



The Science Behind U=U

The term undetectable viral load means that the level of HIV in a person's blood is so low that it does not show up on a viral load test. In the US, undetectable usually means below 20 or 40 copies per milliliter of blood. HIV can still be hiding in the body (in what are known as reservoirs) but the amount of virus in circulating blood and sexual fluids such as semen, rectal fluid, and vaginal secretions is so low that it cannot be passed on to others during sex. When ART reduces a person's viral load to less than 200 copies per milliliter of blood, it is called viral suppression. Studies show (please see the table below) that when someone is virally suppressed they cannot pass on HIV to their sexual partners.

For the purposes of the U=U message, the term "undetectable" is used synonymously with "virally suppressed."

Study	Study Details	Results	Date	Authors
PARTNER ¹	Observational study in two phases: 1—heterosexual and gay male serodiscordant couples 2—gay male serodiscordant couples	Zero transmissions after ~36,000 condomless sex acts among heterosexual couples and 76,000 condomless sex acts among gay male couples, in both cases when viral load was undetectable (<200 copies/ml) and the partners did not take PrEP or PEP.	2016 (phase 1) 2019 (phase 2)	Rodger A et al
OPPOSITES ATTRACT ²	Observational study in serodiscordant gay male couples.	Zero transmissions after >16,000 condomless sex acts when viral load was undetectable (<200 copies/ml).	2017	Bavinton BR et al
HPTN 052 ³	1,763 serodiscordant heterosexual couples randomized to immediate or deferred ART.	Zero transmissions when the viral load was undetectable. Infections occurred in people with detectable viral load; n = 27 in the deferred ART group and one early infection in the immediate ART group before viral load was undetectable.	2011	Cohen M et al
SWISS STATEMENT ⁴	Expert opinion and evidence review of >20 smaller studies looking at the impact of ART on risk factors for HIV transmission.	Concluded that transmission would not occur with an undetectable viral load.	2008	Vernazza P et al

1. Rodger AJ, Cambiano V, Bruun T, et al. Risk of HIV transmission through condomless sex in serodifferent couples when the HIV-positive partner is using suppressive antiretroviral therapy (PARTNER): final results of a multicentre, prospective, observational study. *The Lancet*. 2019 June;393(10189):2428-2438.
2. Bavinton BR, Pinto AN, Phanuphak N, et al. Viral suppression and HIV transmission in serodiscordant male couples: an international, prospective, observational, cohort study. *Lancet HIV*. 2018 Aug;5(8):e438–e447
3. Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *New England Journal of Medicine*. 2011 Aug 11;365(6):493–505.
4. Vernazza P, Hirschel B, Bernasconi E, Flepp M. Les personnes séropositives ne souffrant daucune autre MST et suivant un traitement antirétroviral efficace ne transmettent pas le VIH par voie sexuelle. *Bulletin des Médecins Suisses*. 2008;89(5):165-9.