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College of Health Sciences and Public Policy

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Joanne Senoga Brown

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Review Committee
Dr. Harrison Ndetan, Committee Chairperson, Public Health Faculty
Dr. Thomas O'Grady, Committee Member, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2026

Abstract

Social, Political, and Economic Determinants for HIV PrEP Care Delivery Innovations

Joanne Senoga Brown

MD, Caribbean University, 2021

MPH, Walden University, 2018

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health Epidemiology

Walden University

February (2026).

Abstract

Pre-exposure prophylactic care delivery innovations (PCDI) are critical to the Ending the HIV Epidemic (EHE) initiative. While individual studies have examined isolated factors such as patient awareness, provider willingness to prescribe, and cost-effectiveness, few have synthesized these findings into a unified framework explaining how structural social, political, and economic determinants jointly influence PCDI. Prior literature remains fragmented, emphasizing behavioral or programmatic variables rather than systemic structures. This meta-analysis was done to examine how structural determinants independently and collectively influence PCDI across the 47 U.S. EHE jurisdictions. Guided by the consolidated framework for implementation research and Rogers's diffusion of innovations theory, a PRISMA 2020 search identified 3,214 records. Forty-seven studies met inclusion criteria, representing $N = 46{,}450$ participants. Data were analyzed using inverse-variance weighting under fixed- and random-effects models in SPSS v30. Results indicated a moderate positive association between social determinants and PCDI (ES = 0.82, $p = .003$). Political (ES = 1.03, $p = .001$) and economic determinants (ES = 1.01, $p = .002$) also showed positive associations. The combined determinant model yielded a smaller association with PCDI (ES = 0.06, $p < .001$). These findings support Walden's social change mission by demonstrating that strengthening structural determinants can improve equitable access to PCDI in the 47 underserved U.S. EHE jurisdictions.

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Dedication

To God, whose divine inspiration and boundless grace have guided me along the path of a physician-scientist, I dedicate this work. May I continue to honor this calling by sharing the gift He has bestowed upon me in service to others.

To my incredible family, Jaja the GOAT! My mother, Uncle Sam, Jackie, Gloria, Auntie Joan, Leah, and all whose prayers, encouragement, and unwavering financial and emotional support have sustained me through every challenge. Your love and belief in my purpose are immeasurable, and I am eternally grateful.

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Chapter 1: Introduction to Study

HIV remains one of the most persistent public health challenges worldwide. Over the past four decades, epidemiological studies have shown that HIV transmission and health outcomes differ widely across demographic and geographic populations (Chapin-Bardales et al., 2017; Sullivan et al., 2021). These disparities illustrate the continuing need for evidence-based prevention strategies that address contextual barriers to care (Fauci et al., 2019). Pre-exposure prophylaxis (PrEP), a daily oral antiretroviral medication, has emerged as a cornerstone of HIV prevention and remains one of the most effective biomedical tools to date (Chandler et al., 2020; Mayer et al., 2020). When used consistently, it lowers the risk of acquiring HIV by more than 99%.

The U.S. Department of Health and Human Services launched the Ending the HIV Epidemic (EHE) initiative in 2019 to reduce new infections by 75% within five years and 90% within 10 years (Schaefer et al., 2021). Central to this initiative is expanding equitable access to PrEP care delivery innovations (PCDI) and addressing barriers that limit participation among high-risk groups (Gant et al., 2023; Sharpe et al., 2021). Despite these national goals, PCDI continues to vary across U.S. jurisdictions. Urban and rural communities face persistent social, political, and economic determinants that limit PCDI (Bailey et al., 2021; Bonacci et al., 2021).

Social determinants of health influence the landscape of PCDI (Andriano et al., 2022). Stigma, discrimination, and mistrust discourage individuals from seeking prevention services (Freeman et al., 2017; Willie et al., 2019). Cultural beliefs, limited transportation, and fragmented healthcare systems further restrict participation (Adams et

al., 2018; Biello et al., 2021; Choi et al., 2023). Individuals with higher levels of education, stable housing, and supportive care systems are more likely to engage in PCDI (Brantley et al., 2019; Clement et al., 2019; Walters et al., 2017; Taggart et al., 2020). Structural racism continues to influence these outcomes (Bailey et al., 2017), perpetuating inequitable access to health resources and poorer prevention outcomes in marginalized populations (Adepoju & Kiaghadi, 2023; Alsan et al., 2019; Blackstock et al., 2016).

The PrEP Care Continuum (PCC) provides a conceptual lens for understanding these barriers (Clement et al., 2019). It encompasses awareness, initiation, adherence, and retention (Centers for Disease Control and Prevention [CDC], 2022). Enhancing performance across these stages is essential to achieving optimal prevention outcomes (Barger et al., 2019; Ezennia et al., 2019). However, low-income neighborhoods face challenges with appointments, laboratory testing, and follow-up (Malone et al., 2021; O'Byrne et al., 2021). These barriers highlight that biomedical efficacy alone cannot eliminate disparities in HIV prevention (Bailey et al., 2021; Cespedes et al., 2022; Sullivan et al., 2024).

Political determinants further influence PCDI. Policy frameworks, public health funding, and provider authorization laws determine how PrEP care is organized and delivered (Cespedes et al., 2022; Scott et al., 2023; Vanhamel et al., 2020). States that adopted Medicaid expansion under the Affordable Care Act (ACA) report stronger PCDI infrastructure than non-expansion states (Bailey et al., 2017; Baeten, 2018). In contrast, restrictive HIV criminalization laws or limited telehealth reimbursement hinder access

(Bonacci et al., 2021; Casey et al., 2023). Provider attitudes reflect these environments: clinicians in supportive policy contexts are more likely to prescribe PrEP (Chan et al., 2020; Clement et al., 2017), while those in restrictive regions report lower readiness (Bunting et al., 2021; Dassah et al., 2023; Pleuhs et al., 2020).

Economic determinants play an equally key role (Bavinton & Grulich, 2021). Factors such as medication cost, insurance coverage, and availability of patient-assistance programs determine whether individuals can initiate and sustain care (Coleman et al., 2021; Srikanth et al., 2022). Patients with comprehensive insurance or Medicaid are more likely to remain in care than those who are uninsured or underinsured (Evans et al., 2022; Eichenwald et al., 2024). In areas with limited funding and fragmented reimbursement, retention is reduced and access disparities deepen (Mansergh et al., 2023; Patel et al., 2021).

Although PrEP is highly effective, inequities in its distribution remain. In 2022, an estimated 1.2 million individuals in the United States were eligible for PrEP, but fewer than 25% had active prescriptions (CDC, 2022; Dana et al., 2023). Uptake among Black and Latinx populations was below 15%, despite higher HIV incidence rates (Dana et al., 2023; Sullivan et al., 2021). Most new infections occur within the 47 priority jurisdictions identified by the EHE initiative, where poverty, racism, and limited health infrastructure persist (Brownson et al., 2025; Duhamel et al., 2022; Williams et al., 2019).

These persistent disparities suggest that the core challenge in EHE lies not in scientific efficacy (Cabecinha et al., 2021) but in addressing the social, political, and economic systems that govern access and equity (Bailey et al., 2021; Nilsen &

Bernhardsson, 2019). Understanding these determinants is essential for equitable diffusion of PCDI (Borenstein et al., 2021; Zolfaghari et al., 2022).

This dissertation uses a quantitative systematic review and meta-analysis to assess how social, political, and economic determinants influence PCDI across the 47 EHE jurisdictions. The study is guided by an integrated theoretical model adapted from Flessa and Huebner (2021), combining Damschroder's (2009) consolidated framework for implementation research (CFIR) and Rogers's (2003) diffusion of innovations (DOI). The CFIR–DOI model conceptualizes how contextual determinants and perceived innovation characteristics influence equitable access to PCDI (Mokdad et al., 2018; Nilsen & Bernhardsson, 2019). This chapter presents the background, problem, purpose, theoretical framework, and research questions guiding the analysis and outlines how social, political, and economic determinants affect PCDI.

Background

The provision of PCDI has been influenced by social, political, and economic determinants that either enable or limit access among populations disproportionately affected by HIV (Freeman et al., 2017; Laufer et al., 2015). Social factors, including stigma, cultural norms, and social support networks, influence awareness, attitudes, and adherence (Biello et al., 2018; Pratt et al., 2022). Stigma and discrimination discourage participation (Cahill et al., 2017; Cespedes et al., 2022), while supportive environments, such as nurse-led programs, strengthen engagement (O'Brien et al., 2021; Orser et al., 2023; Rousseau et al., 2021). Community-based interventions, peer navigation, mobile clinics, and pharmacy or nurse-led programs (Brant et al., 2020; Casey et al., 2023)

enhance PCDI access by building trust and mitigating stigma (Walters et al., 2017; Willie et al., 2019). Social networks strongly affect decision-making, and community engagement yields measurable prevention benefits (Rousseau et al., 2021; Kelly et al., 2020).

Political determinants define the broader context in which PCDI develop (Damschroder et al., 2022). Policy decisions affect provider preparedness, licensing regulations, and allocation of resources that support PCDI (Bélanger-Gravel et al., 2021; Elopre et al., 2017; Scott et al., 2023). When community voices are included in policy design, programs achieve greater local legitimacy (D'Avanzo et al., 2024; Ortblad et al., 2018). Partnerships between governments and community-based organizations (CBOs) enhance infrastructure and enable flexible adaptation to diverse populations (Lopez et al., 2020; Sullivan et al., 2024).

Economic determinants continue to influence PCDI outcomes. Public investment in prevention yields long-term savings through reduced HIV incidence and was associated with health outcomes (Hillis et al., 2020; Kim et al., 2022). However, financial barriers remain significant, especially in areas without universal coverage (Srikanth et al., 2022). Socioeconomic disparities correlate with HIV risk and care engagement (Coleman et al., 2021; Smith et al., 2018). Sustainable funding and insurance access are essential to maintain participation (Patel et al., 2021; Srikanth et al., 2022).

Since the first HIV cases in 1981, the epidemic has evolved from a fatal illness to a chronic condition (Crooks et al., 2023). Yet transmission continues along social gradients (Sullivan et al., 2021). Between 2016 and 2020, the United States recorded

about 34,800 new diagnoses annually, with the highest burden among Black and Latinx sexual minority men, transgender women, and residents of southern states (Harawa et al., 2022; Mokdad et al., 2018). Structural inequities such as poverty, housing instability, and limited healthcare access exacerbate vulnerability (Bailey et al., 2017; Sandel et al., 2018). Although PrEP was FDA-approved in 2012 and included in national guidelines by 2014 (Seth et al., 2015), racial and geographic inequities persist (Bush et al., 2018; Bauer & Scheim, 2019).

Recent studies link higher Social Vulnerability Index (SVI) scores with lower PCDI engagement, even after adjusting for HIV incidence (Adepoju & Kiaghadi, 2023; Aggarwal, 2021). These findings confirm that education, income inequality, racial segregation, and political marginalization continue to influence PCDI outcomes (Bailey et al., 2017; Williams et al., 2019). The CDC's EHE plan aims to reduce new infections by 90% by 2030 (CDC, 2023). Achieving this goal requires understanding how social, political, and economic factors intersect to influence PCDI (Beymer et al., 2019; Nosyk et al., 2020).

Federal strategies such as the National HIV/AIDS Strategy 2022–2025, NIH initiatives, and HRSA's Ryan White modernization have facilitated PCDI advancements. Despite these efforts, systems remain fragmented by state-level ACA expansions, pharmacy prescribing laws, and reimbursement disparities (Brantley et al., 2019; Leitner et al., 2018; Lopez et al., 2020). Political barriers, including HIV criminalization and provider scope restrictions, continue to shape access (Schexnayder et al., 2022; Shut, 2021). Financial barriers, such as high drug prices and limited patient assistance

programs, also affect equity (Adamson et al., 2019; Coleman et al., 2021; Thavorn et al., 2018). Social challenges, including stigma and mistrust, remain prominent (Alsan et al., 2019; Tekeste et al., 2019; Willie et al., 2019).

Damschroder's CFIR highlights that evidence-based innovations succeed only when aligned with sociopolitical and economic determinants (Frank et al., 2022; Nilsen & Bernhardsson, 2019; Schuer, 2021). Few empirical syntheses have quantified how multilevel determinants interact across jurisdictions (Biello et al., 2018; Malone et al., 2021; Ramos et al., 2023). The absence of integrated frameworks limits policymakers' ability to design strategies that address structural inequities (Beckham et al., 2022; Birken et al., 2017; Chukwuma, 2023; Frank et al., 2022). This study addresses that gap by examining associations between social, political, and economic determinants and PCDI.

Problem Statement

The problem focused on in this study is the association between social, political, economic determinants and PCDI across the 47 EHE jurisdictions. Although PrEP has indicated efficacy exceeding 99% in preventing HIV acquisition when taken, there is big disproportionation of PrEP among U.S. ethnic minorities (Bell & Owens-Young, 2020: Delaney et al., 2021; He et al., 2022). National surveillance data indicate that approximately 1.2 million people in the United States were eligible for PrEP in 2022; however, only 36% received prescriptions, which is far below the threshold required to achieve epidemic control (CDC, 2023; Sullivan et al., 2021). Almost 94% of White people said they got prescriptions for PrEP, while only 13% of Black people and 24% of Hispanic/Latino people said they used PCDI (CDC, 2022; Sales et al., 2018). The most

significant disparities are evident in southern states (Ojikutu et al., 2019: Patel et al., 2019), which have been prioritized under the EHE initiative due to disproportionately high HIV infection rates and low PCDI (Bush et al., 2018; Sheth et al., 2020; Sullivan et al., 2019).

Biomedical efficacy alone cannot counteract the influence of social, political, and economic determinants on PCDI (Bonacci et al., 2021; Chan et al., 2020; Williams et al., 2019). Social determinants, such as stigma, mistrust, and social vulnerability, have repeatedly been shown to affect awareness and engagement (Doherty et al., 2022; Rousseau et al., 2021; Scribner et al., 2017). Political determinants, including Medicaid expansion status, HIV criminalization laws, and telehealth reimbursement policies, also influence provider readiness and patient access (Agénor et al., 2021; Scott et al., 2023). Economic determinants, particularly cost, insurance coverage, and program funding, remain major predictors of PCDI (Coleman et al., 2021; Eichenwald et al., 2025). In regions without expanded healthcare infrastructure, uninsured individuals face the greatest access barriers (He et al., 2022; Jenness et al., 2018; Thavorn et al., 2018).

While individual studies have examined isolated factors such as patient awareness (Adams et al., 2018), provider willingness to prescribe (Gelaude et al., 2020), and cost-effectiveness modeling (Adamson et al., 2019), few have synthesized these findings into a unified framework capable of explaining how macro-determinants jointly influence PCDI. In addition, prior literature remains fragmented, focusing primarily on behavioral or programmatic variables rather than systemic structures (Freeman et al., 2017; Ortblad et al., 2018; Ramos et al., 2023). As a result, policymakers and practitioners lack an

empirical foundation to adapt interventions that address social, political, and economic determinants for PCDI (Franciosi et al., 2021).

Addressing this gap through a quantitative systematic review and meta-analysis provides an opportunity to create an integrated theory while looking at the associations independently in social, political, and economic aspects (Flessa & Huebner et al., 2021; Gil et al., 2023; Shrader et al., 2021). Therefore, the goal was to synthesize all studies that included social, political, and economic determinants influencing PCDI across the 47 EHE jurisdictions in the United States.

Purpose of the Study

The purpose of this quantitative systematic review and meta-analysis was to examine how social, political, and economic determinants, both collectively and independently, influence PCDI across the 47 EHE jurisdictions in the United States. The study utilized a systematic review on social, political, and economic determinants influencing PCDI. The expected outcome of this study was to produce a comprehensive, evidence-based understanding of how social, political, and economic determinants intersect to influence PCDI across the 47 EHE U.S. jurisdictions, utilizing the CFIR-DOI integrated theory. The findings were expected to fill a critical gap in the implementation of science literature by providing meta-analytic evidence to inform policy reform, resource allocation, and the equitable scaling of PCDI (Malone et al., 2021; Ramos et al., 2023). The synthesis of these data was designed to generate actionable insights for health systems, policymakers, and community-based organizations seeking to align HIV prevention strategies with the social realities of marginalized populations (Beyrer et al.,

2020; Ortblad et al., 2018). The intent of this study was not only to identify the magnitude of associations among social, political, and economic determinants and PCDI, but also to inform future implementation frameworks capable of achieving the goals of the EHE initiative (CDC, 2022). By applying a meta-analytic approach grounded in implementation science, the research provided a foundation for equity-oriented innovations that strengthen PCDI across the U.S.

Research Questions and Hypotheses

The research questions were grounded in an integrated conceptual framework using Damschroder's CFIR and Rogers's DOI theory. This model provided a lens for understanding how these determinants influence the diffusion and equitable inventions of PCDI across the 47 U.S. EHE jurisdictions. The following research questions and hypotheses guided the analysis.

Research Question 1: Is there an association between social determinants and PCDI across the 47 U.S.EHE jurisdictions?

Null Hypothesis ($H_0 1$): There is no statistically significant association between social determinants and PCDI across the 47 U.S. EHE jurisdictions.

Alternative Hypothesis ($H_1 1$): There is a statistically significant association between social determinants and PCDI across the 47 U.S.EHE jurisdictions.

Research Question 2: Is there an association between political determinants and PCDI across the 47 U.S. EHE jurisdictions?

Null Hypothesis ($H_0 2$): There is no statistically significant association between political determinants and PCDI across the 47 U.S. EHE jurisdictions.

Alternative Hypothesis ($H_1$2): There is a statistically significant association between political determinants and PCDI across the 47 U.S. EHE jurisdictions.

Research Question 3: What is the association between economic determinants and PCDI across the 47 U.S. EHE jurisdictions?

Null Hypothesis ($H_0$3): There is no statistically significant association between economic determinants and PCDI across the 47 U.S. EHE jurisdictions.

Alternative Hypothesis ($H_1$3): There is a statistically significant association between economic determinants and PCDI across the 47 U.S. EHE jurisdictions.

Research Question 4: Are there statistically significant strengths and directions among social, political, and economic determinants on PCDI across the 47 U.S. EHE jurisdictions?

Null Hypothesis ($H_0$4): There are no statistically significant strengths and directions among social, political, and economic determinants on PCDI across the 47 U.S EHE jurisdictions.

Alternative Hypothesis ($H_1$4): There is a statistically significant strength and direction among social, political, and economic determinants on PCDI across the 47 U.S. EHE jurisdictions.

Theoretical and Conceptual Framework

PCDI is an integrative theoretical framework drawing upon Damschroder's (2009) CFIR and Rogers's (2003) DOI (Flessa & Huebner,2021). The integrated CFIR–DOI framework conceptualizes PCDI as dynamic processes influenced by contextual determinants, policy structures, and individual-level perceptions of innovation

characteristics. The framework supports the examination of interactive processes influencing PCDI within complex health systems (Birken et al., 2017; Chukwuma, 2023).

Damschroder's CFIR provides a structured framework for examining multilevel factors that affect evidence-based interventions (Guyatt et al., 2021). It highlights the relationships between intervention characteristics, inner and outer settings, individual attributes, and process factors (Biello et al., 2021; Damschroder et al., 2015; Kirk et al., 2015). The outer setting captures patient needs, policy environments, and community resources (Beckham et al., 2022; Hojilla et al., 2021), while the inner setting reflects organizational culture, leadership, and readiness (Nilsen & Bernhardsson, 2019). CFIR also recognizes how individual knowledge, beliefs, and self-efficacy interact with planning, engagement, execution, and evaluation (Barger et al., 2019; Cooke et al., 2019; Schroeder et al., 2022). Within PCDI, CFIR aligns with organizational readiness, resource allocation, and workforce capacity (Green et al., 2023; O'Byrne et al., 2021; Mayer et al., 2020; Ramos et al., 2023).

Rogers's DOI theory explains how innovations spread through communication within social systems (Beckham et al., 2022; Parston et al., 2015). It describes adopter categories and emphasizes attributes of relative advantage, compatibility, complexity, trialability, and observability (Adams et al., 2018; Greenhalgh et al., 2004; Rogers, 2003; Scheuer, 2021). In PCDI, DOI clarifies the diffusion of community pharmacy programs, telehealth services, and nurse-led models across systems (Burns et al., 2023; Evans et al., 2022; O'Byrne et al., 2021). DOI highlights how perceived value, peer influence, and communication channels shape determinants (Brooks et al., 2019; Parmentola & Tutore,

2018). For example, decentralized prescribing and peer navigation promote equitable diffusion by aligning PCD with patient needs (Lopez et al., 2020; Williams et al., 2019).

Integrating CFIR and DOI strengthens the theoretical foundation by linking contextual analysis with diffusion mechanisms (Klaic et al., 2022; Naftagi et al., 2022). CFIR addresses system readiness and structural context, while DOI explains dissemination among providers and patients (Hill et al., 2018; Schroeder et al., 2022). Together, they capture macro-level forces such as funding, policies, and leadership, as well as micro-level processes including motivation, community engagement, and trust (Kimmel et al., 2020; Scott et al., 2023). CFIR outer-setting constructs correspond with DOI communication and compatibility principles, emphasizing environmental readiness and stakeholder collaboration for equitable diffusion (Flessa & Huebner, 2021; Nilsen & Bernhardsson, 2019).

External determinants, including policy regulations, funding mechanisms, and community norms, serve as facilitators or barriers (Sullivan et al., 2019). Supportive factors include leadership engagement and community partnerships, while mistrust and structural stigma hinder equitable diffusion (Bailey et al., 2017; Tekeste et al., 2019). The CFIR and DOI model conceptualizes PCDI as outcomes influenced by continuous feedback between social, political, and economic determinants (Doblecki-Lewis et al., 2019; Parston et al., 2015).

Nature of Study

This study employed a quantitative meta-analysis to examine how social, political, and economic determinants influence PCDI across the 47 EHE jurisdictions in

the United States, the meta-analysis integrated findings from independent studies to enhance statistical power and precision (Borenstein et al., 2021; Higgins et al., 2022). The design-enabled quantification of social relationships that are often examined with qualitative lens methodology in public health (Sen & Yildirim, 2022).

Following PRISMA 2020 guidelines ensured methodological transparency and reproducibility (Liberati et al., 2009; Page et al., 2021). Data extraction and synthesis adhered to Walden University standards for quantitative secondary research, emphasizing rigor and replicability (Walden University, 2023). Only peer-reviewed quantitative studies published between 2007 and 2024 were included, covering the period following FDA approval of PrEP in 2012 (Mayer et al., 2020; Seth et al., 2015). The studies represent diverse populations, including sexual and gender minorities, women who inject drugs, Black women, PrEP providers, and rural or socioeconomically disadvantaged populations.

The analysis employed both fixed- and effects models. The effects model assumed a common actual effect across studies, producing inverse-variance-weighted averages (Borenstein et al., 2021; Higgins & Thompson, 2002). The random effects model accounted for between-study variability arising from heterogeneity across the 47 U.S. EHE jurisdictions (Hedges & Veeva, 1998; Schmidt & Hunter, 2015) and provided greater validity and sensitivity (Roque et al., 2022).

The independent variables of interest included social, political, and economic determinants, operationalized through established integrated theories (Zaccagnini & Li, 2023). Social determinants included stigma, education, housing stability, and community

support (Bailey et al., 2017; Scribner et al., 2017). Political determinants covered Medicaid expansion, pharmacy prescribing authority, and HIV-related policies (Casey et al., 2023; Sullivan et al., 2019). Economic determinants reflected affordability, insurance coverage, and financial assistance (Coleman et al., 2021; Thavorn et al., 2018). The dependent variable was PCDI, which also included PCC factors such as awareness, uptake, adherence, and retention.

Following PRISMA 2020 guidelines, the study employed multi-stage identification, screening, and eligibility procedures (Page et al., 2021). The studies included quantitative data on PCDI across the 47 EHE U.S. jurisdictions. Excluded were qualitative reports, theoretical papers, studies lacking effect size data, and those conducted outside the United States (Brand et al., 2019; Page et al., 2021). The final synthesis included 47 studies with more than 46,000 participants. Study-level data included publication year, sample size, and effect size and confidence interval where appropriate. Analyses were conducted using SPSS *v*30, with significance set at $p < .05$ and 95% confidence intervals (CI). Heterogeneity was assessed using Q and I^2 statistics (Higgins et al., 2003).

This design addressed the four research questions by evaluating the associations between social, political, and economic determinants and PCDI, both independently and cumulatively. Meta-regression identified moderators, including publication year and sample size (Mutinda et al., 2022). These methods revealed structural determinants and associations for equitable PCDI across the 47 U.S. EHE jurisdictions (Borenstein et al., 2021; Higgins et al., 2022). Overall, this quantitative synthesis, grounded in CFIR, DOI

theory, and public health principles, provides an integrated understanding of how social, political, and economic determinants influence PCDI.

Definitions

The following terms are defined to ensure clarity and consistency throughout the dissertation. Each definition reflects how the term was applied within this systematic review and meta-analysis, which examines the social, political, and economic determinants of PCDI.

Consolidated framework for implementation research (CFIR): CFIR provides a comprehensive structure for identifying multilevel factors that influence the delivery of health innovations. It includes intervention characteristics, outer and inner settings, individual attributes, and processes that affect success (Damschroder et al., 2015; Schroeder et al., 2022).

Diffusion of innovations (DOI) theory: DOI explains how innovative ideas and practices spread through social systems based on perceived characteristics such as relative advantage, compatibility, complexity, trialability, and observability (Greenhalgh et al., 2004; Rogers, 2003). It emphasizes communication channels and adopter behavior in the uptake of innovation.

Economic determinants: Economic determinants refer to financial and systemic conditions that influence access to health services. These include insurance coverage, income, medication affordability, and public health funding (Coleman et al., 2021; Thavorn et al., 2018).

Ending the HIV Epidemic (EHE) Initiative: EHE is a federal program launched by

the U.S. Department of Health and Human Services aimed at reducing new HIV infections by 90% by 2030. It focuses on 47 jurisdictions with the highest HIV incidence and most significant inequities (CDC, 2022; Fauci et al., 2019).

Health equity: Health equity represents the attainment of the highest level of health for all people. It requires eliminating systemic barriers, including poverty, stigma, and discrimination, which lead to differential health outcomes (Freeman et al., 2017; Williams et al., 2019).

HIV prevention: HIV prevention encompasses biomedical, behavioral, and structural strategies designed to reduce HIV transmission, such as testing, counseling, condom use, and PrEP (Garcia et al., 2015; Zou & Fan, 2017).

Meta-analysis: Meta-analysis statistically combines data from multiple independent studies to estimate overall effect sizes and assess variability across contexts and populations (Borenstein et al., 2021; Higgins et al., 2022). This study used both fixed and random effects models.

Political determinants of health (PDOH): Political determinants are laws, policies, and governance systems that structure access to care and resources. They shape how health services are organized and distributed (Agénor et al., 2021; Scott et al., 2023). Examples include Medicaid expansion and HIV criminalization policies (Casey et al., 2023; Sullivan et al., 2019).

Pre-exposure prophylaxis (PrEP): PrEP is a once-daily oral antiretroviral medication that is inversely associated with the risk of HIV infection by more than 90 percent when taken consistently (CDC, 2022; Siegler et al., 2020; Sullivan et al., 2021).

PrEP Adherence: PrEP adherence refers to the extent to which individuals take PrEP as prescribed. Consistent adherence is essential for achieving optimal protection against HIV (Ezennia et al., 2019; Mayer et al., 2020).

PrEP care continuum (PCC): The PrEP care continuum describes the sequential stages of PrEP delivery including awareness, access, initiation, adherence, and retention, used to assess performance across systems (Arnold et al., 2017; Nunn et al., 2017).

PrEP care delivery innovations (PCDI): PCDI is an integrated model of PrEP care delivery avenues which includes telehealth, pharmacy-based prescriptions, and nurse-led programs designed to enhance accessibility (Ortblad et al., 2020; Vanhamel et al., 2022).

PrEP Coverage: PrEP coverage measures the proportion of individuals who meet eligibility criteria and have received a PrEP prescription. It serves as an indicator of equity and population-level progress (Ezennia et al., 2019; AIDSVu, 2023).

Preferred reporting items for systematic reviews and meta-analyses (PRISMA) framework: PRISMA provides standardized guidance for reporting systematic reviews and meta-analyses to improve transparency, methodological rigor, and replicability (Moher et al., 2009; Page et al., 2021).

Social determinants of health (SDOH): Social determinants are the social and environmental conditions that shape health outcomes and access to care. In this study, they included stigma, education, housing stability, transportation, and social support (Bailey et al., 2017; Scribner et al., 2017; Willie et al., 2019).

Social Vulnerability Index (SVI): The SVI is a multidimensional metric that

assesses a population's vulnerability to poor health outcomes using socioeconomic and demographic indicators. High SVI scores are linked to reduced PrEP coverage and increased HIV risk (Gant et al., 2023; Sandel et al., 2018).

Structural racism: Structural racism encompasses institutional practices and policies that restrict access to healthcare and social resources based on race or ethnicity. It contributes to inequities in PrEP uptake and HIV outcomes (Bailey et al., 2017; Bowleg, 2021; Chambers et al., 2020).

Assumptions

Assumptions guided this meta-analysis examining how social, political, and economic determinants influence PCDI across the 47 jurisdictions of the EHE initiative. These assumptions delineated the study's scope, ensured consistency, and supported the interpretation of results (Vo et al., 2023). It was assumed that primary studies included in this meta-analysis were conducted with methodological rigor and adhered to validity and reliability standards (Moher et al., 2015; Higgins et al., 2022). This was essential because the research relied on secondary quantitative data from peer-reviewed studies (Vo et al., 2023). It was also assumed that statistical measures, such as effect sizes and confidence intervals, accurately reflected the relationships between determinants and PCDI. The credibility of this meta-analysis depended on the integrity of primary data sources (Borenstein et al., 2021; Vo et al., 2023).

It was assumed that the search strategy captured a representative sample of literature published between 2003 and 2024. The inclusion of randomized controlled trials (RCTs), cohort studies, and cross-sectional designs yielded a diverse dataset for

robust summary estimates (Page et al., 2021; Smith et al., 2022). Excluding qualitative studies and non-English publications was not expected to bias results (Shrader et al., 2021).

It was assumed that constructs of social, political, and economic determinants were consistently defined across studies. Social determinants included stigma, social capital, and access to healthcare (Bailey et al., 2017; Scribner et al., 2017). Political determinants encompassed provider preparedness, public health policies, and regulatory frameworks (Freeman et al., 2017; Ortblad et al., 2018). Economic determinants included cost, insurance coverage, and resource distribution (Glaubius et al., 2016; Ramanaik et al., 2023).

It was assumed that meta-analytic procedures, including fixed- and effects models, provided accurate pooled estimates of associations across contexts. Analyses conducted in SPSS version 30 were assumed to yield valid measures of heterogeneity and effect size (Higgins & Thompson, 2002; Le et al., 2022). Procedures detecting publication bias, including Egger's regression and funnel plots, were assumed to identify distortions (Egger et al., 1997; Haddaway et al., 2022).

Moderators such as race, gender, and region were assumed to be sufficiently documented for subgroup analyses. The heterogeneity of populations across the 47 U.S. EHE jurisdictions was expected to introduce variability in the analysis of equity and access (Agénor et al., 2021; Gant et al., 2023). Synthesizing evidence from multiple jurisdictions was assumed to provide generalizable insights applicable to broader public health systems (Brooks et al., 2019). Aggregated findings were expected to clarify

systemic interactions among determinants that influence PCDI. PCDI was assumed to depend on complex interactions among social, political, and economic determinants. Meta-analytic synthesis was expected to yield actionable knowledge to advance equitable HIV prevention (Scribner et al., 2017; Williams et al., 2019).

These assumptions provided a basis for this study and supported coherence between the CFIR and DOI integrated theory and its application to PCDI, methodology, and interpretation. They ensured that the synthesis accurately reflected associations between determinants and PCDI in the 47 U.S. EHE jurisdictions.

Scope and Delimitations

This meta-analysis encompassed a quantitative synthesis of peer-reviewed literature examining how social, political, and economic determinants influence PCDI across the 47 U.S. EHE jurisdictions. The objective was to identify and analyze patterns linking these determinants to outcomes within the PCC, including PrEP awareness, access, initiation, adherence, and retention (Adu & Miles, 2023; Nunn et al., 2017). The focus was on quantifying how these determinants influence PCDI across the 47 U.S EHE jurisdictions. The scope and delimitations maintained methodological rigor and focus on the study's central purpose (Cohen, 2020): to quantify and interpret how social, political, and economic determinants influence PCDI.

The scope was confined to the United States, aligning with national HIV prevention goals and federal programs promoting equity (Sharpe et al., 2021). Focusing on U.S. jurisdictions ensured the relevance of findings for national implementation strategies and resource allocation (Sullivan et al., 2021). The temporal scope covered

studies published between 2003 and 2024, reflecting the evolution of PCDI following the FDA's approval of PrEP in 2012 (Seth et al., 2015). The population scope included adults aged 18 years and older at increased HIV risk (CDC, 2022). This encompassed men who have sex with men, transgender individuals, women in serodiscordant relationships, people who inject drugs, and racial or ethnic minorities disproportionately affected by HIV (Kanny et al., 2019). The conceptual scope was guided by CFIR and DOI, supporting a multilevel analysis of structural mechanisms that influence PCDI (Nilsen & Bernhardsson, 2019; Flessa & Huebner, 2021). The emphasis was on social, political, and economic determinants rather than individual behavioral factors (Ortblad et al., 2018; Scribner et al., 2017).

The methodological scope adhered to PRISMA 2020 standards and to quantitative synthesis using fixed- and effects models to account for variation (Page et al., 2021; Higgins et al., 2022). Qualitative and gray literature were excluded to maintain focus on peer-reviewed quantitative data (Cohen, 2020; Shrader et al., 2021). The exclusion of non-English studies introduced potential bias but maintained consistency (Smith et al., 2022). Studies involving participants younger than 18 were excluded to avoid confounding factors linked to pediatric prevention (Taggart et al., 2020). Biomedical factors such as pharmacologic adherence were also excluded to maintain focus on structural determinants (Williams et al., 2019). This reliance on secondary data meant the results depended on the transparency and quality of included studies (Higgins et al., 2022; Sen & Yildirim, 2022). Variability in study design and geographic context may have influenced outcomes despite adjustments for heterogeneity (Borenstein et al., 2021;

Glidden et al., 2019).

Limitations

This meta-analysis was limited in ways that must be considered when interpreting the results. A primary limitation was dependence on secondary data. The validity of findings relied on the rigor of the included studies (Borenstein et al., 2021; Moher et al., 2015). Differences in study quality, sampling, and measurement may have affected aggregated estimates. Quality assessment was applied, but precision depended on the accuracy of the original data (Higgins et al., 2022; Page et al., 2021).

Excluding qualitative and gray literature imwas associated with validity but limited understanding of contextual interactions (Shrader et al., 2021). Qualitative insights into cultural and community factors were not captured (Ramos et al., 2023). This may have reduced interpretive depth. Limiting the review to English-language publications may have introduced bias by excluding non-English data relevant to multilingual populations (Schaefer et al., 2021; Smith et al., 2022). Operational variability across studies also presented a constraint (Vo et al., 2023). Determinants were defined inconsistently and measured differently (Ortblad et al., 2018; Scribner et al., 2017), contributing to heterogeneity (Higgins & Thompson, 2002; Sen & Yildirim, 2022).

Publication bias was a potential issue, as studies with significant results are more likely to be published. Despite bias tests, undetected asymmetry could have influenced the results (Haddaway et al., 2022; Page et al., 2021). The temporal restriction from 2003 to 2024 may not fully reflect recent post-pandemic innovations in telehealth or

community interventions (Sharpe et al., 2021; Sullivan et al., 2024). Generalizability was limited to the 47 U.S. jurisdictions under the EHE initiative (Fauci et al., 2019; CDC, 2023). Structural and cultural determinants may differ internationally (Vanhamel et al., 2022). Residual heterogeneity persisted despite random effects modeling (Higgins et al., 2011; Viechtbauer, 2010). Eleven primary studies lacked standard effects (*SE*) and therefore *CI.* These gaps constrained detailed quantification of disparities.

Despite these limitations, this meta-analysis provides a valuable synthesis of evidence on how social, political, and economic determinants influence PCDI across the 47 EHE jurisdictions. The findings contribute to understanding structural determinants and support policy strategies for equitable HIV prevention strategies (Ramos et al., 2023; Williams et al., 2019).

Significance

This meta-analysis contributes to public health scholarship and equity-focused HIV prevention and PCDI. It provides one of the few quantitative syntheses examining how social, political, and economic determinants influence PCDI within the 47 U.S. EHE jurisdictions. By integrating evidence from diverse populations and settings, it offers insights into the systemic factors that sustain disparities in PCDI (Bowleg, 2021; Sullivan et al., 2021).

The study quantifies the associations between social, political, and economic determinants for PCDI. Integrating evidence across jurisdictions yields generalizable findings that inform equitable health policy (Fauci et al., 2019; Gant et al., 2023). The integration of CFIR and DOI theory connects structural determinants of PCDI

(Damschroder et al., 2015; Flessa & Huebner, 2021; Rogers, 2003). CFIR-DOI theory provides a multidimensional understanding of how contextual, policy, and social factors interact to influence PCDI (Le et al., 2022; Zolfaghari et al., 2022).

The findings have direct implications for policymakers and practitioners (Naftagi et al., 2021). Understanding how policies and provider readiness influence uptake can inform resource allocation in regions most affected by HIV (Gelaude et al., 2020; Khanna et al., 2019). The results provide evidence-based recommendations for federal and state decision-making.

This dissertation aligns with Walden University's mission to advance knowledge for positive social change aiming to address inequities rooted in racism, economic disparities, and policy fragmentation (Freeman et al., 2017; Williams et al., 2019). This study also supports culturally responsive program design reflecting the lived experiences of affected communities (CDC, 2022). Understanding stigma, community norms, and engagement supports inclusive health initiatives and education partnerships (Scribner et al., 2017; Sullivan et al., 2024; Vanhamel et al., 2022).

Summary

This chapter presented the purpose, background, and significance of the study examining how social, political, and economic determinants influence PCDI within the 47 EHE jurisdictions. It outlined the integrated CFIR and DOI framework used to analyze these determinants. The problem statement identified persistent inequities in PCDI as a public health concern rooted in social, political, and economic determinants. Despite proven PrEP efficacy, disparities remain across racial, socioeconomic, and geographic

lines (CDC, 2023; Gant et al., 2023). The study sought to quantify these relationships through a meta-synthesis. Assumptions, scopes, and delimitations defined methodological boundaries. The scope emphasized peer-reviewed U.S. studies from 2003 to 2024, while delimitations excluded qualitative and non-English data.

This dissertation contributes to public health research by quantifying the associations among the determinants and PCDI. It bridges theoretical and empirical perspectives by integrating the CFIR and DOI theory, offering a comprehensive approach to understanding PCDI. By synthesizing quantitative evidence from diverse populations, the study provides actionable insights for improving access, policy implementation, and equity in PCDI across the 47 U.S. EHE jurisdictions.

The next chapter presents the literature review. It examines prior research on the social, political, and economic determinants of health and their influence on PCDI. Chapter 2 synthesizes theoretical perspectives and empirical evidence, identifies key gaps that justify this meta-analysis, and positions the current study within the broader context of HIV prevention and structural-equity scholarship.

Chapter 2: Literature Review

The purpose of Chapter 2 is to provide a literature review examining the social, political, and economic determinants that influence PCDI across the 47 U.S. EHE jurisdictions. Although PrEP is a supported biomedical intervention, PCDI implementation varies widely across populations and regions, reflecting broader social and structural forces. Understanding these determinants is essential for explaining why certain jurisdictions demonstrate stronger innovation adoption and sustained engagement while others continue to experience persistent gaps.

This review is organized to support the study's four research questions. The chapter begins with an overview of the literature search strategy used to identify relevant evidence. It then introduces the PCDI integrated theoretical foundation, which draws on Damschroder's CFIR and Rogers' DOI. Following the theoretical foundation, the chapter presents a literature review organized around the key variables of interest. The first section examines social determinants of PCDI, including stigma, cultural congruence, community engagement, and access to services. The following section explores political determinants, including regulatory structures, policy environments, and health system governance. The subsequent section reviews economic determinants affecting PCDI, including affordability, insurance coverage, and resource allocation. The chapter then addresses the combined strength and direction of associations among social, political, and economic determinants and PCDI, providing a multilevel view of how these factors interact. The chapter concludes by identifying gaps in the literature and describing the justification for the dissertation meta-analytic approach. This synthesis establishes the

conceptual and empirical foundation for the methodological decisions outlined in Chapter 3.

Literature Search Strategy

A comprehensive literature search strategy was developed to identify peer-reviewed studies examining the social, political, and economic determinants influencing PCDI across the 47 EHE jurisdictions in the United States. The search was designed to ensure completeness, transparency, and reproducibility while aligning with the Preferred Reporting Items for Meta-Analyses PRISMA 2020 framework. The search was conducted using the Walden University Library's electronic databases, including PubMed, CINAHL, and Embase. Additional searches were conducted through Google Scholar to capture gray literature and relevant peer-reviewed articles that may not have been indexed in primary databases. Search filters were applied to include studies published in English between January 2003 and December 2024, reflecting the evolution of PrEP from early clinical trials through its integration into community and primary care settings.

Search terms and Boolean operators were selected to identify studies examining PCDI and structural determinants. Core search terms included *pre-exposure prophylaxis* OR PrEP AND *social determinants* OR *social factors* OR *social vulnerability index* AND *policy* OR *political determinants* AND *economic determinants* OR *cost* OR *insurance* OR *healthcare access* AND *PrEP uptake* OR *PrEP awareness* OR *care delivery*.

Truncation and proximity operators were employed to enhance search sensitivity while maintaining precision. Reference lists of key studies and systematic reviews were

manually screened to identify additional eligible sources. Articles were included if they presented empirical data on PCDI, structural or contextual determinants, or outcomes related to PrEP awareness, access, uptake, adherence, or persistence. Exclusion criteria were applied to remove editorials, commentaries, opinion pieces, and studies not conducted in the United States or outside the EHE jurisdictions.

Each retrieved article was evaluated for methodological rigor, relevance, and alignment with the study variables. Duplicates were removed using EndNote reference management software, and final articles were imported into a matrix for data. Data fields included study title, year, author, jurisdiction, study population, determinant domain, and PCDI. The review emphasized studies that examined relationships among social, political, and economic determinants and how these factors influenced the trajectory of PCDI across populations and settings.

PCDI Integrated Theoretical Foundation

The integrated theoretical foundation representing PCDI was grounded in Damschroder's CFIR and Rogers's DOI using models proposed by Flessa and Huebner (2021) and Klaic et al. (2022). Together, these frameworks provide a robust conceptual structure for examining how social, political, and economic determinants influence PCDI among populations disproportionately affected by HIV (Agénor et al., 2021; Bailey et al., 2017; Ransome et al., 2020). This integrated foundation captures structural inequities that determine whether health innovations achieve equitable reach and impact (Damschroder et al., 2022; Greenhalgh et al., 2004; Rogers, 2003; Vanhamel et al., 2020).

CFIR provides a structured lens to explore the multilevel factors that influence

PCDI. Its five domains, including intervention characteristics, outer setting, inner setting, characteristics of individuals, and process, describe how contextual and organizational factors outline success (Birken et al., 2017; Damschroder et al., 2009; Schroeder et al., 2022). The outer setting is particularly relevant to PCDI because it encompasses policy environments, social vulnerability, community needs, and external incentives that shape access and equity (Barrett & Johnson, 2020; Hull et al., 2022; Walters et al., 2017). Studies have emphasized that leadership engagement, stakeholder collaboration, and alignment with community context determine whether PCDI is successfully implemented (Barger et al., 2019; Hill et al., 2018; Scott et al., 2023: Wood et al., 2018).

Rogers's DOI complements CFIR by describing how communication patterns within social systems influence the spread of innovation (Greenhalgh et al., 2004; Rogers, 2003; Wejnert, 2002). DOI posits that diffusion depends on perceived relative advantage, compatibility, complexity, trialability, and observability (Beckham et al., 2022; Scheuer, 2021; Sharma et al., 2018). Communication channels, peer norms, and opinion leaders determine the rate at which PCDI is embraced (Wahnich et al., 2021; Willie et al., 2019; Young et al., 2017). In the context of HIV prevention, DOI also explains how healthcare providers' attitudes, patient trust, and local social norms influence the adoption of HIV prevention strategies (Baeten, 2018; Bangham et al., 2023; Ojikutu et al., 2020). The theory has been applied extensively in understanding the spread of decentralized pharmacy-led PrEP services, telehealth-delivered PrEP programs, and nurse-led models (Ortblad et al., 2020; Stekler et al., 2018; Vanhamel et al., 2020; Wilson et al., 2021).

Flessa and Huebner (2021) advanced a systems-oriented model that integrates CFIR and DOI by emphasizing the interaction between external determinants, organizational readiness, and contextual conditions (Flessa & Huebner, 2021; Klaic et al., 2022; Natafgi et al., 2022). This model asserts that policy environments, social structures, and economic systems influence the progression from awareness to consistent use of innovations (Barger et al., 2019; Bavinton & Grulich, 2021; Gant et al., 2023). Studies applying this model demonstrate that alignment between community needs, policy mandates, and implementation infrastructure is essential for PrEP equity (Andriano et al., 2022; Casey et al., 2023; Coleman et al., 2023).

The integration of CFIR and DOI forms the conceptual foundation for this dissertation. It positions social, political, and economic determinants as interactive forces within a broader HIV prevention ecosystem (Beymer et al., 2019; Blackstock et al., 2021; Walters et al., 2017). Social determinants such as stigma, cohesion, cultural congruence, and trust influence community readiness and individual receptivity (Cahill et al., 2017; Calabrese et al., 2018; Goswami et al., 2022; Johnson et al., 2024). Political determinants, including governance structures, regulatory frameworks, Medicaid expansion, and provider scope laws, define the policy architecture that enables or constrains PCDI (Desrosiers et al., 2019; Faryar et al., 2021; Scott et al., 2023; Sullivan & Siegler, 2018). Economic determinants such as cost, insurance coverage, pharmacy access, and resource allocation influence how far innovations diffuse across diverse populations (Hoth et al., 2019; Srikanth et al., 2022; Peebles et al., 2021; Whiteside et al., 2024).

Together, these determinants interact through organizational communication, leadership engagement, and collective decision-making to influence PCDI (Casey et al., 2023; Irie et al., 2024; Johnson et al., 2021; Riley et al, 2023). The conceptual model adapted from Flessa and Huebner et al. (2021) illustrates these relationships and serves as the foundation for the present meta-analysis. It integrates CFIR and DOI and links social, political, and economic determinants to measurable outcomes of PCDI, including awareness, access, uptake, adherence, and persistence (Sharpe et al., 2023; Sullivan et al., 2024; Sun et al., 2022; Vanhamel et al., 2022). See Table 1.

Table 1

Conceptual Mapping of PCDI and Relationship to Social, Political, and Economic Determinants

Determinant Domain	Example Variables	CFIR Domains Reflected	DOI Attributes	Related PCD Outcomes
Social	Stigma, social capital, cultural congruence, and healthcare access	Outer and inner settings, individual characteristics	Compatibility, complexity, observability	Awareness, access, adherence, persistence
Political	Medicaid expansion, prescriptive authority, telehealth reimbursement, inclusive policy, leadership diversity	Outer setting, leadership engagement	Relative advantages, trialability, observability	Access, uptake, adherence
Economic	Medication cost, insurance coverage, financial resources, reimbursement mechanisms	Available resources, readiness, planning	Relative advantage, complexity	Uptake, adherence, persistence

Literature Review Related to Key Variables and/or Concepts.

The purpose of this section is to critically examine empirical findings related to the key variables of this study: social determinants, political determinants, and economic determinants of PCDI. This section builds on the PCDI-integrated theoretical foundation

presented earlier and demonstrates how structural conditions influence health systems and the diffusion of innovations (Klaic et al., 2021; Vanhamel et al., 2020; Walters et al., 2017). Each determinant is analyzed through the dual perspectives of CFIR and DOI, emphasizing both the structural mechanisms that influence policy and the communication processes that drive PCDI (Chukwuma, 2023; Damschroder et al., 2022; Greenhalgh et al., 2004; Nilsen & Bernhardsson, 2019; Scheuer, 2021).

The literature synthesized here draws on quantitative studies conducted in the United States between 2003 and 2024. It reflects populations disproportionately affected by HIV, including Black and Latino sexual minority men, transgender women, women who inject drugs, and rural communities with limited healthcare access (Biello et al., 2018; Blackstock et al., 2020; Malone et al., 2021; Willie et al., 2019; Walters et al., 2017). Collectively, these studies demonstrate that PCDI do not exist independently but arise from intersecting social, political, and economic determinants that influence awareness, access, uptake, adherence, and persistence of PrEP (Casey et al., 2023; Nunn et al., 2017; Scott et al., 2023; Sharpe et al., 2023; Sullivan et al., 2024).

Studies evaluating social determinants consistently show that stigma, discrimination, social support, and cultural congruence directly influence whether individuals initiate and maintain PrEP (Bell & Owens-Young, 2020; Goswami, 2022; Harawa et al., 2022; Johnson et al., 2024; Rolle et al., 2017). Research conducted among MSM and transgender populations highlights the importance of peer networks and community-based organizations in expanding PrEP literacy and reducing barriers to PCDI (Beckham et al., 2022; Wahnich et al., 2021; Wilson et al., 2021; Wood et al.,

2018; Young et al., 2017). Studies analyzing social vulnerability index scores show strong correlations between geographic disadvantage and low PCDI (Bailey et al., 2017; Beyrer et al., 2020; Gant et al., 2023; Hull et al., 2022; Sun et al., 2022).

Political determinants, including Medicaid expansion, prescriptive authority regulations, HIV criminalization, and public-health funding, have shown substantial influence on PrEP availability and PCDI (Agénor et al., 2021; Baugher et al., 2021; Bustamante et al., 2018; Riley et al., 2023; Sullivan & Siegler, 2018). Studies conducted in supportive states demonstrate increased diffusion of tele-PrEP, pharmacy-led PrEP, and same-day PrEP initiation programs (Natafgi et al., 2022; Ortbald et al., 2020; Sharpe et al., 2022; Tanner et al., 2023; Vanhamel et al., 2022). Conversely, studies in restrictive jurisdictions identify barriers related to insurance exclusions, provider hesitancy, and legislative gaps that reduce access to PCDI (Adams et al., 2018; Blackstock et al., 2016; Coleman et al., 2023; Faryar et al., 2021; Pleuhs et al., 2020).

Economic determinants remain a crucial factor in all studies examining PCDI. O'Byrne et al. (2019) showed that affordability, subsidy programs, medication copays, and insurance coverage strongly predict initiation and persistence of PrEP. Studies reveal that financial supports including PrEP assistance programs significantly improve outcomes for low-income Black and Latino men and for young MSM (Evans et al., 2022; Frank et al., 2021; Mansergh et al., 2023; Hamilton et al., 2022; Hojilla et al., 2021). Conversely, uninsured participants consistently demonstrate lower awareness, uptake, and adherence due to persistent cost barriers and limited primary-care access (Brooks et al., 2019; Crooks et al., 2023; Edeza et al., 2021; Ransome et al., 2020; Zhang et al.,

2018).

The subsections that follow analyze each determinant domain to develop an integrated understanding of their combined impact and to provide the foundation for the meta-analysis in Chapter 3 (Borenstein et al., 2021; Duval & Tweedie, 2000; Higgins et al., 2022; Page et al., 2021; Sterne et al., 2011).

Social Determinants and PCDI

Social determinants of health are the conditions in which people are born, grow, live, work, and age, and these factors influence PCDI (Bailey et al., 2017; Mokdad et al., 2018; Nosyk et al., 2020; Williams et al., 2019; Sullivan et al., 2021). The CDC measures these conditions through the Social Vulnerability Index (SVI), which aggregates socioeconomic status, household composition, minority status and language, housing and transportation, and related community-level indicators that influence HIV risk and prevention capacity (CDC, 2022; Gant et al., 2023; Ransome et al., 2020; Sharpe et al., 2021; Sharpe et al., 2022). The SVI captures the cumulative burden of social disadvantage and serves as an empirical indicator of factors that correlate with HIV incidence, care gaps, and uneven innovation outcomes across EHE jurisdictions (Nosyk et al., 2020; Rossiter et al., 2021; Sullivan et al., 2018; Sullivan et al., 2024; Volpe et al., 2021).

PCDI outcomes derived from the PCC include factors such as PrEP awareness, access, uptake, adherence, and persistence, which together map how individuals move through prevention systems over time (Mansergh et al., 2023; Nunn et al., 2017; Pinto et al., 2018; Rutstein et al., 2020; Vanhamel et al., 2020). Each stage can either facilitate or

hinder progress depending on social context, local stigma, and community capacity for outreach and navigation (Malone et al., 2021; Ogunbajo et al., 2021; Okoro & Whitson, 2019; Walters et al., 2017; Willie et al., 2019). Social determinants influence how telehealth, community outreach, same-day start programs, mobile PrEP units, and pharmacist-led prescribing reach populations and are sustained within safety net systems (Refugio et al., 2019; Rouffiac et al., 2020; Salabarría Peña et al., 2022; Stekler et al., 2018; Wilson et al., 2021). Because PCDI are unevenly distributed, populations with the most significant HIV burden often experience the lowest engagement due to SDOH (Nosyk et al., 2020; Siegler et al., 2018; Siegler et al., 2019; Sullivan et al., 2018; Sun et al., 2022).

Income and education influence exposure to health information, access to care, and confidence in prevention, thereby affecting who benefits from PCDI (Bailey et al., 2017; Porter, 2018; Scribner et al., 2017; Wilder et al., 2021; Williams et al., 2019). Concentrated poverty is associated with limited insurance coverage, reduced primary care use, and higher dependence on under-resourced public health systems, all of which weaken engagement with PCDI (Malone et al., 2021; Mokdad et al., 2018; Nosyk et al., 2020; Ransome et al., 2020; Sullivan et al., 2024). Socioeconomic disadvantage and low educational attainment jointly reduce both awareness of PrEP and motivation to participate in prevention, particularly for women, youth, and people in rural communities (Eichenwald et al., 2024; Pratt et al., 2022; Sales et al., 2018; Taggart et al., 2020; Willie et al., 2019).

Racial and ethnic inequities rooted in structural racism further constrain PCDI and

amplify disparities in HIV prevention outcomes (Bailey et al., 2017; Krieger et al., 2020; Rodriguez, 2018; Williams et al., 2019; *The Lancet Public Health*, 2021). Residential segregation, discriminatory policies, and unequal resource distribution intensify HIV risk among Black and Latino sexual minority men, transgender women, and Black women across EHE jurisdictions (Nash et al., 2019; Phillips et al., 2019; Ransome et al., 2020; Sullivan et al., 2018; Volpe et al., 2021). SVI captures this marginalization through its minority status and socioeconomic domains, which reflect social exclusion from equitable access to PCDI (Gant et al., 2023; Rossiter et al., 2021; Sharpe et al., 2021; Sharpe et al., 2022; Siegler et al., 2018). Providers often underestimate HIV risk for Black and Latino patients or avoid PrEP discussions altogether, contributing to lower PCDI (Ojikutu et al., 2018; Ojikutu et al., 2020; Quinn et al., 2018; Tekeste et al., 2018; Walters et al., 2017). Culturally tailored approaches, including peer-led education, community co-design, and structurally competent care training, improve engagement, trust, and continuity and improve PCDI (Natafgi et al., 2021; Natafgi et al., 2022; Neff et al., 2020; Restar et al., 2023; Xavier et al., 2023).

Healthcare access also influences PCDI through the geographic distribution of services, provider density, and clinic-level readiness to deliver PrEP (Rossiter et al., 2021; Sharpe et al., 2021; Siegler et al., 2018; Siegler et al., 2019; Vanhamel et al., 2020). Areas with high SVI scores often have fewer sexual health providers, limited specialty clinics, and fragmented public health infrastructure, which constrain PCDI (Nosyk et al., 2020; Rietmeijer et al., 2021; Sullivan et al., 2018; Sullivan et al., 2024; Sun et al., 2022). Interventions such as same-day PrEP initiation, collaborative practice

agreements, and decentralized pharmacist- or nurse-led models improve retention and reduce gaps when adapted to local conditions and implemented with community input (Lopez et al., 2020; Stewart, 2021; Tung et al., 2018; Weidle et al., 2023; Whelchel et al., 2022). Telehealth, mobile PrEP services, and Project ECHO–style telemonitoring further extend PCDI into rural and underserved communities that otherwise lack specialist capacity (Riley et al., 2023; Salgado et al., 2021; Stekler et al., 2018; Wilson et al., 2021; Wood et al., 2018).

Stigma and discrimination remain persistent barriers that limit the reach of PCDI (Ogunbajo et al., 2021; Ojikutu et al., 2018; Ojikutu et al., 2020; Taggart et al., 2020; Tekeste et al., 2018). Anticipated stigma related to HIV, homophobia, transphobia, and sexual behavior discourages engagement with prevention services and is associated with deferred or covert PrEP use (Nash et al., 2019; Phillips et al., 2019; Quinn et al., 2018; Willie et al., 2019). Social norms that conflate PrEP with promiscuity or infidelity reduce uptake and adherence, particularly among women, adolescents, and people in conservative or tightly networked communities (Page et al., 2017; Pratt et al., 2022; Rendina et al., 2017; Scott et al., 2023; Taggart et al., 2020). Low social capital and weak peer networks restrict the diffusion of accurate PrEP information and supportive norms. In contrast, peer navigation, community-based education, and network-focused interventions have been associated with increased awareness, uptake, and persistence in multiple PrEP demonstration projects (Nash et al., 2019; Phillips et al., 2019; Refugio et al., 2019; van den Berg et al., 2018; Young et al., 2017).

Social determinants therefore function as active drivers of PCDI by structuring

who can access information, navigate health systems, and maintain preventive care (Bailey et al., 2017; Malone et al., 2021; Nosyk et al., 2020; Ransome et al., 2020; Williams et al., 2019). SVI provides a measure of how disadvantages translate into disparities in PCDI across the 47 U.S. EHE jurisdictions (CDC, 2022; Gant et al., 2023; Rossiter et al., 2021; Sharpe et al., 2021; Sharpe et al., 2022). Addressing these social barriers remains critical to achieving equitable outcomes under the federal EHE initiative and realizing long-term goals for population-level HIV incidence reduction in the United States (Fauci et al., 2019; Stover et al., 2019; *The Lancet Public Health*, 2021; Sullivan et al., 2021; Sullivan et al., 2024).

Political Determinants of PCDI

Political determinants define the policy and governance environment that structures healthcare systems, resource distribution, and the terms under which prevention technologies like PrEP are delivered (Rodriguez, 2018; Thompson et al., 2020; Ware & Kerner, 2021; Williams et al., 2019; *The Lancet Public Health*, 2021). They interact with social and economic determinants to influence the reach, strength, and equity of PCDI across the 47 U.S. EHE jurisdictions (McCree et al., 2020; Nosyk et al., 2020; Ransome et al., 2020; Stover et al., 2019; Sullivan et al., 2021). These political drivers model how structural racism, SVI, and economic stratification translate into differential access to HIV prevention within and between regions (Bailey et al., 2017; Nosyk et al., 2020; Taffe & Gilpin, 2021; Volpe et al., 2021; Williams et al., 2019).

Medicaid expansion under the Affordable Care Act (ACA) exemplifies a key

political determinant that increased insurance coverage, reduced uninsured rates, and was associated with access to PrEP and related PCDI in adopting states (Bustamante et al., 2018; Nosyk et al., 2020; Siegler et al., 2020; Staiger et al., 2022; Sullivan et al., 2020). Jurisdictions that expanded Medicaid reported better PrEP-to-need ratios, higher PCDI, and more robust prevention infrastructure compared with nonexpansion areas where coverage gaps and unmet prevention needs persist (McCree et al., 2020; Ransome et al., 2020; Siegler et al., 2018; Siegler et al., 2019; Sullivan et al., 2018). Political decisions regarding eligibility criteria, reimbursement levels, and enrollment support thus directly influence who can access PrEP and remain engaged in care (Nosyk et al., 2020; Schackman et al., 2015; Staiger et al., 2022; Walsh et al., 2022; Wang et al., 2020).

Regulatory frameworks and national clinical guidelines further shape PCDI by defining coverage rules and clinical expectations. The U.S. Preventive Services Task Force Grade A recommendation for PrEP, together with CDC and WHO guidance, has bolstered mandates for coverage without cost sharing and legitimized PrEP as a routine preventive service (Rietmeijer et al., 2021; Sullivan & Siegler, 2018; Sullivan et al., 2020; Vanhamel et al., 2020; WHO, 2022). These policies support the diffusion of nurse-led, pharmacy-based, and decentralized community delivery models that can mitigate provider shortages and expand PCDI (Lopez et al., 2020; Schmidt et al., 2022; Sharma et al., 2018; Tung et al., 2018; Weidle et al., 2023). However, variability in state scope-of-practice laws and implementation capacity constrain the scale-up of these models in high-priority jurisdictions, perpetuating uneven access (Rossiter et al., 2021; Sharpe et al., 2021; Sharpe et al., 2022; Siegler et al., 2018; Siegler et al., 2019).

Federal initiatives such as the EHE program have mobilized targeted funding for tele-PrEP, mobile clinics, and status-neutral HIV prevention, but they have not eliminated geographic and demographic inequities (Fauci et al., 2019; McCree et al., 2020; Nosyk et al., 2020; Stover et al., 2019; Sullivan et al., 2021). Rural, Southern, and structurally marginalized areas remain under-resourced despite high HIV burden, reflecting persistent misalignment between national priorities and local implementation capacity (Sharpe et al., 2021; Sharpe et al., 2022; Sullivan et al., 2018; Sun et al., 2022; Tanner et al., 2023). Policy turnover, litigation over preventive service mandates, and shifting fiscal priorities introduce instability that threatens continuity of PCDI and disrupts long-term planning (Nosyk et al., 2020; Thompson et al., 2020; *The federal 340B drug pricing program*, 2022; Walsh et al., 2022; Ware & Kerner, 2021).

Political determinants also influence institutional climate and healthcare provider readiness through inclusive education, legal protections, and antidiscrimination policies. Structural competency and implementation science training can strengthen providers' ability to recognize and respond to upstream drivers of HIV vulnerability, thereby improving PrEP counseling and PCDI (Neff et al., 2020; Nilsen & Bernhardsson, 2019; Price et al., 2015; Schroeder et al., 2022; Zolfaghari et al., 2022). States and systems that adopt inclusive sexual health education, protect LGBTQ+ patients, and invest in culturally responsive care demonstrate stronger prevention outcomes and more equitable PCDI (Ogunbajo et al., 2021; Petroll et al., 2016; Pleuhs et al., 2020; Pleuhs et al., 2022; Quinn et al., 2018). Conversely, restrictive laws, criminalization statutes, and hostile political rhetoric perpetuate stigma, exacerbate medical mistrust, and erode community

confidence in PrEP services (Mizuno et al., 2021; Ojikutu et al., 2018; Ojikutu et al., 2019; Ojikutu et al., 2020; Rodriguez, 2018).

Economic Determinants of PCDI

Economic determinants influence affordability, infrastructure, and long-term stability of PCDI by influencing who can pay for prevention, how systems are financed, and which services are prioritized within constrained budgets (Mokdad et al., 2018; Nosyk et al., 2020; Schackman et al., 2015; Srikanth et al., 2022; Stover et al., 2019; Thavorn et al., 2018; Walsh et al., 2022; Walsh & Rome, 2022; Wang et al., 2020; *The federal 340B drug pricing program*, 2022). Medication cost, insurance coverage, and health system investment determine who can access and maintain PrEP services and how consistently PCDI are delivered across jurisdictions (Adamson et al., 2019; Eichenwald et al., 2024; Nosyk et al., 2020; Peebles et al., 2021; Schackman et al., 2015; Srikanth et al., 2022; Stover et al., 2019; Walsh et al., 2022; Wang et al., 2020; Whiteside et al., 2024).

High drug and laboratory costs remain significant barriers, particularly when routine monitoring, follow-up visits, and ancillary services are included in the total cost of care (Eichenwald et al., 2024; Kelly et al., 2020; Lopez et al., 2020; O'Byrne et al., 2019; Srikanth et al., 2022; Tung et al., 2018; Vanhamel et al., 2020; Wang et al., 2020; Weidle et al., 2023; Whelchel et al., 2022). Financial strain is inversely associated with initiation and persistence, especially for uninsured and underinsured populations who experience competing basic needs, unstable employment, or intermittent coverage

(Malone et al., 2021; Ogunbajo et al., 2021; Ojikutu et al., 2018; Ojikutu et al., 2020a; Ojikutu et al., 2020b; Ransome et al., 2020; Roth et al., 2019; Sherman et al., 2019; Walters et al., 2017; Willie et al., 2019).

Insurance coverage is strongly correlated with uptake and retention, with individuals who have private insurance, Medicaid, or other public coverage showing higher rates of PrEP initiation and continuation than those without coverage (Patel et al., 2016; Raifman et al., 2019; Siegler et al., 2018; Siegler et al., 2019; Smith et al., 2016; Smith et al., 2018; Sullivan et al., 2018; Sullivan et al., 2021; Tanner et al., 2023; Wang et al., 2020). Administrative hurdles including prior authorization, step therapy, fragmented formularies, and inconsistent reimbursement further hinder continuity and can discourage providers from prescribing PrEP or patients from remaining engaged (Lopez et al., 2020; Nosyk et al., 2020; Pleuhs et al., 2020; Pleuhs et al., 2022; Sharma et al., 2018; Srikanth et al., 2022; Tung et al., 2018; Vanhamel et al., 2020; Weidle et al., 2023; Whelchel et al., 2022).

Economic modeling studies show that scaling PCDI is cost-effective and yields long-term savings by preventing HIV infections, reducing downstream treatment costs, and improving quality-adjusted life years, although these gains require substantial upfront investment in drugs, workforce, and infrastructure (Mokdad et al., 2018; Nosyk et al., 2020; Schackman et al., 2015; Stewart et al., 2020; Stover et al., 2019; Thavorn et al., 2018; Walsh et al., 2022; Walsh & Rome, 2022; Wang et al., 2020; *The Lancet Public Health*, 2021). Stable funding streams, innovative payment models, and value-based care approaches promote sustainability by aligning incentives with prevention outcomes rather

than volume of services (Mullins et al., 2018; Natafgi et al., 2021; Natafgi et al., 2022; Nilsen & Bernhardsson, 2019; Price et al., 2015; Rietmeijer et al., 2021; Schroeder et al., 2022; Thompson et al., 2020; Ware & Kerner, 2021; Zolfaghari et al., 2022).

Economic determinants intersect with social and political forces, as structural racism and place-based disadvantage limit wealth accumulation, stable employment, and insurance access, while policy choices around Medicaid expansion, drug pricing, and safety-net funding either mitigate or exacerbate these inequities (Bailey et al., 2017; Feagin & Bennefield, 2014; McCree et al., 2020; Nosyk et al., 2020; Rodriguez, 2018; Sullivan et al., 2018; Sullivan et al., 2021; Taffe & Gilpin, 2021; Volpe et al., 2021; Williams et al., 2019). Aligning financing with fairness and accessibility is therefore necessary to achieve the federal EHE 2030 goal and ensure that PCDI equitably reach populations with the greatest need (Bailey et al., 2017; CDC, 2022; CDC, 2024; Fauci et al., 2019; Nosyk et al., 2020; Ransome et al., 2020; Stover et al., 2019; Sullivan et al., 2021; Sullivan et al., 2024; *The Lancet Public Health*, 2021).

Strength and Direction Among Social, Political, and Economic Determinants and PCDI

The three determinant domains interact rather than operate independently, creating compounding structural pressures that influence PCDI across the 47 U.S. EHE jurisdictions. Stigma intensifies when restrictive policies and economic hardship coexist, reducing PrEP uptake and continuity (Sharpe et al., 2023; Sullivan et al., 2021; Sullivan et al., 2024; Vanhamel et al., 2020; Vanhamel et al., 2022). Medicaid expansion and

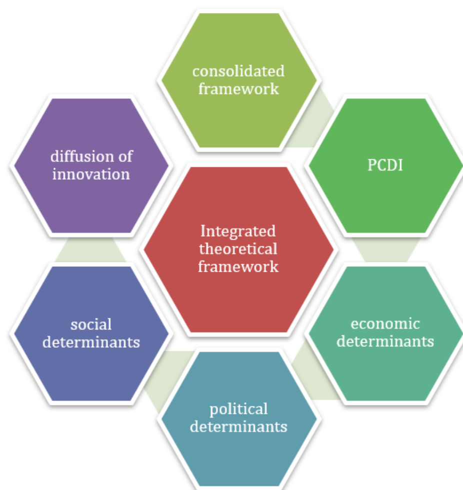
inclusive legislation mitigate these effects when accompanied by social trust and adequate funding (Baugher et al., 2021; Brownson et al., 2022).

Political and economic determinants jointly determine whether clinics can deliver innovations such as tele-PrEP or same day start programs (Bayer et al., 2019; Biello et al., 2021; Brooks et al., 2019). Social and economic inequalities further shape community participation, with marginalized groups experiencing the greatest cumulative barriers to engagement (Adams et al., 2018; Bailey et al., 2021; Blackstock et al., 2016; Burns et al., 2023; Calabrese et al., 2018; Chandler et al., 2020; Coleman et al., 2023; Doherty et al., 2022; Eichenwald et al., 2024).

Effective PCDI emerges when social inclusion, political commitment, and financial support align (Barger et al., 2019; Bavinton & Grulich, 2021; Bell & Owens-Young, 2020). Addressing these interdependent determinants reflects the principles of structural competency in modern public health and ensures that biomedical advances translate into sustained population-level benefit (Evans et al., 2022; Garrison & Haberer, 2021; Hargraves, 2022).

Figure 1

Integrated Theoretical Framework on Social, Political, And Economic Determinants for PCDI



Note. Adapted from Flessa and Huebner (2021) and Klaic et al. (2022), integrating CFIR (Damschroder et al., 2009) and DOI (Rogers, 2003) to conceptualize social, political, and economic determinants of PCDI.

Summary and Conclusions

Chapter 2 summarized the evidence on how social, political, and economic determinants influence PCDI across the 47 EHE jurisdictions. Guided by CFIR and DOI, Chapter 2 provided an integrated understanding of how structural determinants influence PCDI implementation. The chapter examined related outcomes, including awareness, access, uptake, adherence, and persistence. CFIR clarified the relevance of contextual domains that shape implementation. These domains include intervention characteristics, the outer setting, the inner setting, individual characteristics, and implementation processes (Damschroder et al., 2009). DOI emphasized attributes that influence the

spread of prevention strategies across social systems. These attributes include relative advantages, compatibility, complexity, trialability, and observability (Rogers, 2003). Together, CFIR and DOI established the conceptual foundation for examining relationships between community context and PCDI.

The review of social determinants highlighted the importance of cumulative community vulnerability as measured by the SVI. The SVI captures dimensions related to poverty, race and ethnicity, disability, housing, transportation, and language (CDC, 2022). Evidence consistently indicated that higher social vulnerability was associated with lower PCDI. Structural racism, medical mistrust, and stigma emerged as persistent barriers to engagement. In contrast, culturally responsive strategies, strong social networks, and peer supported interventions were associated with improved participation and continuity.

The review of political determinants indicated that Medicaid expansion, provider authority, telehealth reimbursement, inclusive governance, and nondiscrimination protections were associated with stronger PCDI (Raifman et al., 2019). Restrictive policies, unstable funding, and limited public health infrastructure were associated with lower awareness, reduced service access, and diminished continuity. Leadership representation and provider preparedness further shaped whether PCDI was trusted, accessible, and effectively delivered within communities.

The review of economic determinants indicated that medication costs, laboratory fees, visit requirements, and insurance status remain significant barriers for uninsured and underinsured individuals (Clement et al., 2019). Jurisdictions with supportive financing

mechanisms, streamlined payment pathways, and patient assistance programs demonstrated stronger initiation and persistence. Economic modeling studies suggest that scaling PCDI is cost effective over time. Programs require sustained early investment to maintain reach and long-term impact (Nash et al., 2019).

Across determinant domains, the literature consistently indicated that social, political, and economic factors exert cumulative and interacting influences on PCDI. Stigma had greater impact in jurisdictions characterized by restrictive policies or high-cost burdens. Medicaid expansion was most effective when paired with community trust and adequate resources. Jurisdictions that combined supportive legislation, stable funding, and culturally responsive program design consistently demonstrated stronger performance across PCDI indicators.

Chapter 2 established that variation in PCDI across the 47 EHE jurisdictions is driven by the combined and interacting effects of social, political, and economic determinants. This synthesis provided a clear conceptual pathway linking contextual forces to measurable PCDI outcomes. Chapter 3 describes the research design, data sources, inclusion and exclusion criteria, and statistical methods used to examine associations between determinant domains and PCDI across the 47 U.S. EHE jurisdictions.

Chapter 3: Research Method

Chapter 3 describes the research design, methodological framework, and analytical procedures used to examine how social, political, and economic determinants influence PCDI across the 47 EHE jurisdictions in the United States. This chapter outlines the quantitative meta-analysis conducted to synthesize evidence on factors associated with PCDI, using established statistical procedures to integrate structural determinants. PRISMA 2020 guidelines for transparent reporting, risk-of-bias assessment, and reproducibility were followed in this meta-synthesis (Page et al., 2021). Egger et al. (1997) presented safeguards against publication bias, and Duval and Tweedie (2000) explained the trim-and-fill method.

Damschroder's CFIR guided the study, and Rogers's DOI integrated theory provided a structure for analyzing contextual and organizational determinants relevant to PCDI. DOI complemented CFIR by conceptualizing how innovations diffuse through social systems and by identifying attributes that influence adoption. This integrated framework has been applied in HIV prevention and PrEP implementation research to explain multi-level variation in awareness, access, uptake, adherence, and persistence. The methodological approach for this dissertation supported the examination of four hypotheses:

$H_0 1$: stated that there is no statistically significant association between social determinants and PCDI across the 47 EHE jurisdictions.

$H_0 2$: stated that there is no statistically significant association between political determinants and PCDI across the 47 EHE jurisdictions.

$H_0$3 stated that there is no statistically significant association between economic determinants and PCDI across the 47 EHE jurisdictions.

$H_0$4 stated that there are no statistically significant differences in the social, political, or economic determinants of PCDI across the 47 EHE jurisdictions. The corresponding alternative hypotheses proposed statistically significant associations for each domain of determinants.

Chapter 3 details the research design and rationale, methodological procedures, inclusion and exclusion criteria, sampling strategy, data extraction matrix, effect size selection, statistical model specifications, heterogeneity assessment, and evaluation of threats to validity. Together, these components establish the methodological foundation for interpreting the quantitative results presented in Chapter 4 and for discussing the implications in Chapter 5.

Research Design and Rationale

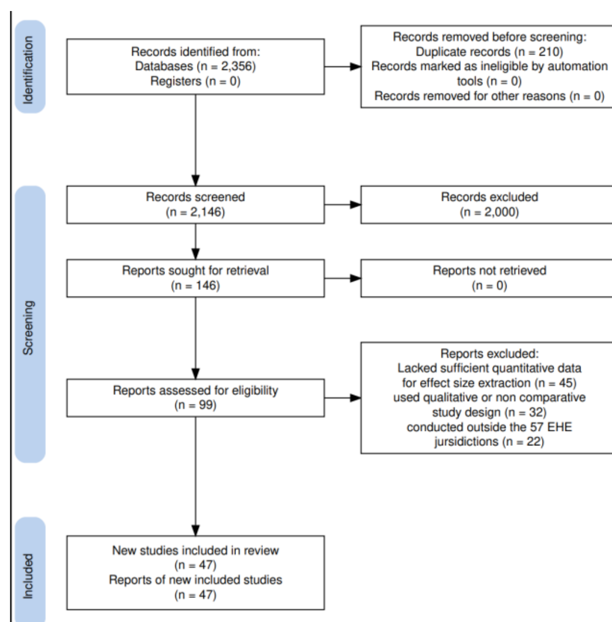
This dissertation employed a quantitative meta-analytic design that combined fixed- and effects modeling to synthesize findings across multiple quantitative studies (Borenstein et al., 2021; Higgins et al., 2022). The meta-synthesis aggregated peer-reviewed studies on the social, political, and economic determinants and their associations with PCDI to estimate overall effect sizes and confidence intervals, and to assess heterogeneity. These analytic procedures align with best practices for quantitative synthesis in public health research, particularly for understanding the true association between the determinant and PCDI.

PRISMA 2020 protocol ensured transparency, reproducibility, and bias reduction

(Moher et al., 2015; Page et al., 2021). Following the PRISMA guidelines strengthened the methodological rigor and supported standardized reporting, thereby improving validity through structured screening of eligibility assessments and bias appraisal (Higgins & Green, 2011; Sterne et al., 2016). Please see the PRISMA flow diagram (Figure 2) illustrates the sequence of study selection, including identification, screening, eligibility, and inclusion, and reflects the relationship between social, political, and economic determinants of PCDI.

Figure 2

PRISMA Flow Diagram



Note. Adapted from PRISMA 2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimized digital transparency and Open Synthesis (Haddaway et al., 2021).

Methodology

Population and Sampling

The target population for this meta-analysis consisted of peer-reviewed quantitative studies published between 2007 and 2024 that examined associations between social, political, and economic determinants and PCDI across the 47 U.S. EHE jurisdictions. These jurisdictions are characterized by high HIV incidence and persistent structural disparities in prevention access and healthcare delivery (CDC, 2021; Fauci et al., 2019). Prior research conducted within these regions has documented inequities related to structural racism, geographic isolation, and fragmented health systems that influence HIV prevention outcomes (Agénor et al., 2021; Bailey et al., 2017; Sullivan et al., 2024).

A total of 2,356 records were identified through database searches. After removing 210 duplicate records, 2,146 titles and abstracts were screened. Of these, 146 reports were retrieved for full-text review, and 99 were assessed for eligibility. Forty-seven studies met the inclusion criteria and were incorporated into the final meta-analysis, consistent with PRISMA-based screening procedures commonly used in implementation and HIV prevention research. Studies were excluded if they lacked sufficient quantitative data for effect-size extraction, employed exclusively qualitative or non-comparative designs, or were conducted outside the 47 EHE jurisdictions.

The meta-analytic design was appropriate for the study’s purpose because individual investigations of PCDI vary substantially in population characteristics, implementation settings, and policy environments. The final analytic dataset comprised

47 studies, with a combined sample of 46,450 participants. Each study examined at least one determinant domain, social, political, or economic, and reported quantitative measures related to PCDI.

The studies included represented diverse populations across the 47 EHE jurisdictions. Study samples included adolescents and adults, as well as populations disproportionately affected by HIV, including men who have sex with men, transgender women, Black women, individuals who inject drugs, and racially and ethnically minoritized groups. Studies also included healthcare providers, such as physicians, pharmacists, and nurses, as units of analysis (Andriano et al., 2022; Blackstock et al., 2021, Walters et al., 2017). Study settings included community clinics, federally qualified health centers, public health departments, academic medical centers, mobile PrEP units, and pharmacy-led PrEP programs (Casey et al., 2023; Coleman et al., 2021; Vanhamel et al., 2020).

Procedures for Recruitment, Participation, and Data Collection

This meta-analysis employed the PICOS framework to enhance methodological transparency, replicability, and rigor (Borenstein et al., 2021; see Table 2). Recruitment referred to the systematic identification, screening, and inclusion of eligible quantitative studies rather than enrollment of individual participants, as the analysis relied exclusively on secondary published data (Cooper, 2016; Liberati et al., 2009; Lipsey & Wilson, 2001).

The participants captured demographic and provider populations represented across included studies. These populations served as the units of analysis through which

associations between structural determinants and PCDI outcomes were examined. End-user populations included men who have sex with men, transgender women, Black women, cisgender women who inject drugs, rural residents, and racial and ethnic minority groups disproportionately impacted by HIV burden (Bailey et al., 2021; Elopre et al., 2017; Evans et al., 2022; Willie et al., 2019). Healthcare providers, including physicians, pharmacists, nurse practitioners, and clinical staff engaged in PrEP counseling and prescribing, were treated as study populations rather than outcome measures (O'Byrne et al., 2021; Petroll et al., 2017; Pleuhs et al., 2020; Vanhamel et al., 2022).

The interventions domain encompassed three determinant categories influencing PCDI. Social determinants included stigma, cultural norms, education, social vulnerability, and community support networks (Bailey et al., 2017; Rousseau et al., 2021; Scribner et al., 2017). Political determinants included structural policy factors such as Medicaid or ACA expansion status, HIV criminalization laws, telehealth parity, and pharmacy or nursing prescribing authority (Agénor et al., 2021; Casey et al., 2023; Scott et al., 2023). Economic determinants were operationalized using indicators of PrEP cost, affordability, insurance coverage, access to subsidies, and retention (Coleman et al., 2021; Hillis et al., 2020; Schackman et al., 2015).

The comparisons domain reflected analytical contrasts across studies, including Medicaid expansion versus non-expansion states, rural versus urban jurisdictions, insured versus uninsured populations, and high versus low SVI strata (Bell & Owens-Young, 2020; Gant et al., 2023; Johnson et al., 2024; Sullivan et al., 2019). The outcomes domain

for PCDI included quantitative indicators of PrEP awareness, uptake, adherence, and persistence. Additional outcomes described characteristics of PrEP delivery models, including provider type and the presence of nurse-led or community-based programs.

The study design domain included RCTs, cohort studies, cross-sectional surveys, and retrospective analyses that reported or permitted extraction of an effect size with corresponding variance estimates (Borenstein et al., 2021; Cohen, 2013; Higgins et al., 2022). Although RCTs were eligible, most included studies employed observational designs, reflecting the nature of real-world implementation research.

Table 2

PICOS Definitions and Operationalization

PICOS Element	Operational Definition	Measurement / Quantitative Indicators	Representative Sources
Participants (P)	Individuals or providers represented in studies conducted within 47 EHE jurisdictions.	Men who have sex with men, transgender women, cisgender women who inject drugs, racial and ethnic minorities, and providers (physicians, pharmacists, nurses).	Walters et al., 2017; Andriano et al., 2022; O'Byrne et al., 2021
Interventions / Determinants (I)	Structural determinants affecting PrEP care delivery.	Social determinants (stigma, education, housing instability, SVI); Political determinants (Medicaid expansion, telehealth parity, prescribing authority); Economic determinants (cost, insurance coverage, public funding levels).	Bailey et al., 2017 ; Casey et al., 2023 ; Coleman et al., 2021
Comparisons (C)	Contextual contrasts are used to evaluate determinant effects.	Medicaid vs. non-Medicaid states, rural vs. urban counties, high vs. low SVI scores, insured vs. uninsured participants.	Sullivan et al., 2019; Bell & Owens-Young, 2020
Outcomes (O)	Quantitative indicators of PCD innovation.	PrEP awareness, uptake, adherence, retention, PrEP Providers	Nunn et al., 2017; Nosyk et al., 2020
Study Design (S)	Eligible quantitative méthodologies for inclusion.	Randomized controlled trials, cohort, cross-sectional, and retrospective analyses reporting effect sizes (Cohen's d, Hedges' g, odds ratios).	Higgins et al., 2022; Borenstein et al., 2021

Social determinants were operationalized using continuous or categorical

indicators such as stigma scores, education level, income brackets, and SVI ratings, which capture cumulative socioeconomic and demographic disadvantage (Bailey et al., 2017; Chandler et al., 2020; Eger et al., 2022; Krieger et al., 2020). Political determinants were defined through binary, ordinal, or categorical policy variables, including Medicaid expansion status, HIV criminalization statutes, prescriptive authority laws, and the presence of telehealth reimbursement or pharmacy-based PrEP protocols (Adams et al., 2018; Baugher et al., 2021; Coleman et al., 2023; Sullivan & Siegler, 2018). Economic determinants were quantified using indicators such as average monthly PrEP medication cost, insurance coverage, access to subsidies, and per-capita state- or federal HIV prevention funding (Coleman et al., 2021; Peebles et al., 2021; Sun et al., 2022; Whiteside et al., 2024).

These operational definitions created standardized coding criteria for extraction and increased cross-study comparability by ensuring that constructs were measured consistently across heterogeneous research designs (Higgins et al., 2022; Lipsey & Wilson, 2001; Roche et al., 2021). The representation of diverse participant groups and varying jurisdictional contexts strengthened ecological validity by incorporating structural, geographic, and policy-driven variability that characterizes PCDI in real-world implementation settings (Evans et al., 2022; Johnson et al., 2024; Ransome et al., 2020). This diversity also enabled analyses to examine how differences in social context, policy structure, and economic resource allocation influence PCDI (Gant et al., 2023; Ortblad et al., 2020; Sharpe et al., 2023).

A detailed inventory of all 47 included studies, including population

characteristics, determinants, sample sizes, outcomes, and extracted effect sizes, is provided in Appendix A (refined dataset). This appendix documents the quantitative inputs used to construct the meta-analytic models and ensures complete transparency and reproducibility of study selection, coding, and data synthesis (Moher et al., 2015; Page et al., 2021).

Meta-Analytic Model, Effect Size, and Heterogeneity

The primary effect-size metric used in this meta-analysis was the standardized mean difference (Hedges' g), which corrects for small-sample bias. When studies reported dichotomous outcomes, effect estimates were converted to standardized mean differences using established transformation methods to ensure comparability across analyses.

Effects models were employed as the primary analytic approach. This model was selected a priori due to anticipated heterogeneity across study populations, jurisdictions, implementation settings, and study designs. Fixed-effect models were computed for comparison but were not emphasized in the interpretation, as the assumption of a single common effect was deemed inappropriate.

Statistical heterogeneity was assessed using the I^2 statistic and Cochran's Q test to quantify between-study variability beyond chance. Given the diversity of the studies included, the assessment of heterogeneity informed both model selection and interpretation. Subgroup analyses and meta-regression models were conducted to explore sources of heterogeneity, including variation by determinant domain, population type, and jurisdictional characteristics, where sufficient studies were available.

Risk of Bias and Study Quality Assessment

Risk of bias and study quality were evaluated using formal appraisal tools appropriate to the study design (Higgins et al., 2011). Nonrandomized and observational studies were assessed using the ROBINS-I tool (Sterne et al., 2016). Quality appraisal was conducted to inform interpretation rather than to determine whether studies were excluded (Higgins et al., 2011).

All eligible studies meeting the inclusion criteria were retained in the primary analyses regardless of quality rating (Higgins et al., 2011). Study weights were determined using inverse variance methods rather than quality scores (Higgins et al., 2011; Reitsma et al., 2009). Sensitivity analyses were conducted to assess whether pooled effect estimates were influenced by study quality or methodological characteristics (Higgins et al., 2011).

Operational Definitions and Coding Procedures

Operational definitions were applied consistently to support standardized coding across studies. Social determinants were operationalized using continuous or categorical indicators such as stigma scores, education level, income categories, and SVI ratings (Bailey et al., 2017; Eger et al., 2022; Krieger et al., 2020). Political determinants were defined using policy indicators, including Medicaid expansion status, HIV criminalization statutes, prescriptive authority laws, and telehealth reimbursement policies (Coleman et al., 2023; Sullivan & Siegler, 2018). Economic determinants were quantified using indicators such as the cost of PrEP medication, insurance coverage,

access to subsidies, and state- or federal-level HIV prevention funding (Coleman et al., 2021; Peebles et al., 2021).

A detailed inventory of all 47 included studies, including population characteristics, determinant measures, sample sizes, outcomes, and extracted effect sizes, is provided in Appendix A to support transparency and reproducibility (Moher et al., 2015; Page et al., 2021).

Search Strategy and Data Collection Procedures

A comprehensive search strategy was developed to identify eligible peer-reviewed studies that examined social, political, and economic determinants influencing PCDI across the 47 EHE jurisdictions in the U.S. Electronic searches were conducted across the following databases: PubMed, Scopus, Embase, and CINAHL. To ensure comprehensive coverage, additional records were identified through Google Scholar, CDC HIV Surveillance Reports, and the National HIV Behavioral Surveillance System. Database selection was based on scope, indexing of public health and behavioral research, and inclusion of epidemiology, implementation, and innovative PrEP-related studies.

The search syntax was constructed using Medical Subject Headings (MeSH) and keyword terms, along with Boolean operators and truncation, to capture variation in terminology across databases. Each search string was adapted to the indexing and syntax requirements of the respective database. The general Boolean framework was designed to identify studies addressing social, political, and economic determinants of PCDI.

An example of the Boolean search structure used across databases is shown ("pre-exposure prophylaxis" OR PrEP) AND ("care delivery" OR "service delivery" OR implementation OR innovation) AND (Social determinants) OR stigma OR "social vulnerability index." OR (SVI) OR (political determinants) OR policy OR "Medicaid expansion." OR “ACA expansion.” OR "prescriber authority" OR (economic determinants) OR cost OR insurance OR reimbursement OR "financial assistance."

Search terms were tested iteratively to maximize sensitivity and precision (Borenstein et al., 2021; Valentine et al., 2010). Filters were applied to limit retrievals to peer-reviewed journal articles, English-language publications, and human subjects research (Liberati et al., 2009; Higgins et al., 2022). The reference lists of all included studies were manually reviewed to identify additional eligible articles not captured in the operational Table 2.

All retrieved citations were imported into Microsoft Excel 2023 for reference management and duplicate removal. After deduplication, the remaining unique records were retained in Excel for tracking during the screening process. The Excel spreadsheet documented the following fields for each record: database source, author(s), publication year, title, journal, abstract summary, inclusion or exclusion decision, and reviewer notes. A detailed log of inclusion decisions was maintained to ensure reproducibility and auditability.

For each study meeting eligibility criteria, quantitative data were first extracted into Microsoft Excel using a standardized data extraction template and then imported into

SPSS v30 for analysis. The following variables were collected: study identification, author, publication year, and journal; methodological characteristics; study design; sample size; setting; and population type.

Independent variables were recorded as operationalized indicators of social, political, and economic determinants, such as stigma index scores, SVI rankings, Medicaid expansion status, telehealth policies, cost measures, and insurance coverage percentages (Bailey et al., 2021; Casey et al., 2023; Coleman et al., 2021; Eger et al., 2022; Peebles et al., 2021). Two independent reviewers extracted all quantitative data, and cross-validation was conducted to minimize transcription error and enhance reliability (Higgins et al., 2022; Liberati et al., 2009). Any discrepancies were reconciled through discussion (Borenstein et al., 2021; Page et al., 2021).

Data Analysis Plan

The data analysis plan for this study was developed to ensure methodological rigor, theoretical alignment, and transparency in evaluating how social, political, and economic determinants influence PCDI across the 47 U.S. EHE jurisdictions. The analytic strategy adhered to PRISMA 2020 and PICOS guidelines for quantitative synthesis (Higgins et al., 2022; Page et al., 2021). Analyses were grounded in an integrated theoretical model combining CFIR and DOI. This integration guided interpretation of findings across social, political, and economic determinants and emphasized how contextual and systemic forces interact to influence PCDI (Damschroder et al., 2009; Flessa & Huebner, 2021; Klaic et al., 2022; Nilsen & Bernhardsson, 2019;

Rogers, 2003).

Effect Size Estimation

The primary effect size metric used across all analyses was the standardized mean difference, expressed as Hedges' g. This metric was selected because it allows comparison across studies reporting outcomes on different scales and corrects for small sample bias (Borenstein et al., 2021). PCDI outcomes were extracted as continuous or dichotomous variables and converted to standardized mean differences to ensure consistency across analyses (Higgins & Thompson, 2002). When studies reported dichotomous outcomes, effect estimates such as odds ratios or risk ratios were converted to standardized mean differences using established transformation procedures (Cooper, 2016; Lipsey & Wilson, 2001). All effect sizes were coded so that positive values reflect stronger or more favorable PCDI outcomes.

Confidence intervals for all effect size estimates were calculated using standard inferential procedures. When studies reported an effect size and its standard error, 95% confidence intervals were computed using the formula $CI = ES \pm 1.96 \times SE$. When standard errors were not directly reported, values were reconstructed by converting reported p values to corresponding Z statistics and applying the formula $SE = ES \div Z$. This approach ensured consistent estimation of precision across studies using different reporting formats. It also allowed comparable confidence intervals to be reported for all pooled and subgroup estimates.

Variable Coding and Moderators

Independent variables represented social, political, and economic determinants and were operationalized using quantitative indicators extracted from the included studies, as summarized in Tables 1 and 2. Social determinants included measures of stigma, education, community engagement, social vulnerability, and peer or network influences (Andriano et al., 2022; Walters et al., 2017). Political determinants included Medicaid and ACA expansion status, HIV criminalization laws, telehealth parity policies, provider scope-of-practice regulations, and public health funding allocations (Baugher et al., 2021; Casey et al., 2023; Riley et al., 2023; Scott et al., 2023; Sullivan & Siegler, 2018). Economic determinants included medication costs, insurance coverage, affordability, access to financial assistance, and overall healthcare expenditures (Crooks et al., 2023; Eichenwald et al., 2024; Peebles et al., 2021; Srikanth et al., 2022; Whiteside et al., 2024).

Moderator variables, including publication year, jurisdiction region, and population category, were coded to explore contextual variation in effect sizes (Ransome et al., 2020; Rolle et al., 2017; Sullivan et al., 2021). Moderator analyses were conducted only when a sufficient number of studies were available, with a minimum threshold of ten studies per moderator. To reduce the risk of overfitting, meta-regression models were limited to one moderator per model.

Meta-Analytic Models and Heterogeneity

All analyses were conducted using SPSS v30 (IBM Corp., 2023). Pooled effect

sizes were estimated using meta-analytic effects models with inverse-variance weighting, allowing studies to contribute proportionally based on estimate precision (Borenstein et al., 2021; Hedges & Vevea, 1998). The use of effects models was appropriate given anticipated variability across study populations, implementation settings, and policy contexts within the 47 EHE jurisdictions.

Statistical heterogeneity was evaluated using Cochran's Q, I^2, and H^2 indices (Higgins & Thompson, 2002; Higgins et al., 2022). Consistent with established guidelines, I^2 values greater than 50 percent were interpreted as indicating substantial heterogeneity (Borenstein et al., 2021; Page et al., 2021). When evidence of heterogeneity was observed, subgroup analyses and meta-regression models were conducted to assess whether variability in effect sizes was associated with determinant domain, population subgroup, jurisdictional context, or study period.

Publication Bias, Validity, and Reliability

Publication bias was evaluated using complementary visual and inferential methods. Funnel plots were inspected for asymmetry, Egger's regression test was used to assess small study effects, and the Duval and Tweedie trim and fill procedure was applied to estimate the potential influence of missing studies on pooled effect sizes (Duval & Tweedie, 2000; Egger et al., 1997; Sterne et al., 2011; Sterne et al., 2016). Together, these approaches strengthened confidence in the robustness of synthesized estimates (Borenstein et al., 2021; Viechtbauer, 2010).

Validity and reliability were maintained throughout all analytic stages. Internal

validity was supported through consistent application of inclusion criteria, dual reviewer verification of extracted data, and adherence to PRISMA 2020 standards (Liberati et al., 2009). Construct validity was reinforced by aligning all variable definitions with the integrated CFIR and DOI framework. Statistical conclusion validity was strengthened through appropriate effect size weighting, heterogeneity testing, and bias correction procedures (Borenstein et al., 2021; Higgins et al., 2022). External validity was enhanced by inclusion of multiple quantitative study designs, supporting generalizability across diverse public health and clinical contexts (Sedgwick, 2014; Touya et al., 2022; Vanhamel et al., 2022).

Ethical Procedures

This study relied exclusively on publicly available, secondary, de identified data sources and therefore qualified for exemption from human subjects review under 45 CFR 46.104(d)(4). This exemption applies to research involving existing data that are publicly accessible and recorded without identifiable private information (Emanuel et al., 2000; Resnik, 2018; U.S. Department of Health and Human Services [HHS], 2018).

Ethical approval was granted by the Walden University Institutional Review Board (IRB Approval #07-24-24-0514759), consistent with federal guidance for exempt research (HHS, 2018; National Commission for the Protection of Human Subjects, 1979). This classification ensured that the study met all requirements for minimal risk research involving secondary data while maintaining compliance with federal and institutional ethics standards.

Throughout the research process, the principles of honesty, transparency, and scholarly integrity guided all procedures (APA, 2017; Israel & Hay, 2006; Shamoo & Resnik, 2015). Data extraction, analysis, and reporting followed the ethical standards outlined in the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct (APA, 2017; Fisher, 2020; Knapp et al., 2013). Proper scholarly attribution was ensured by systematically citing all original authors, consistent with academic integrity requirements (Borenstein et al., 2021; Higgins et al., 2022; Moher et al., 2009; Page et al., 2021). Every analytic decision was documented to allow verification and reproducibility (Cooper, 2016; Lipsey & Wilson, 2001; Sedgwick, 2014).

Data confidentiality was inherently preserved because all datasets analyzed in this meta-analysis were publicly available and contained no identifiable confidential information. The study maintained methodological transparency and ethical accountability by documenting all stages of study identification, screening, and effect size extraction. Overall, the ethical framework guiding this research adhered to Walden University standards for responsible scholarship, data stewardship, and social responsibility (APA, 2017; Fisher, 2020; Shamoo & Resnik, 2015). The procedures implemented throughout this meta-analysis reflect the institutional mission of promoting evidence-based inquiry and contributing to social change through ethically sound research (Israel & Hay, 2006; Kass, 2001; Resnik, 2018).

Summary

Chapter 3 presented the methodological foundation for this quantitative meta-analysis examining how social, political, and economic determinants influence PCDI across the 47 U.S. EHE jurisdictions. The chapter described the research design, theoretical framework, data sources, search procedures, screening process, data analysis plan, and ethical considerations guiding the study. Together, these elements ensured methodological rigor, transparency, and alignment with the purpose of study, which was to quantify and interpret how social, political, and economic determinants influence PCDI.

The chapter presented a quantitative meta-analytic design that synthesized evidence from peer reviewed studies to estimate pooled effect sizes and assess variability in the associations between structural determinants and PCDI. PRISMA 2020 provided guidance for transparent reporting, bias reduction, and reproducibility throughout the systematic review and screening process.

The methodological approach was grounded in CFIR and DOI. CFIR guided the identification of contextual and organizational factors influencing PCDI. DOI emphasized attributes that influence diffusion and adoption patterns across social systems. Together, these frameworks supported interpretation of associations between determinant domains and PCDI in alignment with the study hypotheses.

The analysis evaluated four hypotheses. The chapter also detailed population and sampling frames, which included quantitative studies published between 2007 and 2024

that examined PCDI within the 47 EHE jurisdictions. A total of 47 studies met the inclusion criteria and contributed to the final analytic dataset. These studies represented diverse populations, settings, and policy environments across the 47 U.S. EHE jurisdictions. The PICOS framework guided eligibility determination, data extraction, and evaluation of methodological characteristics.

Data analysis procedures were described in detail, including effect size estimation, inverse variance weighting, fixed effects and effects modeling, and heterogeneity assessment using Q, I^2, and Tau^2 statistics. Moderator analyses and sensitivity procedures were used to explore variation across jurisdictions and study characteristics. Publication bias diagnostics, including funnel plot inspection, Egger regression, and trim and fill estimation, strengthened confidence in the pooled estimates.

Ethical procedures aligned with federal and institutional requirements for exempt secondary analysis using publicly available, de identified data. IRB approval was obtained, and all stages of study selection, coding, and analysis were conducted with transparency, reproducibility, and scholarly integrity.

Chapter 3 established the methodological foundation necessary to interpret the quantitative results that follow. This chapter supports the transition to Chapter 4, where the findings of the meta-analytic models and hypothesis testing are presented.

Chapter 4 presents the results of the quantitative meta-analysis examining how social, political, and economic determinants influence PCDI across the 47 EHE jurisdictions. The chapter reports findings of all four research questions.

Chapter 4: Results

The purpose of the quantitative meta-analysis was to examine the association between social, political, and economic determinants for PCDI across the 47 U.S. EHE jurisdictions. Guided by Damschroder's CFIR and Rogers's DOI theory, this dissertation applied an integrated meta-synthesis approach to evaluate how structural determinants influence PCDI. Social determinants were operationalized as structural and community-level indicators, including stigma, social support, housing stability, transportation access, and measures of the SVI. Political determinants were operationalized as policy and regulatory conditions, including Medicaid/ACA expansion status, prescriber authority, public health funding mechanisms, and related legislative environments. Economic determinants were assessed through indicators of PrEP access and affordability, which considered insurance coverage, cost-related barriers to PrEP, availability,

Chapter 4 presents empirical corresponds with relation to the four research questions. Quantitative meta-analyses were conducted to estimate pooled associations between each determinant domain and PCDI, while exploratory meta-regression analyses were employed to examine whether selected methodological characteristics were associated with variation in observed effect sizes across studies. This data collection was done to answer the following questions:

- RQ 1: Is there an association between social determinants of health and PCDI across the 47 EHE U.S. jurisdictions?
- RQ 2: Is there an association between political determinants and PCDI across the 47 EHE U.S. jurisdictions?

- RQ 3: Is there an association between economic determinants and PCDI across the 47 EHE U.S. jurisdictions?
- RQ 4: What is the strength and direction of the relationship between social, political, and economic factors combined and PCDI across the 47 EHE U.S. jurisdictions?

The chapter begins with descriptive statistics summarizing the characteristics of the included studies to contextualize the analytic sample (Borenstein et al., 2021; Page et al., 2021). Domain-specific pooled effect sizes and corresponding confidence intervals are presented for social, political, and economic determinants (Borenstein et al., 2021; Higgins et al., 2022). Following this, the results are accompanied by heterogeneity statistics that quantify between-study variability across jurisdictions, populations, and study designs (Higgins et al., 2022; Sterne et al., 2016). Exploratory moderator analyses are then reported to assess whether selected study-level characteristics are associated with residual heterogeneity in effect-size estimates (Borenstein et al., 2021; Higgins et al., 2022). Finally, publication bias and small-study effects are evaluated using complementary diagnostic approaches, including funnel plot inspection, trim-and-fill analysis, and regression-based tests (Borenstein et al., 2021; Page et al., 2021; Sterne et al., 2011; Sterne et al., 2016). The chapter concludes with a concise summary of the primary findings, which provides the foundation for interpretation, implications, and recommendations presented in Chapter 5.

Data Collection

Data collection for this meta-analysis followed a structured nine-step protocol outlined in Appendix C, designed to ensure rigor, reproducibility, and transparency in accordance with internationally recognized standards for systematic reviews and meta-analyses. This protocol was informed by the PRISMA guidelines for transparent study identification, screening, eligibility assessment, and synthesis (Liberati et al., 2009; Moher et al., 2009). The analytic plan was further guided by established statistical methods for assessing heterogeneity and weighting study-level estimates in meta-analysis (Higgins & Thompson, 2002). All analyses were implemented using SPSS v30.

A structured literature search was conducted through the Walden University Library across four electronic databases: PubMed, Embase, Google Scholar, and the Cochrane Library. Combined keywords and controlled vocabulary terms were applied using Boolean operators (AND, OR, NOT) to construct comprehensive search strings. Example search syntax included *HIV* AND *PrEP* AND *care delivery* AND "*social determinants*. Searches were restricted to studies conducted within the 47 U.S. EHE jurisdictions and published between 2007 and 2024.

Study screening and selection followed a two-stage process to balance sensitivity and specificity. The first stage involved title and abstract screening to remove duplicate and clearly irrelevant records. The second stage consisted of full-text review to assess methodological eligibility and data availability for meta-analytic inclusion. This two-pass

screening approach is consistent with best practices in systematic review methodology and is recommended to minimize selection bias and screening error (Liberati et al., 2009).

In accordance with PRISMA standards, the systematic review and meta-analysis were conducted to maximize transparency and reproducibility in study selection and data synthesis (Moher et al., 2009). The application of a predefined protocol, structured screening procedures, and standardized analytic methods reflects adherence to established methodological guidance and supports the reliability of the resulting pooled estimates.

Results

Descriptive Statistics

Descriptive statistics were derived from the 47 studies that met the final inclusion criteria. Publication years spanned 2007–2024, aligning with the period of accelerated PrEP research and implementation following the U.S. FDA's 2012 approval of emtricitabine/tenofovir (Truvada) for HIV prevention (Liu et al., 2014; Mayer et al., 2020). Across the pooled sample, the included studies comprised a total of 46,450 participants, with individual sample sizes ranging from 49 to 10,816 (*M* = 988.3, *SD* = 2,042).

The included studies reflected social, political, and economic determinants of PCDI across the 47 U.S. EHE jurisdictions. Populations represented included transgender persons, women who inject drugs, men who have sex with men, Black and Latino sexual-minority men, rural residents, and individuals with limited access to healthcare. Only four studies sampled PrEP providers (e.g., physicians, nurses, pharmacists), contributing institutional-level perspectives on PCDI.

Table 3 summarizes aggregated descriptive metrics, including sample size, publication year, effect-size distribution, and standard-error weighting. The mean observed effect size across studies was 1.07 (*SE* = 0.63; 95% *CI* [–0.17, 2.31]), with values ranging from –0.243 to 4.670. Reported *p* values ranged from .001 to .560 (*M* = .0328), indicating that a substantial proportion of studies reported statistically significant associations at the $p < .05$ threshold.

Table 3

Descriptive Statistics for Social, Political, and Economic Determinants for PCDI

Variable	*k*	Minimum	Maximum	Mean	SD	95% CI
Sample size	47	49	10,816	988.28	2,042	—
Effect size	47	–0.243	4.670	1.07	1.00	[–0.17, 2.31]
SE (weight)	47	0.0031	5.9500	0.63	1.00	—
Year	47	2007	2024	2019.68	3.00	—
p-value	47	0.0010	0.5600	0.0328	—	—

Note. *SD* and variance were computed using *N* (not N – 1). SE (weight) represents the study-level standard error used for effect-size weighting. P-values are reported as two-tailed when available. Analyses conducted in SPSS v30. The 95% confidence interval for the mean effect size was calculated as ES ± 1.96(SE).

The distribution of study designs is summarized in Table 4. Cohort studies accounted for the largest proportion (23.4%), followed by correlational and cross-sectional designs (10.6% each), randomized controlled trials (6.4%), and retrospective cohort studies and descriptive analyses (4.3% each). Studies that did not report or specify

a design were listed separately. The included studies comprised a range of study designs conducted.

Table 4

Distribution of Study Designs in Included Studies

Study design	Frequency	Percent
Cohort study	11	23.4
Correlational analysis	5	10.6
Cross-sectional study	5	10.6
Randomized controlled trial	3	6.4
Retrospective cohort	2	4.3
Descriptive analysis	2	4.3
Other designs (e.g., quasi-experimental, single arm)	9	19.1
Not reported/unspecified	10	21.3
Total	47	100.0

Note. Percentages may not total exactly 100 due to rounding. *SPSS v30*

Association Between Social Determinants and PCDI

The association between social determinants of health and PCDI was examined using an effects model across the 47 U.S. EHE jurisdictions. Social determinants were operationalized using continuous or categorical indicators, including stigma scores, housing stability, income level, social support metrics, and SVI ratings.

Study-specific estimates were converted to standardized mean differences (Hedges' *g*) using reported statistics. Corresponding standard errors were extracted or computed to assess estimate precision. Effect sizes were weighed using inverse variance and pooled using an effects model. Individual study estimates and the pooled effect size are displayed in the forest plot (Figure 3).

Across the 19 studies assessing social determinants, the pooled effects model yielded an effect size of 0.822 (SE = 0.280; p = .003; 95% CI [0.27, 1.37]), as shown in Figure 6. The pooled analytic sample contributing to this estimate was N = 18,632.

Subgroup analyses were conducted to estimate population-specific effects. Among studies focused on young Black men who have sex with men ($k = 5$; $N = 4{,}903$), the pooled effect size was $ES = 3.320$ ($SE = 0.444$; $p < .001$; 95% CI [2.45, 4.19]).

Studies examining African American populations ($k = 8$; $N = 7{,}845$) yielded a pooled effect size of $ES = 1.120$ ($SE = 0.449$; $p < .05$; 95% CI [0.24, 2.00]). Medicaid recipient populations ($k = 2$; $N = 1{,}961$) yielded a pooled effect size of $ES = 0.890$ ($SE = 0.260$; $p < .01$; 95% CI [0.38, 1.40]). In contrast, studies focused on Black women ($k = 4$; $N = 3{,}923$) yielded a pooled effect size of $ES = −0.410$ ($SE = 0.163$; $p < .05$; 95% CI [−0.73, −0.09]). For other subgroups, including Black sexual minority men, men who have sex with men more broadly, and transgender women, pooled estimates were near zero or accompanied by wide confidence intervals.

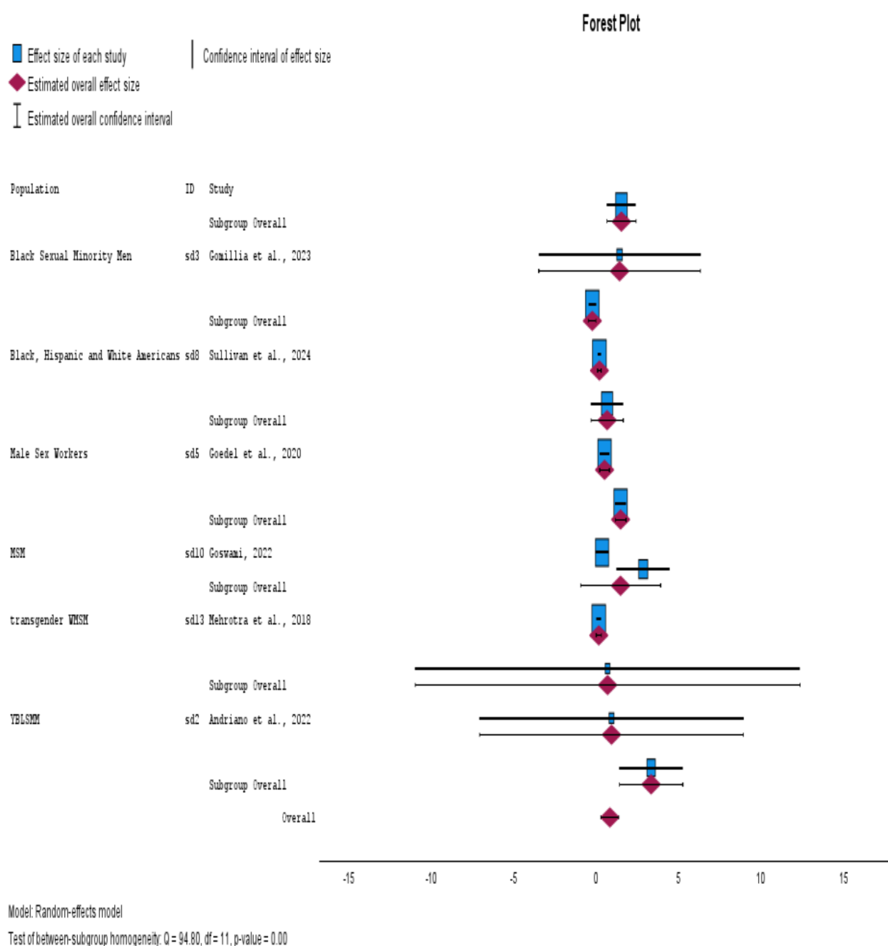
Table 5

Effect Sizes for Social Determinants and PCDI

Subgroup Category	Effect Size (ES)	SE	*p* value	95% CI	k	Total N
Within-domain pooled social determinants	0.822	0.280	.003	[0.27, 1.37]	19	18,632
Young Black MSM	3.320	0.444	< .001	[2.45, 4.19]	5	4,903
African Americans	1.120	0.449	< .05	[0.24, 2.00]	8	7,845
Black women	−0.410	0.163	< .05	[−0.73, −0.09]	4	3,923
Medicaid recipients	0.890	0.260	< .01	[0.38, 1.40]	2	1,961

Figure 3

Social Determinants Forest Plot



Association Between Political Determinants and PCDI

The second research question examined the association between political determinants and PCDI across the 47 U.S. EHE jurisdictions. Political determinants were operationalized using continuous or categorical indicators, including Medicaid expansion status, pharmacy prescribing authority, ACA related coverage provisions, telehealth reimbursement policies, criminalization statutes, and categorical public health funding

levels.

A total of 14 studies ($k = 14$) contributed to the meta-analysis, each reporting a quantitative association between at least one political determinant and a PCDI outcome. Study specific estimates were converted to standardized effect sizes and pooled using an effects model. As shown in Table 6, the pooled effects model yielded an effect size of 1.027 ($SE = 0.314$; $p = .001$; 95% CI [0.41, 1.64]), based on a pooled analytic sample of $N = 9{,}594$.

Subgroup analyses were conducted according to political determinant categories identified during data extraction. Medicaid expansion states yielded a pooled effect size of $ES = 2.114$ ($SE = 0.319$; $p < .001$; 95% CI [1.49, 2.74]), based on two studies ($k = 2$; $N = 1{,}272$). Pharmacy access and prescribing authority policies yielded a pooled effect size of $ES = 1.660$ ($SE = 0.378$; $p < .01$; 95% CI [0.92, 2.40]), based on one study ($k = 1$; $N = 1{,}091$). Jurisdictions with dedicated public health funding programs yielded a pooled effect size of $ES = 1.205$ ($SE = 0.360$; $p < .01$; 95% CI [0.50, 1.91]), based on one study ($k = 1$; $N = 1{,}433$).

Restrictive legal environments yielded a pooled effect size of $ES = -0.487$ ($SE = 0.240$; $p < .05$; 95% CI [−0.96, −0.02]), based on one contributing study ($k = 1$; $N = 1{,}091$).

Population specific subgroup analyses were also conducted. Among cisgender women, the pooled effect size was $ES = 2.180$ ($SE = 0.327$; $p < .001$; 95% CI [1.54, 2.82]), based on one study ($k = 1$; $N = 3{,}551$). Among nursing students and provider and nursing populations, the pooled effect size was $ES = 0.870$ ($SE = 0.352$; $p < .05$; 95% CI

[0.18, 1.56]), based on two studies ($k = 2$; $N = 1{,}156$). All subgroup estimates are summarized in Table 6.

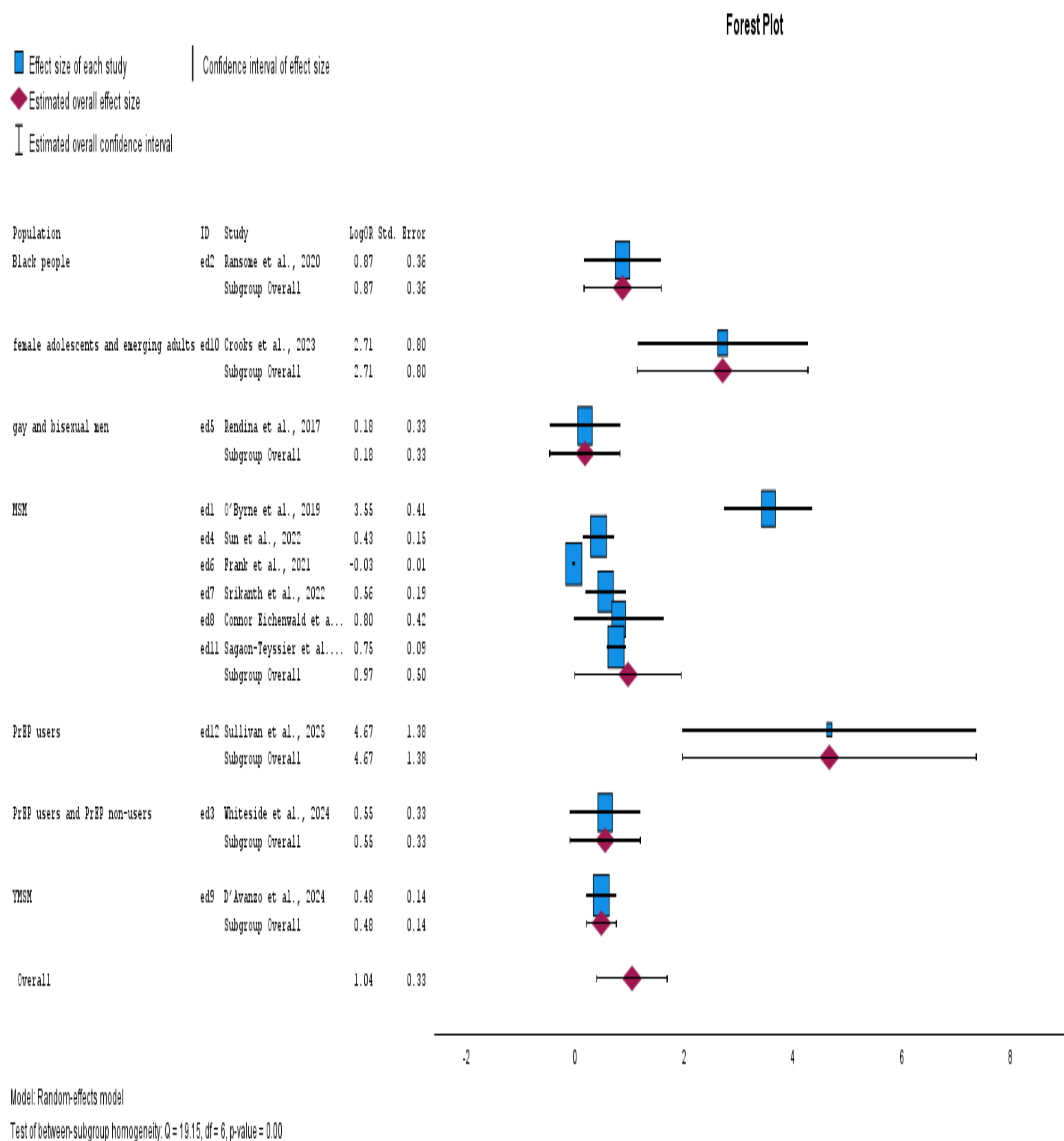
Table 6

Effect Sizes for Political Determinants and PCDI

Subgroup category	Effect size (ES)	SE	p value	95% CI	k	Total N
Within-domain pooled political determinants	1.027	0.314	.001	[0.41, 1.64]	14	9,594
Medicaid expansion states	2.114	0.319	< .001	[1.49, 2.74]	2	1,272
Pharmacy access policies	1.660	0.378	< .01	[0.92, 2.40]	1	1,091
Restrictive legal environments	−0.487	0.240	< .05	[−0.96, −0.02]	1	1,091
Public health funding programs	1.205	0.360	< .01	[0.50, 1.91]	1	1,433
Cisgender women	2.180	0.327	< .001	[1.54, 2.82]	1	3,551
Nursing students / Provider–Nursing	0.870	0.352	< .05	[0.18, 1.56]	2	1,156

Figure 4

Political Determinants Forest Plot



Association Between Economic Determinants and PCDI

The third research question examined the association between economic determinants and PCDI across the 47 U.S. EHE jurisdictions. Economic determinants were operationalized using indicators such as insurance status, PrEP medication costs, availability of financial assistance, income stability, and jurisdictional HIV prevention funding.

A total of 14 studies ($k = 14$) contributed to the meta-analysis, each reporting a quantitative association between at least one economic determinant and a PCDI outcome. Study specific estimates were converted to standardized effect sizes and pooled using an effects model. As shown in Table 7, the pooled effects model yielded an effect size of 0.492 ($SE = 0.203$; $p = .016$; 95% CI [0.09, 0.89]), based on a pooled analytic sample drawn from the included studies.

Subgroup analyses were conducted according to the economic determinant categories identified during data extraction. Pharmacy access programs yielded a pooled effect size of $ES = 0.843$ ($SE = 0.408$; $p < .05$; 95% CI [0.04, 1.65]), based on two studies ($k = 2$; $N = 169$). ACA and Medicaid expansion policies yielded a pooled effect size of $ES = 1.215$ ($SE = 0.365$; $p < .01$; 95% CI [0.50, 1.93]), based on two studies ($k = 2$; $N = 169$).

Population specific subgroup analyses were also conducted. Among Black women, the pooled effect size was $ES = -0.243$ ($SE = 0.118$; $p = .038$; 95% CI [−0.47, −0.01]), based on four studies ($k = 4$; $N = 1{,}437$). Among men who have sex with men, pooled estimates were $ES = 2.067$ ($SE = 0.293$; $p < .001$; 95% CI [1.49, 2.64]), based on

six studies ($k = 6$; $N = 181{,}192$). All economic subgroup estimates are summarized in Table 7.

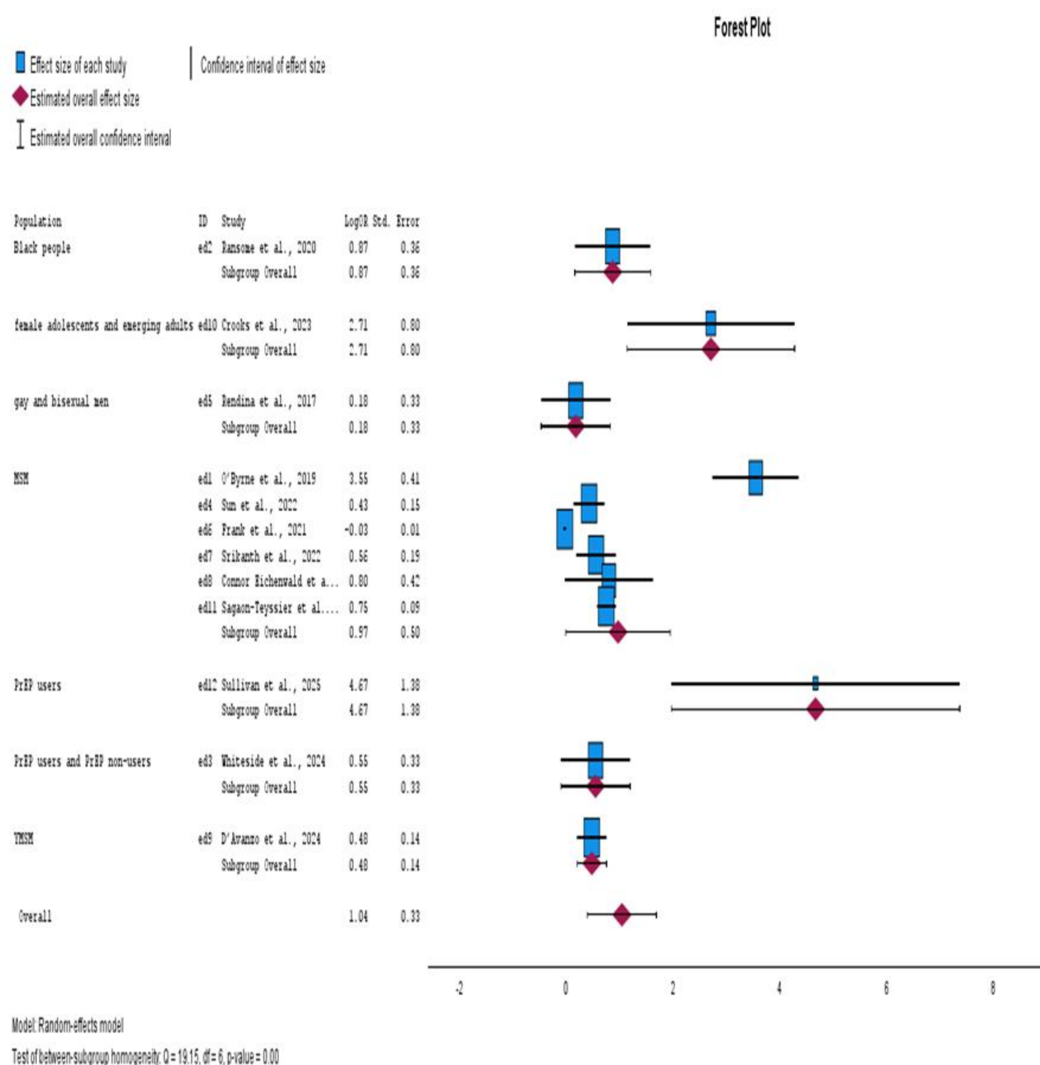
Table 7

Effect Sizes for Economic Determinants and PCDI

Subgroup Category	Effect Size (ES)	SE	*p* value	95% CI	*k*	*N*
Within-domain pooled economic determinants	0.492	0.203	.016	[0.09, 0.89]	14	*18,224*
Black women	−0.243	0.118	.038	[−0.47, −0.01]	4	*1,437*
Pharmacy access programs	0.843	0.408	< .05	[0.04, 1.65]	2	*169*
ACA/Medicaid expansion	1.215	0.365	< .01	[0.50, 1.93]	2	*169*
MSM populations	2.067	0.293	< .001	[1.49, 2.64]	6	*181,192*

Figure 5

Economic Determinants Forest Plot



Note. Each square represents the ES for an individual study, with its size proportional to study weight. Horizontal lines indicate confidence intervals. The diamond represents the pooled ES generated from the effects model.

Strength and Direction of Social, Political, and Economic Determinants and PCDI

The fourth research question evaluated the combined strength and direction of social, political, and economic determinants on PCDI across the 47 U.S. EHE jurisdictions. Determinant domains were jointly modeled to assess their combined association with PCDI. Each domain was represented by standardized effect sizes derived from study level associations using the same extraction and conversion procedures described in the analytic plan. Corresponding standard errors were calculated to quantify estimate precision. All estimates were synthesized using an effects model.

When social, political, and economic determinants were modeled jointly in a combined determinant model, the pooled effect size was −0.062 (SE = 0.003; $p < .001$; 95% CI [−0.067, −0.056]). The funnel plot displays the dispersion of observed study level effect sizes around the pooled combined estimate.

To contextualize the combined model, domain specific pooled estimates were examined independently. As summarized in Table 8, social determinants yielded a pooled effect size of ES = 0.822 (SE = 0.280; p = .003; 95% CI [0.27, 1.37]; k = 19; N = 18,632). Political determinants yielded a pooled effect size of ES = 1.027 (SE = 0.314; p = .001; 95% CI [0.41, 1.64]; k = 14; N = 9,594). Economic determinants yielded a pooled effect size of ES = 0.492 (SE = 0.203; p = .016; 95% CI [0.09, 0.89]; k = 13; N = 18,224).

These domain specific estimates were modeled independently and are summarized for comparison with the combined determinant model.

Table 8

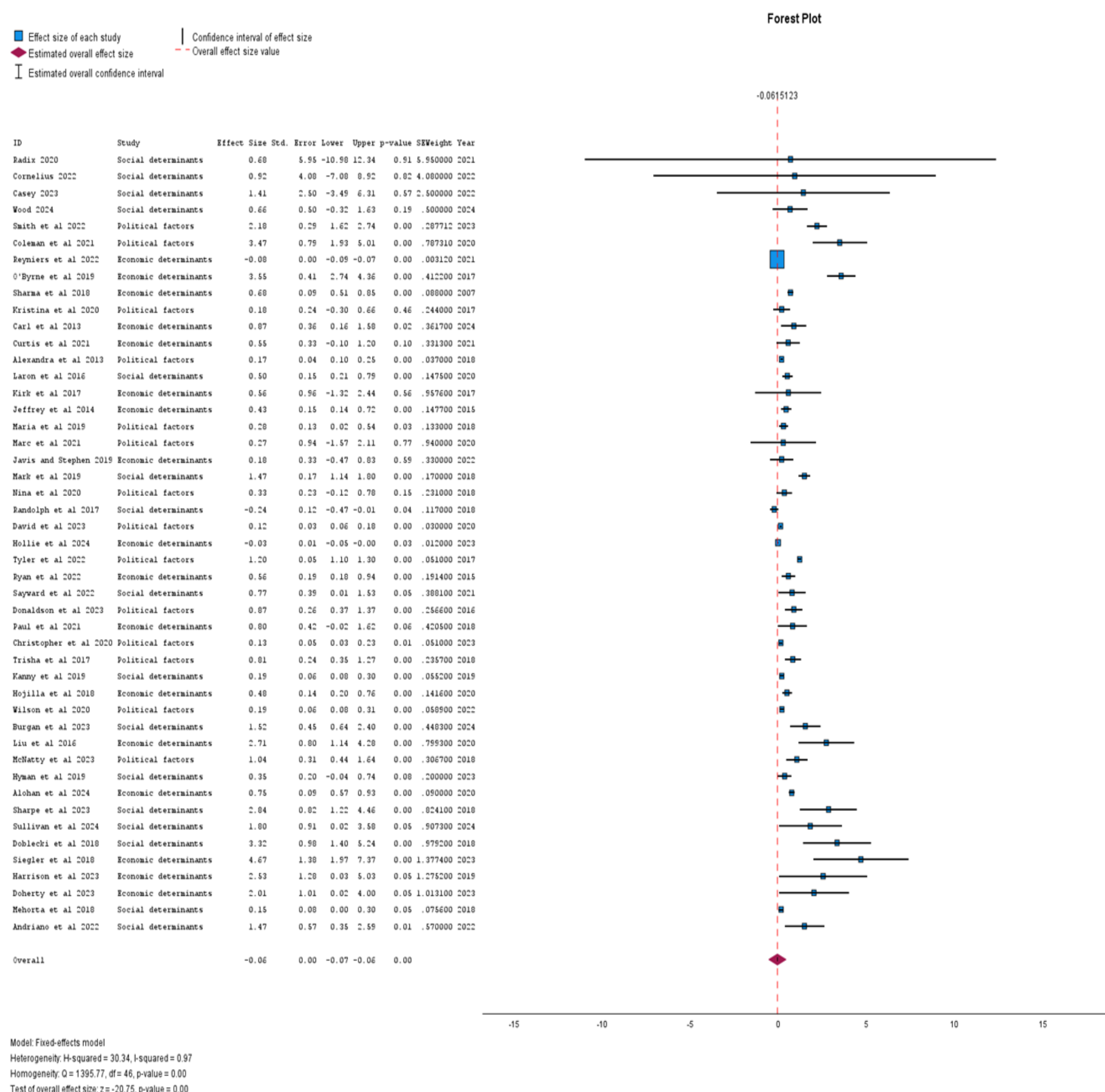
Pooled Effect Sizes for Social, Political, and Economic Determinants

Determinant domain	Effect Size (ES)	Standard Error	*p* value	95% CI lower	95% CI upper	*k*	*N*
Social	0.822	0.280	003	0.273	1.371	*19*	*18,632*
Political	1.027	0.314	.001	0.41	1.64	*14*	*9,594*
Economic	0.492	0.203	.016	0.09	0.89	*14*	*18,224*
Combined joint model	−0.062	0.003	< .001	−0.067	−0.056	*47*	*46,450*

Note. Social, political, and economic rows represent pooled associations estimated in separate domain-specific effects models. The combined joint model represents the net association among social, political, and economic determinants when they are modeled simultaneously.

Figure 6:

Forest Plot of Effect Sizes for Social, Political, and Economic Determinants of PCDI



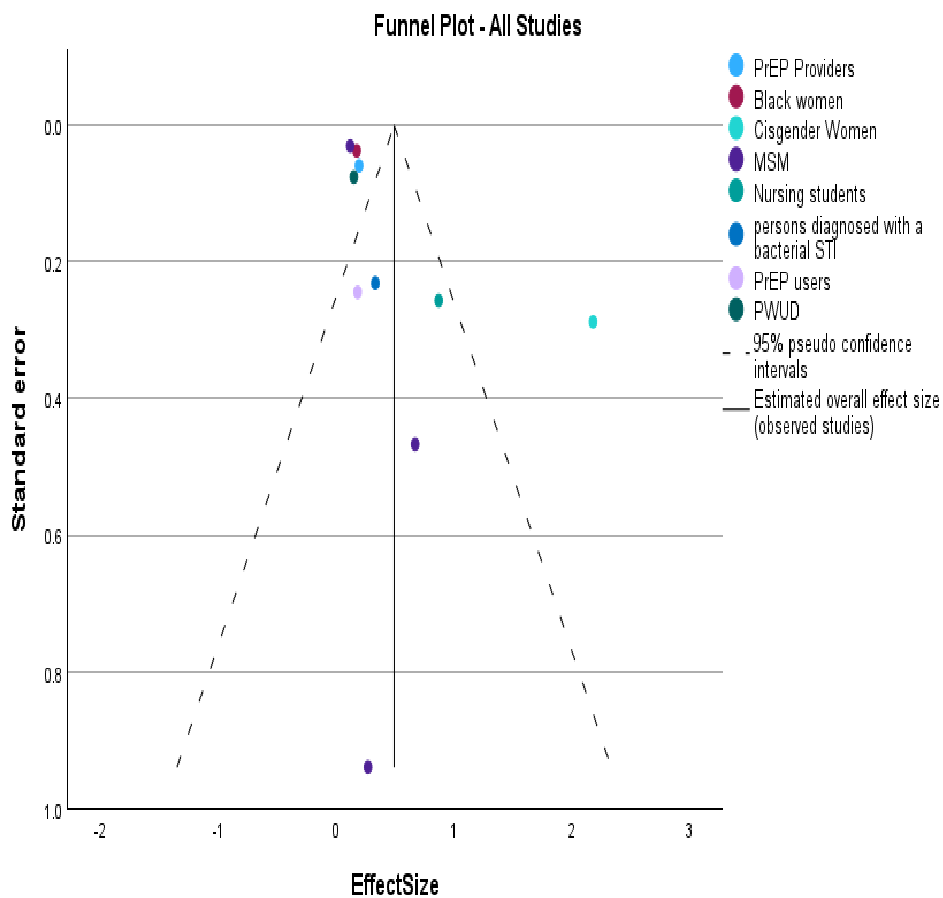
ID	Study	Effect Size	Std. Error	Lower	Upper	p-value	SEWeight	Year
Radix 2020	Social determinants	0.68	5.95	-10.98	12.34	0.91	5.950000	2021
Cornelius 2022	Social determinants	0.92	4.08	-7.08	8.92	0.82	4.080000	2022
Casey 2023	Social determinants	1.41	2.50	-3.49	6.31	0.57	2.500000	2022
Wood 2024	Social determinants	0.66	0.50	-0.32	1.63	0.19	.500000	2024
Smith et al 2022	Political factors	2.18	0.29	1.62	2.74	0.00	.287712	2023
Coleman et al 2021	Political factors	3.47	0.79	1.93	5.01	0.00	.787310	2020
Reyniers et al 2022	Economic determinants	-0.08	0.00	-0.09	-0.07	0.00	.003120	2021
O'Byrne et al 2019	Economic determinants	3.55	0.41	2.74	4.36	0.00	.412200	2017
Sharma et al 2018	Economic determinants	0.68	0.09	0.51	0.85	0.00	.088000	2007
Kristina et al 2020	Political factors	0.18	0.24	-0.30	0.66	0.46	.244000	2017
Carl et al 2013	Economic determinants	0.87	0.36	0.16	1.58	0.02	.361700	2024
Curtis et al 2021	Economic determinants	0.55	0.33	-0.10	1.20	0.10	.331300	2021
Alexandra et al 2013	Political factors	0.17	0.04	0.10	0.25	0.00	.037000	2018
Laron et al 2016	Social determinants	0.50	0.15	0.21	0.79	0.00	.147500	2020
Kirk et al 2017	Economic determinants	0.56	0.96	-1.32	2.44	0.56	.957600	2017
Jeffrey et al 2014	Economic determinants	0.43	0.15	0.14	0.72	0.00	.147700	2015
Maria et al 2019	Political factors	0.28	0.13	0.02	0.54	0.03	.133000	2018
Marc et al 2021	Political factors	0.27	0.94	-1.57	2.11	0.77	.940000	2020
Javis and Stephen 2019	Economic determinants	0.18	0.33	-0.47	0.83	0.59	.330000	2022
Mark et al 2019	Social determinants	1.47	0.17	1.14	1.80	0.00	.170000	2018
Nina et al 2020	Political factors	0.33	0.23	-0.12	0.78	0.15	.231000	2018
Randolph et al 2017	Social determinants	-0.24	0.12	-0.47	-0.01	0.04	.117000	2018
David et al 2023	Political factors	0.12	0.03	0.06	0.18	0.00	.030000	2020
Hollie et al 2024	Economic determinants	-0.03	0.01	-0.05	-0.00	0.03	.012000	2023
Tyler et al 2022	Political factors	1.20	0.05	1.10	1.30	0.00	.051000	2017
Ryan et al 2022	Economic determinants	0.56	0.19	0.18	0.94	0.00	.191400	2015
Sayward et al 2022	Social determinants	0.77	0.39	0.01	1.53	0.05	.388100	2021
Donaldson et al 2023	Political factors	0.87	0.26	0.37	1.37	0.00	.256600	2016
Paul et al 2021	Economic determinants	0.80	0.42	-0.02	1.62	0.06	.420500	2018
Christopher et al 2020	Political factors	0.13	0.05	0.03	0.23	0.01	.051000	2023
Trisha et al 2017	Political factors	0.81	0.24	0.35	1.27	0.00	.235700	2018
Kanny et al 2019	Social determinants	0.19	0.06	0.08	0.30	0.00	.055200	2019
Hojilla et al 2018	Economic determinants	0.48	0.14	0.20	0.76	0.00	.141600	2020
Wilson et al 2020	Political factors	0.19	0.06	0.08	0.31	0.00	.058900	2022
Burgan et al 2023	Social determinants	1.52	0.45	0.64	2.40	0.00	.448300	2024
Liu et al 2016	Economic determinants	2.71	0.80	1.14	4.28	0.00	.799300	2020
McNatty et al 2023	Political factors	1.04	0.31	0.44	1.64	0.00	.306700	2018
Hyman et al 2019	Social determinants	0.35	0.20	-0.04	0.74	0.08	.200000	2023
Alohan et al 2024	Economic determinants	0.75	0.09	0.57	0.93	0.00	.090000	2020
Sharpe et al 2023	Social determinants	2.84	0.82	1.22	4.46	0.00	.824100	2018
Sullivan et al 2024	Social determinants	1.80	0.91	0.02	3.58	0.05	.907300	2024
Doblecki et al 2018	Social determinants	3.32	0.98	1.40	5.24	0.00	.979200	2018
Siegler et al 2018	Economic determinants	4.67	1.38	1.97	7.37	0.00	1.377400	2023
Harrison et al 2023	Economic determinants	2.53	1.28	0.03	5.03	0.05	1.275200	2019
Doherty et al 2023	Economic determinants	2.01	1.01	0.02	4.00	0.05	1.013100	2023
Mehorta et al 2018	Social determinants	0.15	0.08	0.00	0.30	0.05	.075600	2018
Andriano et al 2022	Social determinants	1.47	0.57	0.35	2.59	0.01	.570000	2022
Overall		-0.06	0.00	-0.07	-0.06	0.00		

Note. Error bars represent 95% confidence intervals. The forest plot summarizes studies using an effects model with inverse variance weighting. Overall heterogeneity was substantial (Q = 1395.77, df = 46, p < .001; I^2 = 97.0%). The pooled combined effect size

was statistically significant ($Z = -20.75$; $p < .001$), with a 95% *CI* of [−0.068, −0.056].

Figure 7

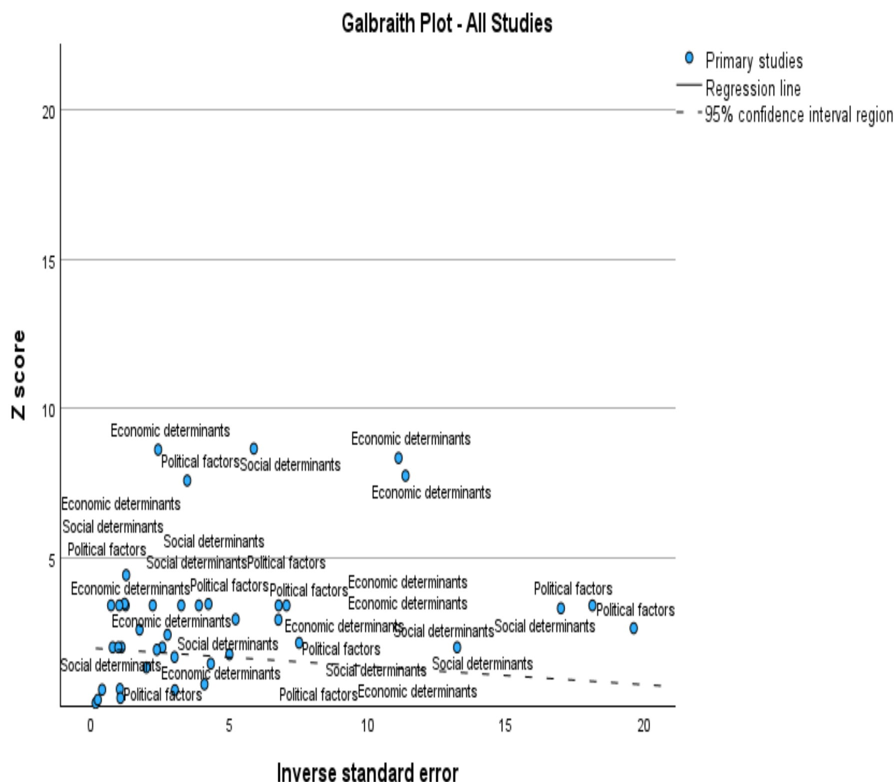
Funnel Plot of Effect Sizes and Standard Errors for the Combined Determinant Model



Note. Each point represents an individual study classified by its primary population, plotted against *SE*. Dashed lines represent pseudo 95% *CI*s. The vertical line indicates the pooled *ES*.

Figure 8

Galbraith Plot of Precision and Heterogeneity Across Studies Examining Social, Political, and Economic Determinants of PCDI



Note. Standardized effect sizes are plotted against inverse standard error. Deviation from the regression line reflects heterogeneity across included studies.

Multiple Regression and Residual Heterogeneity

Multiple meta-regression analyses were conducted as an exploratory assessment to examine whether selected study level characteristics were associated with variability in effect size estimates across the 47 included studies. Moderators included publication year, sample size, standard error, and inverse variance weights. Effect sizes were

regressed on these predictors using an effects meta-regression model with inverse variance weighting.

The regression intercept was statistically significant (*B* = 8.510, *SE* = 0.631; $p < .001$; 95% *CI* [7.27, 9.75]).

Standard error was statistically significantly associated with effect size (*B* = 5.094, *SE* = 0.395; $p < .001$; 95% *CI* [4.32, 5.87]). Sample size was also statistically significantly associated with effect size (*B* = 0.002, *SE* = 8.7×10^{-5}; $p < .001$; 95% *CI* [0.002, 0.002]). Inverse variance weighting demonstrated a statistically significant negative association with effect size (*B* = −4.671, *SE* = 0.144; $p < .001$; 95% *CI* [−4.95, −4.39]).

Publication was included as a categorical moderator, with earlier publication years serving as the reference category. Relative to this reference, studies published in 2018 (*B* = 13.814, *SE* = 0.474; $p < .001$; 95% *CI* [12.89, 14.74]) and 2019 (*B* = 20.540, *SE* = 0.688; $p < .001$; 95% *CI* [19.19, 21.89]) demonstrated differences in effect size magnitude.

Overall, the meta-regression identified statistically significant associations between selected study level characteristics and effect size variability.

Table 9

Meta-Regression Coefficients for Study-Level Moderators of Effect Size

Parameter	Coefficient (B)	Standard Error	***T***	*p* (2-tailed)	95% CI Lower	95% CI Upper
Intercept	8.510	0.6307	13.492	< .001	7.27	9.75
Standard Error (SE)	5.094	0.3952	12.890	< .001	4.32	5.87
Sample Size	0.002	8.7×10^{-5}	22.922	< .001	0.002	0.002
Inverse-Variance Weight	−4.671	0.1440	−32.440	< .001	−4.95	−4.39
Publication Year: 2018	13.814	0.4741	24.062	< .001	12.89	14.74
Publication Year: 2019	20.540	0.6879	29.859	< .001	19.19	21.89

Residual Random-Effects Heterogeneity Analysis

Model heterogeneity was substantial across the 47 included studies contributing to the meta-analysis. The combined determinant model yielded $I^2 = 95.1\%$ (95% *CI* [93.4%, 96.4%]), $H^2 = 20.491$, and $Q\ (44) = 901.584$, $p < .001$. The forest plot (Figure 6) displays wide dispersion of study-level effect estimates around the pooled combined effect size.

Residual heterogeneity was evaluated following the effects of meta-regression. The residual heterogeneity test was statistically significant ($Q\ (32) = 377.304$, $p < .001$). The residual I^2 value was 98.2% (95% *CI* [97.5%, 98.8%]).

Residual heterogeneity is illustrated in the Galbraith (radial) plot (Figure 8), which shows dispersion of standardized effect sizes relative to study precision, with multiple observations deviating from the regression line.

Overall, substantial heterogeneity remained across studies after adjustment for study-level moderators.

Risk of Bias

Risk-of-bias analyses were conducted to evaluate the stability of pooled effect-size estimates using multiple complementary approaches, including Egger's regression, trim-and-fill analysis, visual inspection of funnel plots, and assessment of the Galbraith plot. These methods are commonly used to assess potential publication bias and small-study effects in meta-analyses, particularly when effect-size estimates vary across studies (Egger et al., 1997).

Between-study heterogeneity was substantial across the 47 included studies. The combined determinant model produced $I^2 = 95.1\%$ (95% *CI* [93.4%, 96.4%]), $H^2 = 20.491$, and a statistically significant heterogeneity test ($Q(44) = 901.584$, $p < .001$), indicating that the majority of observed variability in effect sizes reflected true between-study differences rather than sampling error alone. Under conditions of substantial heterogeneity, the performance and interpretability of publication-bias detection methods may be attenuated (Higgins et al., 2003).

The trim-and-fill procedure identified no missing or imputed studies, and the adjusted pooled effect size was identical to the observed estimate, indicating no change in either the magnitude or direction of the pooled association following adjustment. Consistent with prior methodological work, trim-and-fill did not materially alter pooled estimates in this analysis, even in the presence of substantial heterogeneity (Peters et al., 2007). Visual inspection of the funnel plot further indicated approximate symmetry around the pooled effect size, with most studies distributed within expected variance limits.

In contrast, Egger's regression yielded a statistically significant interception (*B* = 8.510, *SE* = 0.631, *t* = 13.492, *p* < .001; 95% *CI* [7.27, 9.75]). Although this finding is conventionally interpreted as evidence of small-study effects, Egger's test is known to be sensitive to heterogeneity and systematic variation in study precision (Egger et al., 1997). Given the high I^2 value observed, this result is interpreted as suggesting possible small-study effects rather than definitive publication bias (Higgins et al., 2003).

Taking together the determinants and theory, the risk-of-bias diagnostics indicate that trim-and-fill adjustment did not materially alter pooled effect-size estimates, while Egger's regression suggests the possible presence of small-study effects in the context of substantial heterogeneity. Accordingly, pooled estimates should be interpreted with appropriate methodological caution, particularly with respect to generalizability, as effect sizes varied in magnitude across studies, populations, and jurisdictions (Li et al., 2016; Mavridis & Salanti, 2014; Stieb et al., 2021).

Summary

Chapter 4 presented the results of a quantitative meta-analysis examining associations between social, political, and economic determinants and PCDI across the 47 U.S. EHE jurisdictions. Evidence was synthesized from 47 eligible studies to estimate pooled effect sizes, assess heterogeneity, and evaluate variability across study populations, jurisdictions, and designs.

Descriptive analyses characterized the analytic sample, which included 46,450 participants from studies published between 2007 and 2024. Study characteristics, sample

sizes, and design features varied across the included literature. Effect sizes differed across studies and subgroups, and heterogeneity statistics indicated substantial between-study variability.

Domain-specific meta-analyses were conducted separately for social, political, and economic determinants. Each domain yielded a statistically significant pooled effect size when analyzed independently. Effect size magnitude and precision varied across studies and subgroups, and domain-specific results were summarized without adjustment for overlap across determinant categories.

A combined determinant model was estimated to evaluate the joint association of social, political, and economic determinants with PCDI. The pooled combined effect size differed in direction from the domain-specific pooled estimates. Results from the combined model and domain-specific models were reported separately.

Across all analyses, heterogeneity statistics indicated substantial between-study variability. Residual heterogeneity remained following meta-regression analyses. Risk-of-bias diagnostics showed no change in pooled estimates following trim-and-fill adjustment, while regression-based tests indicated the presence of small-study effects. All results presented in this chapter provide the quantitative findings that are examined further in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this chapter is to interpret the findings of the quantitative meta-analysis presented in Chapter 4 and to situate those findings within the broader literature on PCDI, implementation science, and public health practice. Despite substantial investment in biomedical HIV prevention, variability in PrEP uptake, access, and delivery persists across U.S. EHE jurisdictions (Fauci et al., 2021). Prior research indicates that social, political, and economic determinants play an important role in shaping how PrEP is delivered, innovated, and adopted. However, the combined relationship among these determinant domains has remained unclear. This dissertation addressed that gap by synthesizing evidence from 47 empirical studies examining how social, political, and economic determinants influence PCDI.

When examined independently, social determinants demonstrated a positive pooled association with PCDI, political determinants showed a larger positive pooled association, and economic determinants demonstrated a smaller but statistically significant positive pooled association. Across all domain-specific analyses, substantial heterogeneity was observed, indicating that sizes varied widely across populations, jurisdictions, and operationalizations of determinants. These findings support rejection of the null hypotheses for Research Questions 1 through 3 while also highlighting the context-dependent nature of observed associations.

When social, political, and economic determinants were modeled simultaneously, the combined model yielded a small but statistically significant negative pooled association with PCDI. This finding reflects the net association observed when correlated

structural domains were estimated together, rather than the independent contribution of any single determinant. Because formal interaction, mediation, or suppression effects were not tested, the combined estimate is interpreted descriptively rather than causally. The presence of substantial heterogeneity in the combined model further underscores the need for cautious interpretation of pooled estimates.

Building on these results, Chapter 5 provides a structured interpretation of the findings using the integrated CFIR and DOI frameworks. The chapter first examines how the observed associations align with existing theory and empirical literature, with particular attention to contextual influences and interdependence among structural determinants. Methodological limitations and sources of uncertainty are then reviewed to clarify the bounds of inference. The chapter concludes with evidence-informed implications for public health practice, implementation policy, and future research, highlighting how these findings can inform more equitable and context-responsive HIV prevention strategies in alignment with Walden University's mission of promoting positive social change.

Interpretation of the Findings

The 47 studies included in this meta-synthesis represented $N = 46{,}450$ participants across the period from 2007 through 2024. Nineteen studies examined social determinants of health, 14 examined political determinants, and 13 examined economic determinants across the 47 U.S. EHE jurisdictions. These studies assessed associations between social, political, and economic determinants and PCDI using standardized effect

sizes (*ES*).

Social determinants demonstrated a statistically significant positive pooled association with PCDI (*ES* = 0.822, 95% *CI* [0.27, 1.37], *p* = .003), as summarized in Table 5 and displayed in the corresponding forest plot (Figure 3). This finding supports rejection of the null hypothesis for an association between social determinants and PCDI. Although the pooled estimate indicates a positive directional association, substantial heterogeneity was present, indicating that the magnitude of association varied considerably across study contexts, populations, and jurisdictions. Heterogeneity of this magnitude suggests that pooled estimates should be interpreted as summaries of diverse effects rather than as indicators of a single underlying association (Borenstein et al., 2021; Higgins & Thompson, 2002).

Subgroup analyses (Table 5) indicated larger pooled effect sizes among studies focusing on young Black men who have sex with men (*ES* = 3.320, 95% *CI* [2.45, 4.19]) and more moderate positive associations among Medicaid recipients (*ES* = 0.890, 95% *CI* [0.38, 1.40]). These subgroup estimates were derived from a limited number of contributing studies and were characterized by wide confidence intervals. Accordingly, these findings are interpreted as context-specific associations rather than stable or generalizable effects. Across analyses, convergence in the direction of association was observed, but not uniformity in magnitude, as illustrated by the dispersion of study-level estimates in Figure 3.

Political determinants were also positively associated with PCDI, with a statistically significant pooled effect size of *ES* = 1.027 (95% *CI* [0.41, 1.64], *p* = .001),

as summarized in Table 6 and displayed in the political determinant forest plot (Figure 7). This estimate indicates a positive directional association across studies, while substantial heterogeneity suggests variability in effect magnitude across policy environments and jurisdictions. Such variability is consistent with prior implementation research demonstrating that policy effects differ according to regulatory context, population reach, and implementation intensity (Damschroder et al., 2009).

Subgroup analyses presented in Table 6 identified larger pooled associations in studies examining cisgender women (*ES* = 2.180, 95% *CI* [1.54, 2.82]) and nursing student or provider nursing populations (*ES* = 0.870, 95% *CI* [0.18, 1.56]). In contrast, population-specific estimates were nonsignificant and imprecise. These patterns indicate that political determinants are associated with PCDI in heterogeneous ways that vary by policy configuration, population focus, and study design rather than reflecting a uniform association across settings.

Economic determinants demonstrated a statistically significant positive pooled association with PCDI (*ES* = 0.492, 95% *CI* [0.09, 0.89], $p = .016$), as summarized in Table 8 and illustrated in the economic determinant forest plot (Figure 4). The magnitude of this association was smaller than that observed for social and political determinants, and heterogeneity remained substantial, indicating variability across economic contexts and measurement approaches.

Subgroup analyses presented in Table 8 indicated positive associations in settings characterized by insurance coverage, financial assistance, or cost reduction mechanisms, while negative associations were observed among uninsured populations (*ES* = −0.693,

95% *CI* [−1.33, −0.05]). Population-specific estimates were near the null and accompanied by wide confidence intervals. These findings suggest that economic determinants are associated with PCDI in a context-dependent manner, with effect sizes varying across jurisdictions rather than demonstrating consistent magnitude, consistent with diffusion theory's emphasis on structural and resource-based constraints to adoption (Rogers, 2003).

When social, political, and economic determinants were modeled jointly, the pooled association with PCDI was statistically significant and negative (ES = −0.062, 95% CI [−0.067, −0.056], $p < .001$), as summarized in Table 9 and depicted in the combined determinant forest plot (Figure 6). This estimate reflects the net association observed when correlated determinant domains were estimated simultaneously and differs in direction from the domain-specific pooled estimates, which were evaluated independently. The combined model represents an aggregate association across overlapping determinant domains rather than the independent contribution of any single domain. Formal interaction, mediation, or suppression effects among social, political, and economic determinants were not explicitly tested. Accordingly, the negative pooled estimate should not be interpreted as evidence that individual determinants are inversely associated with PCDI. Instead, this finding reflects the joint estimation of interrelated structural factors and the influence of shared variance across determinant domains, consistent with CFIR's emphasis on interacting contextual domains and DOI's recognition of system-level complexity (Damschroder et al., 2009; Rogers, 2003).

Substantial heterogeneity was observed in the combined model ($I^2 = 95.1\%$; $Q = 901.584$), indicating that both the magnitude and direction of associations varied widely across studies and jurisdictions, as further illustrated in the Galbraith plot (Figure 8).

Taken together, the findings indicate that social, political, and economic determinants are each associated with PCDI when examined independently, with consistent directionality across models but variability in effect-size. This pattern aligns with broader public health literature demonstrating that associations between social determinants and health outcomes are sensitive to contextual conditions and population characteristics rather than uniform across settings (Kaplan et al., 2017; Marmot et al., 2013).

Subgroup analyses further suggest that these associations vary across population characteristics, policy environments, and economic contexts, underscoring the importance of contextual interpretation. Such variability is consistent with realist and theory-driven synthesis approaches, which emphasize that outcomes emerge from the interaction of mechanisms and context rather than from isolated determinants operating independently (Pawson et al., 2005). Similarly, evaluations of social programs highlight that structural and institutional conditions shape how determinants are experienced and measured across populations, influencing observed associations (Kuhn et al., 2015).

The combined determinant model further highlights the interdependence of structural determinants and the complexity inherent in estimating their joint associations with PCDI. When social, political, and economic determinants were modeled simultaneously, the pooled estimate reflected a net association influenced by shared

variance across domains rather than the independent contribution of any single determinant. This finding is consistent with conceptual frameworks that view social conditions, policy environments, and economic resources as interconnected systems rather than discrete influences (Marmot et al., 2013; Pawson et al., 2005).

Across all analyses, high heterogeneity indicates that observed associations are context-dependent rather than uniform or stable. Accordingly, pooled ES estimates should be interpreted as descriptive summaries of diverse empirical findings rather than predictive or causal indicators of PCDI outcomes. This interpretive approach is consistent with recommendations in the social determinants and implementation science literature, which caution against overgeneralization when synthesizing evidence drawn from heterogeneous populations, jurisdictions, and policy contexts (Kaplan et al., 2017; Kuhn et al., 2015).

Limitations of the Study

Although quantitative meta-analysis provided a structured approach for synthesizing associations between structural determinants and PCDI, methodological and conceptual limitations must be acknowledged when interpreting the results presented in Chapter Four.

First, the evidence base comprised 47 studies that met the predefined inclusion criteria and were published in English. While this reflects the available peer-reviewed literature within the specified timeframe and jurisdictions (see Figure 2), relevant findings from non-English publications and grey literature may not have been captured. This restriction introduces the possibility of selection bias and limits the completeness of

the synthesized evidence, a concern commonly noted in systematic reviews adhering to PRISMA guidelines (Moher et al., 2009; Page et al., 2021).

Second, substantial heterogeneity was observed across all analyses. As reported in Chapter Four and summarized in the combined determinant forest plot (Figure 6) and heterogeneity statistics (Table 8), heterogeneity indices were consistently high (I^2 = 95.1%; $Q(44) = 901.584$, $p = .01$), indicating that the majority of observed variability in effect sizes reflected true between-study differences rather than sampling error. Similar levels of heterogeneity have been documented in large-scale meta-analyses synthesizing structurally diverse populations and outcome definitions (Far et al., 2019; Jokar et al., 2023; Higgins & Thompson, 2002). Although effects models were used to accommodate variability, the magnitude of heterogeneity limits the interpretability of pooled effect sizes as estimates of a single underlying association. Accordingly, pooled estimates should be interpreted as directionally informative summaries of heterogeneous evidence rather than as stable, precise, or generalizable effect magnitudes (Borenstein et al., 2021).

Third, study quality and design varied considerably across the included literature (Table 4). The meta-analysis incorporated randomized controlled trials, cohort studies, cross-sectional analyses, retrospective designs, and descriptive studies, each associated with distinct sources of bias and differing levels of internal validity. Prior meta-analytic work demonstrates that combining effect sizes across heterogeneous designs can amplify uncertainty even when inverse-variance weighting is applied (Ha et al., 2021; Field & Gillett, 2010). This limitation is particularly relevant for subgroup analyses reported in Tables 5–7, where large effect-size estimates were sometimes derived from a small

contributing studies and should therefore be interpreted cautiously (Higgins et al., 2022).

Fourth, the operationalization of social, political, and economic determinants varied widely across studies. As outlined in Chapter Two (Table 1) and Appendix D, determinants were measured using diverse indicators, including categorical policy variables, composite indices, and continuous measures of stigma, cost, insurance status, or access. Because standardized instruments were not uniformly applied, effect sizes were converted to a common metric and, in cases, standard errors were reconstructed from reported statistics. Although these procedures followed established meta-analytic conventions (Lipsey & Wilson, 2001; Borenstein et al., 2021), reliance on derived estimates may reduce measurement precision and contribute to the dispersion of effect sizes observed in domain-specific forest plots (Figures 3, 5, and 6). Similar challenges related to construct heterogeneity have been reported in meta-analyses synthesizing structurally complex exposures (Far et al., 2019; Ha et al., 2021).

Fifth, the geographic scope of the analysis limits generalizability. All included studies were conducted within U.S. jurisdictions designated under the EHE initiative. Evidence from non-EHE jurisdictions and international settings was excluded by design. As a result, findings may not extend to regions with different healthcare systems, policy environments, or implementation infrastructures (Siegler et al., 2018; Sullivan et al., 2021).

Finally, publication bias cannot be definitively excluded. Trim-and-fill analyses and visual inspection of the funnel plot (Figure 7) did not indicate missing studies or meaningful asymmetry, suggesting no detectable impact on pooled estimates. However,

Egger's regression yielded a statistically significant intercept (Table 9), indicating possible small-study effects. It is important to recognize that, under conditions of pronounced heterogeneity, Egger's regression can be particularly sensitive to systematic variations in study precision and effect-size magnitude, complicating interpretation and potentially leading to misidentification of publication bias (Egger et al., 1997; Sterne et al., 2011; Higgins et al., 2003). Consequently, this result should be regarded as suggestive of potential small-study effects rather than definitive evidence of selective publication.

Taking these factors into account, the findings should be interpreted with appropriate methodological caution. The results illuminate associations between social, political, and economic determinants and PCDI, but they are best understood as context-dependent and descriptive of heterogeneous evidence rather than as causal, predictive, or uniformly generalizable relationships (Izudi et al., 2019; Kaplan et al., 2017).

Recommendations

The findings of this meta-analysis support evidence-informed recommendations for public health practice, implementation policy, and future research. According to the 47 studies included, social, political, and economic determinants were associated with PCDI in interdependent and context-dependent ways. These patterns are consistent with CFIR and DOI principles, which emphasize multilevel influences on implementation processes rather than isolated or uniform effects (Damschroder et al., 2009; Rogers, 2003; Greenhalgh et al., 2004; Nilsen & Bernhardsson, 2019; Flessa & Huebner, 2021).

Public health systems should consider incorporating stigma reduction, trust-building, and culturally responsive engagement strategies into both clinical and community-based PCDI efforts. Prior studies included in this synthesis indicate that peer navigation, participatory education, and community-tailored outreach are associated with higher PCDI among Black and Latino sexual minority men, transgender women, and people who use drugs (Golub, 2018; Malone et al., 2021; Ojikutu et al., 2018; Sharpe et al., 2023; Bell & Owens-Young, 2020; Quinn et al., 2018). Embedding these approaches within pharmacies, mobile outreach programs, community health centers, and telehealth platforms may help address structural barriers related to geography, cost, and perceived discrimination (Refugio et al., 2019; O'Byrne et al., 2019; Vanhamel et al., 2022; Sullivan et al., 2024). However, given the substantial heterogeneity observed in Chapter Four, effectiveness is likely to vary across populations and jurisdictions rather than producing uniform outcomes (Kelly et al., 2020; Walters et al., 2017; Siegler et al., 2019).

Consistent with CFIR constructs related to inner and outer settings, implementation strategies should prioritize adaptability and local tailoring rather than standardized application (Damschroder et al., 2009; Bavinton & Grulich, 2021; Nilsen & Bernhardsson, 2019). The magnitude of pooled associations varied widely across studies, indicating that PCDI initiatives are likely to perform differently depending on local social context, population characteristics, and healthcare infrastructure (Beckham et al., 2022; Sharpe et al., 2021; Sullivan et al., 2021). Accordingly, implementation planning should be guided by local data, stakeholder engagement, and community partnership rather than

reliance on pooled estimates alone (Pinto et al., 2018; Restar et al., 2023).

At the system level, findings support increased attention to upstream social determinants, including housing stability, transportation access, community safety, and income security, which have been associated with HIV prevention outcomes and implementation processes (Bailey et al., 2017; Feagin & Bennefield, 2014; Krieger et al., 2020; Nosyk et al., 2020). Strategic resource allocation informed by SVI metrics may assist public health agencies in identifying communities where structural disadvantage intersects with HIV burden, enabling more targeted and context-sensitive PCDI planning (CDC, 2022; Ransome et al., 2020; Gant et al., 2023; Sharpe et al., 2021).

Policy-level recommendations focus on strengthening legislative and institutional conditions associated with PCDI. This meta-analysis identified statistically significant associations between political determinants such as Medicaid expansion, pharmacy prescribing authority, and telehealth reimbursement and PCDI, although effect sizes varied across jurisdictions (Bustamante et al., 2018; Siegler et al., 2020; Sullivan et al., 2021; Scott et al., 2023). Policymakers and public health agencies may therefore consider prioritizing policies that support flexible delivery models and expanded access points for PrEP services, particularly in high-burden EHE jurisdictions (Siegler et al., 2020; Sullivan et al., 2024; Vanhamel et al., 2022). These findings reinforce evidence that policy environments shape local implementation capacity and sustainability rather than operating independently of health systems and community context (Greenhalgh et al., 2004; Damschroder et al., 2009).

Equitable allocation of public health funding remains critical for supporting

implementation capacity and continuity (Patel et al., 2021; Nosyk et al., 2020). Directing resources toward same-day PrEP initiation, mobile PrEP delivery, and tele-PrEP programs may facilitate PCDI in settings where structural barriers are most pronounced (O'Byrne et al., 2019; Refugio et al., 2019; Vanhamel et al., 2022; Sullivan et al., 2024). In addition, expanding provider education requirements and integrating comprehensive sexual health curricula into clinical and pharmacy training programs may help address provider-level barriers identified in prior studies (Petroll et al., 2016; Quinn et al., 2019; Patel et al., 2017). These approaches align with DOI principles related to knowledge dissemination and adoption within professional networks (Rogers, 2003; Flessa & Huebner, 2021).

Public health surveillance systems should enhance monitoring of PCDI-related implementation metrics, including access, uptake, persistence, and delivery modality. Incorporating such indicators into national HIV dashboards and evaluation frameworks may improve accountability and inform adaptive resource allocation aligned with EHE 2030 objectives (Fauci et al., 2019; Gandhi et al., 2020; The Lancet Public Health, 2021; Sullivan et al., 2021).

Findings related to economic determinants underscore the importance of financing mechanisms that address cost-related barriers to PCDI. Evidence from included studies suggests that insurance coverage, PrEP assistance programs, and decentralized pharmacy-led delivery models are associated with higher PCDI, whereas lack of coverage is associated with lower engagement (Schackman et al., 2015; O'Byrne et al., 2019; Peebles et al., 2021; Srikanth et al., 2021; Wang et al., 2020). Public health agencies and

healthcare systems should therefore consider policies that streamline insurance procedures, expand financial assistance, and support alternative delivery models that reduce administrative and financial burden (Nosyk et al., 2020; Vanhamel et al., 2022).

Given the observed heterogeneity, integration of PCDI into value-based payment and population health reimbursement models should be evaluated within local economic and policy contexts rather than assumed to yield uniform effects (Wang et al., 2020; Nosyk et al., 2020; Sullivan et al., 2024). Future research should employ longitudinal, mixed-methods, and multilevel designs to assess how social, political, and economic determinants interact over time (Higgins et al., 2022; Borenstein et al., 2021; Frank et al., 2022). Intersectional approaches examining race, gender identity, socioeconomic status, and geography may further clarify compounding barriers and enhance precision in PCDI research (Agénor et al., 2021; Johnson et al., 2024). Future meta-analyses should also incorporate contextual variables such as telehealth capacity, digital literacy, and post–COVID-19 delivery shifts that may influence PCDI across jurisdictions (Sullivan et al., 2021; Sharpe et al., 2022).

Conclusion

This dissertation applied a quantitative meta-analytic approach to synthesize evidence from 47 empirical studies representing 46,450 participants to examine associations between social, political, and economic determinants and PCDI across the 47 U.S. EHE jurisdictions. Using standardized effect sizes and inverse-variance weighting, domain-specific pooled estimates were generated for social, political, and economic

determinants, followed by a combined determinant model to assess their joint association with PCDI (Borenstein et al., 2021; Higgins et al., 2022). Social determinants demonstrated a moderate positive pooled association with PCDI, political determinants showed a larger positive pooled association, and economic determinants exhibited a smaller but statistically significant positive pooled association (Siegler et al., 2019; Sullivan et al., 2021). When modeled jointly, the combined determinant model yielded a small but statistically significant negative pooled association, reflecting the net association observed when correlated structural domains were estimated simultaneously rather than the independent contribution of any single determinant (Damschroder et al., 2009; Rogers, 2003). Across all models, heterogeneity was substantial, indicating that effect sizes varied widely across studies, populations, and jurisdictions. Accordingly, pooled estimates are best interpreted as indicating consistent directionality of association rather than uniform magnitude or predictive effects (Higgins & Thompson, 2002; Borenstein et al., 2021).

Implications for social change are central to these findings. The results demonstrate that improving PCDI is unlikely to be effective when interventions target single determinants in isolation. Instead, strategies must be tailored to local social conditions, policy environments, and economic constraints, with explicit attention to how these forces interact within communities (Greenhalgh et al., 2004; Nilsen & Bernhardsson, 2019; Sullivan et al., 2021; Sharpe et al., 2022). In alignment with Walden University's mission to advance positive social change, this evidence underscores the necessity of equity-oriented, context-responsive HIV prevention approaches that

prioritize populations disproportionately affected by structural barriers, including Black and Latino sexual minority men, transgender individuals, women, and people with limited access to healthcare (Bailey et al., 2017; Feagin & Bennefield, 2014; Nosyk et al., 2020; Quinn et al., 2018).

By informing more inclusive policies, supporting community-engaged implementation strategies, and emphasizing accountability for equity in public health systems, this work contributes to actionable pathways for reducing HIV disparities and strengthening PCDI in real-world settings (Fauci et al., 2019; Siegler et al., 2019; Sullivan et al., 2024). Taken together, the findings advance implementation science by clarifying how structural determinants shape prevention outcomes and support evidence-based decision-making aimed at sustainable, population-level impact, consistent with Walden University's commitment to scholarship that promotes measurable and positive social change (Marmot et al., 2013; The Lancet Public Health, 2021).

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Appendix A: Summary of Included Studies in the Meta-Analysis (*N* = 47)

Link	Author	Variables	Population	Effect Size	SE
https://pmc.ncbi.nlm.nih.gov/articles/PMC8371736/	Malone et al., 2021	Social determinant	transgender women	0.6819	5.95
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0267031	Andriano et al., 2022	Social determinant	YBLSMM	0.9204	4.08
https://pubmed.ncbi.nlm.nih.gov/37702972 /	Gomillia et al., 2023	Social determinant	Black Sexual Minority Men	1.41	2.5
https://doi.org/10.1080/10410236.2022.2144781	Hull et al., 2022	Social determinant	Cisgender Women	0.655	0.5
https://www.nature.com/articles/s41598-020-62694-5	Goedel et al., 2020	Social determinant	Male Sex Workers	0.5	0.1475
https://pmc.ncbi.nlm.nih.gov/articles/PMC9754721/	Harawa et al., 2022	Social determinant	Medicaid Recipients	1.47	0.17
https://pmc.ncbi.nlm.nih.gov/articles/PMC11395160/	Johnson et al., 2024	Social determinant	Black women	-0.243	0.117
https://www.sciencedirect.com/science/article/pii/S2667193X24000656	Sullivan et al., 2024	Social determinant	Black, Hispanic and White Americans	0.187	0.0552
https://pmc.ncbi.nlm.nih.gov/articles/PMC9196948/	Doherty et al., 2022	Social determinant	African American	1.52	0.4483
https://egrove.olemiss.edu/etd/2432/	Goswami, 2022	Social determinant	MSM	0.35	0.2
https://pmc.ncbi.nlm.nih.gov/articles/PMC11167718/	Sharpe et al., 2023	Social determinant	MSM	2.84	0.8241
https://pmc.ncbi.nlm.nih.gov/articles/PMC5634925/	Rolle et al., 2017	Social determinant	Young Black MSM	3.32	0.9792
https://link.springer.com/article/10.1007/s10461-018-2151-0	Mehrotra et al., 2018	Social determinant	transgender WMSM	0.15	0.0756
https://link.springer.com/article/10.1007/s10461-019-02745-9	O'Byrne et al., 2019	Economic determinant	MSM	3.55	0.4122
https://pmc.ncbi.nlm.nih.gov/articles/PMC7056502/	Ransome et al., 2020	Economic determinant	Black people	0.87	0.3617
https://www.tandfonline.com/doi/full/10.1080/24787489.2024.2382552#abstract	Whiteside et al., 2024	Economic determinant	PrEP users and PrEP non-users	0.55	0.3313
https://pmc.ncbi.nlm.nih.gov/articles/PMC8901150/	Sun et al., 2022	Economic determinant	MSM	0.43	0.1477
https://www.sciencedirect.com/science/article/abs/pii/S0277953616305986	Rendina et al., 2017	Economic determinant	gay and bisexual men	0.18	0.33
https://www.sciencedirect.com/science/article/abs/pii/S0149718921000616	Frank et al., 2021	Economic	MSM	-0.026	0.012

		determinant			
https://pmc.ncbi.nlm.nih.gov/articles/PMC9137017/	Srikanth et al., 2022	Economic determinant	MSM	0.56	0.1914
https://www.sciencedirect.com/science/article/pii/S2773065424001299	Connor Eichenwald et al., 2024	Economic determinant	MSM	0.8	0.4205
https://pmc.ncbi.nlm.nih.gov/articles/PMC11034730/	D'Avanzo et al., 2024	Economic determinant	YMSM	0.48	0.1416
https://www.sciencedirect.com/science/article/pii/S2211335522003692	Crooks et al., 2023	Economic determinant	female adolescents and emerging adults	2.71	0.7993
https://www.tandfonline.com/doi/full/10.1080/09540121.2016.1146653	Sagaon-Teyssier et al., 2016	Economic determinant	MSM	0.75	0.09
https://pmc.ncbi.nlm.nih.gov/articles/PMC12074742/	Sullivan et al., 2025	Economic determinant	PrEP users	4.67	1.3774
https://doi.org/10.1016/j.whi.2023.05.009	Scott et al., 2023	Political determinant	Cisgender Women	2.18	0.287712
https://link.springer.com/article/10.1007/s40615-023-01807-y	Riley et al., 2023	Political determinant	PrEP users	0.182	0.244
https://www.frontiersin.org/journals/reproductive-health/articles/10.3389/frph.2024.1449554/full	Irie et al., 2024	Political determinant	Black women	0.174	0.037
https://pubmed.ncbi.nlm.nih.gov/37467214/	Orser et al., 2023	Political determinant	MSM	0.27	0.94
https://bmjopen.bmj.com/content/11/1/e040817	O'Byrne et al., 2021	Political determinant	people diagnosed with a bacterial STI	0.332	0.231
https://doi.org/10.1093/oso/9780197662984.003.0044	Wood, 2024	Political determinant	MSM	0.119	0.03
https://bmcnurs.biomedcentral.com/articles/10.1186/s12912-023-01531-2	Deidra Carroll Coleman et al., 2023	Political determinant	Nursing students	0.87	0.2566
https://doi.org/10.3390/v15061365	Casey et al., 2023	Political determinant	PrEP Providers	0.194	0.0589
https://pubmed.ncbi.nlm.nih.gov/33907971/	Biello et al., 2021	Political determinant	PWUD	0.15	0.0756
https://pubmed.ncbi.nlm.nih.gov/30476461/	Sullivan & Siegler, 2018	Political determinant	MSM	0.67	0.467

Appendix B: List of 47 Ending the HIV Epidemic Jurisdictions in the United States

Category	State / Territory	Jurisdiction (City / County / Parish)
Counties with Highest HIV Burden (48)	Alabama	Jefferson County
	Arizona	Maricopa County
	California	Los Angeles County · Orange County · Riverside County · Sacramento County · San Bernardino County · San Diego County · San Francisco County
	Florida	Broward County · Duval County · Hillsborough County · Miami-Dade County · Orange County · Palm Beach County · Pinellas County
	Georgia	Cobb County · DeKalb County · Fulton County · Gwinnett County
	Illinois	Cook County
	Indiana	Marion County
	Louisiana	East Baton Rouge Parish · Orleans Parish
	Maryland	Baltimore City · Montgomery County · Prince George's County
	Massachusetts	Suffolk County
	Michigan	Wayne County
	Nevada	Clark County
	New Jersey	Essex County · Hudson County
	New York	Bronx County · Kings County · New York County · Queens County
	North Carolina	Mecklenburg County
	Ohio	Cuyahoga County · Franklin County · Hamilton County
	Pennsylvania	Philadelphia County
	Tennessee	Shelby County
	Texas	Bexar County · Dallas County · Harris County · Tarrant County · Travis County
	Washington	King County
	District of Columbia	Washington, D.C.
	Puerto Rico	San Juan Municipality
States with High Rural HIV Burden (7)		Alabama · Arkansas · Kentucky · Mississippi · Missouri · Oklahoma · South Carolina

Appendix C: Summary of Determinant Domains, Findings, and Recommendations

Determinant Domain	Key Findings	Implications for Practice	Implications for Policy	Implications for Research
Social Determinants	Stigma, discrimination, and limited healthcare access significantly reduced PrEP engagement across EHE jurisdictions (Malone et al., 2021; Willie et al., 2019; Sharpe et al., 2023). Community-based interventions and peer navigation imwas associated with awareness and retention in care (Beymer et al., 2019; Biello et al., 2021).	Expand culturally responsive peer-led PrEP education and outreach programs to improve linkage and retention.	Integrate anti-stigma initiatives and social inclusion policies into local EHE strategic plans to reduce disparities.	Investigate the longitudinal effects of stigma-reduction interventions and social network support on PrEP adherence.
Political Determinants	Variation in Medicaid expansion, telehealth policy, and pharmacy prescribing laws influenced PrEP availability (Bustamante et al., 2018; Riley et al., 2023; Scott et al., 2023). Political support strongly correlated with implementation success (Deidra Carroll Coleman et al., 2023; Wood, 2024).	Align health-system and community-based leadership to enhance governance and accountability in PrEP implementation.	Enact legislation standardizing telehealth and pharmacist prescribing authority to improve equitable PrEP access.	Examine the impact of political stability, health policy diffusion, and interjurisdictional policy learning on HIV prevention.
Economic Determinants	High medication costs, inadequate insurance coverage, and inconsistent patient-assistance programs constrained access and adherence (O'Byrne et al., 2019; Peebles et al., 2021; Whiteside et al., 2024). Subsidized pharmacy and community-based payment models imwas associated with uptake (Vanhamel et al., 2020; Coleman et al., 2021).	Implement financial navigation programs to help patients utilize insurance and subsidy options effectively.	Support sustainable PrEP funding through Medicaid and Ryan White Act expansion for uninsured populations.	Conduct comparative cost-effective studies evaluating pharmacy-based vs. telehealth-based PrEP delivery models.
Combined Structural Determinants	Interactions between social inequities, policy structures, and economic barriers compounded disparities in PrEP uptake (Evans et al., 2022; Sullivan et al., 2024). Jurisdictions with cross-sector collaboration showed greater innovation	Develop integrated models that simultaneously address structural, political, and social inequities within HIV prevention systems.	Institutionalize intersectional frameworks in federal and state EHE programs to ensure proportional resource allocation.	Advance multilevel modeling to quantify causal pathways linking structural determinants and health equity outcomes.

Appendix D: Eight-Step Meta-Analytic Protocol

This appendix outlines the standardized protocol that guided data extraction, computation, and synthesis in this mixed quantitative meta-analysis. The procedure followed PRISMA 2020 and Cochrane Collaboration guidelines to ensure methodological rigor and reproducibility (Moher et al., 2015; Higgins et al., 2022). All analyses were conducted in ***SPSS v 30*** (IBM Corp., 2023).

Step 1: Identification and Compilation of Studies

Relevant studies were identified through systematic searches in PubMed, Embase, Google Scholar, and the Cochrane Library. Boolean operators and Medical Subject Headings captured variations in terminology for PrEP, social determinants, policy factors, and economic barriers (Page et al., 2021). Reference lists were manually screened to ensure that all eligible studies were included (Liberati et al., 2009).

Step 2: Eligibility Screening

Titles and abstracts were screened to remove duplicates and irrelevant records. Full-text reviews were conducted to confirm that studies met the inclusion criteria. Independent reviewers verified all decisions, and disagreements were resolved by consensus to maintain inter-rater reliability (Mutinda et al., 2022).

Step 3: Data Extraction and Coding

A standardized extraction template captured author, year, population, determinant type, study design, sample size, and statistical metrics such as odds ratios, Cohen's *d*, or

Hedges *g* (Cumpston et al., 2020). When necessary, effect sizes were derived from *t* values, *p* values, or F statistics following established meta-analytic formulas (Borenstein et al., 2021). Covariates such as publication year and design type were coded to support moderator analysis.

Step 4: Classification of Determinants and Outcomes

Variables were organized into social, political, and economic categories consistent with the Consolidated Framework for Implementation Research (CFIR) and Diffusion of Innovations (DOI) theory (Damschroder et al., 2009; Rogers, 2003). Outcomes were grouped into uptake, adherence, and persistence metrics to enable domain-specific subgroup analysis (Nunn et al., 2017; Ransome et al., 2020).

Step 5: Calculation of Effect Sizes and Variance Estimates

All effect sizes were converted to standardized units to permit comparison across studies. Standard errors and 95 percent confidence intervals were computed using inverse-variance weighting to ensure precision (Borenstein et al., 2021). Each study was assigned a unique identifier to ensure traceability during analysis.

Step 6: Pooled Analysis Using Fixed-Effect and Random-Effect Models

A mixed quantitative approach combined fixed-effect and random-effect models. The fixed-effect model estimated a pooled mean effect under the assumption of a common actual effect across conceptually similar studies (Baltagi, 2005). The random-effect model incorporated between-study variation and enhanced generalizability when heterogeneity was present (Guimarães & Portugal, 2018). Inverse-variance weighting

was used for both models to ensure proportional representation of larger studies (Dettori et al., 2022).

Step 7: Assessment of Heterogeneity and Publication Bias

Heterogeneity was quantified using Cochran's Q, I^2, and H^2 statistics (Higgins & Thompson, 2002). I^2 values greater than 50% were interpreted as evidence of substantial heterogeneity. Publication bias was evaluated using funnel plots, Egger's regression test, and the trim-and-fill procedure (Egger et al., 1997; Duval & Tweedie, 2000). Sensitivity analyses excluded high-variance studies to test result stability (Guo et al., 2023).

Step 8: Interpretation and Reporting of Results

Results were summarized through pooled estimates, heterogeneity indices, and bias diagnostics. Forest plots displayed precision and direction of effect sizes, while funnel and Galbraith plots visualized distribution and potential bias. Interpretations followed the integrated CFIR–DOI theoretical framework to contextualize how social, political, and economic determinants influenced PCDI across the 47 U.S. EHE jurisdictions (Flessa & Huebner, 2021; Sullivan et al., 2024). All statistical results were reported in Chapter 4, supported by tables and figures showing pooled estimates, heterogeneity metrics, and bias analyses.