PrEP4Her: Developing a Novel Strategy to Implement PrEP Into Women's Healthcare

Study Protocol and Statistical Analysis Plan

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A. SIGNIFICANCE

A1. HIV infection disproportionately affects the Southern U.S. with continuing inequities in rates among Black cis-gender women. Despite advances in antiretroviral therapy (ART), rates of HIV infection have increased among highly disenfranchised populations, accentuating health disparities. Black people comprise only 13% of the U.S population, but account for more than half of new HIV diagnoses.[21] Adverse HIV outcomes are also higher, as Black people are less likely to be linked to or retained in care, contributing to lower rates of viral suppression and higher mortality.[22-24] Notably, Black cis-gender women account for 57% of all new infections among women and the majority occur in those of reproductive age.[2, 21] These health inequities are most pronounced in the U.S. South. Despite comprising only a third of the U.S. population, the South accounts for nearly half of all new HIV infections, with the highest infection and mortality rates among Black populations.[21, 25] Furthermore, rural communities in the South have higher HIV infection rates, requiring targeted prevention strategies to address their unique cultural and structural barriers[25]. This is especially true in Alabama, where rural counties have the highest rates of new HIV infections per 100,000 persons[26]. Additionally, information-based HIV prevention interventions are less effective due to poverty, income and social inequality due to institutional racism.[27] This is reflected in Alabama's local HIV epidemiology as Black cis-gender women are eight times more likely to be diagnosed with HIV compared to White women.[28]

A2. PrEP is an effective biomedical prevention strategy for HIV infection, but underutilized by cis-gender women. Almost two-thirds of people prescribed PrEP are White and, of the 468,000 cis-gender women with a PrEP indication, only 19,000 (4%) are currently receiving prescriptions.[29-33] Our university-affiliated infectious diseases-led PrEP Clinic in Alabama mirrors national trends in PrEP prescriptions, providing services for primarily White men who have sex with men (63% of clientele) with only 7% of our clientele being cis-gender women.[34] Additionally, most studies evaluating PrEP uptake among cis-gender women have demonstrated that cis-gender women who access PrEP are mostly sero-discordant relationships with virally suppressed partners and, therefore, have minimal risk of transmission.[35] Cited barriers for low uptake of PrEP among cis-gender women in the U.S. include: daily regimen, stigma from providers and peers, and perceived difficulty negotiating PrEP use with partners.[36-38] However, these national studies may not be reflective of knowledge, attitudes and beliefs of cis-gender women living in Southern communities with unique social and structural determinants of health. This supports the need for theory-driven studies that focus on enhancing uptake of PrEP among cis-gender women living in the South where access to PrEP services has been limited at best. Theory-driven studies that focus on enhancing uptake of PrEP among cis-gender women living in the South are critically needed, given the dearth of studies focused on increasing uptake of PrEP in this population with inequitable rates of HIV infection.[39] Additionally, this research would provide insight into implementing PrEP into a unique clinical setting, as to date research has focused on integration of PrEP into family planning care and sexually transmitted disease clinics for cis-gender women.[40-42]

A3. Clinical care settings focused on women's health may be ideal for PrEP service delivery among cis-gender women. Given the inequities in PrEP prescriptions among Black cis-gender women, there has been growing literature on how to optimize uptake among this underserved population. However, there have been a dearth of studies that have focused on resource-limited settings like the Southern U.S. Studies conducted within this setting have shown that Black cis-gender women were willing to use PrEP; however, limited uptake has been reported.[43] Safety-net programs created for cis-gender women to receive reproductive healthcare, like family planning clinics, have been evaluated in Southern states as sites for PrEP implementation.[39, 44] Women recruited from family planning clinics reported preferring PrEP information to be delivered through advertising and conversations directly with providers, as well as focused on awareness and access.[45] Additionally, investigators working to implement PrEP in such settings noted low PrEP knowledge as a significant provider-level barrier, resulting in deployment of PrEP informational trainings in family planning clinics located in Southern states (including Alabama) to improve PrEP knowledge.[46] But, even in this implementation study that focused on addressing client- and provider-level barriers through deployment of evidence-based implementation strategies, only 18% of patients seen (67 out of 376 sexually active cis-gender women) accepted off-site PrEP referral purportedly preferring to seek services on-site in the family planning clinic.[46-48] In another study conducted in Washington D.C. at a family planning clinic where PrEP was offered on-site, again provider-knowledge and PrEP referral increased with provider trainings, but uptake was sub-optimal with only 6% of those referred using PrEP.[49] These studies provide proof of concept that general practitioners who specialize in women's health are able to gain foundational knowledge about PrEP indications for cis-gender women, but uptake was still limited and further research is needed on how to integrate PrEP care into routine women's health visits to improve PrEP uptake.

A4. In the state of Alabama, gynecology clinics may provide an ideal setting for PrEP service delivery tailored for cis-gender women, in a state where family planning clinics are not currently prescribing PrEP. There are limited settings that offer specialized care focused on women's health, like family planning clinics. However, *currently family planning clinics within the state of Alabama (AL) are not offering PrEP; furthermore, only one health department in Jefferson County, the county seat of Birmingham and the most populous county in AL, is providing PrEP services, limiting publicly-funded settings for cis-gender women to receive PrEP around the State*. Similar barriers are likely to be found in other Southern states with similar restrictive policies. Therefore, additional clinical settings that offer routine women's healthcare need to be identified as potential sites for PrEP service implementation. There is strong evidence to support that many women in the U.S. are seeking routine annual care for reproductive health and nearly half access only reproductive healthcare services.[50, 51] While family planning clinics provide much needed reproductive and sexual health services for many women (especially for those un- or under-insured), they only reach about one-quarter of U.S. women presenting for such care.[50, 52] Additionally, 81% of patients seen by gynecologists are of reproductive age (18-44 years), which also reflects the age range with greatest risk for HIV acquisition among cis-gender women.[53]

A5. Refining an approach to implement PrEP in gynecology clinics grounded in the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework. RE-AIM has robust support for its use in planning implementation as well as monitoring programs.[54, 55] RE-AIM has been used in program implementation research studies to focus and engage all stakeholders in decision making as well as provide a framework for evaluation. RE-AIM consists of five elements: 1) Reach (individual-level) – the ability to engage the target population in the intervention, 2) Effectiveness/Efficacy (individual-level) – evaluating the effect of the intervention on the primary outcome as well as the effect modification, 3) Adoption (setting-level) – determining the ability of the setting's staff to adopt the intervention, 4) Implementation (setting-level) – the extent to which the intervention was delivered as intended, AND 5) Maintenance (both individual- and setting-level) – evaluating the impact the finished intervention has on participants over time as well as the extent that the intervention is retained after the research period.[56] There is also precedent to evaluate PrEP implementation at a family planning clinic in Washington, D.C., using the RE-AIM framework to evaluate feasibility and impact.[49] Through utilization of this framework, the investigators identified the following: 1) facilitators included provider training, job aids to guide easy identification of guidelines for PrEP recommendation, order sets, documentation aids, educational materials in the waiting room and 2) barriers included lack of insurance and concerns among providers that discussing PrEP in such a setting may not be "patient-centered" especially for those seeking pregnancy termination. This proposal will focus on the initial planning stages, working with key-stakeholders and Black cis-gender women to assess *Reach, Adoption and preliminary Effectiveness* of integrating PrEP services within a gynecology clinic in Birmingham, AL providing women's healthcare to underserved, Black cis-gender women with the ultimate goal of increasing uptake of PrEP.

B. INNOVATION

B1. Overcoming the purview paradox – integrating PrEP into routine GYN care. The "purview paradox" was initially described as a major theme from qualitative data, suggesting that patients may prefer to receive PrEP services from primary providers instead of HIV specialists.[14] However, there are limited studies evaluating implementation of PrEP with gynecologists who often are the primary providers for cis-gender women.[57] National data evaluating willingness to prescribe PrEP showed that GYN providers are more willing to prescribe PrEP compared to general practitioners.[58] *Our GYN pilot site is a large center that sees over 17,000 cis-gender women annually who reside across the state, in both urban and rural areas*. Forty percent of patients seen are Black cis-gender women, with the majority of reproductive age. (See Letter of Support) Prior work at UAB has shown cis-gender women seeking routine care are largely under-recognized as benefiting from PrEP prescription and, to date, no patients seen at the pilot facility have been prescribed PrEP.[59] Implementing PrEP for cis-gender women as a part of routine sexual and reproductive health would also been unique, in that our team will not focus solely on women peri-conception.[60] Given the pilot site's Southern location and patient population served, preliminary results from this pilot will provide substantial guidance on successful refinement and implementation of PrEP4Her in similar clinical-care settings across the South.

B2. Development of a patient-centered implementation strategy, supported by end-user data to deliver PrEP services where, when, and how cis-gender women are most comfortable in engaging in the conversation. Because demand for PrEP among populations with the highest HIV incidence is low, there has been a push to increase awareness of PrEP through development of demand creation tools, which focuses on strategies related to successful marketing campaigns, empowerment branding, and creation of different PrEP

delivery modalities (e.g. long-acting). These initiatives are crucial in improving HIV inequities.[61, 62] Such techniques are often "human-centered", focused on the end-user working with researchers to develop interventions and improve implementation strategies.[63] In fact, preliminary research, utilizing discrete choice experiments to understand PrEP service delivery preferences among Black cis-gender women, has also provided a foundation for PrEP4Her to be patient-centered. Additionally, this research actively engaged the community, through partnerships with community-based organizations, to adequately understand barriers to PrEP uptake and desired attributes for PrEP services.[13] However, PrEP4Her will be focused on the equally important barrier to increasing PrEP uptake (i.e. supply creation) by improving access and expanding provider options for those that may benefit from using PrEP as an effective HIV prevention tool. Both end-user demand and health system supply creation will be necessary to overcome the current "prevention crisis" we are facing attuned to the "purview paradox," in our goals to end the HIV epidemic and this study uniquely expands supply-side options.[64]

B3. Using implementation science methods to develop a clear understanding of optimal provision of PrEP services within the GYN clinic. PrEP is a proven, highly effective intervention to decrease HIV transmission in cis-gender women. However, its impact to decrease HIV transmission among cis-gender women has been hindered due to a poor understanding of how to effectively identify strategies to improve uptake. Our proposed implementation science study is grounded in a conceptual implementation research logic model that includes implementation outcomes drawn from the RE-AIM and Proctor outcomes framework. Additionally, our study design includes evaluation of determinants for successful implementation of PrEP4Her by incorporating study aims to determine individual-, inner- and process- factor domains from the Consolidated Framework for Implementation Research (CFIR).[65] In order to see public health gains from utilization of PrEP in real-world settings, more implementation science studies are needed with clearly outlined and reproducible methods, like what we have proposed in this grant.[66]

C. APPROACH

C1. Team Members

Name/Affiliation	Role	Expertise
Latesha Elopre, MD MSPH	PI	Physician-scientist (HIV and PrEP provider) with expertise in mixed-methods study designs, evaluating barriers to PrEP care for BMSM (K23MH112417)[67, 68] and PrEP service delivery preferences among Black cis-gender women in urban and rural settings (Harold Amos Scholar, Robert Wood Johnson Foundation).[13, 59, 69] Her work has led to a better understanding of key determinants of willingness to use PrEP among Black cis-gender women living in AL, including: social support, HIV knowledge, stigma related to HIV and PrEP, and perceived need for PrEP.[13] Additionally, she has led discrete choice experiments that informed the proposed research. She will lead scientific planning with community partners and oversee overall study design as well as implementation.
Lynn T. Matthews, MD MPH	Co-I	Physician-scientist using mixed-methods approaches to evaluate PrEP uptake/ adherence by HIV-exposed cis-gender women planning for/ with pregnancy in Uganda and South Africa (R01MH108412).[70, 71] Dr. Mathews is also funded through a Center for AIDS Research (CFAR) EHE supplement to investigate provider barriers to increase assess to PrEP among adolescent cis-gender women. Dr. Matthews will lead qualitative data analyses in this proposal.
Zoë Julian, MD, MPH	Co-I	Clinical Instructor in the Department of Obstetrics and Gynecology and a postdoctoral research fellow in the Division of Preventive Medicine, her research focus is evaluating community-based interventions and clinician training programs to combat sexual and reproductive health inequities impacting Black cis-gender women, as well as Black queer, trans, and gender non-conforming individuals. She will be providing expertise in survey instrument development and in-depth interview guide creation for gynecologic care providers.
Mirjam-Colette Kempf, MPH, PhD	Co-I	Professor of Nursing, Epidemiology, Health Behavior and Infectious Diseases, has expertise in psychosocial and structural barriers to care among cis-gender women living with HIV and those at-risk for HIV infection.[72, 73] Relevant to this proposal - she currently serves as PI for an NIH-funded study (i.e. WeExPAnd) on how to implement PrEP services tailored to cis-gender Black women seeking healthcare in Federally Qualified Health Centers in rural AL.
Michael Mugavero, MD	Co-I	Professor in the Division of Infectious Diseases at the University of Alabama at Birmingham. He has expertise in implementing multiple interventions across the state to improve HIV outcomes through collaborations with Community-Based Organizations as well as local and state health departments.[74-77] He also leads the CFAR Implementation Science Hub at UAB. He will be providing his expertise in our implementation study design.
Jessica Sales	Consultant	Associate Professor at the Rollins School of Public Health at Emory University. Dr. Sales is a developmental psychologist and investigator at the Emory CFAR, whose work specializes in dissemination and implementation of HIV prevention for women and girls living in the South.[78-80] Her work has largely focused on improving PrEP knowledge, referrals and care at Title X

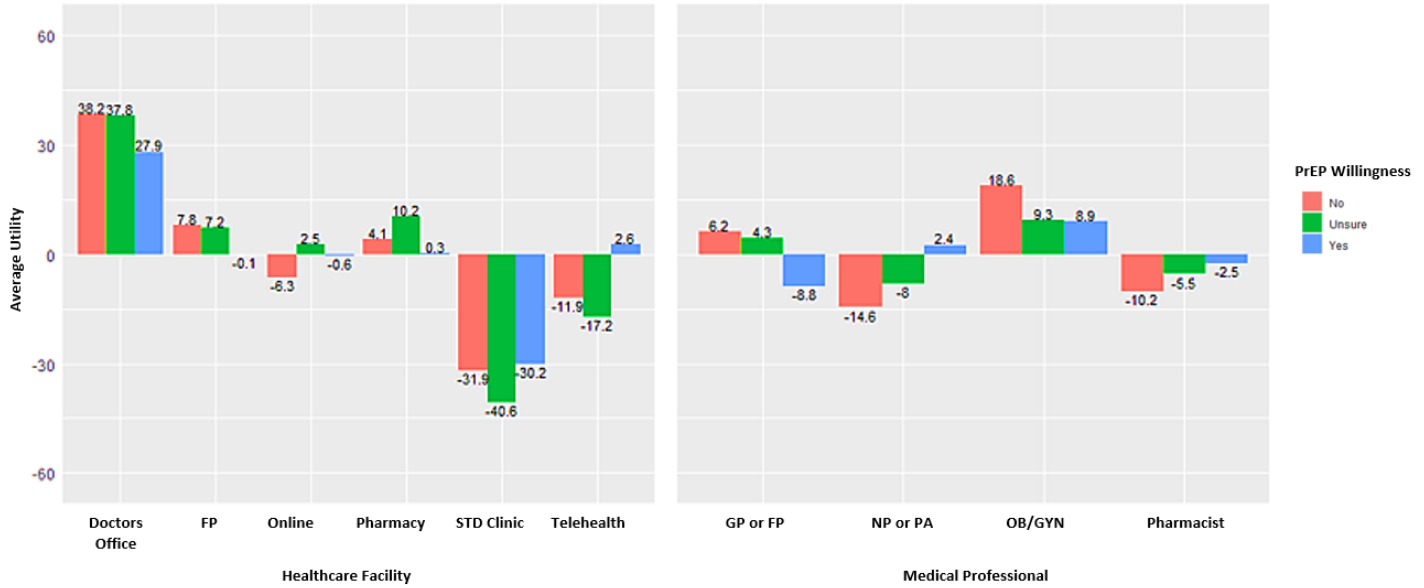
		family planning clinics in the Southern US.[46] She will provide consultation in intervention development. (Letter of Support provided).
Community Partners: - UAB GYN - AL ACOG Chapter	Community Partners	- GYN Continuity Clinic goal is to provide high-quality care to underfunded and unfunded cis-gender women who have limited or no access to care. - The Alabama American College of OB/GYN Chapter AL is dedicated to improving women's health in the state of AL. American Council of Obstetricians and Gynecologists (ACOG) chapter will aid in recruitment of gynecologists in AL to complete surveys.

Building on our collective expertise in conducting implementation science, community engaged research, and intervention development to improve PrEP uptake among disenfranchised groups, we propose to develop PrEP4Her, an intervention tailored to Black cis-gender women to improve uptake of PrEP within gynecology clinic settings in the South.

C2. Preliminary Studies

Utilization of behavioral economics methods to understand Black women's preferred PrEP care delivery models. Research on medical decision-making has increasingly used discrete choice experiments to evaluate intervention development for prevention tools, including HIV testing and the HPV vaccine.[81-84] We conducted a mixed-methods study to understand key barriers, facilitators and desired attributes for PrEP service delivery among Black cis-gender women living in both urban and rural counties with high HIV burden in AL. Focus groups provided major determinants for PrEP uptake and attributes to include in quantitative analyses.[13] *Discrete choice analyses included five attributes with 3-6 levels each, including PrEP delivery: modality, location, provider, medication/refills, and office intervals* (**Figure 1**). Hierarchical Bayes modeling was used to ascertain preferences. Of the 795 Black cis-gender women enrolled, the mean age was 35 and 28% were PrEP eligible based on CDC clinical guidelines. Nine percent were uninsured and about one-quarter had a household income <$25,000. Approximately 30% (n=235) reported being willing to use PrEP, which was associated with higher HIV knowledge and perceived need. Average utilities were highest for PrEP services delivered in a doctor's office (27.9, SD 34.2), by an OB/GYN (8.9, SD 26.5) and only having annual follow-up (29.3, SD 49.0). PrEP modality preferences were almost the same for a long-acting injectable (46.9, SD 64.0) versus a once daily pill (45.0, SD 89.5). Major PrEP service delivery preferences did not differ among urban and rural Black cis-gender women.[13](*under review*) Informed by this innovative science to understand PrEP service delivery preferences for Black cis-gender women living in both urban and rural settings in the South, PrEP4Her has the potential to reach a greater proportion of women and change routine practice among gynecology specialists through implementation of PrEP services.

Figure 1. Hierarchical Bayes Analysis of PrEP Service Delivery Preferences (including 2 prominent attributes) among Black Cis-Gender Women



Legend. Healthcare Facility = FP (family planning clinic); Medical Professional = GP (general practitioner), FP (family practitioner), NP (nurse practitioner), PA (physician assistant), OB/GYN (obstetrician/gynecologist)

C3. Research Design and Methods

***Study Overview*:** We will conduct formative work, evaluating multi-level determinants that will inform selection of components for our implementation strategy to improve PrEP services including prescription for Black cis-

gender in the South receiving routine gynecologic care. Determinants will be evaluated using concurrent mixed-methodology to elucidate CFIR domains, including individual-, inner-setting, and process-level factors that may affect proximal, implementation outcomes.[65] Working closely with a community-advisory board (CAB) of Black cis-gender women and key stakeholders at gynecology (GYN) clinics, we will solicit feedback about PrEP4Her implementation strategy components and procedures for the purposes of determining and refining PrEP4Her prior to piloting. Next, we will conduct a one-arm pilot study of PrEP4Her over a six-month period-of-time. Using the conceptual framework grounded in RE-AIM, the study will assess a wide range of implementation outcomes, including reach, adoption, preliminary effectiveness, feasibility, acceptability, and fidelity.[20, 85]

***Hypothesis*:** We hypothesize that integration of PrEP services into our GYN clinic site will be feasible and acceptable, with an increase in PrEP prescription (currently zero prescriptions) for Black cis-gender women due to this being an initial pilot requiring further refinement of components included in our implementation strategy.

PrEP4Her Implementation Science Research Logic Model: This study is grounded in the RE-AIM framework to successfully implement PrEP into gynecologic (GYN) care that is cohesively organized by an implementation science research logic model. ***(Figure 2)*** Our logic model has been adapted to provide clear representation of the causal pathways between components of our implementation strategy (i.e. methods to enhance implementation of PrEP in GYN settings in the South), change mechanisms (i.e. the process through which implementation strategies affect implementation outcomes) and proximal outcomes for the proposed intervention (i.e. PrEP4Her, implementing PrEP into women's health clinics).[20, 85, 86] Our model also includes hypothesized factors, selected based on our preliminary work and review of the literature, that may influence the effect of an implementation strategy on an outcome (i.e. moderators) as well as factors deemed necessary for implementation mechanisms to be activated (i.e. preconditions for mechanisms of action).[12, 13, 87] This comprehensive model will help us select key components for our implementation strategy that addresses contextual and individual barriers to PrEP prescription to Black cis-gender women.[88]

Figure 2. PrEP4Her Implementation Science Research Logic Model

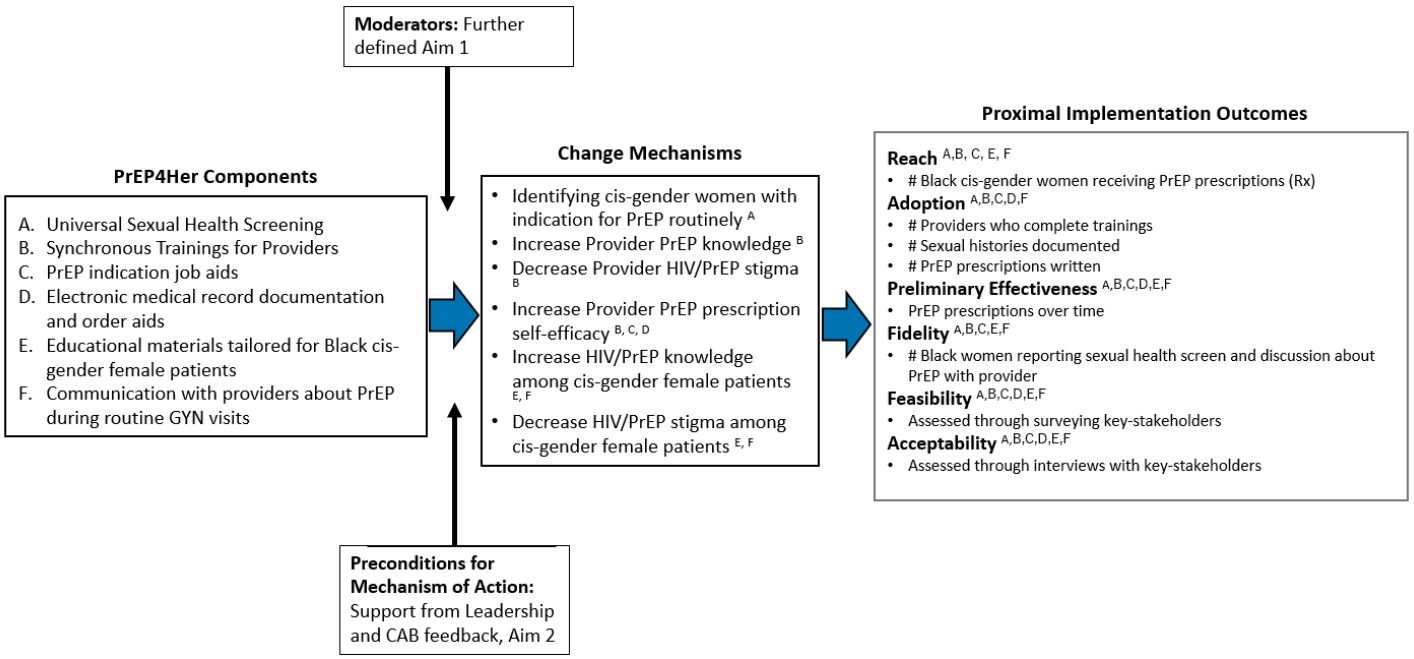


Figure Legend. Causal pathways between implementations strategies, mechanisms and outcomes are designated with superscripts.

Community advisory board (CAB): Throughout the study to promote researcher-community collaboration, we will convene a CAB of 6-8 individuals (not including involvement by Dr. Elopre as researcher representation) – including Black cis-gender women and gynecology practitioners. To ensure we obtain adequate feedback from community members, we will have at least half of our CAB be Black cis-gender women: aged 18-45, self-reported HIV negative, sexually active in the last 6 months and not in a monogamous relationship (to reflect potentially PrEP eligible women). We will recruit CAB members from prior research studies with Black cis-gender women and solicit referrals from the University of Alabama at Birmingham Center for Women's Reproductive Health as well as the AL American College of Obstetricians and Gynecologists (see Letters of Support). In Aim 1, the CAB will meet monthly (following a kick-off meeting) to get initial feedback on our interview guide and help us to

interpret our qualitative findings. In Aim 2, the CAB will meet bi-weekly for 3 months to engage in the process of selecting and refining components of our implementation strategy (PrEP4Her). In Aim 3, the CAB will advise on how to disseminate study results and will resume monthly meetings. We expect at least 10 meetings, during the study and we will adopt a shared decision making structure and take detailed notes to evaluate meeting processes. CAB members will receive a $10 stipend per meeting.[89]

Specific Aim1. Evaluate key individual-, inner-setting, and process-level determinants for implementation of PrEP service delivery in gynecology clinic settings using concurrent mixed-methods study design. Concurrent Mixed-methods Research Design*:* Quantitative and qualitative data will be collected concurrently and integrated using transformation integration procedures (i.e. quantifying themes and/or codes from qualitative data and incorporating it into quantitative databases),[90] to determine major barriers and facilitators to implementing PrEP into gynecology care and, further aid in development and refining of components to include in PrEP4Her in Aim 2.[91-93]

Sub-aim 1: Assess process and inner-setting determinants conducted with key-informants to explore perceived barriers and facilitators for integrating PrEP into routine gynecological clinical care.

Qualitative Study Design: Key informant in-depth interviews will be conducted with gynecologists, practice managers, medical assistants, nurses and pharmacists at our clinical site.

***Sample*:** Open-ended qualitative interviews will be conducted with 15-20 key informants currently employed at our GYN clinical site.[94]

Procedures and Qualitative Data Analysis. These interviews will provide contextual information on barriers to PrEP implementation, which will influence design of our implementation strategy.(**Table. 1)** Potential Interview guide) Also, based on analyses from Aim 1, potential key determinants for intervention development will be vetted during these interviews to assess feasibility of intervention implementation. Medical service providers will include nurse practitioners, gynecologists and internist who provide women's healthcare. We will also engage with case managers and social workers to discuss coverage for PrEP services and programs that exist for those not insured. Digital audio-recorders will be used to record all key informant interviews. Interviews will be conducted via teleconference.

Table 1. Potential Qualitative Interview Topics

Topics (will inform PrEP4Her)	Operationalized Topics
Key-informant Interviews (N = 20)	
Factors effecting PrEP implementation at GYN Clinics **Key barriers/facilitators to implementation** **Potential strategies to address barriers**	▪ For GYN providers, what are the major barriers and facilitators when caring for patient's sexual health? ▪ What would be the major determinants that influence implementing PrEP services into GYN routine care? ▪ What strategies would help overcome barriers?
Black Cis-gender Women Focus Groups (N = 30)	
Sexual Health **Education needed to increase awareness and knowledge** **Stigma** **Communication with care team**	▪ How do would you prefer to communicate with your healthcare team about sexual health? ▪ Who would you feel most comfortable communicating with? ▪ What type of information would be preferred when discussing?: ▪ HIV and PrEP ▪ What information would be needed to feel comfortable speaking to a provider about PrEP and HIV prevention? ▪ What information would help decrease stigmatizing beliefs about HIV and PrEP? ▪ What would ideal communication between your healthcare team about PrEP look?

Data Analysis: Dr. Matthews will lead coding and analytic approach; she has extensive experience conducting qualitative research and working with analytic teams. Analytic steps will include: 1) After each interview, interviewers will document field notes including emerging topic areas for subsequent exploration. 2) After interviews have been completed and recordings transcribed, transcripts will be uploaded to an encrypted password protected computer and NVivo qualitative data management software (QSR International, Melbourne, Australia) will be used to organize coding and analysis. 3) A preliminary codebook will be developed to include inductive codes that emerge from data (e.g. barriers to PrEP implementation, suggested workflow models, etc.) and pattern codes that connect concepts to one another.[95] 4) The coding team will apply codes to a subset of transcripts in parallel, comparing coding strategies and adjusting code definitions until adequate inter-coder reliability is achieved. 5) As the team is applying codes, they will also continuously develop analytic memos reflecting dimensions and characteristics of each code, as well as noting major themes. 6) Data matrices will be created to visually represent relationships between key concepts and elicit patterns in the data. Throughout this process, the qualitative team will hold weekly analysis meetings.

Quantitative Study Design: Cross-sectional study will be done in collaboration with the AL American College of Obstetricians and Gynecologists and the UAB Center for Women's Reproductive Health in the Department of Obstetrics and Gynecology (letters of support provided) to understand barriers to future state-wide implementation that would need to be measured during this study pilot.

Sample: Participants (N = 250) will be recruited from the state of Alabama. *Inclusion criteria:* 1) currently practicing gynecologists or advanced practitioners at GYN clinics 2) English speaking, 3) Age ≥ 18.
Methods: Survey will evaluate structural barriers to PrEP, as well as incorporate potential provider-level barriers.

Data Management: REDCap (Research Electronic Data Capture) will be used for electronic surveys and is a secure, Web-based application designed to support data capture for research studies.

Data collection: Gynecologists will be recruited through direct referral (from AL ACOG and UAB OB/GYN Center for Research) either through email correspondence or direct communication. A prescreening electronic query that will identify whether they meet inclusion criteria will be given through email correspondence, followed by consent. Data will be collected using a secure electronic server and will by designed to only last approximately 15 minutes. Surveys will include sociodemographic variables and validated scales to determine HIV/PrEP knowledge[96, 97], HIV/PrEP stigma[98, 99] as well as questions to ascertain current routine testing and screening practices.

Power Calculations and sample size considerations: We will administer our survey to 250 Alabama gynecologists. This sample size will allow us to detect odds ratios of willingness to prescribe PrEP of 2.09 for binary variables (50% in each group across study) and 1.47 for a standard deviation change in continuous variables assuming 80% power, 30% baseline percentage of willingness to prescribe PrEP, no other variables in the model, and Type 1 error rate of 5%. When covariates are included that have a correlation of 0.2 with the independent variable, the detectable ORs increase (2.27 and 1.54 respectively for binary and continuous variables).

Primary outcome: Willingness to prescribe PrEP (categorical, yes vs no).

Secondary outcome: Belief clinical-setting capable of providing PrEP services (ordinal, 1-10)

Independent variables: Expected variables as listed in *Table2*.

Table 2. Expected Independent Variables, RE-AIM Constructs

Independent Predictor Variable	RE-AIM Construct	Measures
Clinical-setting level - *Determine denominator (i.e. number of providers in clinical settings) willing to prescribe PrEP and factors associated with their willingness* - *Determine belief current clinical setting prepared to provide PrEP services*	**Adoption**	- Socio-demographics: race/ethnicity, clinic name, gender, years of practice, clinic resources, characteristics of populations served - Knowledge: PrEP and HIV - Stigma: PrEP and HIV - Practice: Sexual history, STI testing, STI treatment

Descriptive statistics: Frequencies for reported willingness to prescribe PrEP will be reported overall and for each independent variable. Descriptive statistics (median/interquartile ranges, frequencies/percentages) and comparisons between those willing to prescribe PrEP and not willing will be reported for each independent variable in bivariate logistic regressions. Multivariable logistic regression models will be performed adjusting each independent variable by a priori variables, such as age, race and sex, and other variables included based on literature review.

Logistic regression analyses: Bivariate models will be fit and variables with p-values ≤ 0.1 will be included in multivariable logistic regression analyses. Model fit will be determined using Hosmer and Lemeshow tests. A priori variables will be selected and included based on literature review.

Sub-aim 2: To further assess individual-level determinants, we will conduct focus groups with Black cis-gender women living in Alabama to explore desired PrEP educational materials and communication strategies from gynecologic care teams.

Development of the Interview Guide. We will develop a semi-structured focus group guide for focus groups in collaboration with our CAB, refining it through pilot testing (Table 1). The guide will ensure that appropriate lines of inquiry are pursued among participants by providing topical area questions and probes, while also encouraging explorations of participants' experiences and allowing for the emergence of novel concepts and ideas. The guide will include a mixture of descriptive/narrative questions (e.g., Tell me about experiences you or women you know have had *visiting gynecology clinics)* and questions structured around possible implementation strategy components guided by review of the literature (e.g., Tell me about your experiences discussing sexual health with your gynecologist) to facilitate a more granular understanding of : 1) Black cis-gender women's perceptions of informational content needed to motivate engagement in PrEP care, 2) who in the healthcare team would they feel comfortable discussing sexual health and HIV prevention with and 3) specific implementation strategy components for GYN clinics that would aid in engaging Black cis-gender women in PrEP care. (**Table 1**. Includes possible topics for focus groups)

***Sample*:** Five focus groups, consisting of 5-6 people, will be conducted. Recruitment will be coordinated through flyers and direct referrals from UAB's GYN Continuity Clinic. Sessions will be conducted in private rooms located in public buildings or, if the ability to conduct in-person interviews is affected by the COVID-19 pandemic, focus groups will be conducted virtually to ensure the safety of participants as well as staff. *Inclusion criteria*: 1) self-reported HIV-negative status, 2) Black cis-gender women, 3) English speaking, 4) Age18-45 years (this age range is based on current HIV epidemiology supporting greatest incidence in cis-gender women aged < 54).[1]
Procedures. Potential participants who are referred will be asked to complete an online screening tool to determine whether they meet eligibility criteria and to collect demographic data. If participants are eligible, study staff will contact them via phone to schedule focus groups. Focus groups will be conducted in private, quiet, mutually convenient locations by study staff who are trained in qualitative methods and interview techniques. Informed consent will be obtained prior to each focus group and participants will receive $50 in compensation upon completion. All focus groups will be digitally audio recorded, professionally transcribed, and de-identified.
Qualitative Data Analysis. See Qualitative analyses sub-Aim 1.
Data Integration: We will be integrating our qualitative and quantitative data findings through joint displays, bridging results using visual displays to connect major themes.[90]

Expected Outcomes*:* Following evaluation of overall themes, findings from this aim will create an in-depth and granular understanding of key factors that are necessary to address in development and refinement of PrEP4Her, our implementation strategy to integrate PrEP services into routine GYN care. Large sampling of GYN providers will also allow for greater generalizability of our implementation strategy to other Southern sites.

Specific Aim 2. Develop and refine a multi-component implementation strategy (PrEP4Her) to integrate PrEP in gynecology clinics using formative data from Aim 1 and a process of community-engaged research.

Study Design: *Intervention Mapping Approach*. We will work with our CAB and draw on Intervention Mapping (IM) techniques[100] to guide translation of our Aim 1 results into a protocol for development of our implementation strategy with subsequent piloting in Aim 3. IM is an established process for systematically developing behavior change interventions, with iterative paths from problem identification to problem implementation (**Table 3**). *We have chosen to use this process to select components for our implementation strategy, because the ultimate goal of this study is to change behavior of both providers and patients during routine GYN clinic visits.* IM highlights the importance of incorporating data to map out the problem (i.e., PrEP underutilization by Black cis-gender women), its determinants (better refined in Aim 1), and potential implementation strategy components to facilitate identified goals. Specifically, Aim 2 will focus on Steps 1-4, which are the most relevant steps to intervention development. In Step 1 – we will work with our planning group (the CAB and study team) and review the findings from Aim 1, identifying key barriers we feel need to be addressed among Black cis-gender women and providers. In Step 2 – we will create a *logic model of change*, in which we focus on objectives, smaller goals than the larger overarching goal of improving PrEP prescriptions for Black cis-gender women. In Step 3 – we will map out our implementation strategy components based on the logic model of change, and begin to link them to desired implementation outcomes (e.g., job aids, educational materials for Black cis-gender women, etc.). In Step 4 – we will develop specific content implementation strategies.

Table 3. PrEP4Her Mapping Protocol (adapted from Bartholomew)

Step 1: Logic Model of the Problem	• Review and identify key barriers to PrEP implementation in GYN settings • State evidence-based practice goals
Step 2: Program Outcomes and Objectives; Logic Model of Change	• Specify PrEP4Her objectives • Select key determinants for behavioral outcomes that need to be addressed • Construct matrices of change through select ecological levels (i.e. individual through societal)
Step 3: Program Design	• Choose components of implementation strategy to address determinants
Step 4: Program Production	• Refine components of implementation strategy • Prepare plans for program implementation • Draft & Pre-test materials and protocols
Step 5: Program Implementation Plan	• Identify potential program users • Construct matrices of change objective; program use • Design Implementation intervention
Step 6: Evaluation Plan	• Write effect and process evaluation questions • Develop indicators and measures for assessment • Specify and complete evaluation design/plan

***Proposed PrEP4Her Implementation Strategy Components*:** The development of the PrEP4 Her Implementation Strategy begins with components already identified in existing studies where PrEP was implemented into family planning clinics in the South. Aim 1 findings will then be used in Aim 2 to refine this initial list, by either eliminating unnecessary components, adding additional ones, or adapting existing

components to respond to the unique GYN context. In Table 6, we have provided our hypothesized name, definition and operationalization of components based on the guidelines established by Proctor et al., in terms of seven dimensions of specificity, including: 1) actor (who delivers the strategy), 2) action (steps or processes to be taken), 3) target (what will be impacted by the strategy), 4) temporality (the order or sequence of the strategy), 5) dose (intensity or amount of time spent for a strategy), 6) implementation outcomes affected (grounded and RE-AIM and included constructs from Procter et al) and 7) justification (rationale for selected components).[85, 101, 102]

Table 4. Specification of Hypothesized Components of Implementation Strategy ("PrEP4Her")

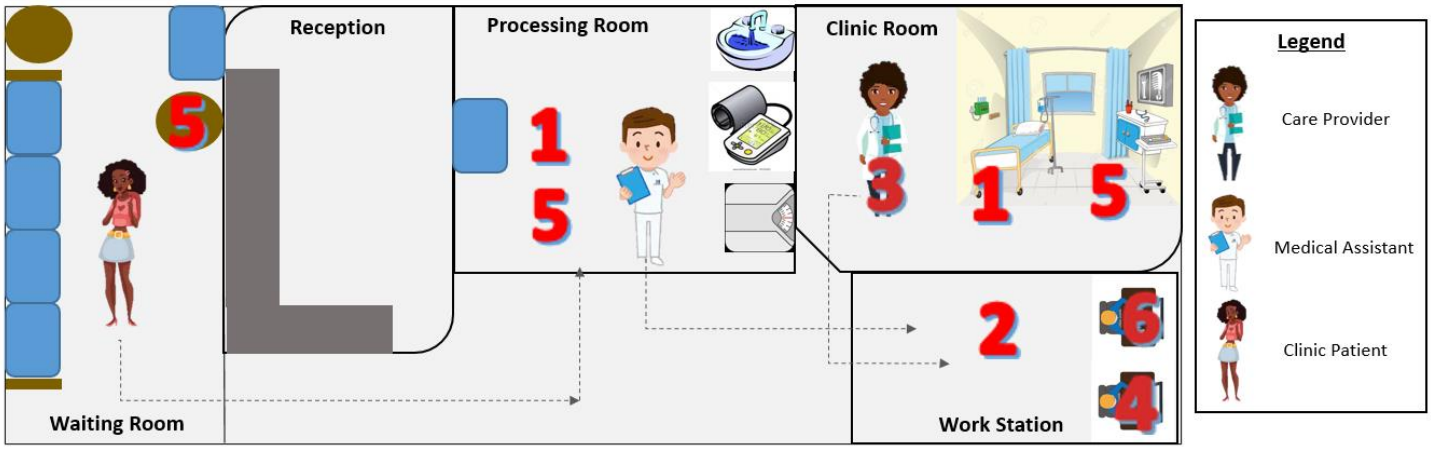
Named PrEP4Her components	**1. Universal sexual health screening for GYN patients** **2. Synchronous Training of GYN care team on HIV, PrEP indication, PrEP care (for both daily and long-acting injectable regimens), and stigma** **3. PrEP indication job aids** **4. Electronic medical record documentation aids, including pre-templated notes and order sets** **5. Educational materials for Black cis-gender women on HIV and PrEP** **6. Asynchronous training on effective communication strategies with patients about sexual health and PrEP**					
Implementation Strategy	**Number 1**	**Number 2**	**Number 3**	**Number 4**	**Number 5**	**Number 6**
Actor	Medical assistant or care provider	Study staff/ PrEP expert	PrEP expert	PrEP expert and information technician	PrEP expert and graphic designer	PrEP expert
Action	Charts evidence based sexual history questionnaire in the medical record[103]	Provides 1.5 hour training on HIV, risk, and PrEP indications and care	Creates easily accessible pocket cards with indications for PrEP[104, 105]	Creates templates in electronic medical record for PrEP visits and order sets	Develops informational content to include in educational materials tailored to Black cis-gender women	Develops 15-30 minute training tutorial on how to communicate with patients about sexual health and PrEP, tailored to Black cis-gender women
Target	Patient	Providers/staff	Provider	Provider	Patient	Patient
Temporality	Medical assistant – Before every patient encounter with a provider OR Provider – Beginning of every visit	1-month prior to PrEP4Her being implemented at our pilot site	Continuously carried by providers and displayed in shared workspaces	1-month prior to PrEP4Her being implemented with instructions on how to access placed in shared workspaces and sent through email communications	Placed in waiting areas and/or private exam rooms, accessible during every visit and replenished by study staff	1-month prior to PrEP4Her being implemented and presentation accessible in shared work space as well as emailed to all providers
Dose	5-minute screener at every visit	1.5 hour training occurring once prior to 6-month pilot	As needed by providers during clinical care	As needed by providers during charting	Available during the entire 6-month pilot for every clinic	Once prior to 6-month pilot and then available as needed
Implementation Outcomes affected	Please see Figure 2. for detailed description of how each implementation strategy maps to implementation outcomes. In short, we will be evaluating the following proximal implementation outcomes: reach, adoption, fidelity, acceptability, and preliminary effectiveness. Distal outcomes will not be evaluated in this study.					
Justification	Implementation strategy components selected for this study have been selected based on observed, researched or hypothesized barriers based on review of the literature. These components may be subject to change based on findings in Aim 1 and feedback from our CAB.					

Pilot intervention development with CAB: We will engage members of our CAB, including key stakeholders in GYN clinic operations, care and management as well as Black cis-gender women (aged between 18-45) bi-weekly over a 3-month period of time (see structure above). During this time, we will conduct IM (outlined above) and pilot materials developed as a part of selected implementation strategy components. After implementation strategy materials have been refined, we will review appropriate operational steps needed to integrate PrEP into our clinical site. For implementation strategy selection and content development, we will work closely with Dr. Sales who has expertise in implementation science working with family planning clinics in Southern settings to improve HIV prevention among Black cis-gender women. We will meet with Dr. Sales monthly, in one-hour meetings with a consultation fee of $100/hour. (See Letter of Support)

<u>Specific Aim 3</u>. Pilot PrEP4Her, refined through Aim 2, to deliver PrEP for Black cis-gender women attending routine gynecologic care visits.

PrEP4Her Study Design: PrEP4Her, a multi-component implementation strategy with components defined as well as refined through prior aims, will be evaluated through a one-arm pilot at a university-affiliated GYN clinic. (**Figure 3**) We have chosen a one-arm trial because PrEP is not currently being offered routinely at GYN clinics and there are three Black cis-gender women on PrEP in the university-affiliated PrEP clinic, making a comparison either between other GYN clinics or between our PrEP clinic have limited meaning. Implementation processes will result from communication with our CAB and consultant (Dr. Sales). Upon completion of PrEP4Her development, we will begin engaging key GYN staff, practice managers and clinicians to begin training as well as implementing job and documentation aids within the clinic. Educational materials will be placed in all areas where patients are seen within the clinic. We will monitor implementation outcomes for PrEP4Her over a 6-month timeframe, with detailed procedures that we have described in the below section.

Figure 3. PrEP4Her Predicted Workflow



PrEP4Her Components		
1. Universal Sexual History – Brief, gender-neutral sexual history screening assessment.[106]	**3. Job Aids** – 2-sided pocket cards for white coats/scrubs that will include CDC guidance summary criteria for PrEP in cis-gender women and 5Ps.[105, 107]	**5. Educational Materials** – Pamphlets, tailored for Black cis-gender women that contain information about HIV and PrEP.[45]
2. Synchronous HIV and PrEP Training – ~ 1.5 hour PrEP informational training (adapted from Sales et al. in family planning clinics) made available on UAB CFAR website.[46]	**4. EMR Documentation/Order Aids** – Premade order sets within UABs electronic medical record for initial and 3-month PrEP visits as well as a PrEP note template.	**6. Asynchronous Training on Communication Strategies** – ~ 15 minute training on communicating empowering, "gain-framing" messaging, made available on CFAR website.[108]

Procedures for Evaluating Proximal Implementation Outcomes:

<u>Reach Outcome</u>: For this study outcome, Reach (i.e. the number of individuals who are willing to participate in an initiative) is defined as the absolute number of Black cis-gender women who receive a PrEP prescription. We will also evaluate the proportion of women prescribed PrEP who had a PrEP indication.[19, 109] PrEP indication will not be defined using the Center for Disease Control and Prevention (CDC) PrEP indication clinical guidelines due to evidence suggesting these criteria are too restrictive and may not predict risk.[105] Instead we will define PrEP eligibility based on the CDC's guidance summary criteria, deeming those PrEP eligible who meet any of the following criteria for cis-gender women not living with HIV (over a 6-month timeframe): HIV-positive sex partner, bacterial STI (gonorrhea or syphilis), more than one sex partner, inconsistent condom use, sex for exchange of goods, or being in a high-prevalence network.[110] This data will be obtained based on the sexual risk screener (a component of implementation strategy) documented in the chart during patient visits.

Procedures. Data will be collected from the university's electronic medical record, looking at visit data for all cis-gender women with clinic visits during the pilot timeframe. We will be able to extract prescription data directly, but PrEP eligibility and referral will require review of chart documentation.

<u>Preliminary Effectiveness Outcome</u>: To evaluate effectiveness of PrEP4Her, we will determine increases in PrEP prescriptions over-time. We will also evaluate what patient factors are associated with PrEP prescription.[109]

Procedures. A data extraction of the UAB electronic medical record will be done (as described above) at 3-month time intervals after implementation of PrEP4Her (i.e. baseline, 3-months and 6-months' time). We will collect the following patient demographics: age, race, ethnicity, and insurance status.

Statistical analysis. Frequencies for prescription will be reported overall and for each independent variable (i.e. patient demographics), at each of the 3 time points (baseline, 3 months and 6 months). Means, standard deviations and t-test comparisons between those referred and prescribed PrEP will be reported for continuous

independent variables if normally distributed. For variables with excessive skewness or otherwise non-normal distribution, medians with upper and lower interquartile ranges will be reported compared by Wilcoxon rank sum test. Categorical independent variables will be reported as frequencies and percentages and compared by chi-square and Fisher's exact test. Bivariate models will be fit and variables with p-values ≤ 0.1 will be included in multivariable logistic regression analyses. Model fit will be determined using Hosmer and Lemeshow tests.

Adoption Outcome: As a dimension within the RE-AIM framework, we define adoption as the proportion of key-stakeholders within our pilot site who were willing to initiate our implementation strategy.[19, 109] In order to assess this, we will conduct and document the following procedures.

Procedures. Trainings: During synchronous trainings we will document the number of providers and staff who attend meeting. Asynchronous attendance will be captured through collecting para-data (to track clicks) on the number of providers and staff who visit the CFAR website and access training materials. Additionally, we will connect a REDCap survey link to the end of training materials that will include a single-item asking "Did you access these training materials to aid in PrEP implementation at the UAB GYN Continuity Clinic?". Sexual History: We will conduct a chart review (similar to what was described above), to evaluate absolute number of patients seen during our pilot timeframe who had a sexual history taken.

Acceptability Outcome: We are defining acceptability as the extent to which key stakeholders, both provider delivering the intervention and Black cis-gender women receiving it, felt PrEP4Her was acceptable. In order to assess this, we will conduct key-informant interviews with stakeholders.

Sample. Key informants will include 15-20 stakeholders from our pilot site (including approximately 10 providers, managers, and other support staff), as well as Black cis-gender women (approximately 10-15) who were seen during the 6-month intervention pilot.

Recruitment. We will recruit key stakeholders directly from our pilot site and Black cis-gender women will be recruited after the pilot through flyers and direct referral from clinical staff.

Procedures. Interview guide questions will be grounded in a theoretical framework of acceptability from Sekhon et al., including seven constructs.[111] (See **Table 5**) Interviews will conducted virtually, to allow for flexibility of clinical staff using a secure system. All interviews will be digitally audio recorded, professionally transcribed and de-identified.

Table 5. Potential Interview Topics grounded in Sekhon et al. Theoretical Framework

	Constructs	Operationalized Topics
Prospective Acceptability: prior to participating in PrEP4Her	Affective Attitude	• Feelings about PrEP4Her
	Burden	• How much effort was required to participate in PrEP4Her
	Ethicality	• Did PrEP4Her align with your values
Concurrent Acceptability: Whilst participating in PrEP4Her	Intervention Coherence	• How well did you understand PrEP4Her and how it worked
	Opportunity Costs	• How much values or perceived benefits were given up to engage in PrEP4Her
	Perceived Effectiveness	• How well did PrEP4Her achieve its purpose
Retrospective Acceptability: After participating in PrEP4Her	Self-efficacy	• Confidence in performing behaviors required to participate in PrEP4Her
Note: For Black cis-gender women, questions will be framed around the PrEP4Her implementation strategy that targeted patients.		

Data Analysis. Drs. Mathews and Elopre will lead coding and the analytic approach. We will develop a preliminary codebook including *a priori* deductive codes, based on constructs from our theoretical framework, inductive codes that emerge from the data and pattern codes that connect concepts to one another.[95] The coding team will code a sub-set of transcripts in parallel to compare coding and adjust codebook definitions until adequate inter-coder reliability is achieved.

Feasibility: We will measure whether PrEP4Her is appropriate for a larger, full-scale implementation trial by surveying out key-stakeholders prior to interviews (conducted to assess acceptability).

Procedures. Feasibility will be measured using the validated scale *Feasibility of Intervention Measure (FIM)* (Cronbach's alpha 0.85-0.91).[112] This includes straightforward items such as *"[PrEP4Her] was appealing to me*", *"[PrEP4Her] seemed suitable",* and *"[PrEP4Her] seemed easy to implement",* which respondents rate on a 5-point Likert scale.

Statistical Analysis: Descriptive statistics, using medians and inter-quartile ranges and frequencies, will be calculated to characterize feasibility.

Fidelity: We will evaluate the "fidelity" or degree to which our implementation strategy (PrEP4Her) was implemented as designed.[113] Specifically, we have chosen to evaluate components of PrEP4Her that are

measurable and reflect the end-user perspective, including: universal sexual health screening of cis-gender women seen within our GYN pilot site, receipt of educational material about PrEP, communicated with a provider about PrEP. We have selected to evaluate fidelity to measure the effect of type III errors on overall effectiveness of PrEP4Her to increase PrEP uptake and to guide future, large-scale implementation.

Procedures. During the 6-month pilot, all patients seen during this period will be given a flyer by staff upon clinic checkout with information to take a brief 5-minute on-line survey, with a compensation of $20. We will stop recruitment after 300 surveys have been completed. A QR code, website and contact information for study staff will be located on the clinic document. While this intervention is tailored to Black cis-gender women in terms of educational material and tailored communication with providers, implementation strategy components are universal to all patients seen and, therefore, we will not conduct targeted sampling.

Methods. Brief electronic surveys will include the following questions: 1) Did your provider (or other clinical staff) take a history asking about your sexual activities and health?, 2) Did you see educational materials during your visit about HIV prevention and a prevention methods call PrEP, 3) Did you speak with a provider about PrEP? AND 4) For those who spoke with a provider about PrEP, would you please describe the conversation and how you felt about communicating with your provider about this prevention strategy?

Data Management. REDCap (Research Electronic Data Capture) will be used for electronic surveys and is a secure, Web-based application designed to support data capture for research studies.

Data Analysis. Quantitative survey data: Descriptive statistics, using medians and inter-quartile ranges and frequencies to determine fidelity. Qualitative survey data: A similar analytic approach used for data analysis of acceptability will be used, except deductive coding will not be included in analyses.

Expected Outcomes: Completion of this aim will provide the necessary information to refine PrEP4Her for broader dissemination in a multi-site implementation study with a step-wedge design.

C4. Potential Challenges and Alternative Strategies: (1) Provider uptake of PrEP4Her: It is often challenging to engage clinical care teams to conduct interventions due to workflow demands and time constraints. This may impact the overall efficacy of PrEP4Her due to low adoption and lack of fidelity to PrEP4Her components. To overcome this barrier, investigators will work with leadership in identifying "champions" within the clinic setting to encourage PrEP4Her implementation. Inclusion of a physician practicing in the GYN continuity clinic as a part of our investigative team embeds a committed champion within our pilot site. (2) Recruitment of Black cis-gender women: We plan to recruit Black cis-gender women from our clinical site, to take part in both interviews and quantitative surveys throughout this proposal. We will use well-established research advertising through UAB, but also will leverage provider referral and referral from our research staff to meet recruitment goals. Dr. Elopre has shown that such networks have been successful in recruiting almost 800 Black cis-gender women for PrEP research studies in AL. (3) Selection bias: we acknowledge the potential for selection bias – Black cis-gender women who are interested in participating in our study may have less HIV and PrEP stigma than the general population. We will make efforts to recruit online and at our clinical site with non-stigmatizing, health promoting messaging to engage a representative sample. (4) Measuring PrEP adherence: due to time and budgetary constraints, we will not evaluate persistence or quantitate adherence with drug levels in the blood or hair, which would be the gold standard to measure adherence to PrEP for those prescribed; however, this is not currently a primary endpoint for this study. In a subsequent efficacy trial, we will measure adherence more definitively.

C5. Study Timeline: See study timeline supplement for detailed timeline.

Table 6. PrEP4Her 3-year study timeline

	Year 1				Year 2				Year 3			
Aim 1: Focus Groups Black women												
Aim 1: Key-informant Interviews												
Aim 1: Surveys of GYN providers												
Aim 2: Development and Refinement PrEP4Her												
Aim 3: PrEP4Her Intervention												
Manuscript Preparation and Dissemination												

C6. Impact and Future Directions: Upon completion of our Aims, we will have developed a culturally tailored strategy to improve uptake of PrEP among Black cis-gender women, ready for further testing. If PrEP4Her shows feasibility, acceptability and preliminary efficacy in enhancing PrEP uptake for Black cis-gender women, we will prepare a subsequent R01 application to conduct a fully powered, implementation science trial across multiple gynecological care sites across the South. Even in the absence of preliminary efficacy of the pilot, the knowledge gained around determinants and components to include in our PrEP4Her implementation strategy to integrate PrEP services into GYN settings will provide novel insights to inform future HIV prevention research among this highly impacted group.

PrEP4Her Analysis Plan

Specific Aim 3: Pilot PrEP4Her, refined through Aim 2, to deliver PrEP for Black cis-gender women attending routine gynecologic care visits.

Started September 26, 2025

Objectives

(Primary manuscript) Mixed methods paper evaluates the implementation outcomes, using the RE-AIM framework, of the PrEP4Her intervention in a low barrier gynecology setting.

(Primary/Fidelity) Described fidelity to PrEP4Her from the end-user perspective. Describe results from survey, compare/;contrast with EHR review (EHR data confirms the number of PrEP prescriptions)

Study population: Reproductive aged women 18-45 who received the PrEP4Her intervention as a component of their standard care from January 2023 – August 2024 [Pre-implementation stage Jan – July 2023; PrEP4Her implementation July 2023 January 2024; Pilot January 2024-August 2024].

PreP4HER components - Universal sexual history screener, synchronous PrEP training, job aides [pocket cards with CDC PrEP guidance and 5Ps, EHR documentation/order aids, educational materials, asynchronous training on communication strategies

Outcomes Assessment

Qualitative data- Grounded in Sekhon, et al. acceptability framework

1. 7 key informant interviews
2. 18 participant interviews

Quantitative data

1. Visits per period (of intervention) with number of PrEP prescriptions
   a. Patient visits by intervention period; total n=4161
   b. PrEP prescriptions per period; n=11

2. EHR review (to confirm PrEP prescriptions)
   a. Total charts reviewed n= 4635; missing =6

3. Demographics of all patients
   a. Race
   b. Sex at birth assignment
   c. Gender in EHR
   d. Lab results
      i. Chlamydia
      ii. Gonorrhea

iii. Syphilis
iv. HIV

4. Demographics of patients with a PrEP prescription
    a. Race
    b. Sex assigned at birth
    c. Gender assigned lin HER
    d. Lab results
        i. Chlamydia
        ii. Gonorrhea
        iii. Syphilis
        iv. HIV

5. Sexual health pre-screener survey; n=1135
    a. Sociodemographics
        i. Race
        ii. Sex assigned at birth
        iii. Gender in EHR
        iv. Lab results
            1. Chlamydia
            2. Gonorrhea
            3. Syphilis
            4. HIV

    b. Sexual health pre-screener outcomes; n=1135
        i. Types of sexual behaviors
        ii. Gender of partners
        iii. Sexually active in last year
        iv. Number of sexual partners in past year

    c. Data on when participants were seen (by month/year)

6. Post visit (fidelity) survey data; n=242
    a. Demographics
        i. Race
        ii. Education
        iii. Employment
        iv. Insurance
        v. Estimated household income
        vi. Reason for visit
        vii. Anal sex in past 6 months
        viii. Condom use history
        ix. Number of partners
        x. Gonorrhea or syphilis diagnosis, past 6 months
        xi. Partner living with HIV and not on medication
        xii. Did provider take sexual history?

xiii. Saw educational materials during visit?
xiv. Spoke with provider about PrEP?
xv. Prescribed PrEP during visit?

b. Fidelity items
   i. Comfort discussing PrEP w/ provider
   ii. Understood side effects of PrEP after discussion w/ provider
   iii. Provider discussed how to pay for PrEP
   iv. Felt confident could take PrEP daily after visit

c. Row percentages -Talked to doctor about PrEP and demographics

7. PrEP prescriptions data with physician and intervention period
   a. Demographics of patient prescribed; n=11
      i. Race
      ii. Age
      iii. Lab results
      iv. Earliest Emtricitabine-Tenofovir
      v. Study Prescription Date
      vi. Order Date

8. Number of women with a PrEP indication seen during the study visit (no indication/STI in last 12 months/multiple partners/STI in last 12 months and multiple partners); n=4241
   a. Data by visit date

Paper 1: Mixed Methods Paper, guided by REAIM

Procedures for Evaluating Proximal Implementation Outcomes:

1. **Reach**: For this study outcome, Reach (i.e. the number of individuals who are participated in PrEP4Her) is defined as the absolute number of Black cis-gender women who receive a PrEP prescription. We will also evaluate the proportion of women prescribed PrEP who had a PrEP indication.

PrEP eligibility is based on the CDC's guidance summary criteria, deeming those PrEP eligible who meet any of the following criteria for cis-gender women not living with HIV (over a 6-month timeframe): HIV-positive sex partner, bacterial STI (gonorrhea or syphilis), more than one sex partner, inconsistent condom use, sex for exchange of goods, or being in a high-prevalence network. This data will be obtained based on the sexual risk screener.

Procedures:

a. **Visit data for all cis-gender women with clinic visits during the pilot timeframe**
b. **PrEP prescription data**

c. **PrEP eligibility and referral data**

2. **Preliminary Effectiveness:** Defined by increases in PrEP prescriptions over time. We will also evaluate what patient factors are associated with PrEP prescription.

Procedures:

a. **Frequencies of PrEP prescriptions by**
b. **Report demographics of patients prescribes PrEP**

3. **Adoption:** Defined as the proportion of key-stakeholders within our pilot site who were willing to initiate our implementation strategy.

Procedures:

a. **Number of providers/staff who attended PrEP4Her trainings**
b. **Track clicks for asynchronous training attendance**
c. **RedCap survey item for providers – Did you access these training materials to aid in the PrEP implementation at the GYN Continuity Clinic?**
d. **Chart review – number of patients seen during pilot who receiving a sexual history screener.**

4. **Acceptability:** Extent to which key stakeholders, both provider delivering the intervention and Black cis-gender women receiving it, felt PrEP4Her was acceptable.

Procedures:

a. **IDIs and key informant interviews, grounded in Sekhon et al. [prospective/concurrent/retrospective acceptability]**
b. **We also have AIM data – would that go here?**

5. **Feasibility:** Measure whether PrEP4Her is appropriate for a larger, full-scale implementation trial by surveying out key-stakeholders prior to interviews (conducted to assess acceptability).

Procedures:

a. **Validated scale Feasibility of Intervention Measure (FIM)**

Paper 2: Fidelity Outcomes

1. **Fidelity:** Degree to which our implementation strategy (PrEP4Her) was implemented as designed, from end user perspective.

Procedures: Patient fidelity survey outcomes.