



Kirby Institute

Undetectable viral load and the risk of HIV transmission: Scientific evidence

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Three periods of research on TasP/UVL*

Prior to 2011

Observational research, primarily in untreated African heterosexual couples.

2011 to 2014/15

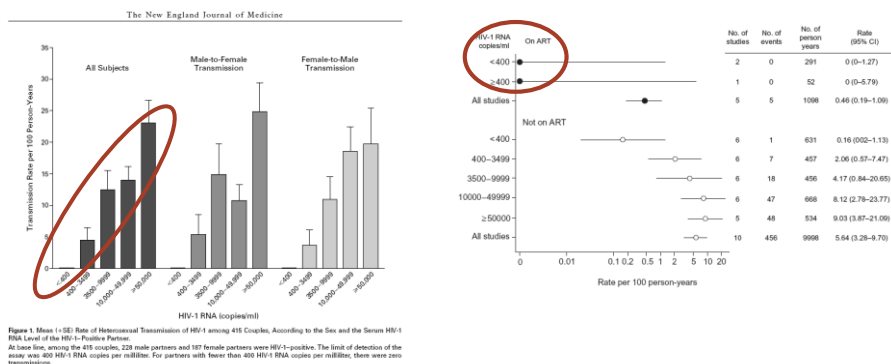
HPTN 052 randomised clinical trial of early versus delayed ART initial (2011) and final (2015) results released.

2014/15 onwards

First data from observational studies in homosexual male serodiscordant couples available from **PARTNER** (2014, 2016) and **Opposites Attract** (2015, 2017)

* TasP = Treatment as Prevention. UVL = Undetectable Viral Load.

Efficacy of TasP in serodiscordant couples



(Quinn et al, NEJM, 2000)

(Attia et al, AIDS, 2009)

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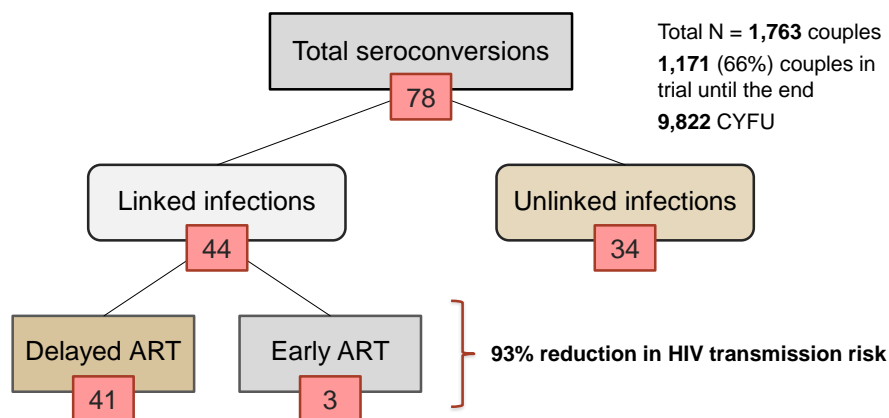
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Efficacy of TasP in serodiscordant couples

HPTN 052: Final results (2015)



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Cohen et al, 2015, IAS

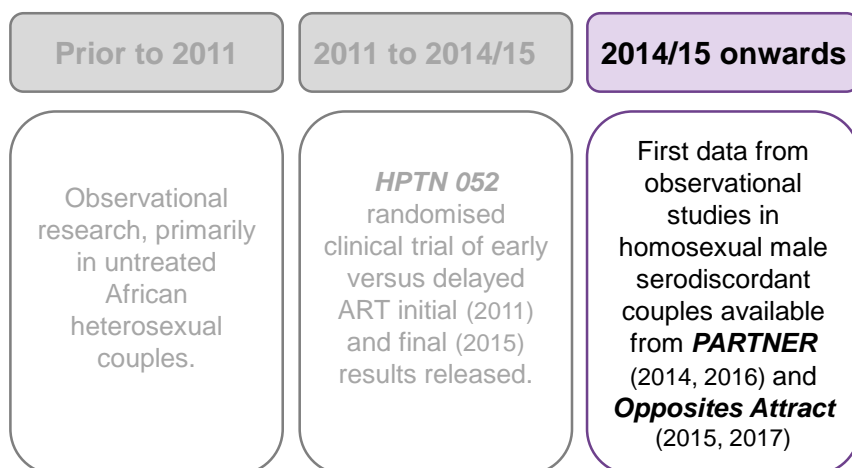
Efficacy of TasP in serodiscordant couples

HPTN 052: Final results (2015)

- **No** linked transmissions occurred when the HIV-positive partner was *virally suppressed*.
- Of the **8 linked infections** that occurred when the HIV-positive partner was *taking ART*:
 - 4 infections were diagnosed shortly after the HIV-positive partner started ART (i.e. not yet virally suppressed)
 - 4 infections were diagnosed after ART failure.

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Three periods of research on TasP/UVL



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Efficacy in serodiscordant gay couples

Why was this phase of research necessary?

- Preventive effect of treatment in gay couples may differ from heterosexual couples:
 - Risk from anal intercourse is 10 times higher than vaginal intercourse.
 - STI rates are higher in gay men.
- The *PARTNER Study* and *Opposites Attract* were designed to contribute data about homosexual couples

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Rodger et al., 2016, JAMA; Bavinton et al., 2014, BMC Public Health

Efficacy of TasP in serodiscordant couples

PARTNER Study: Final results, Phase 1 (2016)

- Observational cohort study of serodiscordant couples in Europe.
- The results of Phase 1 published in July 2016.
- Phase 1 included 548 heterosexual couples and 340 MSM couples.
- Phase 2 is ongoing and is recruiting more MSM couples
 - Results expected in next 12 months.
 - PrEP is likely to have made a significant impact

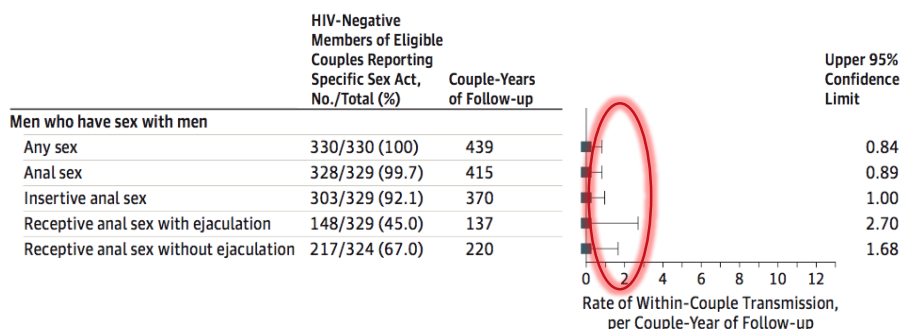
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Rodger et al., 2016, JAMA

Efficacy of TasP in serodiscordant couples

PARTNER Study: Final results, Phase 1 (2016)

- **MSM results:**
There were no linked HIV transmissions (transmission rate = 0 per 100 couple-years of follow-up, 95%CI = 0 – 0.89 per 100 PY).



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Rodger et al., 2016, JAMA

Efficacy of TasP in serodiscordant couples

Opposites Attract study design

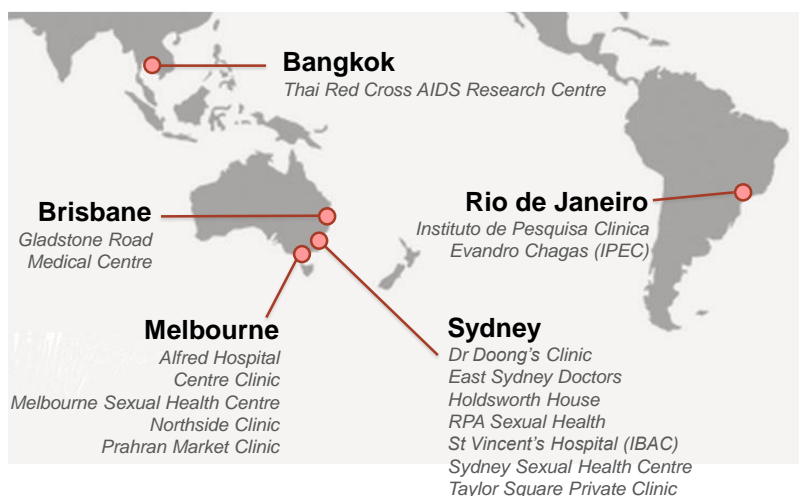
- Prospective cohort study of 358 gay serodiscordant couples.
- Unit of recruitment was a couple comprising two men in an ongoing sexual relationship where one was HIV-positive and the other HIV-negative at baseline.
- Couples attended at least 2 clinic visits per year:
 - Viral load and CD4 in HIV-positive partners
 - HIV antibody tests in HIV-negative partners
 - Tests for sexually transmissible infections in both partners.
- Both partners completed a behavioural questionnaire at each clinic visit.

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Bavinton et al., 2014, BMC Public Health

Efficacy of TasP in serodiscordant couples

Opposites Attract study sites



Incident HIV infections

- There were **3 incident HIV infections** during follow-up.
- The incidence rate was **0.51 per 100 person-years** (95% CI = 0.16 – 1.57).
- In the period immediately prior to diagnosis:
 - All three seroconverters reported CLAI with outside partners.
- All 3 infections were non-linked

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Transmission rates

Overall

Type of condomless anal intercourse (CLAI) reported by HIV-negative partner	Linked transmissions (n)	Couple-years of follow up (CYFU)	No. of CLAI acts	Incidence rate 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 while not on PrEP	0	241.3	12,928	0 (0-1.53)

Zero linked infections

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Transmission rates

When HIV-negative partner not on PrEP

Type of CLAI reported by HIV-negative partner when NOT on PrEP	Linked transmissions (n)	Couple-years of follow up (CYFU)	No. of CLAI acts	Incidence rate per 100 CYFU (95% CI)
Any CLAI when VL \geq 200 copies	0	5.2	290	0 (0-71.4)
Any CLAI when VL <200 copies	0	236.2	12,638	0 (0-1.56)

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Opposites Attract: Conclusion

- *Opposites Attract* had no linked transmissions in homosexual male serodiscordant couples on treatment with UVL.
 - Over 12,000 acts of condomless anal intercourse when the HIV-positive partner had UVL and HIV-negative partner was not on PrEP.
 - Upper confidence limit in this scenario was 1.56 per 100 CYFU.
- *Opposites Attract* saw no linked transmissions even with:
 - High rates of STIs (incidence >20% per year)
 - 43% of couples being in their first year of the relationship at baseline
 - 25% of HIV-positive partners starting treatment during follow-up

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Conclusion

- PARTNER and Opposites Attract combined have now reported no linked transmissions despite nearly 35,000 acts of CLAI in homosexual male serodiscordant couples not using daily PrEP.
- While we cannot say that a transmission with UVL is absolutely *impossible*, the risk is **negligible to non-existent**.
- We are as close to certainty on this as science gets.



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All Study Participants

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