Table S1. Assessment of Individual Studies by Outcome for the Behavioral Counseling Interventions (Adherence and Risk Reduction)

Study Characteristics				Key Findings (Magnitude of effect (HR, OR, RR, RD & 95% CI) or other description)	Quality of evidence for individual studies			Comments
					External and Internal Validity *(1=Good; 2=Fair; 3=Poor)*		Overall Quality of Evidence Rating* *(1=Strong; 2=Medium ; 3=Weak)*	
Citation	**Study Design**	**Study Period and Setting**	**No. Participants**		**Internal Validity**	**External Validity**		
ADHERENCE COUNSELING AND SUPPORT								
Mortality								
Nachega et al., 2010[9]	Randomized control trial comparing treatment-supporter directly observed therapy (DOT) or self-administered ART (SAT).	August 2010 to April 2006, South Africa	N=274 HIV-infected adults initiating ART; n=137 in DOT; n=137 in SAT	Study was stopped early due to futility. In an intention-to-treat analysis, survival was significantly better in the DOT arm (N=9, 6.6%) than in the SAT arm (N=21, 15.3%; log-rank p = 0.02). In Cox regression analysis, mortality was independently associated with study arm (DOT vs. SAT; HR 0.38, 95% CI 0.17–0.86).	Fair	Fair	Medium	Study was stopped at the third annual review for "futility" when analyses showed no significant difference between the two treat arms (DOT versus self-ART). Follow-up occurred with ~50% of participants.
Taiwo et al., 2009[10]	Randomized control trial comparing patient-selected treatment partner-assisted therapy (TPA) to standard of care (SOC).	June 2006 to December 2007, Nigeria	N=499 HIV-infected adults (n=248 TPA, N=251 SOC)	There were no significant differences in mortality after 48 weeks of follow-up (10.6% vs. 6.1%) between TPA vs. SOC, respectively.	Good	Good	Strong	Findings may not apply to patients who are unwilling to select a treatment partner or otherwise unlikely to disclose their status.
Morbidity								
Cantrell et al., 2008[11]	Non-randomized control trial comparing 4 clinics with food supplementation to 4 control clinics	May 2004 to March 2005, Zambia	N=636 food insecure HIV-infected adults; n=442 at food support clinics	70% of patients in the food group achieved ≥95% medication possession ratio compared to 48% of controls (RR: 1.5; 95% CI: 1.2 to 1.8).	Fair	Good	Medium	Study was underpowered to detect differences in weight gain between groups.

			n=194 at control clinics	No significant differences observed for weight gain or CD4 cell response				
Chang et al., 2010[18]	Cluster randomized control trial. 15 AIDS clinics were randomized 2:1 to receive community-based peer health workers (PHWs) or standard of care.	May 2006 to July 2008, Uganda	N=1336 HIV-infected adults	No significant differences were found in 95% pill counts (RR: 0.55, 95% CI: 0.23–1.35), cumulative risk of virologic failure (RR: 0.81, 95% CI 0.61–1.08) or in 72 week virologic outcomes (RR 0.81, 95% CI 0.44–1.49). However, virologic failure rates ≥96 weeks were significantly decreased (RR: 0.50, 95% CI 0.31–0.81).	Good	Medium	Strong	PHW tasks included clinic and home-based counseling, adherence to ART, and social support. Findings suggest PHWs may be an effective intervention to sustain long-term ART adherence in low-resource settings
Chung et al., 2011[12]	Randomized control trial with four arms: (1) 3 counseling sessions, (2) pocket alarm, (3) counseling plus alarm, and (4) control	May 2006 to Sept. 2008, Zambia	N=400 HIV-infected, ARV-naïve adults (100 per arm)	Participants receiving adherence counseling were 29% (HR 0.71; 95% CI 0.49–1.01; p=0.055) less likely to experience poor adherence and 59% (HR 0.41; 95% CI 0.21–0.81; p=0.01) less likely to experience viral failure. External alarm devices had no effect on adherence (HR 0.93; 95% CI 0.65–1.32; p=0.7) or viral failure (HR 0.99; 95% CI 0.53–1.84; p=1.0).	Fair	Good	Medium	Study was biased towards retaining participants who may have been slightly poorer. Baseline differences between intervention arms were noted.
Idoko et al., 2007[23]	Observational study with four arms: (1) daily observed therapy (DOT), (2) twice weekly observed therapy (TWOT), (3) weekly observed therapy (WOT), and (4) self-administered therapy (SAT).	July 2003 to June 2004, Nigeria	N=175 HIV-infected, ARV naïve adults; (n=46 DOT; n=39 TWOT; n=36 WOT; n=52 SAT)	Non-significant differences between the three observation groups and the self-administered group on increases in CD4 cell count (DOT: 218/μL; TWOT: 267/ μL; WOT: 205/ μL and SAT: 224/ μL) and percent of patients who reached undetectable viral loads (DOT: 91%; TWOT: 88%; WOT: 84% and SAT: 79%).	Poor	Poor	Medium	Baseline characteristics were similar among the four groups although authors do not report if any statistical tests were used to check for differences.

Khachani et al., 2014[19]	Pre-post design examining 3 to 5 one-hour personalized support sessions offered at each medical consultation.	Nov. 2006 to Sept. 2007, Morocco	N=50 HIV-infected adults on ART	Adherence scores were high at baseline (98%) and showed no significant change over the study. Significant increases in undetectable viral load (52% vs. 72%), p=0.05) and median CD4 count (288.5/mm^3 to 554 mm^3, p<0.001).	Poor	Poor	Weak	The program team included a medical intern, physician, educator, and psychologist. Only patients with regular clinic attendance were enrolled in the study.
Kunutsor et al., 2012[13]	One group pre- and post-intervention design that included counseling, group education, leaflets, late attendee tracing, and adherence diaries	Aug 2009 - Aug 2010, Uganda	N=967 HIV-infected adults	Enhanced adherence package resulted in a statistically significant increase in mean adherence [97.4% vs. 99.1%, p=0.001)] after 12 months of follow-up. There was a significant difference between proportions achieving suboptimal and optimal adherence pre- and post-intervention (7.0% difference, 95% CI: 4.6 9.4%, P<0.001)	Fair	Fair	Medium	Intervention included several components and analysis conflated these, no control group.
Lester et al., 2010[20]	Randomized control trial comparing mobile phone short message service (SMS) to standard of care.	May 2007 to Oct. 2009, Kenya	N=538 HIV-infected adults (n=273 to SMS intervention and n=265 to control)	Rates of non-adherence [38% vs. 50%; RR= 0.81; 95% CI: 0.69-0.94; p=0.006)] and virologic failure [43% vs. 48%; RR= 0.84; 95% CI: 0.71-0.99; p=0.04)] were lower in the intervention group compared to the control group.	Good	Good	Strong	Each SMS costs about US $0.05, equivalent to $20 per 100 patients per month. Follow-up voice calls averaged $3.75 per nurse per month)
Mbuagbaw et al., 2012[25]	Randomized control trial comparing weekly motivational text messages versus standard of care	Nov. 2010 to June 2011, Cameroon	N= 200 HIV-infected adults on ART (n=101 in the intervention, n=99 in the control)	No significant effect on adherence by Visual Analogue scale (RR= 1.06; 95% CI: 0.89, 1.29; p = 0.542); reported missed doses (RR=1.01, 95% CI: 0.87, 1.16; p.0.999) or number of pharmacy refills (mean difference [MD] 0.1, 95% CI: 0.23, 0.43; p = 0.617) was	Fair	Good	Medium	Missing data for CD4-count and viral load was common. Drug stock-outs were frequent in the last two months of the trial. Sample size was powered to detect a 20% difference in adherence between both arms but the actual difference was

				observed between the intervention and control group.				much less.
Mugusi et al., 2009[24]	Randomized control trial with 3 arms: (1) regular adherence counseling, (2) regular counseling plus a calendar, and (3) regular counseling and a treatment assistant.	Nov. 2004 to April 2007, Tanzania	N=621 HIV-infected adults on ART Arm 1, n=312; Arm 2, n=242; Arm 3, n=67	There were no differences in self-reported adherence (P = 0.573), CD4 count (P = 0.360) or weight changes (P = 0.398) over time between the three study arms.	Fair	Good	Medium	All patients received a monthly 5–10 minute counseling session delivered by a nurse counselor.
Munoz et al., 2010[14]	Case-control study comparing an intervention with community health workers (CHWs) to controls matched by age, CD4 count, and primary referral criteria.	Dec. 2005 to April 2007, Peru	N=120 HIV-infected adults starting ART; 60 cases and 60 controls	Intervention participants were more likely to remain on ART at 12 months (90.0% vs. 65.0%, p<0.01), be cured of TB (83.8% vs. 51.6%, p<0.05), adhere to HAART (80.0% vs. 61.7%, p<0.05), and have a suppressed viral load at 12 months (76.7% vs. 58.3%, P<0.05).	Fair	Fair	Medium	CHWs offered twice-daily home visits to directly observe ART and provide additional medical, social, and economic support.
Nachega et al., 2010[9]	Randomized control trial comparing treatment-supporter directly observed therapy (DOT) or self-administered ART (SAT).	August 2010 to April 2006, South Africa	N=274 HIV-infected adults initiating ART; n=137 in DOT; n=137 in SAT;	Study was stopped early due to futility. In an intention-to-treat analysis, there was no difference in proportions of patients with VL <400 copies/mL at 12 months (72.8% in the DOT vs. 68.4% in SAT, p= 0.42). DOT patients had greater median CD4 cell count increases at 6 months (148 [IQR 84-222] vs. 111 [IQR 44-196]; p= 0.02) but there was no difference between the study arms at all other time-points.	Fair	Fair	Medium	Study was stopped at the third annual review for "futility" when analyses showed no significant difference between the two treat arms (DOT versus self-ART). Follow-up occurred with ~50% of participants.
Nyamathi et	Two villages were	August 2009	N=68 women	Intervention participants	Fair	Fair	Medium	Intervention participants

al., 2012[15]	randomized to receive counseling provided by Accredited Social Health Activists (Ashas) or standard of care.	to March 2011, India	living with HIV (n=34 from each village)	showed greater improvement in ART adherence compared to those in the usual care group after 6 months of FU (99% vs. 60%, p<0.0001)				received six classes and weekly visits by the Ashas. Baseline variables were not comparable but were adjusted for in regression analysis.
Pearson et al., 2007[21]	Randomized control trial comparing peer-delivered directly observed therapy (DOT) or standard of care.	Oct. 2004 to May 2006, Mozambique	N=350 HIV-infected adults initiating ART (n=175 per arm)	Self-reported mean adherence was higher among intervention participants at 6 months (97% vs. 91% [mean difference: −0.06, 95% CI: −0.11, −0.02] and 12 months (98% vs. 93% [mean difference: −0.05, 95% CI: −0.10, −0.01]). There were no between-arm differences in chart-abstracted CD4 counts.	Fair	Fair	Medium	Study conducted at one large, urban hospital. Intervention expenses approximated USD$33 per participant for the 6-week intervention.
Pop-Eleches et al., 2011[16]	Randomized control trial with four intervention arms and one control arm. Each participant in an intervention arm received SMS reminders that were either: short or long and sent either daily or weekly.	June 2007 to Dec. 2008, Kenya	N=428 HIV-infected adults on ART; (n=139 in control group; n=70 in the short daily reminder group; n=72 in the long daily group; n=73 in the short weekly group; and n=74 in the long weekly reminder group)	Participants receiving weekly reminders were more likely to report adherence of at least 90% (53 vs. 40%, p = 0.03) and to have fewer treatment interruptions exceeding 48 hours (81 vs. 90%, p=0.03) compared to the control group. There was no difference in reported adherence (41 vs. 40%, P = 0.92) or treatment interruptions (86 vs. 90%, p=0.30) between participants receiving daily messages and the control group.	Strong	Fair	Good	Weekly reminders improved adherence, whereas daily reminders did not. Habituation, or the diminishing of a response to a frequently repeated stimulus, may explain this finding. Daily messages might also have been considered intrusive.

Sabin et al., 2009[17]	Randomized control trial comparing counseling using electronic drug monitor feedback to standard of care.	June 2006 to November 2007, China	N=68 HIV-infected adults (n=34 per arm)	Intervention participants had a higher likelihood of achieving ≥95% adherence by 12-months (83.9 vs. 39.4%; RR = 2.1; 95% CI: 1.4–3.3, p-value = 0.0003). The mean CD4 count rose by 90 cells/µl in the intervention group compared to a mean decline of 9 cells/µl (t-test statistic = -2.4; p-value = 0.02) among controls.	Good	Fair	Medium	They study was conducted the study in a distinctive cultural context—Chinese patients who were predominantly former IDUs. Whether EDM feedback would be as effective in other cultural contexts remains to be tested.
Sampaio-Sa et al., 2008[26]	Randomized control trail comparing educational workshops based on information-motivation-behavioral skills model to a video session.	December 2003 to December 2005, Brazil	N=107 HIV-infected, ART-naïve adults (n=52 intervention, n=55 control)	No significant differences were observed between groups on self-reported adherence, viral load, or pharmacy records.	Poor	Fair	Medium	The study may have lacked adequate power to detect differences between groups, due to the small sample size.
Sarna et al., 2008[22]	Randomized control trial comparing modified directly observed therapy (mDOT) to standard of care.	Sept. 2003 to Nov. 2004, Kenya	N=231 HIV-infected adults (n=116 intervention, n=118 control)	m-DOT participants had better adherence (OR: 4.8; 95% CI: 2.7, 8.6, p<0.001) and larger body mass index increases at 24 weeks (2.2 vs. 1.4 kg/m^3, p=0.014) compared to control participants.	Good	Good	Strong	mDOT consisted of 24 weeks of twice weekly nurse-observed pill ingestion, adherence support, and medication collection
Siedner et al., 2012[27]	Prospective cohort comparing patients who received adherence counseling prior to ART initiation and those who received adherence counseling on the day of initiation	2007 to 2009, Uganda	N=300 HIV-infected adults (n=232 completed pre-ART counseling; n=69 received no pre-ART counseling)	Completing adherence counseling prior to ARV initiation was not associated with average adherence >90% (AOR 0.8, 95%CI 0.4–1.5), absence of treatment gaps (AOR 0.7, 95%CI 0.2–1.9), or HIV viremia (AOR 1.1, 95%CI 0.4–3.1) but was associated with longer delays for ART initiation (49 vs 14 days, p=0.01).	Fair	Fair	Medium	Study was conducted at one large rural hospital. Findings suggest the benefit of adherence counseling must be balanced by the risk of patient attrition and patient mortality during the pre-therapy period.

Simoni et al., 2011[28]	Randomized control trial comparing an enhanced counseling arm (choice of electronic reminder device, 3 counseling sessions, or both) to a minimal arm.	December 2006 to March 2008, China	N=70 HIV-infected adults (n=36 enhanced; n=34 minimal)	No significant differences were observed between groups on self-reported adherence, adherence measured using electronic drug monitoring, CD4 count, or HIV-1 RNA viral load.	Good	Fair	Medium	Participants in both arms received a 30-min education session, pillbox, and referral to a peer support group.
Taiwo et al., 2009[10]	Randomized control trial comparing patient-selected treatment partner-assisted therapy (TPA) to standard of care (SOC).	June 2006 to December 2007, Nigeria	N=499 HIV-infected adults (n=248 TPA, N=251 SOC)	The TPA arm had higher rates of undetectable viral load at 24 weeks (OR: 1.58, 95%CI: 1.11, 2.26, $p<0.05$) and greater drug pickup adherence at 48 weeks (OR=1.95, 95%CI: 1.29, 2.93, $p<0.01$). No significant differences in CD4 cell count increases between the two arms at week 48.	Good	Good	Strong	Findings may not apply to patients who are unwilling to select a treatment partner or otherwise unlikely to disclose HIV status.
Torpey et al., 2008[29]	Pre-post comparison of the addition of community volunteers as adherence support workers (ASWs) in five ART clinics.	July 2006 to April 2007, Zambia	N=500 HIV-infected adults	There was no statistically significant difference in self-reported adherence before and after the introduction of ASWs nor between clients counseled by HCWs and those counseled by ASWs.	Fair	Good	Medium	Average cost per ASW for the 10 day training was $320. Once trained they were paid $25 per month for 80 hours of work.
Van Loggerenberg, 2014[30]	Randomized control trial comparing didactic counseling (DC) to individualized motivational counseling (MC).	August 2007 and Feb. 2009, South Africa	N=297 HIV-infected ART-naïve patients (n=147 MC and n=150 DC)	There was no difference between arms in virologic suppression at 9 months (RR: 0.98: 95% CI: 0.90–1.07, $p = 0.62$) or achievement of 95% adherence by pill count at 6 months (RR: 0.96: 95% CI: 0.85–1.09, $p = 0.51$).	Good	Fair	Strong	Exposure to MC was high and poor coverage not likely a factor in the findings. Observed viral suppression rate in the DC arm was higher than assumptions made in the sample size calculations.
Retention in HIV Care								
Mugusi et al., 2009[24]	Randomized control trial with 3 arms: (1) regular adherence counseling, (2) regular counseling plus a calendar, and (3) regular counseling and a	Nov. 2004 to April 2007, Tanzania	N=621 HIV-infected adults on ART Arm 1, n=312; Arm 2, n=242; Arm 3, n=67	There was no difference in the number of patients who stopped attending the clinic for more than 3 months between the three study arms (A: 16%, B: 14.5%; and C:	Fair	Good	Medium	All patients received a monthly 5–10 minute counseling session delivered by a nurse counselor.

	treatment assistant.			25.4%, p=0.12).				
Quality of Life								
Khachani et al., 2014[19]	Pre-post design examining 3 to 5 one-hour personalized support sessions offered at each medical consultation.	Nov. 2006 to Sept. 2007, Morocco	N=50 HIV-infected adults on ART	Health-related quality of life (HR-QoL) median scores improved considerably and continuously throughout the study (P < .001)	Poor	Poor	Weak	HR-QoL included: patient mobility, self-care, daily activity, and levels of pain, anxiety, and depression.
Munoz et al., 2010[14]	Case-control study comparing an intervention with community health workers (CHWs) to controls matched by age, CD4 count, and primary referral criteria.	Dec. 2005 to April 2007, Peru	N=120 HIV-infected adults starting ART; 60 cases and 60 controls	Intervention participants experienced significantly greater improvements in stigma (-10.4 vs. -1.7, P<0.01), social support (+12.7 vs. -9.8, t test (P<0.01) and self-efficacy (+25.4 vs. +10.7, P<0.01). Both groups reported comparable improvement in quality of life (p=0.19) and depressive symptoms (p=0.07).	Fair	Fair	Medium	CHWs offered twice-daily home visits to directly observe ART and provide additional medical, social, and economic support.
Prevention of Ongoing Transmission								
Holdstad et al., 2012[31]	Quasi-experimental post-test only design comparing motivational interviewing (MI) to a health promotion program.	April 2008 to Dec. 2008, Nigeria	N=60 HIV-infected women (30 per group)	MI participants reported significantly higher levels of adherence to ART on a visual analogue scale (100% vs. 61.1%, p<0.001) and higher rates of condom use (84.6% vs. 43.8%, p=0.014). MI participants also reported fewer mean number of sex partners (1.5 vs. 2.8, p=0.047).	Poor	Poor	Weak	Only 48 women returned for the post-assessment. All measures are self-reported.
RISK REDUCTION EDUCATION AND CONDOM PROVISION								
Morbidity								
Maman et al., 2014[34]	Randomized control trial comparing an enhanced counseling arm offered during pregnancy and post-partum to a standard counseling arm.	May 2008 to June 2010, South Africa	N=1,480 pregnant women (n=733 intervention, n=278 HIV+; n=747 control,	There were no intervention effects on incident STIs among HIV-positive women (aRR 0.86, 95% CI 0.61–1.23)	Fair	Fair	Medium	Study achieved 77% retention in the treatment group and 72% retention in the control groups at 9 months. 22% of HIV-positive women in the

			n=293 HIV+)					treatment arm were not exposed to the postpartum counseling sessions.
Saleh-Onoya et al., 2009[33]	Randomized control trial comparing four four-hour sexual risk reduction and coping training sessions to one four-hour motivational messages session.	June to November 2003, South Africa	N=120 HIV-infected women (n=54 intervention; n=66 control)	STI incidence was lower in the intervention group compared to the comparison group including: Trichomonas vaginalis (27% vs. 6%, OR: 0.06, 95% CI: 0.01, 0.46), Neisseria Gonorrhea (29 vs. 4%, OR: 0.10, 95% CI: 0.02, 0.49), and Chlamydia Trachomatis (40 vs. 14%, OR: 0.21, 95% CI: 0.07, 0.59).	Fair	Fair	Medium	STIs were diagnosed using vaginal swabs and internationally recognized diagnostic tests.
Quality of Life								
Futternman et al., 2010[35]	Non-randomized quasi-experimental study comparing mentor mothers and an eight session cognitive behavioral intervention to standard of care.	2006-2007, South Africa	N=160 HIV-infected pregnant women (n=83 intervention, n=77 control)	Participants in the intervention group reported greater availability of social support ($p<0.05$) and greater improvement in their depression scores (CES-D Intervention: 14.0 to 5.6; CES-D Control 9.0 to 5.0, $p=0.008$).	Fair	Fair	Medium	Loss to follow-up was a problem; only 44% of the baseline sample completed the second assessment.
Olley et al., 2006[36]	Randomized control trial comparing four 60-minute weekly psycho-education sessions to a wait-list control	Not reported, Nigeria	N=67 HIV-infected adults (n=34 intervention; n=33 control)	The intervention group showed significant increases in coping behaviors including acceptance ($F=18.7$, $p<0.001$) and positive reframing ($F=6.32$, $p<0.001$) and less depression ($F=21.06$, $p<0.001$) than the control group	Fair	Fair	Medium	Patients were self-referred and may represent the most motivated and resilient participants.
Prevention of Ongoing Transmission								
Apondi et al., 2011[37]	Prospective cohort study of a home-based program offering annual HIV testing and counseling, risk	May 2003 to Dec. 2007, Uganda	N=928 HIV infected adults on ART	Of sexually active participants, 22% reported risky sex at baseline, 8% at 6 months ($P<0.001$), and 14% at 36 months ($P=0.018$).	Fair	Good	Medium	Transmission risk estimates are based on self-reported behaviors. Other markers of unprotected sex and

	reduction counseling, condom distribution, and prevention support for sero-discordant couples.			Median viral load among those reporting risky sex was 122 500 [IQR: 45,100–353,000] copies/ml pre-ART at baseline and undetectable at follow-up. Estimated HIV transmission risk reduced 91%, from 47.3 to 4.2/1000 person-years.				HIV-acquisition risk, such as STI incidence and circumcision, were not assessed.
Cornman et al. 2008[38]	Randomized control trial comparing a counselor-delivered risk reduction intervention to standard of care.	Oct. 2004 to Aug. 2005, South Africa	N=152 HIV-infected adults (n=103 intervention, n=49 control)	The mean number unprotected vaginal and anal sexual events decreased significantly over time (from 2.64 to 0.40) among the intervention group (RR = 0.24, 95%CI = 0.07, 0.89), whereas there was a marginally significant increase (from 2.26 to 3.85) over time in the control group (RR = 1.95, 95% CI = 1.0 to 3.83).	Good	Fair	Strong	Results rely on self-reported data. Clients were required to pay $20 per month for clinic visits. Public health care clinics do not require their patients to pay for care, limiting the generalizability of the findings.
Da Sliveria et al., 2006[39]	Non-randomized quasi-experimental study comparing doctor-delivered educational advice and free condoms to standard of care.	April to November 2003, Brazil	N=340 HIV-infected women (n=170 in both arms)	Self-reported condom use at last sex increased by 8.8% points in the intervention group after 30 days and by 5.7 points in the control group (p= 0.52)	Poor	Fair	Medium	The study lacked sufficient power to detect differences between the two arms.
Futternman et al., 2010[35]	Non-randomized quasi-experimental study comparing mentor mothers and an eight session cognitive behavioral intervention to standard of care.	2006-2007, South Africa	N=160 HIV-infected pregnant women (n=83 intervention, n=77 control)	There were no statistically significant differences between control and intervention participants in using ARVs during pregnancy, testing the baby for HIV, HIV serostatus disclosure to partner, or partner testing for HIV.	Fair	Fair	Medium	Loss to follow-up was a problem; only 44% of the baseline sample completed the second assessment.
Jones et al., 2006[40]	Randomized control trial comparing a risk reduction intervention	Not reported, Zambia	N=240 HIV-infected women	Among those sexually active, participants in the group arm were more likely to use	Fair	Good	Strong	Participants were provided with a one-month supply of male and

	delivered to "groups" or "individuals".			sexual barriers ($p<0.05$) and male condoms ($p<0.001$) than participants in the individual arm. There were no differences between arms in levels of female condom use ($p=0.86$), lubricant use ($p=0.91$) or use of lubricants with condoms ($p=0.07$).				female condoms and vaginal lubricants. Approximately one third of participants were not sexually active at all time points and all data are based on self-report.
Jones et al., 2005[41]	Randomized control trial of a 4-session risk reduction intervention. Women were randomized to receive a single session with their male partner or high intensity intervention in which they attended all 4 sessions with their male partner.	Not reported, Zambia	HIV-positive women (n=180) and their male partners (n=152).	Women in the high intensity condition reported higher rates of condom use ($F= 5.68$, $p = .02$) than those in the low-intensity condition.	Fair	Good	Strong	Small sample size precluded analyses by specific cultural group.
Lightfoot et al., 2007[42]	Randomized control trial comparing a culturally adapted 18-session cognitive-behavioral intervention to standard of care.	2003 to 2004, Uganda	N=100 youth aged 14 -21 years) living with HIV (n=50 per arm)	Youth in the intervention group reported a significant decrease in the mean number of sex partners (4.2 vs. 15.1, $p=.04$) and increased condom use (93% vs. 12%, $p<0.01$) compared to the control group.	Good	Fair	Strong	The intervention was delivered individually by nurses during home visits. Future research would be needed to examine its feasibility in resource poor settings
Maman et al., 2014[34]	Randomized control trial comparing an enhanced counseling arm offered during pregnancy and post-partum to a standard counseling arm.	May 2008 to June 2010, South Africa	N=1,480 pregnant women (n=733 intervention, n=278 HIV+; n=747 control, n=293 HIV+)	There were no intervention effects on inconsistent condom use among HIV-positive women (aRR1.08; 95% CI 0.67–1.75).	Fair	Fair	Medium	Study achieved 77% retention in the treatment group and 72% retention in the control groups at 9 months. 22% of HIV-positive women in the treatment arm were not exposed to the postpartum counseling sessions.
Olley et al., 2006[36]	Randomized control trial comparing four 60-minute weekly psycho-	Not reported, Nigeria	N=67 HIV-infected adults (n=34	The intervention group showed significant increases in safer sex practices	Fair	Fair	Medium	Patients were self-referred and may represent the most motivated and

	education sessions to a wait-list control		intervention; n=33 control)	compared to the control group (F=7.56, p<0.001)				resilient participants.
Papas et al., 2011[44]	Randomized control trial comparing cognitive behavioral therapy (CBT) to reduce alcohol use to standard of care (SOC).	February 2009 to December 2009, Kenya	N=75 HIV-infected adults who reported hazardous or binge drinking (n=42 CBT; n=32 to SOC)	CBT participants reported fewer drinking days (mean difference = 24.93, 95% CI: 12.43, 37.43, p<0.0002), fewer mean drinks per day (mean difference = 2.88, 95% CI: 1.05, 4.70), and more abstinence from alcohol than control participants (90 days, 69% versus 38%, P = 0.008).	Fair	Fair	Medium	Limitations of the study include the small sample size, reliance on self-report of alcohol use, a relatively brief follow-up (only 90 days), and assessment by non-blinded research assistants
Peltzer et al., 2010[43]	Pre-post design with no comparison group evaluating a risk reduction intervention delivered by lay counselors.	December 2008 to July 2009, South Africa	N=488 HIV-infected adults	At the 4 month FU visit, participants reported significant reductions in multiple sex partners (21% vs. 8%, p<0.0001), unprotected sex (55% vs. 16%, p<0.0001), use of alcohol or drugs in the context of sex (17% vs. 4% p<0.0001), exchanging sex for for food or a place to stay (11% vs. 2%, p<0.0001), and hazardous or harmful drinking (16% vs. 7%, p<0.0001).	Fair	Fair	Medium	Participants received a three-session motivational skills building intervention. The first session occurred immediately after diagnosis and the other two sessions were spaced over a two month period.
Rongkavilit et al., 2013[45]	Randomized control trial comparing four sessions of motivational interviewing (MI) to four sessions of general health education.	Sept. 2008 to Sept. 2010, Thailand	N=108 youth living with HIV (n=55 in the MI group, n=53 in the control group)	There were no statistical differences in sexual risks, alcohol use, and ARV adherence between the two groups.	Poor	Fair	Medium	The sample size was small and was not adequately powered to detect the between-group differences.
Saleh-Onoya et al., 2009[33]	Randomized control trial comparing four four-hour sexual risk reduction and coping training sessions to one four-hour motivational messages session.	June to November 2003, South Africa	N=120 HIV-infected women (n=54 intervention; n=66 control)	There was no significant intervention effect on condom use at last sex at follow-up (OR 0.48, 95% CI 0.09, 2.54, p 0.39).	Fair	Fair	Medium	Interviewers were not blinded to the condition at the three months follow-up assessment which may have distorted or even enhanced the self-reported measures.

Table S2. Assessment of Individual Studies by Outcome for Biomedical Interventions (Partner Testing, Family Planning, and STI Diagnosis and Treatment)

Study Characteristics				Key Findings (Magnitude of effect (HR, OR, RR, RD & 95% CI) or other description)	Quality of evidence for individual studies			Comments
					External and Internal Validity *(1=Good; 2=Fair; 3=Poor)*		Overall Quality of Evidence Rating* *(1=Strong; 2=Medium; 3=Weak)*	
Citation	**Study Design**	**Study Period and Setting**	**No. Participants**		**Internal Validity**	**External Validity**		
DISCLOSURE COUNSELING AND PARTNER HIV TESTING AND COUNSELING								
Retention in HIV Care								
Farquhar et al., 2004[46]	Prospective cohort study comparing couples HTC and individual HTC	Sept. 2001 to Dec. 2002, Kenya	N=314 HIV-positive pregnant women	Couple counseling was significantly associated with follow-up postpartum and nevirapine utilization. Women who were counseled as a couple were more likely to return for follow-up and report nevirapine use at delivery than women who did not receive couple counseling (OR = 8.0; 95% CI 1.0–66; P = 0.03).	Fair	Fair	Medium	Women whose partners came to clinic were a select group who may have differed from those whose partners did not come. These underlying differences, rather than partner participation or couple counseling may have resulted in effects on uptake of interventions.
Kalembo et al., 2013[47]	Retrospective cohort study comparing prevention of mother-to-child HIV transmission outcomes for women whose partners were and were not involved in antenatal care.	Jan. 2004 to Dec. 2006, Malawi	N=476 HIV-infected pregnant women	Male partner involvement was significantly associated with hospital delivery (AOR =25.9; 95%CI: 10.6– 63.6, P<0.001), and completion of the 18-month post-natal follow-up visit (AOR = 16.8, 95% CI: 8.5–33.4, P<0.001).	Fair	Fair	Medium	More than half of the study participants were lost to follow-up by the 18 months postnatal period. This may have led to underestimation of HIV transmission rates among the infants.
Quality of Life								
Kaaya et al., 2013[48]	Randomized control trial comparing a six-week structured nurse-facilitated psychosocial	October 2001 to February 2004,	N=331 HIV-positive pregnant women	There was no significant difference between study arms on rates of depression (RR=0.82, 95% CI: 0.67,	Fair	Good	Medium	Over 30% of those enrolled into the study and randomized to the treatment arm failed to

	support group to standard of care.	Tanzania		1.01, p=0.066) or HIV serostatus disclosure (RR=1.2, 95% CI: 0.91-1.6, p=0.19). Women in the intervention group who disclosed had a significantly higher level of satisfaction with the response to disclosure than women in the control group (RR=1.4, 95% CI: 1.1-1.8, p=0.004).				initiate either the standard of care or intervention therapy.
Semrau et al., 2005[49]	Post-intervention comparison of HIV-infected women who tested as couples and those who tested individually	April 2001 to July 2003, Zambia	N=9,409 pregnant women attending ANC clinics	Six months after delivery, 28% of 324 HIV-positive women reported at least one adverse social event (including physical violence, verbal abuse, divorce or separation). There were no significant differences in reported adverse social events between women testing as a couple and those testing alone.	Poor	Fair	Weak	The study did not collect pre-test adverse event information and therefore cannot comment on the direct effect of disclosure of HIV status on the frequency of adverse events.
Prevention of Ongoing Transmission								
Alusio et al., 2011[52]	Prospective cohort study investigating the relationship between male involvement and infant HIV acquisition and mortality.	1999 to 2005, Kenya	N=456 HIV-infected pregnant women	140 male partners (31%) attended the antenatal clinic. Vertical transmission risk [aHR = 0.56, 95% CI: 0.33 to 0.98; P = 0.042] and the combined risk of HIV acquisition or infant mortality (aHR = 0.55; 95% CI: 0.35 to 0.88; P = 0.012) was lower among women with male partner attendance compared with those without after adjusting for maternal viral load and breastfeeding.	Good	Good	Strong	Study did not assess for any potential negative effects of male involvement. There may have been a response bias when women answered sensitive questions regarding partner serostatus disclosure and testing.
Becker et al., 2010[50]	Randomized control trial comparing couples HIV	May 2003 to October	N=1,521 pregnant women	HIV-positive women who received CVCT were more	Fair	Fair	Weak	Results presented are from a sub-analysis of

	testing and counseling (CHTC) to individual HIV testing and counseling (IHTC)	2004, Tanzania	of which 93 were HIV-infected	likely to use preventive measures against transmission (90 vs. 60%) and to receive nevirapine for themselves (55 vs. 24%) and their infants (55 vs. 22%) as compared to women randomized to IVCT. No p-values reported.				the main study.
Brown et al., 2011[58]	Randomized control trial comparing three methods of partner notification: passive referral (PaR), contract referral (CR), or provider referral (PrR).	October 2008 to December 2009, Malawi	N=240 individuals newly diagnosed as HIV-positive at an STI clinic (n=77 PaR, n=82 CR, n=81 PrR)	240 index patients named 302 sexual partners and provided locator information for 252. The number of partners returning for HTC was higher in the contract referral arm (51%; 95% CI 41 – 62%) and provider referral arm (51%; 95% CI 40 – 62%) compared to the passive arm (24%; 95% CI 15 – 34%) ($p<0{\cdot}001$). 64% of returning partners, were HIV-infected with 54 (81%) newly diagnosed. Median CD4 count among partners was 344 (range: 47 - 940).	Good	Fair	Strong	Passive referral group notified their partners themselves. The contract referral group was given seven days to notify their partners, after which a health care provider contacted partners. In the provider referral group, a health care provider notified partners directly. Only two social harms were reported throughout the study period.
Conkling et al., 2010[61]	Prospective cohort study examining the effect of same-day individual HTC and weekend couples HTC.	Mar. 2001 to Dec.2005, Zambia and Rwanda	N=3,625 pregnant women (n=1940 in Rwanda, n=272 HIV+; n=1685 Zambia, n=455 HIV+)	Having a partner tested was not a significant predictor of nevirapine use or compliance among HIV-positive women and couples HTC had no impact on nevirapine use compared to women who tested alone.	Fair	Good	Medium	Loss to follow up was more common in Kigali than Lusaka (33% vs. 24%, p = 0.000). In Lusaka, HIV-positive and HIV-negative women had significantly different loss-to-follow-up rates (30% vs. 22%, p = 0.002).
Farquhar et al., 2004[46]	Prospective cohort study comparing couples HTC and individual HTC	Sept. 2001 to Dec. 2002, Kenya	N=314 HIV-positive pregnant women	HIV-positive women who underwent couples HCT were more likely to return for nevirapine (OR=3.1; 95% CI: 1.2-8.4, p=0.02), to report	Fair	Fair	Medium	Women whose partners came to clinic were a select group who may have differed from those whose partners did not

				administering nevirapine at delivery (OR=3.4; 95% CI: 1.3-9.0, p= 0.009), and to avoid breast-feeding (OR = 0.2; 95% C: 0.04–0.9; P = 0.03) compared with those counseled individually. Partner notification of HIV-positive results was reported by 138 women (64%) and was associated with increased condom use (OR = 4.2; 95%CI 1.5–11.5; P = 0.004).				come. These underlying differences, rather than partner participation or couple counseling may have resulted in effects on uptake of interventions.
Henley et al., 2013[59]	Retrospective cohort study to examine the effect of a partner case-finding service for HIV-positive index cases diagnosed in antenatal care, voluntary HTC, and inpatient facilities.	August 2009 to June 2010, Cameroon	N=1462 individuals newly diagnosed as HIV-positive	Participants provided information on 1,607 sexual partners. Advisors notified 1,347 (83.8%) of these partners, of whom 900 (66.8%) were HIV-tested. Of those partners tested, 50.1% were HIV-positive, of whom 85.6% enrolled into HIV medical care.	Fair	Good	Medium	An average of 3.2 index cases needed to be interviewed to identify 1 HIV case. Study collected limited data on potential deleterious effects of partner notification, although investigators only received 2 reports of domestic violence.
Kairania et al., 2010[54]	Prospective cohort study of counselor facilitated disclosure among HIV sero-discordant couples.	Not reported, Uganda	N=293 HIV sero-discordant couples	Overall, 237 HIV-infected persons (80.9%) disclosed their HIV-positive results and accepted facilitated couple counselling. Disclosure was similar irrespective of the sex of the HIV-infected partner (male HIV-positive couples 81.3%, female HIV-positive couples 80.2%). Disclosure did not differ significantly by age, education or occupation of the HIV-infected partners	Fair	Fair	Medium	In this study, disclosure was directly observed by the counsellor, reducing instances of social desirability biases associated with self-reported data.
Kalembo et al., 2013[47]	Retrospective cohort study comparing prevention of mother-to-	Jan. 2004 to Dec. 2006, Malawi	N=476 HIV-infected pregnant	Male partner involvement was significantly associated with condom use (AOR = 5.6,	Fair	Fair	Medium	More than half of the study participants were lost to follow-up by the

	child HIV transmission outcomes for women whose partners were and were not involved in antenatal care.		women,	95%CI: 2.3–13.5, P<0.001).				18 months postnatal period. This may have led to underestimation of HIV transmission rates among the infants.
Lugada, et al., 2010[55]	Randomized control trial comparing a home-based vs. clinic-based ART program that included HTC for household (HH) members.	Feb. 2005 to Feb. 2007, Uganda	N=1,453 HIV-positive adults (n=859 home arm, n=594 clinic arm)	HH members in the home arm were more likely to undergo HIV testing and receive their results than persons in the clinic arm [AOR: 10.41; 95% CI: 7.89 to 13.73; P<0.001], although HIV prevalence was higher in the clinic arm (17.3% vs. 7.1%; OR: 2.76; 95% CI: 1.97 to 3.86; P<0.001). Of 148 spouses of index clients tested, 69 were HIV negative, giving an HIV serodiscordance rate of 46.6%. The serodiscordance rate was similar in the home arm (47.9%) and the clinic arm (41.4%, p=0.51).	Good	Fair	Strong	Clinic arm participants were given free HTC vouchers for HH members; In the home arm, HTC was provided to HH members in the home.
Msuya et al., 2007[51]	Prospective cohort study examining the effect of encouraging pregnant women to bring their partners to the clinic for an HIV test	June 2002 and March 2004, Tanzania	N=2,654 HIV-infected pregnant women	A total of 332 (12.5%) of male partners came for HTC. HIV-positive women whose partners attended were more likely to use Nevirapine prophylaxis (91% vs. 74%; OR 3.45; 95%CI: 1.00-12.00), to avoid breastfeeding (19% vs. 6%; OR: 3.72; 95% CI: 1.19-11.63) and to adhere to the infant feeding method selected (67% vs. 28%; OR 5.15; 95% CI: 2.18-12.16) than those whose partners didn't attend.	Fair	Good	Medium	Study relied on women's reports that they had informed their partners of the availability of HTC services at the clinic and had no way of corroborating whether women had actually informed their partners or not. This may help account why so few men were tested.

Osoti et al., 2013[56]	Randomized control trial comparing home visits to written invitation letters to offer HIV testing to male partners of pregnant women.	July 2012 and Feb. 2013, Kenya	N=300 pregnant women (n=150 per arm)	Couples HTC was significantly higher in the home-visit arm than in clinic-invitation arm (85% vs.36%; P<0.001). The home-arm identified more HIV-seropositive men (12.0 vs. 8.0%; P=0.248) and more HIV-discordant couples (14.7 vs. 4.7%; P=0.003) than the clinic arm. There was no difference in intimate partner violence between the arms.	Good	Fair	Strong	Study excluded women in unstable relationships whose risk of incident sexual and vertical HIV transmission may have been higher.
Rosenberg et al., 2013[53]	Prospective cohort study examining couples HTC, ongoing counseling, and condom distribution among HIV sero-discordant couples.	2004 to 2008, South Africa	N=508 HIV-positive adults in sero-discordant relationships	The odds of reporting unprotected sex were lower one month after testing compared to baseline (OR = 0.45, p<0.05) and remained lower six months after testing (OR = 0.69, p<0.05).	Fair	Fair	Medium	Findings suggest that a couple's mutual awareness of HIV discordance is more protective than a person's individual awareness of HIV-positive status.
Semrau et al., 2005[49]	Post-intervention comparison of HIV-infected women who tested as couples and those who tested individually	April 2001 to July 2003, Zambia	N=9,409 pregnant women attending ANC clinics	Being counseled as part of a couple was not associated with increased acceptance of Nevirapine (67.5% for women testing as a couple vs. 63.9% testing alone, p=0.22).	Poor	Fair	Weak	Couples may represent a highly motivated group willing to come to the clinic which may limit generalizability.
Skogmar et al., 2006[60]	Post-intervention only comparison looking at the effect of enhanced counseling on HIV serostatus disclosure.	November 2003 to December 2003, South Africa	N=144 HIV-positive adults attending two HIV clinics	There were no significant differences in disclosure between patients with only pre- and post-test counselling compared to those attending professional counselling, support groups, or not attending any form of counselling.	Poor	Fair	Weak	Participants were selected by convenience sampling during routine clinical visits. Counselling' was loosely defined to allow investigators to include any form of counselling support.

Were et al., 2006[56]	Prospective cohort study of a home-based HTC and HIV care project.	May 2003 to December 2004, Uganda	N=730 HIV-infected adults and N=2,373 household members	Of the 397 spouses living in the households, 268 (68%) had never been tested for HIV despite their partner's HIV-infected status. Of the 120 spouses of ART patients that were tested for HIV, 52 (43%) were HIV negative, and of these, 99% had not been previously tested.	Fair	Fair	Medium	High acceptance rates for HIV testing were in the context of provision of ART and may not be applicable to other settings.
FAMILY PLANNING COUNSELING AND SERVICES								
Morbidity								
Stringer et al., 2007[76]	Randomized control trial comparing a copper intra-uterine (IUD) to hormonal contraception (HC).	June 2002 to Oct. 2003, Zambia	N=599 postpartum, HIV-infected women	One woman assigned to the IUD group experienced pelvic inflammatory disease (PID); there was no PID among HC users. Clinical disease progression (death or CD4 count dropping below 200 cells/μL) was more common in HC users (13.2/100 woman-years) than in IUD users (8.6/100 woman-years; HR: 1.5; 95% CI, 1.04-2.1).	Fair	Good	Strong	Limitations of this study include the relatively high rates of method switching or discontinuation and the withdrawal or loss of approximately one-third of study participants.
Prevention of Ongoing Transmission								
Baumgartner et al., 2013[65]	Pre-post serial cross-sectional design with no comparison group to test a 'facilitated referral' model for integrating FP into HIV care and treatment	September 2009 to February 2010, Tanzania	N=323 at baseline and N=299 HIV-infected patients attending 12 HIV care and treatment clinics	The proportion of sexually active clients using a contraceptive method post-intervention increased by an estimated 12% (P=0.013). Dual method use increased by 16% (P=0.004)	Poor	Good	Medium	The facilitated referral model included FP counseling, a written referral to FP services co-located within the same facility, and physical escort to the FP clinic.
Grossman et al., 2013[66]	Cluster randomized control trial comparing 12 HIV clinics with integrated FP services to 6 clinics providing FP services through referral	December 2009 to September 2011, Kenya	N=5682 clinical encounters at baseline and N=12 531 encounters	Women at integrated sites were more likely to use effective contraceptive methods at study end [increase from 16.7 to 36.6% at integrated sites, compared	Good	Good	Strong	Follow-up was only 1-year which may be too short to see a difference in pregnancy incidence. The small fee intermittently charged to

			post-intervention at 18 HIV clinics	to 21.1 to 29.8% at control sites; OR: 1.81, 95% CI: 1.24, 2.63]. No difference in incident pregnancy comparing intervention and control sites (IRR: 0.90; 95% CI 0.68, 1.20).				patients seeking contraception at three of the control sites might have reduced use of more effective methods at these sites.
Haddad et al., 2013[72]	Randomized control trial using a factorial design comparing three different educational videos plus provision of comprehensive family planning services.	Not reported, Zambia	N=1,060 couples of which n=721 were concordant positive and n=339 were sero-discordant	Neither intervention video was associated with upgrading from a less effective method (pills, condoms) to a more effective method (implants, injectables, IUDs). Incident unintended pregnancy was associated with time to stopping or downgrading from a more to a less effective method (cHR 13.4; 95% CI 9.3–19.3, P<0.001)	Good	Fair	Strong	The three videos included a "Methods' video detailing FP methods, a 'Motivational' video modelling future planning behaviours and a 'Control' video containing general health information.
Hoke et al., 2014[67]	Serial cross-sectional design to test provider-delivered contraceptive counseling for postpartum women, strengthen IUD services, and reinforce referral mechanisms for female sterilization.	Not reported, South Africa	N=1,077 HIV-infected post-partum women (n=538 pre-intervention and n=539 post-intervention)	No significant difference comparing pre- and post-intervention in the number of women reporting using pills, injectables, IUDs, or sterilization as their contraceptive method. Self-reported condom use did increase (6.3 vs. 12.2%, p=0.016)	Poor	Fair	Weak	Chief limitation was the failure to implement the intervention fully as intended. While providers' expressed support for promoting an expanded range of contraceptive methods, observations reveal that they did not consistently offer these services to clients.
Kosegi et al., JAIDS, 2011[68]	Retrospective cohort study comparing effectiveness of integrating FP services into an HIV clinic (IFP) to routine care (RC)	October 2005 to February 2009, Kenya	N=4,031 HIV-infected women attending an HIV clinic (n= 1453 IFP;	Integration of FP services into HIV care was associated with a 12.9% increase in new use of modern FP methods with condoms (95% CI: 9.4% to 16.4%, p<0.001). There was	Fair	Good	Medium	Enrollment to the intervention group was not randomized and results may have been affected by possible confounding due to

			n=2578 RC)	no change in incident pregnancy (0.1% increase; 95% CI: −1.9% to 2.1%, p=0.9).				unmeasured factors. In addition, multiple filtering steps to exclude subjects could have introduced a selection bias.
Mark et al., 2007[69]	Three-armed RCT comparing two intervention arms (intervention 1: FP education and onsite contraceptive provision; intervention 2: 1 plus a presentation to reduce pressures to conceive) and a control arm (FP education and referral).	Sept. 1996 to Nov. 1998, Zambia	N=251 couples (92% HIV serodiscordant, 6% concordant positive, and 2% concordant negative)	Non-barrier method initiation was significantly greater in the two intervention groups compared to the control group ($p<0.001$ in each case), although contraceptive use was not statistically significantly different between the intervention groups (p=0.52). In each arm, OCs and injectables were the most commonly chosen contraceptive method; with only 2 women selecting implants, and none selecting an IUD. No impact on incident pregnancy (22% in control group, 22% in int. 1, and 16% in int. 2, $p>0.05$).	Good	Fair	Strong	The interventions had no impact on incident pregnancy, largely due to high levels of contraceptive discontinuation, method switching and user failure.
McCarraher et at. 2011[70]	Quasi experimental design where local government areas were assigned to receive a basic (BIP) or an enhanced FP/HIV (EIP) integration package.	March 2008 and June 2009, Nigeria	N= 274 HIV-infected women on ART recruited across the five areas	Modern contraceptive use increased in both arms (EIP: 21.8 vs. 34.7%, p=0.005; BIP: 5.3 vs. 17.6%, p=0.039). There were no significant differences between arms in modern contraceptive use or pregnancy incidence.	Fair	Good	Strong	Investigators speculate that over-reporting in the enhanced group at FU is more probable given the expanded efforts targeted at both the community and facility level. If this is correct, differential misclassification bias is possible.
Ngure et al., 2009[71]	Pre/post design evaluating a multipronged intervention that included staff training,	December 2004 to April 2007, Kenya	N=213 HIV-serodiscordant couples and N=1216 couples at	Nonbarrier contraceptive use increased at the intervention site from 31.5 to 64.7% [OR: 4.0, 95% CI: 3.0–5.3] but changed minimally at the	Fair	Fair	Medium	Intervention was conducted within a clinical trial, limiting generalizability.

	couples family planning sessions, and free provision of hormonal contraception on-site.		three comparison sites	comparison sites from 15.6 to 22.3%. Pregnancy incidence at the intervention site post-intervention was significantly lower (hazard ratio 0.2, 95% CI 0.1–0.6) and was approximately half that observed at the comparison sites (hazard ratio 0.5, 95% CI 0.3–0.8).				
Sarnquist et al., 2014[75]	Quasi-experimental design comparing an intervention of three 90-min group sessions aimed at increasing FP use and negotiation power to standard of care (SOC).	May to August 2011, Zimbabwe	N=98 HIV-positive women (n=33 SOC; n=65 intervention)	There was no significant difference between arms on uptake of FP methods. However, intervention participants were significantly more likely to report disclosing their HIV status to a partner (98.4 vs. 87.5%, p=.04) and that their partner had disclosed his HIV status (75.8 vs. 55.2%, p=0.04) compared to SOC.	Fair	Fair	Medium	Only outcomes are self-reported. Short duration, small sample size, and exclusion of women not attending antenatal care limit generalizability of findings.
Stephenson et al., 2011[73]	Randomized control trial of two video-based interventions ("Methods" and "Motivation"). HIV-positive couples were randomized to 1 of 4 intervention arms: (1) "Methods", (2) "Motivation", (3) "Methods + Motivation", and (4) "Control"	July 2002 to May 2006, Zambia	N=1,502 HIV-positive couples (n=491 HIV serodiscordant couples and n=1,011 concordant positive couples)	A multivariate regression analysis showed that couples who viewed the “Methods video” were more likely to adopt injectables [RR = 1.55, 95% CI: 1.03 to 2.34] relative to pills, and couples viewing both Methods and Motivational videos were more likely to adopt injectables (RR = 1.65, 95% CI: 1.07 to 2.55) and IUD, Norplant implant or tubal ligation (RR = 2.06, 95% CI: 1.17 to 3.44) relative to pills. The “Motivational” video alone did not have a significant impact on	Good	Fair	Strong	Couples included in this study are not representative of the general adult population. They are couples who opted to attend joint HIV testing and to enroll in research studies.

				contraceptive initiation.				
Stringer et al., 2007[76]	Randomized control trial comparing a copper intra-uterine (IUD) to hormonal contraception	June 2002 to Oct. 2003, Zambia	N=599 postpartum, HIV-infected women	Women assigned to hormonal contraception were more likely to become pregnant than those who received an IUD (4.6/100 vs 2.0/100 woman years; HR: 2.4; 95% CI, 1.3-4.7).	Fair	Good	Strong	Limitations of this study include the relatively high rates of method switching or discontinuation and the withdrawal or loss of approximately one-third of study participants.
Wall et al., 2013[74]	Randomized control trial of two video-based interventions ("Methods" and "Motivation"). HIV-positive couples were randomized to 1 of 4 intervention arms: (1) "Methods", (2) "Motivation", (3) "Methods + Motivation", and (4) "Control"	July 2002 to May 2006, Zambia	N=1,502 HIV-positive couples (n=491 HIV serodiscordant couples and n=1,011 concordant positive couples)	The video interventions had no impact on incident pregnancy among couples not using contraception at baseline. Among baseline contraceptive users, viewing the "Methods" video was associated with a significantly lower pregnancy incidence [HR = 0.38; 95% CI: 0.19 to 0.75] relative to those viewing control and/or motivational videos. The effect was strongest in concordant positive couples (HR = 0.22; 95% CI: 0.08 to 0.58) and couples with HIV-positive women (HR = 0.23; 95% CI: 0.09 to 0.55).	Good	Fair	Strong	Couples included in this study are not representative of the general adult population. They are couples who opted to attend joint HIV testing and to enroll in research studies.

Sexually Transmitted Infections (STIs) Assessment and Treatment								
Morbidity								
Balkus et al., 2013[79]	Prospective cohort study to examine treatment of Trichomonas vaginalis (TV) with a single-dose 2g oral metronidazole,	February 1993 to December 2010, Kenya	N=360 sex workers contributing 570 infections to the analysis (282 HIV-seropositive and 288 HIV-seronegative)	The frequency of persistent TV infection following treatment was similar by HIV status (aOR =1.14; 95% CI: 0.70, 1.87). Persistent TV infection was associated with being on ART (OR: 2.91; 95% CI 1.91, 7.27) and having a concurrent bacterial vaginosis infection (aOR=1.90; 95% CI: 1.16, 3.09).	Fair	Fair	Medium	All participants included in the analysis used nevirapine-based ART, limiting the generalizability of the findings to other ARV regimens. It is possible that a proportion of persistent infection was due to re-infection from an untreated partner
Celum et al., 2010[81]	Randomized control trial of twice-daily acyclovir to treat HSV-2 in HIV serodiscordant couples.	Nov. 2004 and April 2007, 14 sites in Africa	N=3,360 HIV sero-discordant couples (n=1683 in the acyclovir group and n=1677 in the placebo group) where the HIV-positive partner was co-infected with HSV.	Suppression with acyclovir reduced the occurrence of HSV-2–positive genital ulcers by 73% (RR, 0.27; 95% CI, 0.20 to 0.36; P<0.001).	Good	Good	Strong	Daily acyclovir therapy did not reduce the risk of transmission of HIV-1, despite a reduction in plasma HIV-1 RNA of 0.25 log10 copies per milliliter and a 73% reduction in the occurrence of genital ulcers due to HSV-2.
Dionne-Odom et al., 2013[80]	Retrospective cohort to examine response to syphilis treatment among HIV-serodiscordant couples	January 2002 to October 2008, Rwanda and Zambia	N=1,321 individuals in HIV - serodiscordant couples (total of 1,810 episodes of syphilis)	HIV infection did not impact the likelihood of serologic response to therapy (OR: 1.001; P =0.995). By 400 days, 67% had responded to therapy, 27% were serofast, and 6.5% had documented reinfection.	Fair	Good	Medium	Investigators did not perform confirmatory treponemal testing for all rapid plasma reagin (RPR)-positive samples. A majority of the reactive RPR tests were of low titer and could have been false-positive tests.
Lingappa et al., 2010[84]	Randomized control trial of twice-daily acyclovir to treat HSV-2 in	Nov. 2004 and April	N=3381 HIV-1/HSV-2 dually infected	HSV-2 suppression with acyclovir reduced the risk of HIV-1 disease progression by	Good	Good	Strong	Participants were recruited from the HIV Prevention Trials

	individuals co-infected with HSV-2 and HIV-1.	2007, 7 sites in Africa	persons (n=1693 received acyclovir; n=1688 received placebo)	16% (95% CI 2–29%). 284 participants on acyclovir versus 324 on placebo reached CD4 < 200 cells/mm^3 (HR: 0.84, 95% CI: 0.71–0.98, p=0.03) during 24 months of follow-up. Among participants with CD4 counts ≥350 cells/mm^3, acyclovir delayed risk of CD4 decline to <350 cells/mm^3 (HR 0.81, 95% CI 0.71–0.93, p=0.002).				Network (HPTN) 039.
Mayaud et al., 2008[87]	Prospective cohort study to document the natural history of HSV-2 in relation to HIV and ART	Not reported, Burkina Faso	N=22 HIV-negative women (group 1), N=30 HIV-infected women on ART (group 2), and N=68 HIV-infected women not on ART. All women were HSV-2 infected	HSV-2 reactivations occur more frequently among HIV-infected women, particularly those with low CD4 cell counts, and are only partly reduced by ART. Ulcers occurred on 1.9%, 3.1% and 7.2% of visits in groups 1, 2 and 3 (p=0.02).	Fair	Fair	Medium	Antiretroviral therapy appears only partly to reduce the frequency of genital herpes manifestations, but not to the levels of HIV-uninfected women.
Paz-Bailey et al., 2009[82]	Double-blind, randomized, placebo-controlled trial of 5-day acyclovir (400 mg 3 times daily) to treat HSV-2.	March 2005 through December 2006, South Africa	N=615 men with genital ulcers (n=309 in the acyclovir arm and n=306 in the placebo arm).	Acyclovir improved ulcer healing; 61% in the acyclovir arm healed by day 7, compared to 42% in the placebo arm (aRR: 1.4; 95% CI: 1.1–1.8, p=0.003).	Good	Good	Strong	Because of infrequent visits, the median time to healing was based on self-reported ulcer duration.
Phiri et al., 2010[83]	Randomized control trial of twice daily 800mg acyclovir added to syndromic management of genital	Sept. 2004 and June 2006, Malawi	N=422 patients with genital ulcer disease (n=208 to acyclovir and n=214 to	There was no impact on ulcer healing; 85% of ulcers were healed at day 14 with no difference between treatment arms (RR= 1.02, 95% CI 0.93 to 1.11).	Good	Good	Strong	Findings do not support inclusion of acyclovir for genital ulcer treatment, except for patients presenting early and in HIV-negative patients

	ulcer disease.		placebo)					with recurrent herpes.
Reynolds et al., 2012[85]	Randomized control trial of twice daily 400 mg acyclovir to treat HSV-2	May 2007 to Nov. 2010, Uganda	N=440 HIV-1/HSV-2 co-infected adults not on ART (n=220 per arm)	Acyclovir reduced the rate of disease progression by 25%. Participants in the acyclovir arm were less likely to reach the primary endpoint (defined as CD4 count <250 cells/mL or WHO clinical stage 4) (aHR 0.75, 95% CI 0.58-0.99; p=0.040). Participants with a baseline viral load ≥ 50,000 copies/ml experienced a 38% reduction in HIV disease progression (aHR 0.62, 95% CI 0.43-0.96;p=0.03).	Good	Good	Strong	Individuals with AIDS defining illnesses, or those receiving ART were excluded.
Roxby et al., 2012[86]	Randomized control trial of twice daily 500 mg valacyclovir to treat HSV-2 among pregnant women 34 weeks gestation through 12 months postpartum.	April 2008 and June 2009, Kenya	N=148 pregnant women co-infected with HIV-1 and HSV-2 not yet on ART (n=73 per arm)	Valacyclovir was associated with a significant increase in mean CD4 count (154 cells/ml vs. 78 cells/ml, p = 0.03) and a smaller increases in HIV-1 RNA levels after 12 months (0.21 log10 copies/ml vs. 0.66 log10 copies/m, p = 0.001) compared to the placebo arm.	Good	Good	Strong	Ability of study to comment on disease progression events is limited by the small number of women and the relatively brief follow-up time.
Wolday et al., 2004[88]	Prospective cohort study to determine effect of syndromic treatment of HSV-2	June 2001 to Dec 2001, Ethiopia	N=71 women living HIV (n=60 with genital discharge (GDS) or genital ulcer (GUD) and n=11 asymptomatic controls).	GUS was significantly associated with syndromic treatment failure, independent of plasma HIV RNA load and CD4 T-cell count (OR: 4.79; 95% CI: 1.32–17.46).	Fair	Fair	Medium	The failure to cure GUS (46% in this study) could be due to the presence of genital herpes that was not treated.
Prevention of Ongoing Transmission								
Anderson et al., 2012[96]	Prospective cohort study to assess whether directly	Not reported, South	N=557 HIV-infected women not on	Cure rate for trichomoniasis was 80.4%. Plasma viral load was not significantly	Fair	Fair	Medium	Investigators were unable to provide therapy for partners Investigators had to rely upon the

	observed treatment for trichomoniasis among HIV-infected women not on ART was associated with decreased HIV genital shedding.	Africa	ART	different after therapy, p=0.93. However, genital tract viral load decreased by 0.5 log10, [mean viral load (log10) 4.66 to 4.18, p<0.01] following therapy.				subjects to both give letters to their partners as well as abstain from intercourse or use condoms until their partner was treated
Baeten et al., 2008[90]	A randomized cross-over trial of HSV-2–suppressive therapy (valacyclovir, 500 mg twice daily, or placebo for 8 weeks, a 2-week washout period, then the alternative therapy for 8 weeks)	Not reported, Peru	N=20 women co-infected with HSV-2 and HIV who were not on ART.	Plasma HIV viral loads were significantly lower during the valacyclovir arm, compared with the placebo arm (-0.26 log10 copies/mL, a 45% decrease [*P*<.001]), as was cervical HIV viral loads (-0.35 log10 copies/swab, a 55% decrease [*P*<.001]).	Good	Fair	Medium	Very small sample size precluded the ability of investigators to explore other potential clinical factors such as CD4 count.
Celum et al., 2010[81]	Randomized control trial of twice-daily acyclovir to treat HSV-2 in HIV serodiscordant couples.	Nov. 2004 and April 2007, 14 sites in Africa	N=3,360 HIV sero-discordant couples (n=1683 in the acyclovir group and n=1677 in the placebo group) where the HIV-positive partner was co-infected with HSV.	Of 132 HIV-1 seroconversions (an incidence of 2.7 per 100 person-years), 84 were linked within couples by viral sequencing: 41 in the acyclovir group and 43 in the placebo group (HR with acyclovir: 0.92, 95% CI: 0.60 - 1.41, P = 0.69). Suppression with acyclovir reduced the mean plasma concentration of HIV-1 by 0.25 log10 copies per milliliter (95% CI, 0.22 to 0.29; P<0.001).	Good	Good	Strong	Daily acyclovir therapy did not reduce the risk of transmission of HIV-1, despite a reduction in plasma HIV-1 RNA of 0.25 log10 copies per milliliter and a 73% reduction in the occurrence of genital ulcers due to HSV-2.
Delaney et al., 2009[89]	Randomised, double-blind, placebo-controlled trial of acyclovir to treat HSV-2 in HIV-infected women.	April 2005 and April 2006, South Africa	N=300 women co-infected with HIV-1 and HSV-2 (n=152 acyclovir and n=148	There was no significant difference in detectable genital HIV viral load between the two groups. However, acyclovir significantly decreased the frequency of HIV-1	Good	Good	Strong	All episodes of genital ulcer disease were treated with acyclovir irrespective of treatment arm. However, there was no evidence to suggest that this approach undermined the intent-to-treat analysis.

			placebo)	shedding (AOR: 0.57, 95%CI 0.36 to 0.89), the plasma HIV-1 RNA viral load (−0.34 $\log_{10}$ copies/mL 95%CI 0.15 to 0.54), and genital ulceration (8% vs. 18%, RR 0.43, 95%CI 0.22 to 0.84).				
Drake et al., 2012[91]	Randomized, double-blind trial of twice daily 500 mg valacyclovir or placebo	April 2008 and August 2010, Kenya	N=148 HIV 1/ HSV-2 co-infected pregnant women (n=74 per arm)	Mean plasma HIV-1 was lower during pregnancy (2.56 log10 copies/mL; 95% CI: 2.77 to 2.34) and after 6 weeks postpartum (2.51 log10 copies/mL; 95% CI, 2.73 to 2.30) in the valacyclovir arm. Valacyclovir also reduced breast milk HIV-1 RNA detection at 6 and 14 weeks postpartum (30% lower, P=0.04; 46% lower, P=0.01, respectively), but not after 14 weeks. Cervical HIV-1 RNA detection was similar between the two arms (P=0.91).	Good	Fair	Strong	Investigators were unable to evaluate the effect of valacyclovir on vertical transmission or on change in HIV-1 RNA among women who were eligible for ART. Study was underpowered to detect an association between valacyclovir and breast milk HIV-1 RNA levels or detection at 6 and 12 months postpartum due to small numbers of women able to express breast milk at these visits.
Kim et al., 2010[98]	Randomized control trial of twice-daily acyclovir to treat HSV-2 in HIV sero-converters.	October 2003 and November 2007, multiple sites in Africa, Peru, and the U.S.	N=76 HIV-1 sero-converters (n=36 in the acyclovir arm and n=40 in the placebo arm)	There were no significant differences in plasma HIV-1 RNA levels (p=0.30) or CD4 cell counts (p=0.85) between the acyclovir and placebo recipients.	Good	Good	Strong	Participants were recruited from the HIV Prevention Trials Network (HPTN) 039. Findings indicate that acyclovir suppression during HIV-1 seroconversion and the subsequent 6 months does not affect HIV-1 set point.
Masese et al., 2011[97]	Prospective cohort study to examine treatment of Trichomonas vaginalis with a single	March 2004 and December 2008, Kenya	N=31 HIV-infected women on ART, co-infected with	There was no difference in the likelihood of detecting vaginal HIV-1 RNA before vs. during infection (OR: 1.41, 95% CI 0.23, 8.79, p	Fair	Fair	Medium	The diagnosis of trichomoniasis by wet mount has limited sensitivity as it relies on visualization of motile protozoa.

	dose metronidazole (2 g) among women living with HIV.		Trichomonas vaginalis	= 0.7) or before infection vs. after successful treatment (OR 0.68, 95% CI: 0.13, 3.45, p = 0.6).				
Mayud et al., 2009[99]	Randomized control trial of 400 mg acyclovir 400 given 3 times daily for 5 days to treat HSV-2 in HIV-infected women.	May 2003 through October 2005, Ghana and Central Africa Republic	N=118 HIV-infected women with HSV-2 ulcers (n=54 in the acyclovir arm; n=64 in the placebo arm).	There was no significant difference between the arms in ulcer healing (RR, 1.26; 95% CI, 0.9–1.9), the mean cervicovaginal HIV-1 RNA load (-0.06 log10 copies/mL; 95% CI:-0.4 to 0.3 log10 copies/mL) or plasma HIV-1 RNA loads (0.09 log10 copies/mL; 95% CI:-0.1 to 0.3 log10 copies/mL).	Fair	Fair	Strong	Women in the acyclovir group were more likely to have detectable plasma, lesional, and cervicovaginal HIV-1 RNA at baseline. Together with the small sample size, the study may have been underpowered to detect significant differences between the arms.
Mayaud et al., 2008[87]	Prospective cohort study to document the natural history of HSV-2 in relation to HIV and ART	Not reported, Burkina Faso	N=22 HIV-negative women (group 1), N=30 HIV-infected women on ART (group 2), and N=68 HIV-infected women not on ART. All women were HSV-2 infected	Among HIV-infected women, cervicovaginal HSV-2 DNA was detected more frequently during ulcer episodes (aRR: 2.79, 95% CI 2.01 to 3.86). Among women not yet on ART, those with CD4 cell counts of 200–500 cells/ml were more likely to shed HSV-2 (aRR 1.71, 95% CI 1.02 to 2.86) than those with CD4 counts above 500 cells/ml. Women on ART had a similar risk of HSV-2 shedding compared to women with CD4 counts above 500 cells/ml who were not yet on ART (aRR 0.95, 95% CI 0.52 to 1.73).	Fair	Fair	Medium	Small sample size leading to low power to detect differences in per-woman analyses.
Mugwanya et al., 2011[92]	Randomized, crossover trial of 2 dosing regimens of HSV-2 suppression:	March and November 2010, Kenya	N= 32 HIV-1/ HSV-2 dually infected adults not on ART	Mean plasma HIV-1 levels were significantly lower on valacyclovir compared with acyclovir: 2.94 vs 3.56	Good	Fair	Medium	Findings suggest that high-dose HSV-2 suppressive therapy could substantially slow HIV-1 disease progression and reduce HIV-1

	valacyclovir 1.5 g vs acyclovir 400 mg,			log10 copies/mL (mean difference: 0.62 log10 copies/mL; 95% CI: -0.68, -0.55; p<0.001).				transmission among HIV-1/HSV-2 co-infected persons not yet eligible for ART.
Nagot et al., 2007[93]	Randomized, double-blind, placebo-controlled trial of twice daily 500mg valacyclovir to treat HSV-2	August 2004 and January 2005, Burkina Faso	N=136 women co-infected with HIV-1/HSV-2 but not on ART (n=68 per group)	Valacyclovir significantly decreased the frequency of genital HIV-1 RNA (OR: 0.41; 95%CI: 0.21 to 0.80), the mean genital viral load (−0.29 log10 copies per milliliter; 95% CI: −0.44 to −0.15), and the mean plasma viral load (-0.53 log10 copy per milliliter; 95% CI: −0.72 to −0.35).	Good	Fair	Strong	Trial had no HIV clinical outcomes.
Paz-Bailey et al., 2009[82]	Double-blind, randomized, placebo-controlled trial of 5-day acyclovir (400 mg 3 times daily) to treat HSV-2.	March 2005 through December 2006, South Africa	N=615 men with genital ulcers (n=309 in the acyclovir arm and n=306 in the placebo arm).	Acyclovir reduced HIV-1 ulcer shedding on day 7 (24% for acyclovir vs 37% for placebo; p=0.05).	Good	Good	Strong	Because of infrequent visits, the median time to healing was based on self-reported ulcer duration.
Phiri et al., 2010[83]	Randomized control trial of twice daily 800mg acyclovir added to syndromic management of genital ulcer disease.	Sept. 2004 and June 2006, Malawi	N=422 patients with genital ulcer disease (n=208 to aciclovir and n=214 to placebo)	Among 244 HIV-1/HSV-2 co-infected individuals, acyclovir reduced the frequency of lesional HIV-1 RNA shedding (aRR=0.64, 95% CI: 0.41 to 0.99) and of seminal HIV-1 RNA plasma detection in men (aRR=0.59, 95% CI: 0.40 to 0.88), but not the frequency of cervico-vaginal HIV-1 shedding among women.	Good	Good	Strong	The benefits of suppression of HIV in the genital tract whether in a lesion or in semen are unknown since the exact mechanisms of HIV transmission, including the concentration of HIV required for transmission, remains unknown.
Wolday et al., 2004[88]	Prospective cohort study to determine	June 2001 to Dec	N=71 women living HIV	Cervical HIV load was higher in women with GUS	Fair	Fair	Medium	Findings suggest that poor syndromic treatment, along with

	effect of syndromic treatment of HSV-2	2001, Ethiopia	(n=60 with genital discharge (GDS) or genital ulcer (GUD) and n=11 asymptomatic controls).	than in those with GDS (median 3.46; IQR, 2.84–4.18 versus median, 2.83; QR, 1.90–3.31 log10 copies/ swab; P = 0.019). There was no significant reduction in genital HIV shedding after syndromic treatment of GDS or GUS. The median genital HIV load decreased significantly only in the subgroup of women with clinical improvement (median, 2.91; IQR, 1.90–3.45 versus median, 2.25; IQR, 1.90–3.08 log10 RNA copies/swab, respectively; P = 0.006).				untreated infections, such as herpetic ulcers, might be responsible for the persistence of genital shedding of HIV-1 observed in this study
Zuckerman et al., 2009[94]	A randomized cross-over trial of HSV-2–suppressive therapy (valacyclovir, 500 mg twice daily, or placebo for 8 weeks, a 2-week washout period, then the alternative therapy for 8 weeks)	Not reported, Peru	N=20 ART-naive HIV-1/HSV-2 co-infected men who have sex with men	Valacyclovir significantly reduced the proportion of days with detectable seminal HIV-1 (63% vs. 78%, p=0.04) and led to a 44% reduction in the quantity of HIV-1 in semen (-0.25 $\log_{10}$ copies/mL; 95% CI −0.40 to −0.10, p=0.001) compared to placebo.	Good	Fair	Medium	Investigators sampled only cell-free seminal plasma for HIV-1, although cell associated HIV-1 may also be important in HIV-1 transmission
Zuckerman et al., 2007[95]	A randomized cross-over trial of HSV-2–suppressive therapy (valacyclovir, 500 mg twice daily, or placebo for 8 weeks, a 2-week washout period, then the alternative therapy for 8 weeks)	Not reported, Peru	N=20 ART-naive HIV-1/HSV-2 co-infected men who have sex with men	Valacyclovir led to a 33% decrease in rectal HIV-1 viral levels (-0.16 log10 copies/mL; 95% CI: 0.07–0.25; p=0008) and a 53% decrease in plasma HIV-1 levels (-0.33 log10 copies/mL; 95% CI: 0.23–0.42; $p<0001$) compared to placebo.	Good	Fair	Medium	Adherence was assessed by pill count and self-report. The 8-week duration of treatment may have been too short to detect the maximal effect of HSV suppression on HIV levels.

Table S3: Summary of the Overall Quality of the Evidence and Impact of the Five Prevention Interventions on the Clinical Outcomes

	Overall Quality of Evidence		**Impact of the Intervention**	**Evidence from Economic Evaluation**		**Comments**
	No. Studies Addressing Each Outcome	**Overall Quality of the Body of Evidence** *(1=Good; 2=Fair; 3=Poor) (Score and narrative)*	**Expected Impact of the Intervention** *(1=High; 2=Moderate; 3=Low; 4=Uncertain)*	**No. Studies With Cost Effectiveness Data**	**Quality of Evidence from Economic Evaluation**	
ADHERENCE COUNSELING AND SUPPORT						
Mortality	2 studies[9-10]	Poor	Uncertain	None		Only two studies included mortality as a main outcome measure. The studies reported conflicting results with one reporting directly observed therapy was associated with lower mortality and one reporting null effects. The study with a positive association was stopped early due to futility.
Morbidity	22 studies[9-30]	Good	High	1 study	A cohort study conducted in South Africa among 6,833 HIV-infected adults found that increasing patients' ART adherence was associated with reduced hospitalization costs and lower mean monthly direct health care costs [32].	Several high quality randomized control trials and observational studies show that adherence counseling and support interventions can improve self-reported adherence and clinical outcomes such as CD4 cell count and undetectable viral load.
Retention	1 study[24]	Poor	Uncertain	None		Only one study included retention in care as a main outcome measure. The study found adherence counseling had no effect on retention.

Quality of Life	2 studies[14, 19]	Fair	Low	None		Two studies, both with weak designs, found that adherence counseling and support was associated with improvements in social support, quality of life, and depressive symptoms.
Prevention	1 study[31]	Poor	Uncertain	None		Only one study with a quasi-experimental post-test only design included prevention of onward transmission as an outcome. The study included only self-reported data from 60 individuals.
RISK REDUCTION EDUCATION AND CONDOM PROVISION						
Morbidity	2 studies[33-34]	Poor	Uncertain	None		Two studies included morbidity as a main outcome measure. The studies reported conflicting results with one study reporting lower STI incidence following risk reduction education and one reporting null effects.
Quality of Life	2 studies[35-36]	Fair	Moderate	None		Two studies, one a quasi-experimental design and the other a randomized control trial, found that risk reduction sessions were associated with better social support and coping behaviors as well as lower depression scores.
Prevention	13 studies[33-45]	Good	High	None		While evidence is mixed, several well-conducted randomized control trials show significant impact of risk reduction education sessions on self-reported risk behaviors, particularly with multiple high-intensity sessions.
DISCLOSURE COUNSELING AND PARTNER HIV TESTING AND COUNSELING						
Retention	2 studies[46-47]	Fair	Low	None		Two cohort studies found that male partner involvement in antenatal care was associated with better retention of women for follow-up care post-delivery.

Quality of Life	2 studies[48-49]	Poor	Uncertain	None		Two studies found no significant difference on quality of life indicators, including HIV serostatus disclosure and adverse social events, following interventions to improve partner HIV testing.
Prevention	15 studies[46-47, 49-61]	Good	High	2 studies	The total programme cost for couples HTC was more expensive (US$44,013) than individual HTC (US$42,528), but couples HTC averted a greater number of infant infections (91 vs. 88) [62]. The costs per new case identified were $36 for provider notification, $18 for contract notification and $8 for passive referral. The costs per partner tested were $19 (provider), $9 (contract) and $4 (passive) [63]. Contact tracing could be a cheaper approach to detecting new HIV cases than both client-initiated and provider-initiated testing in rural settings with low to moderate HIV prevalence [64].	Several well-conducted randomized control trials and cohort studies found that partner HIV testing and counseling was associated with better uptake of PMTCT interventions, improved infant outcomes, and reduced sexual behavior. Partner notification strategies were also feasible to implement and resulted in many new HIV diagnoses among previously undiagnosed sex partners.
FAMILY PLANNING COUNSELING AND SERVICES						
Morbidity	1 study[76]	Poor	Uncertain	None		One randomized control trial found that clinical disease progression was more common among hormonal contraceptive users than intra-uterine device users.

Prevention	12 studies[65-76]	Good	Medium	2 studies	Cost analysis indicates that preventing unintended births among HIV-infected women with family planning services would cost $63 per birth averted globally [77]. In a randomized control trial from Kenya, integration of services was associated with an average marginal cost of $841 per site, $48 per female patient, and $1368 for each pregnancy averted [78].	Several well-conducted randomized control trials and observation studies have found that integration of family planning services into HIV clinical care was associated with improved uptake of modern contraceptive methods. However, the impact on pregnancy incidence remains unclear with most studies failing to show an association between improved uptake of modern contraceptives and pregnancy incidence.
SEXUALLY TRANSMITTED INFECTIONS (STIs) ASSESSMENT AND TREATMENT						
Morbidity	10 studies[79-88]	Good	High	None		Strong evidence from several well-conducted randomized control trials and observation studies that treatment of STIs among PLHIV can reduce STI -related morbidity including the frequency and severity of genital ulcers. STI treatment is also associated with slower HIV-1 disease progression and improved CD4 counts.
Prevention	16 studies[81-83, 87-99]	Good	Low	1 study	In South Africa, the costs of HSV-2 suppressive therapy is estimated to be about US $737 per life year gained (95% CI: $373-2,489) if the ART eligibility criteria is CD4 count <350 cells/μL, which compares favorably with the estimated cost-effectiveness of ART in South Africa (~US $1200 per life year gained) [100].	Several studies have found that valacyclovir and acyclovir were associated with decreases in plasma HIV-1 RNA viral load, HIV-1 viral shedding, and seminal HIV-1 viral load. However, one well-conducted intervention trial failed to find an impact of HSV-2 treatment on HIV transmission.