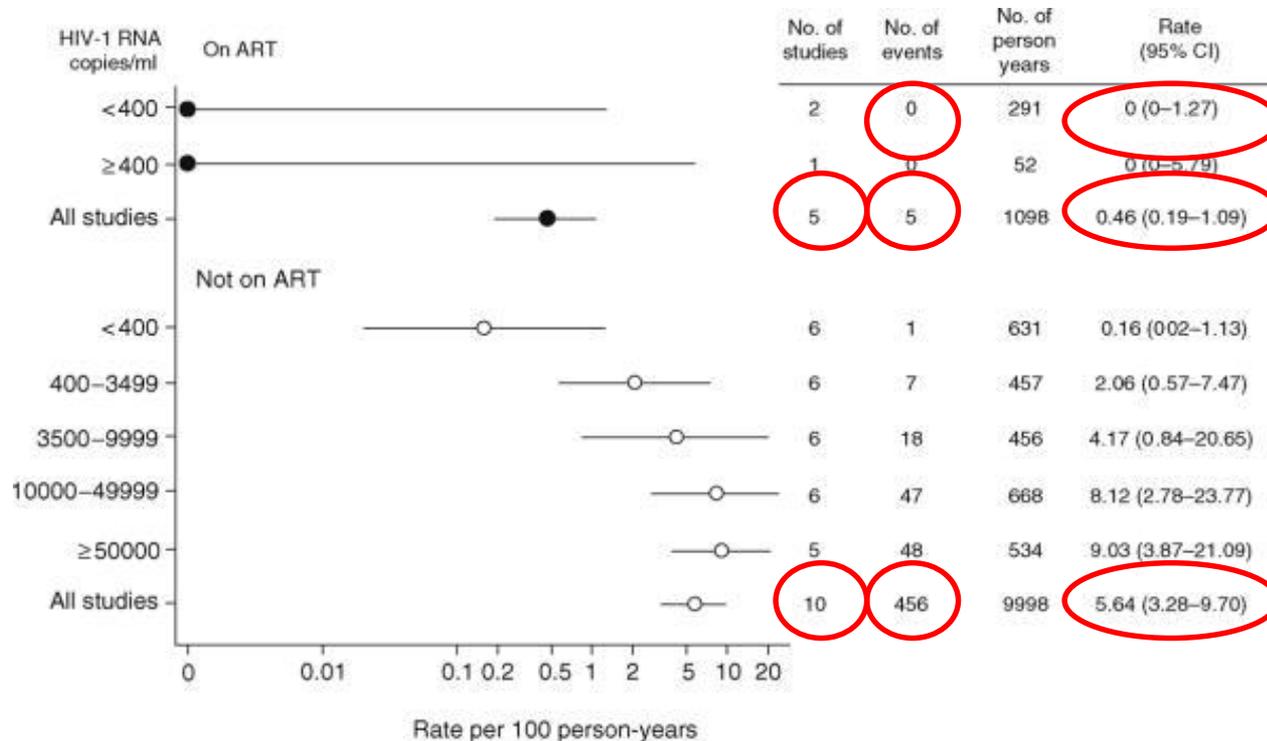
**Rakai study:** 415 HIV serodifferent heterosexual couples in Uganda

0 cases of HIV transmission to sexual partners for patients with VL <1,500 copies/mL



# Sexual transmission of HIV according to viral load and antiretroviral therapy: systematic review and meta-analysis

Suzanna Attia<sup>a</sup>, Matthias Egger<sup>a,b</sup>, Monika Müller<sup>a</sup>,  
Marcel Zwahlen<sup>a</sup> and Nicola Low<sup>a,b</sup>



- 11 cohorts reporting on 5021 heterosexual couples
- 92% reduction transmissions on cART: 5.64 to 0.46 per 100PYs
- compatible with one transmission per 79PYs

# Sexual transmission of HIV according to viral load and antiretroviral therapy: systematic review and meta-analysis

Suzanna Attia<sup>a</sup>, Matthias Egger<sup>a,b</sup>, Monika Müller<sup>a</sup>,  
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*“In conclusion, our study supports the WHO’s view that at present there is insufficient evidence to formulate guidance on the role of ART in HIV prevention, both at the level of the individual and the population. Further studies quantifying transmission risk in different patient groups and under different conditions are required to inform such recommendations.”*

Rate per 100 person-years

- 11 cohorts reporting on 5021 heterosexual couples
- 92% reduction transmissions on cART: 5.64 to 0.46 per 100PYs
- compatible with one transmission per 79PYs

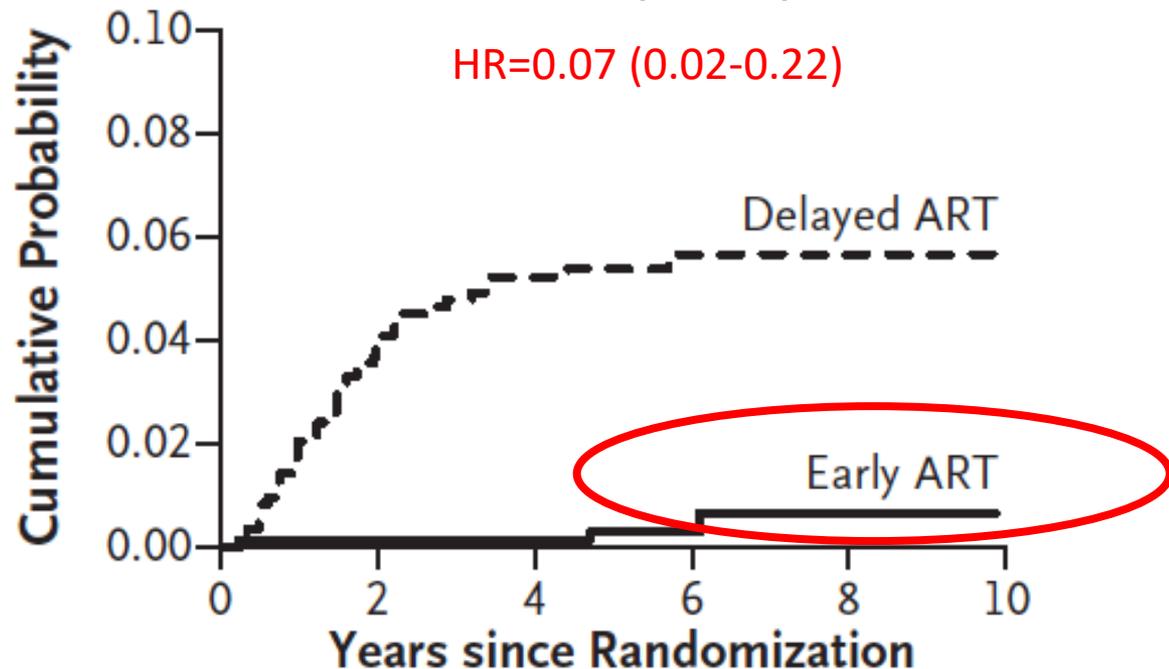


## ORIGINAL ARTICLE

Antiretroviral Therapy for the Prevention  
of HIV-1 Transmission

M.S. Cohen, Y.Q. Chen, M. McCauley, T. Gamble, M.C. Hosseinipour,

*“Early ART at enrollment [CD4+ count 350 to 550 cells] was associated with a 93% lower risk of linked partner infection than was delayed ART (CD4+ fell to <250)”*

Risk of HIV-1 infection among partners of  
index participants



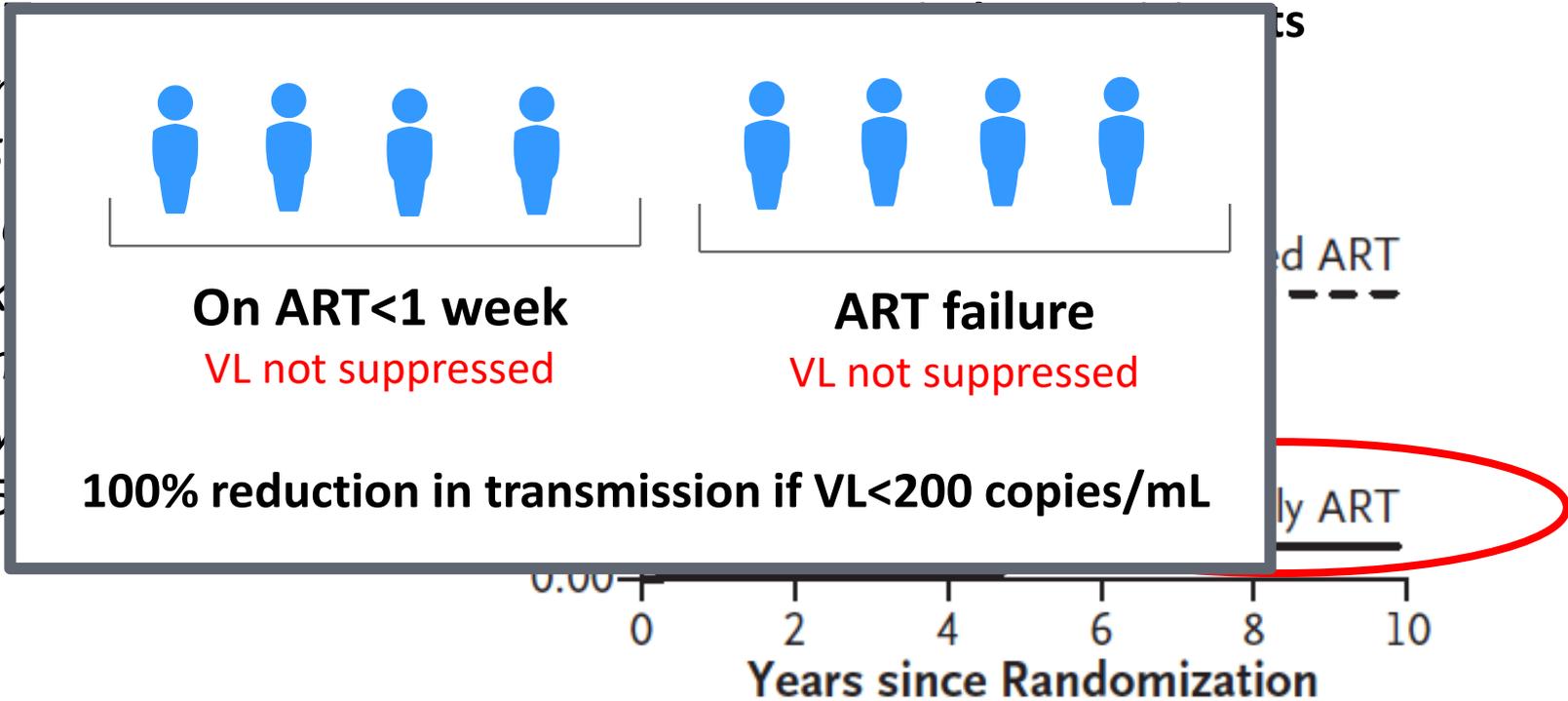
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“Early AR... enrollment... 350 to 55... associate... lower risk... partner in... was delay... fell to <25



ed ART  
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ly ART  
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# PARTNER Study

## (Partners of people on ART: a New Evaluation of the Risks)

**Design:** an observational multi-centre European study of HIV serodifferent couples (gay and heterosexual) in which the positive partner is on ART

**PARTNER 1:** 2010-2014 (gay and heterosexual couples)

**PARTNER 2:** 2014-2018 (gay couples only)

### Primary Study Aim

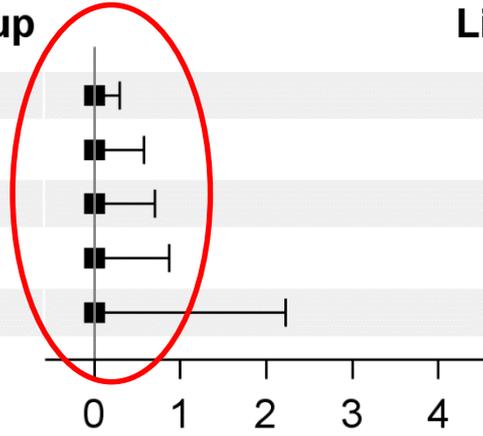
To assess HIV transmission risk through condomless sex where the HIV-positive partner is on ART with a plasma HIV-1 RNA load <200 copies/mL



# PARTNER1: Rate of HIV transmission according to sexual behaviour reported by the negative partner

## All couples

	% of Eligible Couples Reporting Specific Sex Act	Couple-Years of Follow-up	Rate of Within-Couple Transmission, per 100 Couple-Years of Follow-up	Upper 95% Confidence Limit
<b>Any sex</b>	99.7	1238	0.30	0.30
<b>Vaginal sex</b>	60.6	629	0.59	0.59
<b>Anal sex</b>	52.9	522	0.71	0.71
<b>Insertive anal sex</b>	42.1	417	0.88	0.88
<b>Receptive anal sex with ejaculation</b>	21.4	166	2.23	2.23



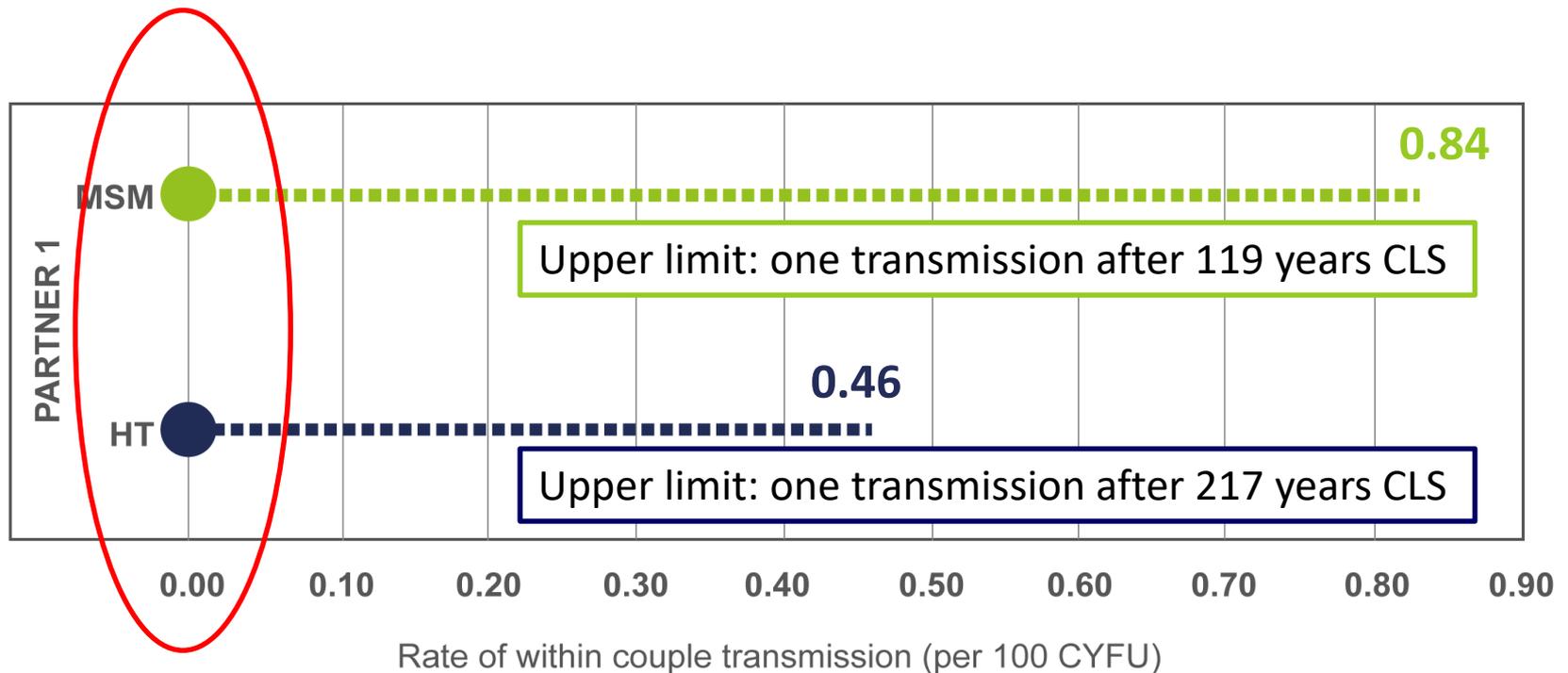
**Rate of Within-Couple Transmission, per 100 Couple-Years of Follow-up**

1166 enrolled couples, 888 eligible (548 HT, 340 MSM)  
 1238 CYFU with >56,000 CL sex acts

- 36,000 heterosexual CL sex acts
- 22,000 MSM CL sex acts

# PARTNER1: Upper 95% CL around estimated rate of zero HIV transmissions

- Zero transmissions for both heterosexual and gay couples.
- But, PARTNER1 was not a large enough study in gay men to be really sure of the accuracy of the result



# The Opposites Attract Study

- 343 serodifferent gay couples
- HIV+ partner undetectable on ART
- 12,928 condomless anal sex acts, no PrEP
- **No HIV transmissions** from primary partner
- 3 from other partners outside of study



	Linked trans- missions (n)	Couple-years of follow up (CYFU)	CLAI acts (n)	Incidence per 100 CYFU (95% CI)
Overall	0	591.2	16,889	0 (0-0.62)
Any CLAI	0	318.0	16,889	0 (0-1.16)
Any CLAI, no daily PrEP	0	241.3	12,928	0 (0-1.53)
Insertive CLAI	0	210.0	8,389	0 (0-1.76)
Receptive CLAI	0	132.1	4,569	0 (0-2.79)
UVL (VL <200)	0	236.2	12,638	0 (0-1.56)
VL >200	0	5.17	290	0 (0-71.4)
STI diagnosed	0	23.2	1,007	0 (0-15.9)
First 6 months ART	0	10.0	341	0 (0-36.9)

Final piece of the jigsaw....



# HIV transmission risk through condomless sex in gay couples with suppressive ART: The PARTNER2 Study extended results in gay men

Alison Rodger, Valentina Cambiano, Tina Bruun, Pietro Vernazza, Simon Collins, Olaf Degen, Giulio Maria Corbelli, Vicente Estrada, Anna Maria Geretti, Apostolos Beloukas, Dorte Raben, Nneka Nwokolo, Pep Coll, Andrea Antinori, Jan Gerstoft, Jan M Prins, Francois Raffi, Armin Rieger, Anders Blaxhult, Rainer Weber, Arne Van Eeden, Jorge Del Romero, Amanda Clarke, Nobert H Brockmeyer, Vincent Leclercq, Agathe Leon, Maria Kitchen, Heiko Jessen, Kees Brinkmann, Johannes Bogner, Felix Gutiérrez, Andrew N Phillips and Jens Lundgren **for the PARTNER Study Group**

# PARTNER2: HIV negative partner characteristics

**1,596**  
eligible CYFU

**77,000**  
condomless sex acts

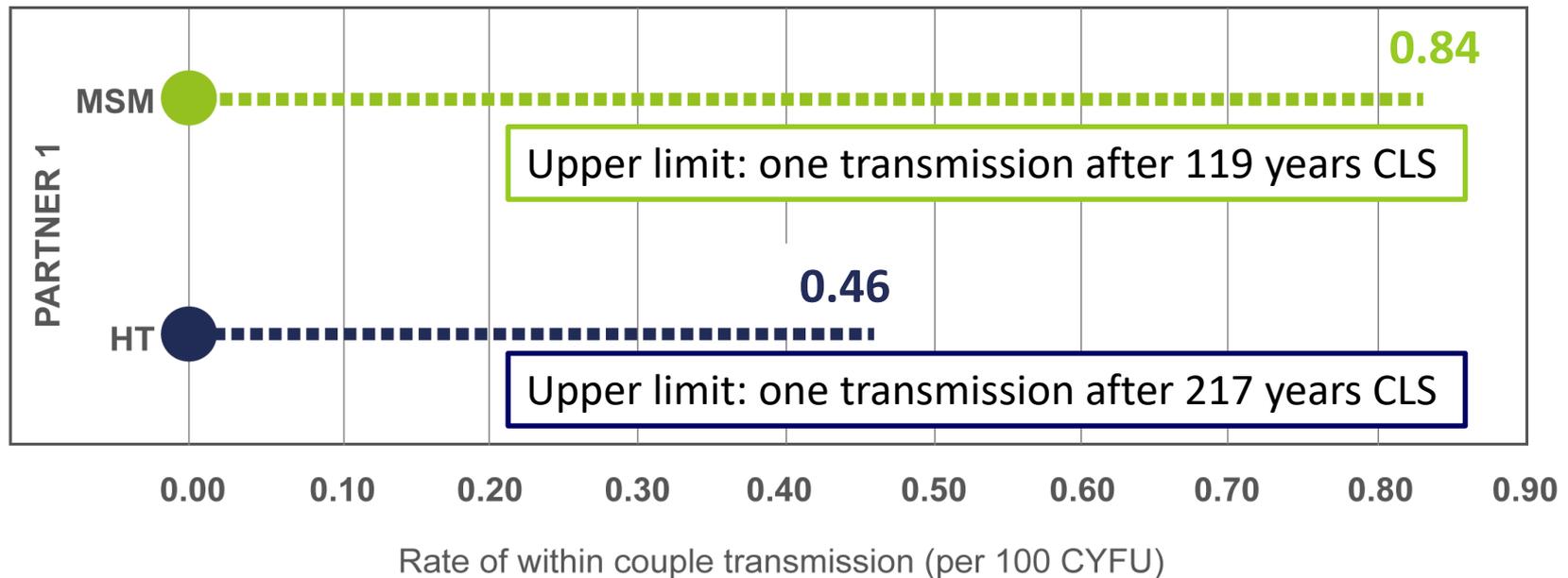
## At study entry

Age, median (IQR, n=759)	38 (31-45)
White ethnicity (% , n=768)	687 (89%)

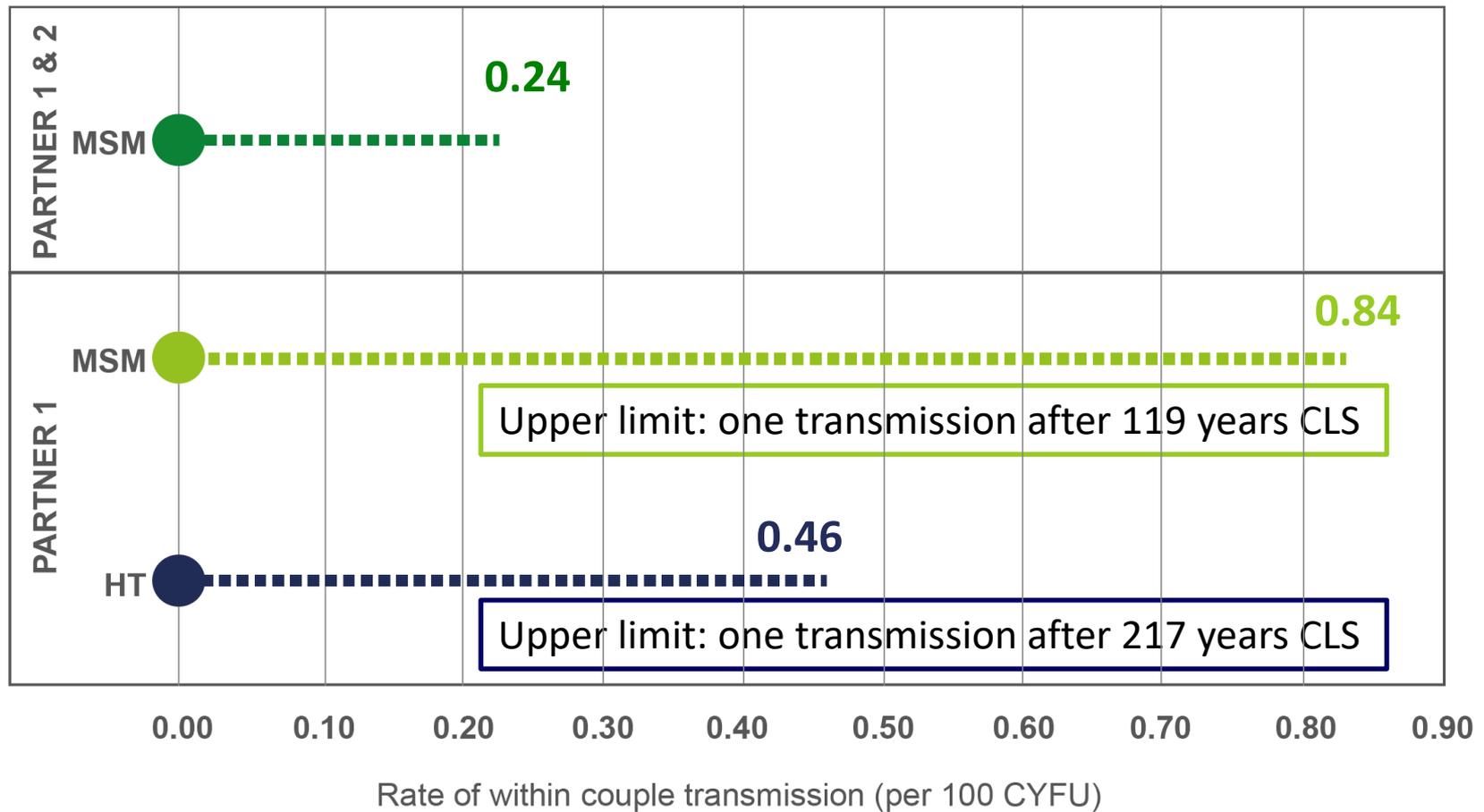
## During follow up

Years in the study, median (IQR)	1.6 (0.9-2.9)
Diagnosed with STI, %	23%
Condomless sex with other partners, %	37%
Condomless sex per year, median (IQR)	43 (19-74)

# Upper 95% CL around estimated rate of zero HIV transmissions: PARTNER 1 compared to PARTNER 1&2



# Upper 95% CL around estimated rate of zero HIV transmissions: PARTNER 1 compared to PARTNER 1&2



# Conclusions

- Among serodifferent gay couples who had sex 77,000 times without condoms with undetectable viral load, we found zero linked transmissions during almost 1600 CYFU
- Our results give equivalence of evidence for gay men as for heterosexual couples and indicate that the risk of HIV transmission when HIV viral load is suppressed is effectively zero
- **Undetectable = Untransmissible**

# Now we have the data - what do we do with it?

Action	Status
<ul style="list-style-type: none"><li>HIV health care professionals (HCPs) are communicating it effectively</li></ul>	still some work to do
<ul style="list-style-type: none"><li>Ensure all PLHIV know the message</li></ul>	still some work to do
<ul style="list-style-type: none"><li>Ensure non-HIV HCPs are aware of the message</li></ul>	much work to do
<ul style="list-style-type: none"><li>Ensure the general public know the message - to address stigma primarily</li></ul>	even more work to do

# A huge thanks to...

- All the study participants who so generously took part in the PARTNER studies
- The PARTNER study team
- Alison Rodger





Thanks for listening