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Supplementary Materials

The Health Outcomes Around Pregnancy and Exposure to HIV/ARVs (HOPE) Study Protocol: A Prospective Observational Cohort Study of Reproductive-Aged Women Living with HIV

Supplementary Table 1: HOPE Domain Specific Aims and Selected Research Questions

Supplementary Table 2. Minimum detectable Relative Risks (RRs) between two exposure groups at 80% power and alpha=0.05 for various prevalence levels of the outcome in the reference exposure group (Group 2) with a range of sample sizes

Supplementary Table 3. Detectable differences in means (relative to SD) between exposure groups based on a 2-sample t-test at 80% power and alpha=0.05 for a range of total sample sizes with various sample size distribution between two exposure groups.

Supplementary Figure 1: HOPE Schedules of Evaluations

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Supplementary Table 1: HOPE Domain Specific Aims and Selected Research Questions

Aims	Selected Research Questions
Reproductive Health • Determine factors associated with a) fertility desires and b) alignment of family planning practices with stated fertility desires of reproductive-aged women living with HIV. • Assess contraception preferences and uptake, patterns of use, adherence, discontinuation, and associated individual, interpersonal and structural factors. • Describe the unique gynecologic health problems, concerns and needs of reproductive-age WLHIV and determine factors associated with gynecologic healthcare utilization. • Determine factors associated with pregnancy outcomes (e.g., spontaneous abortion, fetal loss, preterm birth) and complications (e.g., hypertensive disorders of pregnancy, gestational diabetes mellitus, and chorioamnionitis). • Determine factors associated with awareness of and use of HIV prevention practices and safer conception practices (i.e., methods that reduce the likelihood of transmission during attempted conception in a mixed status couple).	• Do fertility desires of WLHIV vary across time and by demographic, clinical, & psychosocial factors? • Are WLHIV with better health care engagement and better HIV control more likely to engage in routinely recommended gynecological care?
Cardiometabolic Health • Assess associations of antiretroviral therapy (ART) use with patterns of weight change. • Assess associations of mode of HIV acquisition, immune status, viral control, and ART use with hypertension. • Assess associations of ART use with gestational diabetes. • Evaluate the influence of sleep and physical activity on cardiometabolic health of women living with HIV.	• Is protease inhibitor use in pregnancy associated with higher risk for gestational diabetes relative to integrase strand transfer inhibitor use? • Is self-reported sleep duration associated with incident hypertension and changes in weight over time?
General Health and Co-Infections • Investigate prevalence of and factors associated with self-reported SARS-CoV-2 infection and hospitalization for SARS-CoV-2 infection in WLHIV of reproductive age. • Identify barriers and facilitators of SARS-CoV-2 vaccine uptake among WLHIV. • Identify barriers and facilitators of Influenza vaccine uptake among WLHIV. • Evaluate differences or similarities in rates of HIV viral suppression between women co-infected with Hepatitis C and HIV and those living with HIV only.	• Is Black racial identity, Hispanic ethnicity, or lower socioeconomic status associated with higher incidence of self-reported SARS-CoV-2 infection and hospitalization for SARS-CoV-2 infection among non-pregnant WLHIV due to experiences of discrimination and structural racism? • Is prevalence of self-reported SARS-CoV-2 infection similar between pregnant and non-pregnant WLHIV? Is severity of COVID-19 disease higher in pregnant WLHIV?
HIV Disease, Care Continuum, Care Engagement, and Treatment Adherence • Investigate the prevalence, changes in, and HIV history-related predictors (e.g. mode of HIV acquisition) of HIV care continuum outcome components (e.g., linkage to HIV care,	• Are women who experience adversities in childhood and adulthood less likely to

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Aims	Selected Research Questions
retention in HIV care, adherence, viral suppression, immune status), across the reproductive life course among WLHIV. • Investigate individual, interpersonal, social and structural determinants of HIV care continuum-related outcomes (linkage to HIV care, retention in HIV care, adherence, viral suppression, immune status) across the reproductive life course among WLHIV. • Describe the transition from obstetrical care to postpartum HIV care, and barriers and facilitators to successful transition.	remain engaged in HIV care and/or achieve viral suppression? • Do disparities in HIV care continuum outcomes vary by region, socioeconomic deprivation, and interpersonal and family factors?
Substance Use • Assess the changes in substance use behavior among WLHIV over time, including the patterns unique to individuals who experience reproductive life events such as pregnancy, the first postpartum year, and early years of parenting. • Assess the relationships of substance use among pregnant and postpartum WLHIV with perinatal outcomes. • Determine predictors of substance use behavior in WLHIV across the reproductive lifespan, including mental health, and social determinants (e.g. significant political events, social movements, public health policy, and health care systems/processes).	• Is the association of substance use during pregnancy/postpartum with longer-term maternal and child health outcomes modified by HIV disease control (e.g. detectable viral load) and health care engagement? • Is prevalence of marijuana use among WLHIV higher among those residing in states where marijuana is medically or recreationally legal?
Stigma, Racism and Social Determinants of Health • Assess the relationship of structural racism and individual experiences of racism to the health of WLHIV. • Identify prevalence, predictors and health consequences of disclosure or non-disclosure of HIV status to intimate partners, HIV-exposed children, and women's wider social networks. • Identify predictors and health related sequelae of internalized HIV stigma and racism among WLHIV across the reproductive life course.	• Does stress mediate the relationship of racism to suboptimal HIV care continuum outcomes? • Do women reporting higher levels of racism, HIV-related stigma, and/or discrimination during or prior to pregnancy have lower CD4 count, higher risk of perinatal depression, hypertensive disorders of pregnancy, and adverse birth outcomes?
Mental Health and Psychosocial Conditions • Describe the prevalence, incidence and persistence of mental health problems, including significant symptoms of depression, anxiety and PTSD, among WLHIV, including women living with perinatally acquired HIV and those living with non-perinatally acquired HIV. • Identify individual, HIV disease, treatment, pregnancy-related, and psychosocial factors associated with the presence and chronicity of mental health problems among women living with HIV. • Determine the relationship of mental health problems to adherence and HIV outcomes (viral suppression, CD4 cell count and engagement in HIV care) among WLHIV.	• Is the prevalence, incidence and persistence of mental health problems among WLHIV associated with adverse life events during childhood or adolescence, higher levels of HIV-related stigma, stressful life events during adulthood (e.g., violence, HIV related health complications), and limited personal resources (e.g., income, education, access

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Aims	Selected Research Questions
• Examine the relative contribution of violence exposure, mental health problems, and HIV disease factors to a) hypertension/changes in blood pressure during and after pregnancy, b) adverse pregnancy outcomes.	to care), regardless of timing of HIV infection? • Is exposure to specific ARVs or ARV classes associated with elevated risks of depression? Does risk of depression vary by ARV class and treatment duration?
Impact of Child Health on Maternal Health • Assess the relationship of adverse infant or child health outcomes to the health of WLHIV	• Are adverse birth outcomes (preterm birth) and child conditions (hospitalizations in the first two years) associated with increased risk of adverse maternal outcomes, such as unsuppressed viral load? • Are chronic child health conditions, e.g., asthma, neurologic diagnoses, in the offspring of WLHIV associated with increased risk of unsuppressed viral load and lower CD4 cell count among WLHIV after 1 year postpartum? • Is the relationship of child chronic health conditions to maternal unsuppressed viral load mediated by maternal chronic stress, inadequate sleep, depression, and anxiety? • Is the relationship of child acute and chronic health conditions to maternal physical and mental health outcomes moderated by presence of resilience resources (e.g. social support, less social isolation)?

WLHIV=Women Living with HIV; ARV=Antiretroviral; PTSD=Post-Traumatic Stress Disorder

Supplementary Table 2. Minimum detectable Relative Risks (RRs) between two exposure groups at 80% power and alpha=0.05 for various prevalence levels of the outcome in the reference exposure group (Group 2) with a range of sample sizes

Prevalence in Group 2	Percent sample size		Minimum detectable RR for given total sample size				
	Group 1	Group 2	N = 1600	N = 1200	N = 800	N = 400	N = 300
5%	10%	90%	2.50	2.82	3.40	4.85	5.67
	20%	80%	2.00	2.20	2.56	3.47	4.00
	30%	70%	1.82	1.98	2.26	2.96	3.37
	40%	60%	1.74	1.87	2.11	2.71	3.05
	50%	50%	1.70	1.83	2.05	2.59	2.89
10%	10%	90%	1.90	2.07	2.37	3.10	3.49
	20%	80%	1.62	1.74	1.94	2.42	2.69
	30%	70%	1.52	1.62	1.78	2.17	2.39
	40%	60%	1.48	1.56	1.70	2.05	2.24
	50%	50%	1.46	1.54	1.67	1.99	2.17
20%	10%	90%	1.53	1.62	1.78	2.14	2.32
	20%	80%	1.38	1.45	1.56	1.82	1.95
	30%	70%	1.33	1.38	1.48	1.69	1.81
	40%	60%	1.30	1.35	1.44	1.63	1.74
	50%	50%	1.29	1.34	1.42	1.61	1.71
40%	10%	90%	1.29	1.34	1.41	1.57	1.64
	20%	80%	1.22	1.25	1.31	1.43	1.50
	30%	70%	1.19	1.22	1.27	1.38	1.44
	40%	60%	1.18	1.21	1.25	1.35	1.41
	50%	50%	1.17	1.20	1.25	1.35	1.40

RR=Relative Risk

Supplementary Table 3. Detectable differences in means (relative to SD) between exposure groups based on a 2-sample t-test at 80% power and alpha=0.05 for a range of total sample sizes with various sample size distribution between two exposure groups.

Percent sample size		Minimum detectable difference in means (relative to SD)				
Group 1	Group 2	N = 1600	N = 1200	N = 800	N = 400	N = 300
10%	90%	0.23	0.27	0.33	0.47	0.54
20%	80%	0.18	0.20	0.25	0.35	0.41
30%	70%	0.15	0.18	0.22	0.31	0.35
40%	60%	0.14	0.17	0.20	0.29	0.33
50%	50%	0.14	0.16	0.20	0.28	0.33

SD=Standard Deviation

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Supplementary Figure 1: HOPE Schedules of Evaluations