

Appendix 2- articles included and characteristics

Control measures

Authors	Year	Title	Geo_Area of study population	Main findings/Prevalence	Journal
Kamali, A f Quigley, M ; Nakiyingi, J ; Kinsman, J ; Kengeya-Kayondo, J ; Gopal, R ; Ojwiya, A ; Hughes, P ; Carpenter, L ; Whitworth, J.	2003	Syndromic management of sexually-transmitted infections and behaviour change interventions on transmission of HIV-1 in rural Uganda: a community randomised trial	East Africa	Incidence of HSV2 was lower in group A than in group C (incidence rate ratio 0.65, 0.53–0.80) however, more effective STI and behavioural interventions need to be developed for HIV control in mature epidemics	The Lancet
Hearst, Norman ; Chen, Sanny	2004	Condom Promotion for AIDS Prevention in the Developing World: Is It Working?	Multiple regions	Condoms are about 90 percent effective for preventing HIV transmission and HSV-2, and their use has grown rapidly in many countries. Condoms have produced substantial benefit in countries like Thailand, where both transmission and condom promotion are concentrated in the area of commercial sex. The public health benefit of condom promotion in settings with widespread heterosexual transmission, however, remains unestablished. In countries like Uganda that have curbed generalized epidemics, reducing the number of individuals' sex partners appears to have been more important than promoting the use of condoms	Studies in Family Planning

Feldblum, Paul J ; Kuyoh, Maureen A ; Bwayo, Job J ; Omari, Mohamed ; Wong, Emelita L ; Tweedy, Kathryn G ; Welsh, Michael J.	2001	Female condom introduction and sexually transmitted infection prevalence: results of a community intervention trial in Kenya	East Africa	female condom introduction did not enhance STI prevention at the sites. It is unclear which aspects of the intervention	Health
Van Damme, Lut ; Ramjee, Gita ; Alary, Michel ; Vuylsteke, Bea ; Chandeying, Verapol ; Rees, Helen ; Sirivongrangsorn, Pachara ; Tshibaka, Léonard Mukenge ; Ettiègne-Traoré, Virginie ; Uaheowitchai, Charn ; Karim, Salim S. Abdool ; Mâsse, Benoît ; Perriens, Jos ; Laga, Marie	2002	Effectiveness of COL-1492, a nonoxynol-9 vaginal gel, on HIV-1 transmission in female sex workers: a randomized controlled trial	Multiple regions	No significant effect of nonoxynol-9 on HSV-2	The Lancet
Baeten, J. M ; Strick, L. B ; Lucchetti, A ; Whittington, W. L. H ; Sanchez, J ; Coombs, R. W ; Magaret, A ; Wald, A ; Corey, L ; Celum, C.	2008	Herpes simplex virus (HSV)-suppressive therapy decreases plasma and genital HIV-1 levels in HSV-2/HIV-1 coinfecting women: a randomized, placebo-controlled, cross-over trial	South America	HIV-1 level was significantly lower during the valacyclovir arm, compared with the placebo arm (45% decrease [P<.001]), and cervical HIV-1 level (55% decrease [P<.001]),	Journal of Infectious Diseases
Fife KH, Warren TJ, Justus SE, Heitman CK	2008	An international, randomized, double-blind, placebo-controlled, study of valacyclovir for the suppression of herpes simplex virus type 2 genital herpes in newly diagnosed patients	Multiple regions		Sexually Transmitted Diseases

Nagot N, Ouédraogo A, Foulongne V, Konaté I, Weiss HA, Vergne L	2007	Reduction of HIV-1 RNA levels with therapy to suppress herpes simplex virus	West Africa		New England Journal of Medicine
Cowan, F. M ; Pascoe, S. J ; Barlow, K. L ; Langhaug, L. F ; Jaffar, S ; Hargrove, J. W ; Robinson, N. J ; Bassett, M. T ; Wilson, D ; Brown, D. W. G ; Hayes, R. J.	2008	A randomised placebo-controlled trial to explore the effect of suppressive therapy with acyclovir on genital shedding of HIV-1 and herpes simplex virus type 2 among Zimbabwean sex workers	Southren Africa	suppressive acyclovir therapy had no effect on the rate of HIV genital shedding despite a reduction in genital HSV-2 of 24%	Sexually Transmitted Infections
Mayaud, P ; LeGoff, J ; Weiss, H. A ; Grésenguet, G ; Nzambi, K ; Bouhlal, H ; Frost, E ; Pépin, J ; Malkin, J. E ; Hayes, R. J ; Mabey, D. C. W ; Bélec, L.	2009	Impact of acyclovir on genital and plasma HIV-1 RNA, genital herpes simplex virus type 2 DNA, and ulcer healing among HIV-1-infected African women with herpes ulcers: a randomized placebo-controlled trial	Multiple (Ghana, Central African Republic)	cervicovaginal HSV-2 DNA (RR, 0.69; 95% CI, 0.4-1.3), had a lower quantity of HSV-2 DNA (-0.99 log(10) copies/mL; 95% CI, -1.8 to -0.2 log(10) copies/mL), and were more likely to have a healed ulcer (RR, 1.26; 95% CI, 0.9-1.9).	Journal of Infectious Diseases
Dunne, E. F ; Whitehead, S ; Sternberg, M ; Thepamnuay, S ; Leelawiwat, W ; McNicholl, J. M ; Sumanapun, S. Tappero, J. W ; Siriprasiri, T ; Markowitz, L.	2008	Suppressive acyclovir therapy reduces HIV cervicovaginal shedding in HIV- and HSV-2-infected women, Chiang Rai, Thailand	East Asia	Acyclovir reduced HIV genital shedding and plasma viral load among HIV-1- and herpes simplex virus type 2-coinfected women	JAIDS, Journal of Acquired Immune Deficiency Syndromes

Tobian, A. A. R ; Serwadda, D ; Quinn, T. C ; Kigozi, G ; Gravitt, P. E ; Laeyendecker, O ; Charvat, B ; Ssempijja, V ; Riedesel, M ; Oliver, A. E ; Nowak, R. G ; Moulton, L. H ; Chen, M. Z ; Reynolds, S. J ; Wawer, M. J. ; Gray, R. H.	2009	Male Circumcision for the Prevention of HSV-2 and HPV Infections and Syphilis	east Africa	At 24 months, the cumulative probability of HSV-2 seroconversion was 7.8% in the intervention group and 10.3% in the control group (adjusted hazard ratio in the intervention group, 0.72; 95% confidence interval [CI], 0.56 to 0.92; P=0.008)	New England Journal of Medicine
Sobngwi-Tambekou, J ; Taljaard, D ; Lissouba, P ; Zarca, K ; Puren, A ; Lagarde, E ; Auvert, B.	2009	Effect of HSV-2 serostatus on acquisition of HIV by young men: results of a longitudinal study in Orange Farm, South Africa	Southren Africa	the protective effect of male circumcision on HIV acquisition appears independent of HSV-2 serostatus.	Journal of Infectious Diseases
Martin, Emily T ; Krantz, Elizabeth ; Gottlieb, Sami L ; Magaret, Amalia S ; Langenberg, Andria ; Stanberry, Lawrence ; Kamb, Mary ; Wald, Anna	2009	A Pooled Analysis of the Effect of Condoms in Preventing HSV-2 Acquisition	Multiple regions	Consistent condom users (used 100% of the time) had a 30% lower risk of HSV-2 acquisition compared with those who never used condoms (hazard ratio [HR], 0.70; 95% confidence interval [CI], 0.40-0.94) (P = .01). Risk for HSV-2 acquisition increased steadily and significantly with each unprotected sex act (HR, 1.16; 95% CI, 1.08-1.25) (P < .001). Condom effectiveness did not vary by gender.	Archives of Internal Medicine

Gottlieb SL, Giersing BK, Hickling J, Jones R, Deal C, Kaslow DC	2019	Meeting report: Initial World Health Organization consultation on herpes simplex virus (HSV) vaccine preferred product characteristics	Multiple regions		Vaccine
Connie, ; Noah, ; Myron,	2005	Potential Effect of HIV Type 1 Antiretroviral and Herpes Simplex Virus Type 2 Antiviral Therapy on Transmission and Acquisition of HIV Type 1 Infection	Multiple regions	trials of ART or HSV-2 antiviral therapy are successful, prevention benefits may be difficult to translate to community benefits; in general, trials of ART and HSV-2 antiviral therapy must be viewed as proof-of-concept studies. Favourable results can lead to the development of agents more appropriate to prevention and to operational strategies required for optimal implementation.	Oxford University Press (OUP)
Gregson, Simon ; Adamson, Saina ; Papaya, Spiwe ; Mundondo, Jephias ; Nyamukapa, Constance A ; Mason, Peter R ; Garnett, Geoffrey P ; Chandiwana, Stephen K ; Foster, Geoff ; Anderson, Roy M.	2007	Impact and Process Evaluation of Integrated Community and Clinic-Based HIV-1 Control: A Cluster-Randomised Trial in Eastern Zimbabwe	Southren Africa	Integrated peer education, condom distribution, and syndromic STI management did not reduce population-level HIV-1 and HSV-2 incidence in a declining epidemic, despite reducing HIV-1 incidence in the immediate male target group.	PLoS Medicine

Paz-Bailey, G ; Ramaswamy, M ; Hawkes, S. J ; Geretti, A. M.	2006	Herpes simplex virus type 2: epidemiology and management options in developing countries	Multiple regions	multifaceted interventions are required to improve recognition of genital herpes, to prevent its spread and also to prevent its potential to promote HIV transmission in developing countries	Sexually Transmitted Infections
Jewkes, R ; Nduna, M ; Levin, J ; Jama, N ; Dunkle, K ; Puren, A ; Duvvury, N.	2008	Impact of Stepping Stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster randomised controlled trial	Southren Africa	the programme was associated with a reduction of about 33% in the incidence of HSV-2 (0.67, 0.46 to 0.97; P=0.036	BMJ
Prichard, Mark N ; Kaiwar, Ravi ; Jackman, Winthrop T ; Quenelle, Debra C ; Collins, Deborah J ; Kern, Earl R ; Kembler, George M ; Spaete, Richard R.	2005	Evaluation of AD472, a live attenuated recombinant herpes simplex virus type 2 vaccine in guinea pigs	global	Immunization with AD472 at doses of 1 × 10 ⁵ PFU generally precluded colonization of the ganglia or establishment of latency by the challenge virus.	Vaccine
Paz-Bailey, G ; Sternberg, M ; Puren, A. J ; Markowitz, L. E ; Ballard, R ; Delany, S ; Hawkes, S ; Nwanyanwu, O ; Ryan, C ; Lewis, D. A.	2009	improvement in healing and reduction in HIV shedding with episodic acyclovir therapy as part of syndromic management among men: a randomized, controlled trial	Southren Africa	Acyclovir improved ulcer healing--61% of those receiving acyclovir healed by day 7, compared with 42% of those receiving placebo (adjusted relative risk, 1.4 [95% confidence interval, 1.1-1.8]; P= .003)	Journal of Infectious Diseases

Baeten, J. M ; Reid, S. E ; Delany-Moretlwe, S ; Hughes, J. P ; Wang, R. S ; Wilcox, E ; Limbada, M ; Akpomemie, G ; Corey, L ; Wald, A ; Celum, C.	2012	Clinical and virologic response to episodic acyclovir for genital ulcers among HIV-1 seronegative, herpes simplex virus type 2 seropositive African women: a randomized, placebo-controlled trial	Southren Africa	episodic acyclovir therapy resulted in modestly greater likelihood of lesion healing (HR=1.48, p=0.098; mean 5.1 vs. 6.0 days) and cessation of HSV shedding (HR=1.88, p=0.008; mean 3.0 vs. 5.0 days) compared with placebo, similar to results from high-income countries.	Sexually Transmitted Diseases
Celum, C ; Batten, J. M.	2012	Tenofovir-based pre-exposure prophylaxis for HIV prevention: evolving evidence	Global	Peri-coital use of 1% tenofovir gel in CAPRISA 004 reduced HIV-1 acquisition by 39% and HSV-2 acquisition by 51%. Daily oral FTC/TDF demonstrated 44% reduction in HIV-1 acquisition among men who have sex with men (MSM) in iPrEx. Both studies showed higher efficacy among those with higher adherence. Efficacy of daily oral TDF and FTC/TDF was 66% and 73%, respectively, among HIV-1 uninfected partners in an HIV-1 serodiscordant partnership in the Partners PrEP Study. Efficacy of daily oral FTC/TDF was 66% in young heterosexuals in Botswana in the TDF-2 trial. The FEM-PrEP and VOICE studies in African women found no efficacy with oral FTC/TDF and TDF, respectively. Safety and tolerability were excellent and limited resistance was observed in seroconverters	Current Opinion in Infectious Diseases

Watson-Jones D, Weiss HA, Rusizoka M, Chagalucha J, Baisley K, Mugeye K	2008	Effect of herpes simplex suppression on incidence of HIV among women in Tanzania	East Africa	RCT	New England Journal of Medicine
Fuchs, J ; Celum, C ; Wang, J ; Hughes, J ; Sanchez, J ; Cowan, F ; Reid, S ; Delany-Moretlwe, S ; Corey, L ; Wald, A.	2010	Clinical and virologic efficacy of herpes simplex virus type 2 suppression by acyclovir in a multi-continent clinical trial	Global	Overall, acyclovir was associated with a 47% [RR 0.53 (95% CI 0.46, 0.62)] reduction in GUD	Journal of Infectious Diseases
Moreno, R ; Nababan, H. Y ; Ota, E ; Wariki, W. M. V ; Ezoe, S ; Gilmour, S ; Shibuya, K.	2014	Structural and community-level interventions for increasing condom use to prevent the transmission of HIV and other sexually transmitted infections	Developing countries	no clear evidence that the intervention work	Cochrane Database of Systematic Reviews

Roxby, A. C. Drake, A. L. Ongecha-Owuor, F. Kiarie, J. N. Richardson, B; Matemo, D. N ; Overbaugh, J ; Emery, S ; John- Stewart, G. C ; Wald, A ; Farquhar, C.	2012	Effects of valacyclovir on markers of disease progression in postpartum women co-infected with HIV-1 and herpes simplex virus-2	East Africa	Women randomized to valacyclovir suppressive therapy during pregnancy and postpartum had greater increases in CD4 counts and smaller increases in plasma HIV-1 RNA levels than women in the placebo arm. Valacyclovir suppression during pregnancy and breastfeeding may improve outcomes and delay antiretroviral therapy for HIV-1/HSV-2 co-infected women.	PLoS ONE
Reynolds, S. J ; Makumbi, F ; Newell, K ; Kiwanuka, N ; Ssebowa, P ; Mondo, G ; Boaz, I ; Wawer, M. J ; Gray, R. H ; Serwadda, D ; Quinn, T. C.	2012	Effect of daily aciclovir on HIV disease progression in individuals in Rakai, Uganda, co-infected with HIV-1 and herpes simplex virus type 2: a randomised, double-blind placebo-controlled trial	east Africa	Aciclovir reduces the rate of disease progression, with the greatest effect in individuals with a high baseline viral load. However, no significant difference in HIV disease progression existed between participants in the treatment group and those in the placebo group who had baseline HIV viral loads of less than 50,000	Lancet Infectious Diseases
Phiri, S ; Hoffman, I. F ; Weiss, H. A ; Martinson, F ; Nyirenda, N ; Kamwendo, D ; Fiscus, S. A ; Chen, C. Y ; Miller, W. C ; Hoeven, L. van de ; Chilongozi, D ; Cohen, M. S ; Mayaud, P.	2010	Impact of aciclovir on ulcer healing, lesional, genital and plasma HIV-1 RNA among patients with genital ulcer disease in Malawi	Southren Africa	85% of ulcers were healed at day 14 with no difference between treatment arms (risk ratio (RR)=1.02, 95% CI 0.93 to 1.11). Among 244 HIV-1/HSV-2 co-infected individuals, aciclovir reduced lesional HIV-1 RNA (adjusted RR=0.64, 95% CI 0.41 to 0.99) and seminal HIV-1 RNA (adjusted RR=0.59, 95% CI 0.40 to 0.88), but not cervical HIV-1 RNA or plasma HIV-1 RNA.	Sexually Transmitted Infections

Obiero, J ; Mwethera, P. G ; Wiysonge, C. S.	2012	Topical microbicides for prevention of sexually transmitted infections	Multiple regions	Tenofovir reduced the incidence of herpes simplex virus type 2 (HSV-2) infection (one trial, 426 women; RR 0.55; 95% CI 0.37 to 0.83)	Cochrane Database of Systematic Reviews
Lou, Yijun ; Qesmi, Redouane ; Wang, Qian ; Steben, Marc ; Wu, Jianhong ; Heffernan, Jane M.	2012	Epidemiological Impact of a Genital Herpes Type 2 Vaccine for Young Females	Global	vaccination of some females reduces infection in men, which then reduces infection in women.	PLoS one
Lingappa, Jairam R ; Baeten, Jared M ; Wald, Anna ; Hughes, James P ; Thomas, Katherine K ; Mujugira, Andrew ; Mugo, Nelly ; Bukusi, Elizabeth A.	2010	Daily aciclovir for HIV-1 disease progression in people dually infected with HIV-1 and herpes simplex virus type 2: a randomised placebo-controlled trial	Multiple (East Africa, Southern Africa)	Acyclovir reduced risk of HIV-1 disease progression by 16%; 284 participants assigned acyclovir versus 324 assigned placebo reached the primary endpoint (hazard ratio [HR] 0.84, 95% CI 0.71-0.98, p=0.03).	Elsevier BV
Tanton, Clare ; Weiss, Helen A ; Rusizoka, Mary ; Legoff, Jerome ; Changalucha, John ; Baisley, Kathy ; Mugeye, Kokugonza ; Everett, Dean ; Belec, Laurent ; Clayton, Tim C ; Ross, David A ; Hayes, Richard J ; Watson-Jones, Deborah	2010	Long-term impact of acyclovir suppressive therapy on genital and plasma HIV RNA in Tanzanian women: a randomized controlled trial	East Africa	there was little difference between acyclovir and placebo arms for cervico-vaginal HIV-1 RNA detection, Acyclovir 400mg bid is unlikely to be a useful long-term intervention to reduce HIV transmission.	The Journal of infectious diseases
Cowan, Frances M ; Pascoe, Sophie Js ; Langhaug, Lisa F ; Mavhu, Webster ; Chidiya, Samson ; Jaffar, Shabbar ; Mbizvo, Michael T ; Stephenson, Judith M ; Johnson, Anne M ; Power, Robert M ; Woelk, Godfrey ; Hayes, Richard J.	2010	The Regai Dzive Shiri project: results of a randomized trial of an HIV prevention intervention for youth	Southern Africa	no impact of the intervention on prevalence of HSV-2	AIDS
Skoberne, M ; Cardin, R ; Lee, A ; Kazimirova, A ; Zielinski, V ; Garvie, D ; Lundberg, A ; Larson, S ; Bravo, F. J ; Bernstein, D. I ; Flechtner, J. B ; Long, D.	2013	An Adjuvanted Herpes Simplex Virus 2 Subunit Vaccine Elicits a T Cell Response in Mice and Is an Effective Therapeutic Vaccine in Guinea Pigs	Multiple regions	the frequency of recurrent viral shedding was considerably reduced in GEN-003/MM-2-vaccinated animals but not in GEN-003- or MM-2-vaccinated animals	Journal of Virology

Morello, Christopher S ; Kraynyak, Kimberly A ; Levinson, Michael S ; hen, Zhijiang ; Lee, Kuo-Fen ; Spector, Deborah H.	2012	Inactivated HSV-2 in MPL/alum adjuvant provides nearly complete protection against genital infection and shedding following long term challenge and rechallenge	Multiple regions	optimized vaccine for-mulation of FI- HSV2 MPL/Alhydrogel given i.m. completely protected against detectable vaginal HSV-2 shedding in the majority of animal sand HSV-2 latent DNA in the DRG of all animals.	Elsevier BV
Free, C.; Roberts, I. G ; Abramsky, T ; Fitzgerald, M ; Wensley, F.	2011	A systematic review of randomised controlled trials of interventions promoting effective condom use	Multiple regions	The results are generally consistent withmodest benefits but there is considerable potential forbias due to poor trial quality. Because of the lowproportion of trials using the same outcome thepotential for bias from selective reporting of outcomesis considerable. Despite the public health importanceof increasing condom use there is little reliablevidence on the effectiveness of condom promotioninterventions	Journal of Epidemiology & Community Health
Qesmi, Redouane ; Wang, Qian ; Steben, Marc ; Wu, Jianhong ; Heffernan, Jane M.	2012	Epidemiological Impact of a Genital Herpes Type 2 Vaccine for Young Females	developing countires	Computer simulation shows that an adolescent-only vaccination program may be effective in eliminating HSV-2 disease, however, the success of extinction greatly depends on the level of vaccine uptake, the vaccine efficacy, the age of sexual maturity and safe sex practices. However, the time course of eradication would take many years	PloS one

Dropulic, Lesia K ; Cohen, Jeffrey I.	2012	The challenge of developing a herpes simplex virus 2 vaccine	developing countries	HSV-2 vaccines that reduce primary disease and shedding are an important goal for an HSV-2 vaccine. While sterilizing immunity would be ideal, the observation that persons can become infected with more than one strain of HSV-2 suggests that this might not be achievable.	Expert review of vaccines
Halford, William P ; Püschel, Ringo ; Gershburg, Edward ; Wilber, Andrew ; Gershburg, Svetlana ; Rakowski, Brandon	2011	A Live-Attenuated HSV-2 ICPO- Virus Elicits 10 to 100 Times Greater Protection against Genital Herpes than a Glycoprotein D Subunit Vaccine	Multiple regions	In vivo imaging demonstrated that a luciferase-expressing HSV-2 challenge virus failed to establish a detectable infection in 0DNLS-immunized mice, whereas the same virus readily infected naïve and gD-2-immunized mice. Collectively, these results suggest that a HSV-2 vaccine might be more likely to prevent genital herpes if it contained a live-attenuated HSV-2 virus rather than a single HSV-2 protein.	Plos one
Mujugira, Andrew ; Magaret, Amalia S ; Celum, Connie ; Baeten, Jared M ; Lingappa, Jairam R ; Morrow, Rhoda Ashley ; Fife, Kenneth H ; Delany-Moretlwe, Sinead ; de Bruyn, Guy ; Bukusi, Elizabeth A. ; Karita, Etienne ; Kapiga, Saidi ; Corey, Lawrence ; Wald, Anna ; Partners in Prevention, H. S. V. H. I. V. Transmission Study Team	2013	Daily acyclovir to decrease herpes simplex virus type 2 (HSV-2) transmission from HSV-2/HIV-1 coinfecting persons: a randomized controlled trial	East Africa, Southern Africa	Treatment of African HSV-2/HIV-1-infected persons with daily suppressive acyclovir did not decrease risk of HSV-2 transmission to susceptible partners	The Journal of infectious diseases

Doyle, Aoife M ; Ross, David A ; Maganja, Kaballa ; Baisley, Kathy ; Masesa, Clemen ;Andreasen, Aura ; Plummer, Mary L ; Obasi, Angela I. N ; Weiss, Helen A ; Kapiga, Said ;Watson-Jones, Debora ; Chagalucha, John ; Hayes, Richard J.	2010	Long-Term Biological and Behavioural Impact of an Adolescent Sexual Health Intervention in Tanzania: Follow-up Survey of the Community-Based MEMA kwa Vijana Trial	East Africa	Prevalences ofthe primary outcomes HIV and HSV-2 were 1.8% and 25.9% in males and 4.0% and 41.4% in females, respectively. Theintervention did not significantly reduce risk of HIV (males adjusted prevalence ratio [aPR] 0.91, 95%CI 0.50–1.65; femalesaPR 1.07, 95%CI 0.68–1.67) or HSV-2 (males aPR 0.94, 95%CI 0.77–1.15; females aPR 0.96, 95%CI 0.87–1.06	PLoS Medicine
Soares AR, Robaina MCS, Mendes GS, Silva TSL, Gestinari LMS, Pamplona OS	2012	Antiviral activity of extracts from Brazilian seaweeds against herpes simplex virus	Brazil		Revista Brasileira de Farmacognosia

Alsallaq RA, Schiffer JT, Longini Jr IM, Wald A, Corey L, Abu-Raddad LJ	2010	Population level impact of an imperfect prophylactic HSV-2 vaccine	Developing countries	population and individual effects of HSV-2 vaccine	Sexually transmitted diseases
Johnston, Christine ; Koelle, David M ; Wald, Anna	2014	Current status and prospects for development of an HSV vaccine	global	the importance of the mucosal immune response, availability of novel adjuvants and delivery mechanisms, identification of T cell epitopes via proteomic screening and advancement in replication competent and replication-incompetent candidates. In addition, we have learned from past vaccine studies; we need to depend on objective evidence of seroconversion rather than the variable phenotype of clinical disease in preventative vaccine studies. Similarly, viral shedding should be measured rather than recurrence rate as the most sensitive tool to evaluate both prophylactic and therapeutic vaccines, to provide data on potential impact of vaccination on HSV transmission	Vaccine

Moussa HS, Ibrahem ABB, El-Sayed AFM, Mohammed FA	2015	In vitro evaluation of anti-microbial activities of marine Streptomyces against viral models, bacterial and fungal strains.	In vitro study aimed at developing countries		International Journal of Virology
Roberts, Lindi; Liebenberg, Lenine; Barnabas, Shaun ; Passmore, Jo-Ann	2012	Vaginal microbicides to prevent human immunodeficiency virus infection in women: Perspectives on the female genital tract, sexual maturity and mucosal inflammation	Multiple regions	vaginal microbicides offer an important female-controlled strategy to prevent sexual transmission of HIV. Use of antiretroviral drugs such as TFV 1% in coitally linked topical microbicide formulations has recently proven to be a moderately effective tool at preventing new infections in women 18 years and older	Best Practice & Research Clinical Obstetrics & Gynaecology

García, Patricia J ; Holmes, King K ; Cárcamo, César P ; Garnett, Geoff P ; Hughes, James P ; Campos, Pablo E ; Whittington, William L. H ; Peru, Preven Study Team	2012	Prevention of sexually transmitted infections in urban communities (Peru PREVEN): a multicomponent community-randomised controlled trial	South America	We report a non-significant reduction in prevalence of STIs in young adults, adjusted for baseline prevalence, in intervention cities compared with control cities (relative risk 0.84, 95% CI 0.69–1.02; p=0.096)	Lancet (London, England)
Hallfors, D. D ; Cho, H. S ; Rusakaniko, S ; Mapfumo, J ; Iritani, B ; Zhang, L ; Luseno, W ; Miller, T.	2015	The impact of school subsidies on HIV-related outcomes among adolescent female orphans	Southren Africa	The two groups did not differ on HIV or HSV-2 biomarkers	Journal of Adolescent Health
Low, A. J ; Nagot, N ; Weiss, H. A ; Konate, I ; Kania, D ; Segondy, M ; Meda, N ; Perre, P. van de ; Mayauda, P.	2016	Herpes Simplex Virus Type-2 Cervicovaginal Shedding Among Women Living With HIV-1 and Receiving Antiretroviral Therapy in Burkina Faso: An 8-Year Longitudinal Study	West Africa	Cervicovaginal HSV-2 DNA was detected in 42% of women (99 of 236) in 8.2% of visits . ART was associated with a reduction in the odds of HSV-2 shedding, which declined for each year of ART use (odds ratio [OR], 0.74; 95% confidence interval [CI], .59–.92).	Journal of Infectious Diseases

<p>Yuan, Tanwei ; Fitzpatrick, Thomas ; Ko, Nai-Ying ; Cai, Yong ; Chen, Yingqing ; Zhao, Jin ; Li, Linghua ; Xu, Junjie ; Gu, Jing ; Li, Jinghua ; Hao, Chun ; Yang, Zhengrong ; Cai, Weiping ; Cheng, Chien-Yu ; Luo, Zhenzhou Zhang, Kechun Wu, Guohui Meng, Xiaojun Grulich, Andrew E. Hao, Yuantao Zou, Huachun Majiwa, M. Onyango, C. O. Kuile, F. O. ter Phillips-Howard, P. A.</p>	2019	<p>Circumcision to prevent HIV and other sexually transmitted infections in men who have sex with men: a systematic review and meta-analysis of global data</p>	Developing countries	<p>Circumcision was associated with reduced odds of herpes simplex virus (HSV) infection among MSM overall (0.84, 0.75–0.95; k=5; I²=0%)</p>	The Lancet. Global health
<p>Stoner MCD, Neilands TB, Kahn K, Hughes JP, Gómez-Olivé FX, Twine R</p>	2019	<p>Multilevel measures of education and pathways to incident Herpes simplex virus type 2 in adolescent girls and young women in South Africa</p>	Southern Africa		Journal of Adolescent Health

Farr Zuend, Christina , Nomellini, John F , Smit, John, Horwitz, Marc S , Townsend, J.	2018	Generation of a Dual-Target, Safe, Inexpensive Microbicide that Protects Against HIV-1 and HSV-2 Disease	Southren Africa	Protection from HSV-2 disease was strongly associated with early cytokine production in the vaginal tract. Our data support the potential for a dual-target microbicide that can protect against both HIV-1 and HSV-2, which could have an enormous impact on public health	Scientific Reports
Johnston, Christine ; Gottlieb, Sami L ; Wald, Anna	2016	Status of vaccine research and development of vaccines for herpes simplex virus	Multiple regions	provide an overview of efforts to develop HSV-2 vaccines, including a discussion of the clinical need for an HSV vaccine, and status of research and development with an emphasis on recent insights from trials of vaccine candidates in clinical testing. In addition, we will touch upon aspects of HSV vaccine development relevant to low and middle income countries	Vaccine

Jiang, Yu-Chen ; Feng, Hui ; Lin, Yu-Chun ; Guo, Xiu-Rong	2016	New strategies against drug resistance to herpes simplex virus	Multiple regions	new antiviral drugs with different antiviral actions, including new antiviral targets, new antiviral mechanisms, and new antiviral molecules, are required. Janus-type nucleosides have two different faces (mimicking the natural purine and pyrimidine systems) in one molecule, and these drugs may pair with diverse natural bases via rotation around the glycosyl bond, which further induces viral lethal mutation. Therefore, unique Janus-type nucleoside analogues possess great potential in the exploitation of new lethal mutagenesis drugs as novel strategies for antiviral chemotherapy.	International journal of oral science
Shahzad, Naveed ; Farooq, Roman ; Aslam, Bilal ; Umer, Muhammad	2017	Microbicides for the Prevention of HPV, HIV-1, and HSV-2: Sexually Transmitted Viral Infections	South Asia	More trials can guide for more development of more rationally, accurately, behaviorally, and socially accepted and single solution maximum potential STIs.	Fundamentals of Sexually Transmitted Infections (Book)

Egan, Kevin P ; Hook, Lauren M ; Naughton, Alexis ; Pardi, Norbert ; Awasthi, Sita ; Cohen, Gary H ; Weissman, Drew ; Friedman, Harvey M.	2020	An HSV-2 nucleoside-modified mRNA genital herpes vaccine containing glycoproteins gC, gD, and gE protects mice against HSV-1 genital lesions and latent infection	Global	In the two experiments, them RNA vaccine prevented death and genital disease in 54/54(100%) mice infected with HSV-1 and 20/20 (100%) with HSV-2. They prevented HSV DNA from reaching the dorsal root ganglia,the site of virus latency, in 29/30(97%) mice infected with HSV-1 and 10/10 (100%) with HSV-2.	PLOS Pathogens
Magaret, Amalia S ; Mujugira, Andrew ; Hughes, James P ; Lingappa, Jairam ; Bukusi, Elizabeth A ; DeBruyn, Guy ;Delany-Moretlwe, Sinead ; Fife, Kenneth H ; Gray, Glenda E ; Kapiga, Saidi ; Karita, Etienne ; Mugo, Nelly R ; Rees, Helen ; Ronald, Allan ; Vwalika, Bellington ; Were, Edwin ; Celum, Connie ; Wald, Anna ; Partners in Prevention, H. S. V. H. I. V. Transmission Study Team	2016	Effect of Condom Use on Per-act HSV-2 Transmission Risk in HIV-1, HSV-2-discordant Couples	Multiple regions	Transmission of HSV-2 occurred in 68 couples, including 17 with susceptible women and 51 with susceptible men. The highest rate of transmission was from men to women: 28.5 transmissions per 1000 unprotected sex acts. We found that condoms were differentially protective against HSV-2 transmission by sex; condom use reduced per-act risk of transmission from men to women by 96% (P < .001) and marginally from women to men by 65% (P = .060).	Clinical infectious diseases : an official publication of the Infectious Diseases Society of America
Ceña-Diez, Rafael; Vacas-Córdoba, Enrique ; García-Broncano, Pilar ; de la Mata, F. J. ; Gómez, Rafael ; Maly, Marek ; Muñoz-Fernández, M. Ángeles	2016	Prevention of vaginal and rectal herpes simplex virus type 2 transmission in mice: mechanism of antiviral action	Multiple regions	Topical vaginal or rectal administration of G1-S4 or G2-S16 prevents HSV-2 transmission in BALB/c mice in values close to 100%	International journal of nanomedicine

HSV-2 and HIV interactions

Authors	Year	Title	Geographical area of study population	Study design	sample size	Journal	Study topic	Main findings
Mbopi-Kéou, F. X., Grésengué, G., Mayaud, P., Weiss, H. A., Gopal, R., Matta, M., Paul, J. L., Brown, D. W. G., Hayes, R. J., Mabey, D. C. W., Bélec, L.	2000	Interactions between herpes simplex virus type 2 and human immunodeficiency virus type 1 infection in African women: opportunities for intervention	central Africa (CAR)	cross sectional study	300	Journal of Infectious Diseases	biological relationship: comparing serology, genital DNA and shedding in HIV infected and non infected	HSV shedding, antibody presence and HSV DNA presence were all more prevalent in HIV positive persons. Positive significant correlation between HIV RNA and HSV-2 DNA levels in genitals in dually infected women. They suggested more RCT research with HIV shedding or incidence as outcomes
Weiss, H. A., Buvé, A., Robinson, N. J., Dyck, E. van, Kahindo, M., Anagonou, S., Musonda, R., Zekeng, L., Morison, L., Caraël, M., Laga, M., Hayes, R. J.	2001	The epidemiology of HSV-2 infection and its association with HIV infection in four urban African populations	West, East and Southern Africa	cross sectional study	2000	AIDS	epidemiological /prevalence relationship	strong association between HSV-2 and Hiv prevalence (aOR between 4 and 8 in different groups)

<p>Auvert, B.,Ballard, R.,Campbell, C.,Caraël, M.,Carton, M.,Fehler, G.,Gouws, E.,MacPhail, C.,Taljaard, D.,Dam, J. van,Williams, B.</p>	<p>2001</p>	<p>HIV infection among youth in a South African mining town is associated with herpes simplex virus-2 seropositivity and sexual behaviour</p>	<p>Southern Africa</p>	<p>cross sectional study</p>	<p>1507</p>	<p>AIDS</p>	<p>epidemiological /prevalence relationship</p>	<p>HSV-2 a strong independent RF for HIV (OR 5.3 for men and 8.4 for women). Hsv plays major role in spread of HIV. Suggest prompt treatment of STIs and encourage condom use and school based sexual education</p>
<p>Gray RH, Wawer MJ, Brookmeyer R, Sewankambo NK, Serwadda D, Wabwire-Mangen F</p>	<p>2001</p>	<p>Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1-discordant couples in Rakai, Uganda</p>	<p>East Africa</p>			<p>The Lancet</p>		

McClelland, R. S., Wang, C. C., Overbaugh, J., Richardson, B. A., Corey, L., Ashley, R. L., Mandaliya, K., Ndinya-Achola, J., Bwayo, J. J., Kreiss, J. K.	2002	Association between cervical shedding of herpes simplex virus and HIV-1	East Africa	cross sectional study	200	AIDS	Biological: relationship between cervical shedding	significant association between HIV RNA and HSV DNA cervical shedding (r=0.24 Pearson). Researchers suggest more prospective studies to investigate relationship between non ulcerative HSV reactivation and HIV shedding
Mbizvo, E. M., Sia, E. M., Stray-Pedersen, B., Chirenje, M. Z., Munjoma, M., Hussain, A.	2002	Association of herpes simplex virus type 2 with the human immunodeficiency virus among urban women in Zimbabwe	Southern Africa	cross sectional study	393	International Journal of STD & AIDS	epidemiological /prevalence relationship	HSV-2 positive women were twice as likely to be HIV positive (OR 2.05). Hsv-1 thought to contribute more to HIV than syphilis. Authors communicate urgent need for HSV 2 vaccine

Rodríguez, M. del M. P., Obasi, A., Mosh, F., Todd, J., Brown, D., Chungalucha, J., Mabey, D., Ross, D., Grosskurth, H., Hayes, R.	2002	Herpes simplex virus type 2 infection increases HIV incidence: a prospective study in rural Tanzania	East Africa	unmatched case control study nested within a prospective RCT	763	AIDS	epidemiological : prevalent HSV and incident HIV	significant association between HSV and HIV incidence. Stronger in men (OR 6.2) than women (OR 1.32). Stronger association in those who seroconverted during study (new HSV infections). Population attributable fraction of incident HIV due to HSV was 74% in men and 22% in women. HSV plays big role in HIV transmission in Tanzania and urgent need for HSV control measures to control HIV in Africa.
Ahmed, H. J., Mbwana, J., Gunnarsson, E., Ahlman, K., Guerino, C., Svensson, L. A., Mhalu, F., Lagergard, T.	2003	Etiology of genital ulcer disease and association with human immunodeficiency virus infection in two Tanzanian cities	East Africa	cross sectional study	195	Sexually Transmitted Diseases	epidemiological /prevalence relationship	HIV prevalence significant higher in HSV positive people than negative in all areas. Women with HSV more likely to be HIV positive than men with HSV

Mbopi-Kéou, F. X., Legoff, J., Grésenguet, G., Ali, Si-Mohamed, Matta, M., Mayaud, P., Andreoletti, L., Malkin, J. E., Weiss, H., Brown, D., Bélec, L.	2003	Genital shedding of herpes simplex virus-2 DNA and HIV-1 RNA and proviral DNA in HIV-1- and herpes simplex virus-2-coinfected African women	central Africa (CAR)	cross sectional study	300	JAIDS, Journal of Acquired Immune Deficiency Syndromes	biological: HIV pro vira DNA genital load in dually infected persons (effect of HSV on genital shedding)/transmission	those infected with serum HSV and HIV were twice as likely to be shedding HSV than those HSV positive and HIV negative. No association between genital proviral HIV DNA and genital HSV DNA levels, or between genital HIV RNA and genital HSV DNA shedding. There was a significant correlation between genital HIV RNA and genital HSV dNA amongst dually infected women, but only in HSV shedders.
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<p>Serwadda, D., Gray, R. H., Sewankambo, N. K., Wabwire-Mangen, F., Chen, M. Z., Quinn, T. C., Lutalo, T., Kiwanuka, N., Kigozi, G., Nalugoda, F., Meehan, M. P., Morrow, R. A., Wawer, M. J.</p>	2003	<p>Human immunodeficiency virus acquisition associated with genital ulcer disease and herpes simplex virus type 2 infection: a nested case-control study in Rakai, Uganda</p>	East Africa	case control study	248	Journal of Infectious Diseases	biological: timing of HSV relative to HIV seroconversion	<p>those who seroconverted (HIV) were more likely to be HSV seropositive (OR 1.7), HIV viral load was higher in dually infected</p>
<p>Reynolds, S. J., Risbud, A. R., Shepherd, M. E., Zenilman, J. M., Brookmeyer, R. S., Paranjape, R. S., Divekar, A. D., Gangakhedkar, R. R., Ghate, M. V., Bollinger, R. C., Mehendale, S. M.</p>	2003	<p>Recent herpes simplex virus type 2 infection and the risk of human immunodeficiency virus type 1 acquisition in India</p>	South Asia	cohort study	2737	Journal of Infectious Diseases	effect of genital herpes (new and old infections) on HIV acquisition	<p>HSV prevalent cases more likely to acquire HIV (hazard ratio 1.67). Stronger relationship between recent incident HSV (<6m) and HIV acquisition (hazard ratio 3.81). Suggest that HSV prevention will help reduce HIV acquisition risk</p>

Baeten, J. M., McClelland, R. S., Corey, L., Overbaugh, J., Lavreys, L., Richardson, B. A., Wald, A., Mandaliya, K., Bwayo, J. J., Kreiss, J. K.	2004	Vitamin A supplementation and genital shedding of herpes simplex virus among HIV-1-infected women: a randomized clinical trial	East Africa	RCT	376	Journal of Infectious Diseases	effect of vitamin A on HSV shedding in dually infected people	vitamin A unlikely to reduce vaginal HSV 2 shedding in dually infected, secondary finding was that those who were HSV shedding had higher HIV shedding
Duffus, W. A., Mermin, J., Bunnell, R., Byers, R. H., Odongo, G., Ekwaru, P., Downing, R.	2005	Chronic herpes simplex virus type-2 infection and HIV viral load	East Africa	cross sectional study	339	International journal of STD & AIDS	natural history of HSV and HIV coinfection: effect of HSV on viral load and cd4	coinfection associated with higher HIV viral load. Chronic HSV may have a negative impact on clinical course of HIV
Nadal, S. R., Calore, E. E., Manzione, C. R., Horta, S. C., Ferreira, A. F., Almeida, L. V.	2005	Hypertrophic herpes simplex simulating anal neoplasia in AIDS patients: report of five cases	South America	case series	5	Diseases of the Colon and Rectum	effect of HSV on HIV clinical course/natural hx: anal neoplasia	HSV 2 may cause verrucous lesion that can lead to neoplasia in AIDS pts on HAART

Gita, Ramjee, Williams, B., Gouws, E., Dyck, E. van, Deken, B. de, Karim, S. A.	2005	The impact of incident and prevalent herpes simplex virus-2 infection on the incidence of HIV-1 infection among commercial sex workers in South Africa	Southern Africa	cohort study	187	JAIDS, Journal of Acquired Immune Deficiency Syndromes	effect of incident and prevalent HSV on HIV acquisition	no sig difference in HIV incidence between people who were HSV positive or negative throughout trial. However, those with incident HSV were more likely to acquire HIV than those with prevalent HSV (hazard ratio 6). So, suggests that new HSV infection increases HIV acquisition risk and the risk decreases with time, this effect seems greater in men.
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<p>Chu, K., Jiamton, S., Pepin, J., Cowan, F., Mahakkanukrauh, B., Suttent, R., Robinson, N. J., Deslandes, S., Frost, E., Chaisilwattana, P., Suthipinittharm, P., Grosskurth, H., Brown, D., Jaffar, S.</p>	2006	<p>Association between HSV-2 and HIV-1 viral load in semen, cervico-vaginal secretions and genital ulcers of Thai men and women</p>	East Asia	cross sectional study	104	International Journal of STD & AIDS	effect of HSV on HIV viral load in different samples	<p>presence of HSV shedding did not affect HIV viral load in semen and vagina. Findings suggest that HSV does not cause increased viral loads in genital secretions.</p>
<p>Cowan, F. F., Pascoe, S. J. S., Barlow, K. L., Langhaug, L. F., Jaffar, S., Hargrove, J. W., Robinson, N. J., Latif, A. S., Bassett, M. T., Wilson, D., Brown, D. W. G., Hayes, R. J.</p>	2006	<p>Association of genital shedding of herpes simplex virus type 2 and HIV-1 among sex workers in rural Zimbabwe</p>	Southern Africa	cross sectional study	214	AIDS	Shedding/transmission	<p>almost all HIV positive were co infected (95%). No apparent relationship between HSV shedding and HIV 1 shedding</p>

Lama, J. R.,Lucchetti, A.,Suarez, L.,Laguna- Torres, V. A.,Guanira, J. V.,Pun, M.,Montano, S. M.,Celum, C. L.,Carr, J. K.,Sanchez, J.,Bautista, C. T.,Sanchez, J. L.	2006	Association of herpes simplex virus type 2 infection and syphilis with human immunodeficiency virus infection among men who have sex with men in Peru	South America	cross sectional study	3280	Journal of Infectious Diseases	prevalence	80% of HIV seropositive were HSV2 seropositive. Hsv2 seropositivity a significant predictor of HIV seropositivity. Hsv control measure should help reduce HIV infection in msmin Peru
Ouedraogo, A.,Nagot, N.,Vergne, L.,Konate, I.,Weiss, H. A.,Defer, M. C.,Foulongne, V.,Sanon, A.,Andonaba, J. B.,Segondy, M.,Mayaud, P.,Perre, P. D. van	2006	Impact of suppressive herpes therapy on genital HIV-1 RNA among women taking antiretroviral therapy: a randomized controlled trial	West Africa	RCT	60	AIDS	effect of HSV on genital HIV rna SHEDDING	overall no association between valaciclovir use and HIV shedding. But amongst the HIV shedders only , valacyclovir was associated with reduce genital HIV shedding. Conc: HSV-2 may cause replication of genital HIV in dually infected women on haart

Ao TTH, Sam NE, Masenga EJ, Seage GR, III, Kapiga SH	2006	Human immunodeficiency virus type 1 among bar and hotel workers in northern Tanzania: the role of alcohol, sexual behavior, and herpes simplex virus type 2	East Africa			Sexually Transmitted Diseases.		
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Legoff, Jérôme, Bouhlal, Hicham, Grésenguet, Gérard, Weiss, Helen, Khonde, Nzambi, Hocini, Hakim, Désiré, Nathalie, Si-Mohamed, Ali, de Dieu Longo, Jean, Chemin, Cécile, Frost, Eric, Pépin, Jacques, Malkin, Jean-Elie, Mayaud, Philippe, Bélec, Laurent	2006	Real-time PCR quantification of genital shedding of herpes simplex virus (HSV) and human immunodeficiency virus (HIV) in women coinfected with HSV and HIV	West and central Africa	cross sectional study	269	Journal of clinical microbiology	accuracy of real time pcr in detecting HSV and HIV shedding in dually infected persons	real time PCR is a suitable method of measuring HIV and HSV shedding for future studies
Santos, F. C., Oliveira, S. A. de, Setúbal, S., Camacho, L. A. B., Faillace, T., Leite, J. P. G., Velarde, L. G. C.	2006	Seroepidemiological study of herpes simplex virus type 2 in patients with the acquired immunodeficiency syndrome in the City of Niterói, Rio de Janeiro, Brazil	South America	cross sectional study	150	Memórias do Instituto Oswaldo Cruz	associations in prevalence	52% of participant were HSV seropositive. Only 20% of HSV positive were aware of their infection.

LeGoff, J.,Weiss, H. A.,Gresenguet, G.,Nzambi, K.,Frost, E.,Hayes, R. J.,Mabey, D. C. W.,Malkin, J. E.,Mayaud, P.,Belec, L.	2007	Cervicovaginal HIV-1 and herpes simplex virus type 2 shedding during genital ulcer disease episodes	West and central Africa - urban	cross sectional study	441	AIDS	correlates of HSV and HIV SHEDDING	genital herpes infection was associated with increased genital HIV shedding and plasma HIV viral load in co infected women with genital ulcer
Ziyaeyan, M.,Alborzi, A.,Japoni, A.,Kadivar, M.,Davaranah, M. A.,Pourabbas, B.,Abassian, A.	2007	Frequency of acyclovir-resistant herpes simplex viruses isolated from the general immunocompetent population and patients with acquired immunodeficiency syndrome	South Asia	cross sectional study	133	International Journal of Dermatology	occurrence of acyclovir resistance HSV strains in AIDS patients	AIDS patients are much more likely to be infected with acyclovir resistant strains of HSV2. alternative anti virals should be used in AIDS pts
Zuckerman, R. A.,Lucchetti, A.,Whittington, W. L. H.,Sánchez, J.,Coombs, R. W.,Zuñiga, R.,Magaret, A. S.,Wald, A.,Corey, L.,Celum, C.	2007	Herpes simplex virus (HSV) suppression with valacyclovir reduces rectal and blood plasma HIV-1 levels in HIV-1/HSV-2-seropositive men: a randomized, double-blind, placebo-controlled crossover trial	South America	cross over RCT	20	Journal of Infectious Diseases	effect of valacyclovir on genital and serum HIV levels	valacyclovir was associated with a significant reduction in rectal and plasma HIV levels in co-infected msm not on ART. Valacyclovir may be useful in affecting the clinical course of HIV in coinfecting men not on ART and also may reduce transmission.

Drake, Alison L.,John-Stewart, Grace C.,Wald, Anna,Mbori-Ngacha, Dorothy A.,Bosire, Rose,Wamalwa, Dalton C.,Lohman-Payne, Barbara L.,Ashley-Morrow, Rhoda,Corey, Lawrence,Farquhar, Carey	2007	Herpes simplex virus type 2 and risk of intrapartum human immunodeficiency virus transmission	East Africa	nested case control study	175	Obstetrics and gynecology	transmission: effect of HSV2 on HIV transmission during birth	87% of the pregnant mothers with HIV were dually had HSV.
Baeten, J. M.,Benki, S.,Chohan, V.,Lavreys, L.,McClelland, R. S.,Mandaliya, K.,Ndinya-Achola, J. O.,Jaoko, W.,Overbaugh, J.	2007	Hormonal contraceptive use, herpes simplex virus infection, and risk of HIV-1 acquisition among Kenyan women	East Africa	cohort study	1206	AIDS	effect of genital herpes infection on the relationship between hormonal contraceptive use and HIV ACQUISITION	both hormonal contraceptives and HSV 2 infection were separately associated with acquisition, however HSV infection did not increase the HIV risk in hormone contraceptive users. They both increased the risk separately.

Brown, J. M., Wald, A., Hubbard, A., Rungruengthanaakit, K., Chipato, T., Rugpao, S., Mmiro, F., Celentano, D. D., Salata, R. S., Morrison, C. S., Richardson, B. A., Padian, N. S.	2007	Incident and prevalent herpes simplex virus type 2 infection increases risk of HIV acquisition among women in Uganda and Zimbabwe	East and Southern Africa	prospective cohort study	4531	AIDS	effect of incident and prevalent HSV on HIV acquisition	prevalent and incident HSV associated with higher risk of HIV acquisition in both countries. Incident HSV had more of an effect (hazard ratio 4.6 to 8.6). Hsv had a greater effect in zimbabwe. POPULATION ATTRIBUTABLE RISK for HIV due to incidence and prevalent HSV was 42% in India and 65% in zimbabwe. HSV PLAYS BIG ROLE IN HIV ACQUISITION.
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Rebbapragada, Anuradha, Wachihi, Charles, Pettengell, Christopher, Sunderji, Sherzana, Huibner, Sanja, Jaoko, Walter, Ball, Blake, Fowke, Keith, Mazzulli, Tony, Plummer, Francis A., Kaul, Rupert	2007	Negative mucosal synergy between Herpes simplex type 2 and HIV in the female genital tract	East Africa	cross sectional study	102	AIDS (London, England)	mucosal interactions between HSV and HIV in the genital tract and effect on transmission	found 'negative mucosal synergy' where there is a vicious cycle. Genital HSV causes increased HIV target cells- HIV infection affects genital HSV immune regulation- HSV reactivation causes increased transmission of HSV and HIV.
Freeman, E. E., Orroth, K. K., White, R. G., Glynn, J. R., Bakker, R., Boily, M. C., Habbema, D., Buvé, A., Hayes, R.	2007	Proportion of new HIV infections attributable to herpes simplex 2 increases over time: simulations of the changing role of sexually transmitted infections in sub-Saharan African HIV epidemics	West, East and Southern Africa	cross sectional modelling study	999	Sexually Transmitted Infections	modelling effect of HSV on HIV incidence (Population attributable fraction)	HSV2 has an increasing effect on HIV incidence as a model epidemic progresses (PAF of 35-48% 15 years in to epidemic). Effect of HSV on HIV infectivity (transmission) thought to have more of an effect than effect of HSV on HIV acquisition. Hsv2 programmes may be essential in HIV epidemics.

Nagot, N., Ouédraogo, A., Foulongne, V., Konaté, I., Weiss, H. A., Vergne, L., Defer, M. C., Djagbaré, D., Sanon, A., Andonaba, J. B., Becquart, P., Segondy, M., Vallo, R., Sawadogo, A., Perre, P. van de, Mayaud, P.	2007	Reduction of HIV-1 RNA levels with therapy to suppress herpes simplex virus	West aFrica	RCT	136	New England Journal of Medicine	HIV shedding/transmission: effect of valcyclovir	valcyclovir significantly reduced genital and plasma HIV rna level in dually infected women not on HAART. May be useful in HIV control.
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<p>Kapiga, S. H., Sam, N. E., Bang, H. J., Ni, Q. H., Ao, T. T. H., Kiwelu, I., Chiduo, S., Ndibe, U., Seage, G., III, Coplan, P., Shao, J., Rosenberg, Z. F., Essex, M.</p>	<p>2007</p>	<p>The role of herpes simplex virus type 2 and other genital infections in the acquisition of HIV-1 among high-risk women in Northern Tanzania</p>	<p>East Africa</p>	<p>cohort study</p>	<p>845</p>		<p>effect of HSV on HIV ACQUISITION</p>	<p>risk of HIV acquisition was increased in those with prevalent genital HSV (hazard ratio 4.3) and even more elevated in incident HSV (HR .55). Hsv2 is a big part of HIV acquisition</p>
<p>Celum, C., Wald, A., Hughes, J., Sanchez, J., Reid, S., Delany- Moretlwe, S., Cowan, F., Casapia, M., Ortiz, A., Fuchs, J., Buchbinder, S., Koblin, B., Zwierski, S., Rose, S., Wang, J., Corey, L.</p>	<p>2008</p>	<p>Effect of aciclovir on HIV-1 acquisition in herpes simplex virus 2 seropositive women and men who have sex with men: a randomised, double- blind, placebo- controlled trial</p>	<p>South America Southern Africa</p>	<p>RCT</p>	<p>3172</p>		<p>HIV ACQUISITION: effect of acyclovir</p>	<p>Acyclovir did NOT reduce HIV acquisition in HSV seropositive MSM and women</p>

Dunne, E. F ; Whitehead, S ; Sternberg, M ; Thepamnuay, S ; Leelawiwat, W ; McNicholl, J. M ; Sumanapun, S. Tappero, J. W ; Siriprasiri, T ; Markowitz, L.	2008	Suppressive acyclovir therapy reduces HIV cervicovaginal shedding in HIV- and HSV-2-infected women, Chiang Rai, Thailand	East Asia			JAIDS, Journal of Acquired Immune Deficiency Syndromes		Acyclovir reduced HIV genital shedding and plasma viral load among HIV-1- and herpes simplex virus type 2-coinfected women
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Watson-Jones, D., Weiss, H. A., Rusizoka, M., Changalucha, J., Baisley, K., Mugeye, K., Tanton, C., Ross, D., Everett, D., Clayton, T., Balira, R., Knight, L., Hambleton, I., Goff, J. le, Belec, L., Hayes, R.	2008	Effect of herpes simplex suppression on incidence of HIV among women in Tanzania	East Africa	RCT	821	New England Journal of Medicine	effect of HSV suppression on HIV acquisition (acyclovir)	acyclovir had NO effect on hi acquisition in tanzanian women with HSV
Mayaud, P., Nagot, N., Konaté, I., Ouedraogo, A., Weiss, H. A., Foulongne, V., Defer, M. C., Sawadogo, A., Segondy, M., Perre, P. van de	2008	Effect of HIV-1 and antiretroviral therapy on herpes simplex virus type 2: a prospective study in African women	West Africa	cohort study	120	Sexually Transmitted Infections	effect of HIV and haart on HSV natural hx	those with HIV had more frequent HSV recurrence. Haart did not significantly help. Hsv therapy still recommended for those with HSV and on haart.

Abu-Raddad, Laith J.,Magaret, Amalia S.,Celum, Connie,Wald, Anna,Longini, Ira M., Jr.,Self, Steven G.,Corey, Lawrence	2008	Genital herpes has played a more important role than any other sexually transmitted infection in driving HIV prevalence in Africa	East and West Africa	modelling study	999	PloS one	contribution of HSV to HIV (PAF as an outcome)	HSV2 has had a huge role in HIV epidemics in SSA. PAF up to 35% in general populations in Africa. Hsv has facilitated spread of HIV through low risk groups. This supports need for a HSV 2 vaccine
Baeten, J. M.,Strick, L. B.,Lucchetti, A.,Whittington, W. L. H.,Sanchez, J.,Coombs, R. W.,Magaret, A.,Wald, A.,Corey, L.,Celum, C.	2008	Herpes simplex virus (HSV)-suppressive therapy decreases plasma and genital HIV-1 levels in HSV-2/HIV-1 coinfecting women: a randomized, placebo-controlled, cross-over trial	South America	cross over RCT	20	Journal of Infectious Diseases	effect of valacyclovir on plasma and genital HIV (transmission)	valacyclovir was associated with reduced plasma and genital HIV. May be useful in reducing HIV transmission in dually infected
Anuradha, K.,Singh, H. M.,Gopal, K. V. T.,Rao, G. R. R.,Ramani, T. V.,Jyothi, Padmaja	2008	Herpes simplex virus 2 infection: a risk factor for HIV infection in heterosexuals	South Asia	case control study	100	Indian Journal of Dermatology, Venereology & Leprology	comparing prevalence of HSV in HIV pos and neg	prevalence of HSV significantly higher in HIV pos

Glynn, J. R.,Crampin, A. C.,Ngwira, B. M. M.,Ndhlovu, R.,Mwanyongo, O.,Fine, P. E. M.	2008	Herpes simplex virus type 2 trends in relation to the HIV epidemic in northern Malawi	Southern Africa	cross sectional study	999	Sexually Transmitted Infections	long term trends of HSV-2 compared to HIV /natural history/prevalence	HSV2 was likely to already be highly prevalent before HIV epidemic. High HSV prevalence not likely to be a consequence of HIV
Benjamin, R. J.,Busch, M. P.,Fang, C. T.,Notari, E. P.,Puren, A.,Schoub, B. D.,Tobler, L. H.,Hogrefe, W.,Heyns, A. P. du,Stramer, S. L.,Crookes, R. L.	2008	Human immunodeficiency virus-1 infection correlates strongly with herpes simplex virus-2 (genital herpes) seropositivity in South African and United States blood donations	Southern Africa	cross sectional study	625	Transfusion	prevalence /epi	HSV 2 genital infection strongly correlated to HIV

<p>Bollen, L. J. M., Whitehead, S. J., Mock, P. A., Leelawiwat, W., Asavapiriyant, S., Chalermchokchareonkit, A., Vanprapar, N., Chotpitayasunondh, T., McNicholl, J. M., Tappero, J. W., Shaffer, N., Chuachoowong, R.</p>	2008	<p>Maternal herpes simplex virus type 2 coinfection increases the risk of perinatal HIV transmission: possibility to further decrease transmission?</p>	East Asia	longitudinal survey	307	AIDS	<p>effect of maternal genital herpes on perinatal HIV transmission/shedding in dually infected people</p>	<p>maternal HSV infection associated with increased risk of perinatal HIV transmission. Increased risk of intrapartum HIV transmission in those who were shedding.</p>
<p>Moira A. McMahon‡, Janet D. Siliciano§, Jun Lai¶, Jun O. Liu‡, James T. Stivers‡, Robert F. Siliciano§¶, and Rahul M. Kohli§</p>	2008	<p>The Antiherpetic Drug Acyclovir Inhibits HIV Replication and Selects the V75I Reverse Transcriptase Multidrug Resistance Mutation*</p>	sub saharan Africa	lab study	999	journal of biological chemistry	<p>effect of acyclovir on ART resistance in HIV patients (V5721 gene)</p>	<p>episodic therapy with acyclovir may be associated with mutation in HIV reverse transcriptase gene leading to ART resistance. Clinicians may need to be cautious when starting dually infected people not on haart on acyclovir</p>

Cowan, F. M., Pascoe, S. J., Barlow, K. L., Langhaug, L. F., Jaffar, S., Hargrove, J. W., Robinson, N. J., Bassett, M. T., Wilson, D., Brown, D. W. G., Hayes, R. J.	2008	A randomised placebo-controlled trial to explore the effect of suppressive therapy with acyclovir on genital shedding of HIV-1 and herpes simplex virus type 2 among Zimbabwean sex workers	Southern Africa	RCT	125	Sexually Transmitted Infections	effect of acyclovir on HIV and HSV genital shedding	acyclovir reduced HSV shedding but did not reduce HIV shedding. May be explained by low adherence or small sample size, larger clinical trials needed.
Nakubulwa, S., Mirembe, F. M., Kaye, D. K., Kaddu-Mulindwa, D.	2009	Association between HSV-2 and HIV serostatus in pregnant women of known HIV serostatus attending Mulago Hospital antenatal clinic, Kampala, Uganda	East Africa	case control study	250	Journal of Infection in Developing Countries	compare HSV prevalence in HIV neg and pos pregnant women	odds of HSV positivity was almost 4 times higher in HIV pos (OR 3.7)

Sobngwi-Tambekou, J., Taljaard, D., Lissouba, P., Zarca, K., Puren, A., Lagarde, E., Auvert, B.	2009	Effect of HSV-2 serostatus on acquisition of HIV by young men: results of a longitudinal study in orange farm, South Africa	Southern Africa	longitudinal study nested within a RCT	2974	Journal of Infectious Diseases	effect of HSV on HIV acquisition in men	prevalent HSV caused a increase in HIV acquisition (incident rate ratio = 3.3). Incident HSV had even greater effect (IRR= 7.0). Population attributable fraction of incident HIV caused by HSV was 27.8%. HSV does not alter the protective effect size of circumcision on HIV acquisition
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Gray, R. H.,Serwadda, D.,Tobian, A. A. R.,Chen, M. Z.,Makumbi, F.,Suntoke, T.,Kigozi, G.,Nalugoda, F.,Iga, B.,Quinn, T. C.,Moulton, L. H.,Laeyendecker, O.,Reynolds, S. J.,Kong, X. R.,Wawer, M. J.	2009	Effects of genital ulcer disease and herpes simplex virus type 2 on the efficacy of male circumcision for HIV prevention: analyses from the Rakai trials	East Africa	RCT	2756	PLoS Medicine	effect of HSV on the effectiveness of circumcision in preventing HIV acquisition	HSV di not have a significant effect on the effectiveness of circumcision to prevent HIV acquisition, suggesting that the protective effect mainly comes from removal of HIV target cells in the foreskin tissue.
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Johnson, K. E., Sherman, M. E., Ssempiija, V., Tobian, A. A. R., Zenilman, J. M., Duggan, M. A., Kigozi, G., Serwadda, D., Wawer, M. J., Quinn, T. C., Rabkin, C. S., Gray, R. H.	2009	Foreskin inflammation is associated with HIV and herpes simplex virus type-2 infections in Rakai, Uganda	East Africa	cross sectional study nested within RCT	233	AIDS	effect of HSV andn HIV on foreskin inflammation	HSV and HIV increased foreskin inflammation separately and together to a greater extent. Foreskin inflammation may be implicated in HIV transmission and acquisition
Zuckerman, R. A., Lucchetti, A., Whittington, W. L. H., Sánchez, J., Coombs, R. W., Magaret, A., Wald, A., Corey, L., Celum, C.	2009	HSV suppression reduces seminal HIV-1 levels in HIV-1/HSV-2 co-infected men who have sex with men	South America	RCT	20	AIDS	effect of HSV therapy on seminal HIV shedding in dually infected men	valcyclovir therapy reduced seminal HIV shedding in dually infected msm in Peru. Another trial will be carried out to validate this with HIV transmission as an outcome

Mayaud, P., LeGoff, J., Weiss, H. A., Grésenguet, G., Nzambi, K., Bouhlab, H., Frost, E., Pépin, J., Malkin, J. E., Hayes, R. J., Mabey, D. C. W., Bélec, L.	2009	Clinical and virologic response to episodic acyclovir for genital ulcers: a randomized placebo-controlled trial	West and central Africa	RCT	441	Journal of Infectious Diseases	effect of episodic acyclovir on HIV transmission parameters in dually infected	episodic acyclovir reduced cervicovaginal HSV shedding but did not reduce genital and plasma HIV RNA loads. Trials of longer duration of therapy should be done
Freeman, Esther E., White, Richard G., Bakker, Roel, Orroth, Kate K., Weiss, Helen A., Buvé, Anne, Hayes, Richard J., Glynn, Judith R.	2009	Population-level effect of potential HSV2 prophylactic vaccines on HIV incidence in sub-Saharan Africa	East West and Southern African cities	modelling study based on population based data	999	Vaccine	effect of HSV vaccine on HIV incidence	HSV vaccine may have substantial effect on HIV incidence (theoretical). More should be done to make one available sooner
Baggaley, Rebecca F., Griffin, Jamie T., Chapman, Ruth, Hollingsworth, T. Déirdre, Nagot, Nicolas, Delany,	2009	Estimating the public health impact of the effect of herpes simplex virus suppressive therapy on plasma HIV-1 viral load	West and Southern Africa	modelling study	999	AIDS (London, England)	effect of HSV therapy on viral load	limited effect of HSV therapy on HIV viral load

Sinead,Mayaud, Philippe,de Wolf, Frank,Fraser, Christophe,Ghani , Azra C.,Weiss, Helen A.								
Baltzer, H.,Chege, D.,Rebbapragada, A.,Wachihi, C.,Shin, L. Y. Y.,Kimani, J.,Ball, T. B.,Jaoko, W.,Plummer, F. A.,Kaul, R.	2009	Relative HIV resistance in Kenyan sex workers is not due to an altered prevalence or mucosal immune impact of herpes simplex virus type 2 infection	East Africa	cross sectional study	139	Current HIV Research	investigating whether HSV was implicated in relative HIV resistance in FSW in Kenya	relative HIV resistance was not likely to be due to decreased HSV prevalence or mucosal immune impact of genital HSV
Mahiane, S. G.,Legeai, C.,Taljaard, D.,Latouche, A.,Puren, A.,Peillon, A.,Bretagnolle, J.,Lissouba, P.,Nguéma, E. P. N.,Gassiat, E.,Avert, B.	2009	Transmission probabilities of HIV and herpes simplex virus type 2, effect of male circumcision and interaction: a longitudinal study in a township of South Africa	Southern Africa	modelling study using longitudinal study data	3274	AIDS	the effect of HSV on female to male sexual transmission of HIV (and vice versa).	HSV in either partner increased female to male risk of transmission of HIV (RR 3.0). HIV in either partner increased female to male risk of transmission of HSV (RR 2.5).

Tobian AAR, Ssempijja V, Kigozi G, Oliver AE, Serwadda D, Makumbi F	2009	Incident HIV and herpes simplex virus type 2 infection among men in Rakai, Uganda.	Southern Africa			AIDS		
Tanton, C.,Weiss, H. A.,Rusizoka, M.,LeGoff, J.,Changalucha, J.,Baisley, K.,Mugeye, K.,Everett, D.,Belec, L.,Clayton, T. C.,Ross, D. A.,Hayes, R. J.,Watson-Jones, D.	2010	Long-term impact of acyclovir suppressive therapy on genital and plasma HIV RNA in Tanzanian women: a randomized controlled trial	East Africa	RCT	484	Journal of Infectious Diseases	long term effect of acyclovir on HIV genital and plasma load in dually infected women	acyclovir did not show significant effect on HIV shedding parameters

LeGoff, J., Tanton, C., Delaugerre, C., Weiss, H. A., Changalucha, J., Ross, D. A., Mugeye, K., Belec, L., Hayes, R. J., Watson-Jones, D.	2010	No selection of nucleoside reverse transcriptase inhibitor resistance associated mutations by acyclovir suppressive therapy in herpes simplex virus-2/HIV-1 dually infected persons	East Africa	cross sectional study nested within RCT	21		does acyclovir induce mutations that cause NRTI resistance in dually infected?	acyclovir did not cause the mutations in dually infected women from Tanzania who had received bd acyclovir 400mg for 12 months
C. Celum, A. Wald, J.R. Lingappa, A.S. Magaret, R.S. Wang, N. Mugo, A. Mujugira, J.M. Baeten, J.I. Mullins, J.P. Hughes, E.A. Bukusi, C.R. Cohen	2010	Acyclovir and Transmission of HIV-1 from Persons Infected with HIV-1 and HSV-2	Southern Africa	RCT	3408	new England Journal of Medicine	effect of standard dose acyclovir on forward transmission of HIV in dually infected	although acyclovir reduced plasma HIV rna , it did not reduce HIV transmission in heterosexual HIV discordant couples
Munjoma, M. W., Mapingure, M. P., Stray-Pedersen, B.	2010	Risk factors for herpes simplex virus type 2 and its association with HIV among pregnant teenagers in Zimbabwe	Southern Africa		176	Sexual Health	prevalence /epi	prevalence of HSV much higher in HIV infected (OR: 7.9)

Vickerman, P., Devine, A., Foss, A. M., Delany-Moretlwe, S., Mayaud, P., Meyer-Rath, G.	2011	The cost-effectiveness of herpes simplex virus-2 suppressive therapy with daily aciclovir for delaying HIV disease progression among HIV-1-infected women in South Africa	Southern Africa	modelling study using primary healthcare data, demographic data and participant data from a	999	Sexually Transmitted Diseases	cost effectiveness (cost per life year gained) of acyclovir daily in dually infected	acyclovir daily could be a cost effective strategy to extend women's lives who are dually infected and not started art. This is assuming acyclovir becomes cheaper and widely available at that price.
Charpentier, C., Koyalta, D., Ndinaromtan, M., Tchobkréo, B., Jenabian, M. A., Day, N., Si-Mohamed, A., Weiss, H., Bélec, L.	2011	Distribution of HIV-1 and HSV-2 epidemics in Chad revealing HSV-2 hot-spot in regions of high-risk HIV spread	central Africa	population based survey (national)	548	Journal of Infection in Developing Countries	national distribution of HIV and HSV in chad-prevalence	significant association between prevalence of HIV and HSV

Baeten, J. M., Lingappa, J., Beck, I., Frenkel, L. M., Pepper, G., Celum, C., Wald, A., Fife, K. H., Were, E., Mugo, N., Sanchez, J., Essex, M., Makhema, J., Kiarie, J., Farquhar, C., Corey, L.	2011	Herpes simplex virus type 2 suppressive therapy with acyclovir or valacyclovir does not select for specific HIV-1 resistance in HIV-1/HSV-2 dually infected persons	South America, Southern Africa, and East Africa	modelling study using RCT data (in vivo)	168	Journal of Infectious Diseases	does acyclovir or valacyclovir induce mutations that cause NRTI resistance in dually infected? (V751)	in vivo studies suggest that acyclovir and valacyclovir do NOT cause V751 mutations at normal dose (contrary to what McMahon found in in vitro studies)
Mugwanya, K., Baeten, J. M., Mugo, N. R., Irungu, E., Ngure, K., Celum, C.	2011	High-dose valacyclovir HSV-2 suppression results in greater reduction in plasma HIV-1 levels compared with standard dose acyclovir among HIV-1/HSV-2 coinfecting persons: a randomized, crossover trial	East Africa	cross over RCT	32	Journal of Infectious Diseases	high dose valacyclovir vs standard dose acyclovir in reducing plasma HIV RNA in dually infected	high dose valacyclovir reduced plasma HIV significantly more than standard dose acyclovir- high dose valacyclovir may be considered in the effort to delay clinical course of HIV and reduce HIV infectivity

Foss, A. M., Vickerman, P. T., Mayaud, P., Weiss, H. A., Ramesh, B. M., Reza-Paul, S., Washington, R., Blanchard, J., Moses, S., Lowndes, C. M., Alary, M., Watts, C. H.	2011	Modelling the interactions between herpes simplex virus type 2 and HIV: implications for the HIV epidemic in Southern India	South Asia (India)				Sexually Transmitted Infections	modelling HSV and HIV interaction: contribution of HSV-2 to HIV and modelled effect of a 'perfect' HSV suppressive treatment. PAF as a outcome	HSV-2 plays big role in transmission and acquisition of HIV in South India. Continuous suppressive HSV therapy may be useful in FSW and clients in South India. 35.5% of HIV incidence in FSW due to HSV-2.
Tanton, Clare, Weiss, Helen A., LeGoff, Jerome, Changalucha, John, Clayton, Tim C., Ross, David A., Belec, Laurent, Hayes, Richard J., Watson-Jones, Deborah	2011	Patterns of herpes simplex virus shedding over 1 month and the impact of acyclovir and HIV in HSV-2-seropositive women in Tanzania	East Africa	RCT	78		Sexually transmitted infections	effect of acyclovir on HIV shedding in dually infected	acyclovir did not significantly reduce HIV shedding in dually infected

Camara, M., Seydi, M., Dieye, T. N., Sow, P. S., Mboup, S., Kestens, L., Jennes, W.	2012	Association between herpes simplex virus type 2 and HIV-1 in a population of married couples from Dakar, Senegal	West Africa	cross sectional study	208	International Journal of STD & AIDS	prevalence of HSV in different HIV couple status	strong association in prevalence of HIV and HSV (OR 4.6) but no difference in HSV prevalence between HIV discordant and HIV concordant positive suggesting HSV is not a RF for HIV in this population
Ghebremichael, Musie, Habtzgi, Desale, Paintsil, Elijah	2012	Deciphering the epidemic synergy of herpes simplex virus type 2 (HSV-2) on human immunodeficiency virus type 1 (HIV-1) infection among women in sub-Saharan Africa	East Africa	cross sectional study random sample	1418	BMC research notes	prevalence of HSV and HIV +association	HSV positive women more likely to be HIV positive (OR: 2.7)
Drake, A. L.; Roxby, A. C.; Ongecha-Owuor, F.; Kiarie, J.; John-Stewart, G.; Wald, A.; Richardson, B. A.; Hitti, J.; Overbaugh, J.; Emery, S.; Farquhar, C.	2012	Valacyclovir suppressive therapy reduces plasma and breast milk HIV-1 RNA levels during pregnancy and postpartum: a randomized trial	East Africa	RCT	148	Journal of Infectious Diseases		

Reynolds, S. J., Makumbi, F., Newell, K., Kiwanuka, N., Ssebowa, P., Mondo, G., Boaz, I., Wawer, M. J., Gray, R. H., Serwadda, D., Quinn, T. C.	2012	Effect of daily aciclovir on HIV disease progression in individuals in Rakai, Uganda, co-infected with HIV-1 and herpes simplex virus type 2: a randomised, double-blind placebo-controlled trial	East Africa	RCT	440	Lancet Infectious Diseases	effect of acyclovir of hi disease progression (CD4 count as outcome)	acyclovir standard dose reduced rate of HIV disease progression in those with high baseline viral load
Roxby, A. C., Drake, A. L., Ongecha-Owuor, F., Kiarie, J. N., Richardson, B., Matemo, D. N., Overbaugh, J., Emery, S., John-Stewart, G. C., Wald, A., Farquhar, C.	2012	Effects of valacyclovir on markers of disease progression in postpartum women co-infected with HIV-1 and herpes simplex virus-2	East Africa	RCT	148	PLoS ONE	effect of valacyclovir on HIV disease progression (CD4 and viral load as outcome measures)	valacyclovir was associated with greater increases in CD4 and smaller increases in viral load. Could be useful for pregnant women and delay need for ART

Forhan, S. E., Dunne, E. F., Sternberg, M. R., Whitehead, S. J., Leelawiwat, W., Thepamnuay, S., Chen, C., Evans-Strickfaden, T. T., McNicholl, J. M., Markowitz, L. E.	2012	HIV-1 and herpes simplex virus type-2 genital shedding among co-infected women using self-collected swabs in Chiang Rai, Thailand	East Asia	longitudinal survey	67	International Journal of STD & AIDS	self collected samples for HIV and HSV shedding in dually infected	SCS useful for future studies in dually infected since it allows more frequent sampling of more people.
Mawak JD, Dashe N, Atseye AB, Agabi YA, Zakeri H	2012	Seroprevalence and co-infection of herpes simplex virus type 2 and human immunodeficiency virus in Nigeria	West Africa	Cross sectional survey		Shiraz E Medical Journal		

Janbakhsh, A., Mansouri, F., Vaziri, S., Sayad, B., Afsharian, M., Abedanpor, A.	2012	Seroepidemiology of herpes simplex virus type 2 (HSV2) in HIV infected patients in Kermanshah-Iran	South Asia	cross sectional study	335	Caspian Journal of Internal Medicine (CJIM)	prevalence	HSV prevalence in HIV positive people was low (6%) therefore HSV interventions are not necessary for HIV management in this part of Iran
Todd, J., Riedner, G., Maboko, L., Hoelscher, M., Weiss, H. A., Lyamuya, E., Mabey, D., Rusizoka, M., Belec, L., Hayes, R.	2013	Effect of genital herpes on cervicovaginal HIV shedding in women co-infected with HIV and HSV-2 in Tanzania	East Africa	longitudinal survey	131	PLoS ONE	effect of HSV on HIV shedding in co infected	data suggests HSV is associated with increased HIV shedding and hence transmissibility (not synonymous though). Data suggests that quantity of HSV genital shedding is a more prominent determinant of genital HIV shedding than presence of herpetic lesions.
Biraro, S., Kamali, A., White, R., Karabarinde, A., Ssendagala, J. N., Grosskurth, H., Weiss, H. A.	2013	Effect of HSV-2 on population-level trends in HIV incidence in Uganda between 1990 and 2007	East Africa	retrospective cohort	13,021	Tropical Medicine and International Health	long term effect of population level HSV on population level HIV incidence: epi	high PAF (60% in males and 70% in females) in this pop. However no association found between trends of HSV and HIV but this may be due to HIV incidence not changing much across the time.

Phiri, S., Zadrozny, S., Weiss, H. A., Martinson, F., Nyirenda, N., Chen, Cheng Yen, Miller, W. C., Cohen, M. S., Mayaud, P., Hoffman, I. F.	2013	Etiology of genital ulcer disease and association with HIV infection in Malawi	Southern Africa	cross sectional study	422	Sexually Transmitted Diseases	prevalence /epi	Hiv prevalence strongly associated with HSV . Hiv more prevalent in recurrent HIV rather than first episode
Muiru, Anthony N., Guthrie, Brandon L., Bosire, Rose, Merkel, Michele, Liu, Amy Y., Choi, Robert Y., Lohman-Payne, Barbara, Gatuguta, Ann, Mackelprang, Romel D., Kiarie, James N., Farquhar, Carey	2013	Incident HSV-2 infections are common among HIV-1-discordant couples	East Africa	prospective cohort study	469	The Journal of infectious diseases	effct of HIV on HSV incidence	high prevalence and incidence of HSV in HIV discordant couples in Kenya. Suggests that HSV therapy may be useful in reducing HSV and HIV transmission in high risk groups.

Celum, C.,Morrow, R. A.,Donnell, D.,Hong, T.,Hendrix, C. W.,Thomas, K. K.,Fife, K. H.,Nakku-Joloba, E.,Mujugira, A.,Baeten, J. M.	2014	Daily oral tenofovir and emtricitabine-tenofovir preexposure prophylaxis reduces herpes simplex virus type 2 acquisition among heterosexual HIV-1-uninfected men and women: a subgroup analysis of a randomized trial	East Africa	sub analysis of a RCT	1498	Annals of Internal Medicine	effect of daily PrEP on HSV incidence	daily oral tenofovir based PrEP reduced rate of HSV acquisition in heterosexual men and women. This is an added benefit of tenofovir based prep on top of HIV prevention
Chamoun-Emanuelli, Ana M.,Bobardt, Michael,Moncla, Bernard,Mankowski, Marie K.,Ptak, Roger G.,Gallay, Philippe,Chen, Zhilei	2014	Evaluation of PD 404,182 as an anti-HIV and anti-herpes simplex virus microbicide	conducted in US with view of developing countries	in vitro study	999	Antimicrobial agents and chemotherapy	evaluation of new microbicide PD in treating HIV and HSV	was previously known to kill HIV but study found that it is also effective in destroying HSV. Other tests suggest it is suitable for further investigation to becoming licensed virucidal

Kenyon C, Buyze J, Colebunders R.	2014	Classification of incidence and prevalence of certain sexually transmitted infections by world regions	Multi			International journal of infectious diseases	prevalence /epi	
Kenyon, C. R., Osbak, K., Buyze, J.	2014	The prevalence of HIV by ethnic group is correlated with HSV-2 and syphilis prevalence in Kenya, South Africa, the United Kingdom, and the United States	East and Southern Africa	cross sectional study	>20,000	Interdisciplinary Perspectives on Infectious Diseases	prevalence /epi	prev of HSV more common in HIV positive
Meque, I., Dubé, K., Feldblum, P. J., Clements, A. C. A., Zango, A., Cumbe, F., Chen, P. L., Ferro, J. J., Wijgert, J. H. van de	2014	Prevalence, incidence and determinants of herpes simplex virus type 2 infection among HIV-seronegative women at high-risk of HIV infection: a prospective study in beira, Mozambique	Southern Africa	prospective cohort study	411	PLoS ONE	risk of HIV in HSV pts	no association between being HSV positive at baseline and acquiring HIV

Ankamma, A.,Nagaraja, B.,Radha, P.,Reddy, B. K.,Venkatarao, B.	2014	Study of seroprevalence of HSV-2 among HIV seropositive individuals at S.V.R.R.G.G.H Tirupati	South Asia	cross sectional study	182	International Journal of Pharmaceutical Research and Bio-Science	prev	high prevalence in caes compared to control (sig)
Nakku-Joloba E, Kambugu F, Wasubire J, Kimeze J, Salata R, Albert JM	2014	Sero-prevalence of herpes simplex type 2 virus (HSV-2) and HIV infection in Kampala, Uganda	East Africa	cross sectional study		African Health Sciences	prev	
Behling, Juliane,Chan, Adrienne K.,Zeh, Clement,Nekesa, Carolyne,Heinzerling, Lucie	2015	Evaluating HIV Prevention Programs: Herpes Simplex Virus Type 2 Antibodies as Biomarker for Sexual Risk Behavior in Young Adults in Resource-Poor Countries	East Africa	cross sectional study	70,000	PloS one	the use of HSV incidence as a proxy marker for sexual risk behaviour and HIV infection (because HIV incidence is much lower and therefore a huge sample size would be required)	the anticipated association between HSV serostatus and sexual risk behaviour was not found. Likely due to social bias from the interviews on sexual behaviour. Still some potential though for HSV serostatus as a marker of HIV

Saramma, Jacob, Thatchina moorthy, Gopal, Sivasange etha, Kanagasabai, Anita, Durairaj, Kamala, Sushi, Ganesan, Arumugam	2015	Herpes Simplex Virus 2 infection in HIV-seropositive individuals in Tamil Nadu, India	South Asia	longitudinal survey	273	International Journal of Medical Science and Public Health	prevalence of HSV in HIV positive pts	HSV significantly more prevalent in HIV positive. More so in women than men.
Okango, E., Mwambi, H., Ngesa, O., Achia, T.	2015	Semi-parametric spatial joint modeling of HIV and HSV-2 among women in Kenya	East Africa	modelling study	999	PLoS ONE	joint spatial modelling the relationship between HIV and HSV	positive significant spatial relationship between HIV and HSV
Bharathi, V. C., Anaparty, Usharani	2015	Sero evaluation of coinfection of HIV and HSV-2	South Asia	cross sectional study	130	Journal of Pharmaceutical and Scientific Innovation (JPSI)	prevalence of HSV in HIV positive pts	high HSV prevalence in HIV positive (no control group though)

Low, A. J., Nagot, N., Weiss, H. A., Konate, I., Kania, D., Segondy, M., Meda, N., Perre, P. van de, Mayauda, P.	2016	Herpes simplex virus type-2 cervicovaginal shedding among women living with HIV-1 and receiving antiretroviral therapy in Burkina Faso: an 8-year longitudinal study	West Africa	cohort study	236	Journal of Infectious Diseases	effect of ART on vaginal shedding of HSV in dually infected	ART was associated with reduced genital HSV shedding over the 8 years.
Thienkrua, W., Todd, C. S., Chonwattana, W., Wimonasate, W., Chaikummao, S., Varangrat, A., Chitwarakorn, A., Griensven, F. van, Holtz, T. H.	2016	Incidence of and temporal relationships between HIV, herpes simplex II virus, and syphilis among men who have sex with men in Bangkok, Thailand: an observational cohort	East Asia	cohort study	960	BMC Infectious Diseases	temporal relationship between HIV and HSV	high incidence of HIV and HSV in this cohort. Timeframe (60m) was not enough to assess the temporal relationships between HSV and HIV
Daniels, B., Wand, H., Ramjee, G.	2016	Prevalence of Herpes Simplex Virus 2 (HSV-2) infection and associated risk factors in a cohort of HIV negative women in Durban, South Africa	Southern Africa	cohort study with a RCT	2236	BMC Research Notes	prevalence of HSV and HIV incidence	very high baseline HSV prevalence (65%). Hiv incidence significantly higher in those with prevalent HSV

Nwadike, V. U., Anaedobe, C. G., Azeez, R. A., Jinadu, S. S., Chigozie, J. O.	2018	Atypical presentation of genital herpes in a retroviral disease patient on highly active anti-retroviral therapy	West Africa	case study	1	African Journal of Clinical and Experimental Microbiology	is haart associated with increased risk of acyclovir resistant genital herpes and chrionic genita herpes?	HIV positive people on haart may have more severe forms of HSV and clinicalns should consider offering acyclovir
Kenyon, C. R.	2018	HIV prevalence by ethnic group covaries with prevalence of herpes simplex virus-2 and high-risk sex in Uganda: an ecological study	East Africa	cross sectional study populatio n based	11454	PLoS ONE	association between HIV prevalence and HSV prevalece	highlyl correlated
Adejumo, B. I. G., Oronsaye, F. E., Drisu, U. I., Adebowale, M. O., Oke, O. M., Dimkpa, U., Omosor, K. I., Abdulrahman, O. N., Ukatu, E. N., Michael, E. A.	2018	The level of CD4+ T cell count among reproductive age women coinfectd with human immune virus, hepatitis surface antigen and herpes simplex virus in Kogi state, Nigeria	West Africa	cross sectional study	342	Health	is CD4 count affected by HSV and HIV coinfection	no evidence for this

Mohraz, M., Aghakhani, A., Moayedi-Nia, S., Banifazl, M., Janbakhsh, A., Mamishi, S., Karami, A., Bavand, A., Mirzapour, P., Ramezani, A.	2018	No role of herpes simplex virus type 2 (HSV-2) infection on HIV progression in naïve HIV patients	South Asia	cohort study	201	Iranian Biomedical Journal	effect of HSV in HIV disease progression	no evidence that hcoinfection accelerates HIV progression
Lima, L. R. P., Almeida, N. A. A. de, Guterres, A., Pilotto, J. H., Niel, C., Paula, V. S. de	2018	Novel variants of human herpesvirus 2 from Brazilian HIV-1 coinfecting subjects	South America	cross sectional study	6	Memórias do Instituto Oswaldo Cruz	new variants of HSV-2	new variant- should be further investigated

Bradley, J.,Floyd, S.,Piwowar-Manning, E.,Laeyendecker, O.,Young, A.,Bell-Mandla, N.,Bwalya, J.,Bock, P.,Fidler, S.,Ayles, H.,Hayes, R. J.	2018	Sexually transmitted bedfellows: exquisite association between HIV and herpes simplex virus type 2 in 21 communities in Southern Africa in the HIV Prevention Trials Network 071 (PopART) study	Southern Africa	RCT	38691	Journal of Infectious Diseases	effect of HSV-2 on HIV incidence	HIV incidence much more common in HSV-2 positive people (Or 6.6). Strong association between the prevalence of both on an individual and community level. Hsv interventions should be incorporated into HIV prevention
Madebe, R.,Kiwelu, I.,Ndaro, A.,Francis, F.,Baraka, V.,Theilgaard, Z.,Katzenstein, T.	2020	Herpes Simplex virus type 2 seroprevalence and risk factors among adolescents and youth with HIV-1 in Northern, Tanzania	East Africa	cross sectional study	180	Journal of Infection in Developing Countries	prevalence of HSV in HIV pos pts	overall prevalence of HSV amongst the HIV pos youths was 18% but varried a lot by age- those between 20-14 had a six fold higher odds of being HSV pos than for 10-14 yr olds . Age specific interventions are important

Mathematical modelling

Authors	Year	Title	Geographical area of study participants	Study topic	Main findings
Korenromp, Eline L., Bakker, Roel, De Vlas, Sake J., Robinson, N. Jamie, Hayes, Richard, Habbema, J. Dik F.	2002	Can behaviour change explain increases in the proportion of genital ulcers attributable to herpes in sub-Saharan Africa? A simulation modeling study	East Africa (Tanzania)	proportion of GUD attributable to HSV: the effect of HIV and behaviour change on HSV incidence	increased proportion of GUD attributable to HSV likely to be artefact of increased detection etc not absolute (not caused by hv epidemic). Behavioural change in response to HIV epidemic (more condom use, less transactional sex) may have significant effect on increasing relative HSV cases (less of other treatable STIs/better treatment)
Korenromp, E. L., Bakker, R., Vlas, S. J. de, Gray, R. H., Wawer, M. J., Serwadda, D., Sewankambo, N. K., Habbema, J. D. F.	2002	HIV dynamics and behaviour change as determinants of the impact of sexually transmitted disease treatment on HIV transmission in the context of the Rakai trial	East Africa (India)	does HIV dynamics and behaviour change affect the impact of HSV treatment on HIV transmission	impact of HSV treatment on HIV transmission decreases with time in the first decade of an epidemic. in the second decade of a simulated epidemic the behaviour change may be a greater determinant of the impact of HSV therapy on HIV transmission than the stage of the epidemic. Timing and behaviour change are important things to consider before strating a HSV treatment for HIV transmission.
Freeman, E. E., Orroth, K. K., White, R. G., Glynn, J. R., Bakker, R., Boily, M. C., Habbema, D., Buvé, A., Hayes, R.	2007	Proportion of new HIV infections attributable to herpes simplex 2 increases over time: simulations of the changing role of sexually transmitted infections in sub-	East Africa, West Africa, Southern Africa (SSA)	impact of HSV on HIV incidence- population attributable fraction (PAF) as a outcome	PAF of HIV caused by HSV incresed with time in the modelled epidemic. Hsv has only small impact on nHIV incidence in early epidemic but a larger impact as the epidemic deelopos and in core groups. Hsv interventions may be important later in epidemic of HIV.

		Saharan African HIV epidemics			
Abu-Raddad, L. J., Magaret, A. S., Celum, C., Wald, A., Longini, I. M., Jr., Self, S. G., Corey, L.	2008	Genital herpes has played a more important role than any other sexually transmitted infection in driving HIV prevalence in Africa	East Africa, West Africa, Southern Africa (SSA)	role of HSV in driving HIV epidemic	HSV played a bigger role than any other STI in driving the Africa HIV epidemic. PAF (population attributable fraction) of HIV caused by HSV estimated to be over 25% in Kisumu Kenya. Support need for an HSV vaccine
Vickerman, P., Ndowa, F., Mayaud, P.	2008	Modelling the cost per ulcer treated of incorporating episodic treatment for HSV-2 into the syndromic algorithm for genital ulcer disease	sub saharan Africa input	cost effectiveness of incorporating acyclovir into syndromic management of GUD	incorporating acyclovir into syndromic management may be an affordable way of managing HSV correctly in low resource settings,. Prevalence of HSV-2 in the area may help determine whether or not to do this.
White, R. G., Freeman, E. E., Orroth, K. K., Bakker, R., Weiss, H. A., O'Farrell, N., Buvé, A., Hayes, R. J., Glynn, J. R.	2008	Population-level effect of HSV-2 therapy on the incidence of HIV in sub-Saharan Africa	West and East Africa	effect of HSV therapeutics on HIV incidence (acquisition and transmission)- epi	HSV therapy could have a positive impact on HIV incidence on population level in more concentrated epidemics, but only with high coverage long duration of therapy. Ideally a vaccine is needed. PAF of HSV on HIV is higher in more concentrated epidemics.
Foss, A. M., Vickerman, P. T., Chalabi, Z., Mayaud, P., Alary, M., Watts, C. H.	2009	Dynamic modeling of Herpes simplex virus type-2 (HSV-2) transmission: issues in structural uncertainty	South Asia (India)	transmission modelling: structural issues	simple model is as accurate as complex model in developed HSV epidemics (>60% prev)

Freeman, E. E., White, R. G., Bakker, R., Orroth, K. K., Weiss, H. A., Buvé, A., Hayes, R. J., Glynn, J. R.	2009	Population-level effect of potential HSV2 prophylactic vaccines on HIV incidence in sub-Saharan Africa	East West and Southern African cities	effect of HSV vaccine on HIV incidence	HSV vaccine may have substantial effect on HIV incidence (theoretical). More should be done to make one available sooner
Mahiane, S. G., Legeai, C., Taljaard, D., Latouche, A., Puren, A., Peillon, A., Bretagnolle, J., Lissouba, P., Nguéma, E. P. N., Gassiat, E., Auvert, B.	2009	Transmission probabilities of HIV and herpes simplex virus type 2, effect of male circumcision and interaction: a longitudinal study in a township of South Africa	South Africa	what is the rate of female to male sexual transmission of HSV and how is it affected by male circumcision?	HSV 2 increased risk of female to male sexual transmission of HIV. HIV increased risk of sexual transmission of HSV-2. MC reduced risk of HSV-2 transmission. Estimated transmission rate of HSV-2 : 0.0067 in Africa
Alsallaq, R. A., Schiffer, J. T., Longini, I. M., Jr., Wald, A., Corey, L., Abu-Raddad, L. J.	2010	Population level impact of an imperfect prophylactic vaccine for Herpes simplex virus-2	developing country	population and individual effects of HSV-2 vaccine	pre exposure HSV 2 vaccine would only have a small effect on HSV 2 incidence. They would have much greater public health benefits in developing countries where prevalence is higher.
Vickerman, P., Devine, A., Foss, A. M., Delany-Moretlwe, S., Mayaud, P., Meyer-Rath, G.	2011	The cost-effectiveness of herpes simplex virus-2 suppressive therapy with daily aciclovir for delaying HIV disease progression among HIV-1-infected	Southern Africa	cost effectiveness of HSV suppressive therapy on HIV progression in co infected	HSV suppressive therapy could be a cost effective way to reduce HIV progression before ART initiation, this is based on cheap acyclovir being available

		women in South Africa			
Foss, A. M., Vickerman, P. T., Mayaud, P., Weiss, H. A., Ramesh, B. M., Reza-Paul, S., Washington, R., Blanchard, J., Moses, S., Lowndes, C. M., Alary, M., Watts, C. H.	2011	Modelling the interactions between herpes simplex virus type 2 and HIV: implications for the HIV epidemic in Southern India	South Asia (India)	modelling HSV and HIV interaction: contribution of HSV-2 to HIV and modelled effect of a 'perfect' HSV suppressive treatment. PAF as a outcome	HSV-2 plays big role in transmission and acquisition of HIV in South India. Continuous suppressive HSV therapy may be useful in FSW and clients in South India. 35.5% of HIV incidence in FSW due to HSV-2.
Arora P, Nagelkerke N, Sgaier SK, Kumar R, Dhingra N, Jha P	2011	HIV, HSV-2 and syphilis among married couples in India: patterns of discordance and concordance	South Asia	Modelling concordance and discordance in couples in India	
Kacker, S., Frick, K. D., Quinn, T. C., Gray, R. H., Tobian, A. A. R.	2013	Financial implications of male circumcision scale-up for the prevention of HIV and other sexually transmitted infections in a sub-	East Africa (India)	effect of MC on STIs including HSV-2	STIs other than HIV (including HSV-2) also contribute to cost savings associated with increased MC rate.

		Saharan African community			
Todd J, Riedner G, Maboko L, Hoelscher M, Weiss HA, Lyamuya E	2013	Effect of genital herpes on cervicovaginal HIV shedding in women co-infected with HIV and HSV-2 in Tanzania	East Africa	effect of HSV on HIV shedding in co infected	data suggests HSV is associated with increased HIV shedding and hence transmissability (not synonymous though). Data suggests that quantity of HSV genital shedding is a more prominent determinant of genital HIV shedding than presence of herpetic lesions.
Terris-Prestholt F, Foss AM, Cox AP, Heise L, Meyer-Rath G, Delany-Moretlwe S	2014	Cost-effectiveness of tenofovir gel in urban South Africa: model projections of HIV impact and threshold product prices	Southern Africa	Cost effectiveness models	
Jewell, B. L., Cremin, I., Pickles, M., Celum, C., Baeten, J. M., Delany-Moretlwe, S., Hallett, T. B.	2015	Estimating the cost-effectiveness of pre-exposure prophylaxis to reduce HIV-1 and HSV-2 incidence in HIV-serodiscordant couples in South Africa	South Africa	cost effectiveness of daily tenofovir PrEP for reducing HSV2 incidence	the protective effects of PrEP against HSV-2 does not significantly improve the cost effectiveness of PrEP. But the modest improvement may be an additional factor that makes this more appealing as a HIV intervention.

Ghebremichael, M.	2015	Joint modelling of correlated binary outcomes: HIV-1 and HSV-2 co-infection	East Africa (Tanzania)	HIV and HSV 2 coinfection using joint response model that accounts for the interdependence of both infections	joint response model is more accurate and less biased than modeling both diseases separately
Okango, E., Mwambi, H., Ngesa, O., Achia, T.	2015	Semi-parametric spatial joint modeling of HIV and HSV-2 among women in Kenya	East Africa	joint spatial modelling the relationship between HIV and HSV	positive significant spatial relationship between HIV and HSV
Okango, E., Mwambi, H., Ngesa, O.	2016	Spatial modeling of HIV and HSV-2 among women in Kenya with spatially varying coefficients	East Africa	relaxing assumptions in spatial modelling of HSV	spatial variation in determinants of HSV occurred. using models to relax assumptions can result in more accurate results and interpretations.
Omori, R., Abu-Raddad, L. J.	2017	Sexual network drivers of HIV and herpes simplex virus type 2 transmission	East Africa (Kenya, India) and many SSA countries	effect of key sexual network characteristics on HSV transmission. Is HSV prevalence a good proxy for HIV prevalence.	HSV-2 prevalence could be used as HIV prevalence proxy. Many sexual network predictors of HSV
Abbai, Nathlee S., Nyirenda, Makandwe, Naidoo, Sarita, Ramjee, Gita	2018	Prevalent Herpes Simplex Virus-2 Increases the Risk of Incident Bacterial Vaginosis in Women from South Africa	Southern Africa	effect of prevalent HSV on BV incidence	HSV positive women at higher risk of developing BV (AOR: 1,17)
Stoner MCD, Neilands TB, Kahn K, Hughes JP,	2019	Multilevel measures of education and pathways to incident	Southern Africa		

Gómez-Olivé FX, Twine R		Herpes simplex virus type 2 in adolescent girls and young women in South Africa			
Looker, K. J., Johnston, C., Welton, N. J., James, C., Vickerman, P., Turner, K. M. E., Boi, M. C., Gottlieb, S. L.	2020	The global and regional burden of genital ulcer disease due to herpes simplex virus: a natural history modelling study	global including Africa, Asia, Americas	proportion of GUD attributable to HSV	estimated 178 million people aged 15-49 experienced 1 or more GUD caused by HSV-2 in the world in 2016 (almost 5% of world pop). Highest in Africa and double in women than men.