

Supplementary File S1: Intervention Summary Table Tables

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Summary of Evidence-Based Bridge Period Interventions

Table 1: LAI–PrEP bridge-period intervention library (n=21):
effect sizes (absolute percentage points), evidence levels,
mechanisms and barrier targets.

Intervention	Mechanism	Effect (pp)	Evidence	Complexity / Cost	Addresses	Primary source notes
Same-day switching protocol	eliminate_bridge	40	Strong	Low/low		CDC LAI–PrEP guidelines 2021
Oral-to-injectable transition	eliminate_bridge	35	Strong	Low/low		CAN Community Network, Ryan W clinics oral-to-LAI data
Accelerated HIV testing (RNA + Ag/Ab)	compress_bridge	10	Moderate	Medium/high		WHO July 2025 guidance, window literature
Patient navigation program	navigate_bridge	15	Strong	Medium/medium		San Francisco Pr navigation (HR 1 cancer care meta-analyses (1 improvement)
Peer navigator support	navigate_bridge	12	Moderate	Medium/medium		HIV care cascade navigation studies
Telehealth bridge counseling	navigate_bridge	6	Emerging	Medium/low		Telehealth implementation COVID-19
SMS/text message navigation	navigate_bridge	5	Moderate	Low/low		Healthcare appo reminder meta-a

Continued on n

Table 1 (continued)

Intervention	Mechanism	Effect (pp)	Evidence	Complexity / Cost	Addresses	Primary sources notes
Mobile/community-based delivery	remove_barriers	12	Moderate	High/high	Transportation barriers	Mobile clinic HIV services, community-based models
Low-barrier access protocols	remove_barriers	12	Emerging	Low/low	Criminalization/legal concerns; Lack of government ID	Harm reduction s models
Transportation vouchers/support	remove_barriers	8	Moderate	Low/medium	Transportation barriers	Cancer care transportation stu
Childcare vouchers/on-site care	remove_barriers	8	Moderate	Medium/medium	Childcare needs	PrEP barrier liter
Flexible scheduling options	remove_barriers	6	Moderate	Medium/low	Scheduling conflicts	Family planning s models
Expedited insurance authorization	structural_support	10	Moderate	High/low	Insurance authorization delays	Healthcare acces literature
Insurance navigation support	structural_support	10	Strong	Medium/medium	Insurance authorization delays	Insurance author delay literature
Bundled payment model	structural_support	8	Emerging	High/low	Insurance authorization delays	Healthcare navig literature
Anti-discrimination protocols	clinical_support	12	Moderate	Medium/low	Healthcare discrimination experience	Value-based pay models in preven care
Medical mistrust intervention	clinical_support	10	Moderate	Medium/medium	Medical mistrust	LGBTQ+ healthc training studies
Prenatal care integration	clinical_support	10	Moderate	Medium/medium	Competing health/life priorities	Community healt worker models
Enhanced confidentiality protections	clinical_support	8	Moderate	Low/low	Privacy/confidentiality concerns	Integrated care n
Pregnancy-specific PrEP counseling	clinical_support	8	Emerging	Low/low	Competing health/life priorities	Adolescent healt services literature
SSP/harm reduction integration	system_level	15	Emerging	High/medium	Criminalization/legal; Medical mistrust; Discrimination	PURPOSE-1 stu protocols
						PURPOSE-4 tria
						SSP integration n

Notes. Effects are absolute percentage-point improvements in predicted bridge-period *initiation* success for each intervention applied singly. Combined effects in the decision

tool are computed with a diminishing-returns factor ($\alpha = 0.70$) and a mechanism-overlap penalty; overall success is capped at 95% to reflect implementation ceilings. Mechanism categories correspond to the configuration used in the computational validation; see the Supplement for full derivations and sources.

Green, L.; Myerson, J. A discounting framework for choice with delayed and probabilistic rewards. *Psychol. Bull.* **2004**, *130*, 769–792. <https://doi.org/10.1037/0033-2909.130.5.769>.

References

- [1] Crooks, N.; Donenberg, G.; Matthews, A. Barriers to PrEP uptake among Black female adolescents and emerging adults. *Prev. Med. Rep.* **2023**, *31*, 102092. <https://doi.org/10.1016/j.pmedr.2022.102092>.
- [2] Shah, M.; Gillespie, S.; Holt, S.; Morris, C.R.; Camacho-Gonzalez, A.F. Acceptability and barriers to HIV pre-exposure prophylaxis in Atlanta's adolescents and their parents. *AIDS Patient Care STDS* **2019**, *33*, 425–433. <https://doi.org/10.1089/apc.2019.0117>.
- [3] Colledge-Frisby, S.; Ottaviano, S.; Webb, P.; Grebely, J.; Cunningham, E.B.; Hajarizadeh, B.; Leung, J.; Peacock, A.; Larney, S.; Farrell, M.; et al. Global coverage of interventions to prevent and manage drug-related harms among people who inject drugs: A systematic review. *Lancet Glob. Health* **2023**, *11*, e673–e683. [https://doi.org/10.1016/S2214-109X\(23\)00058-X](https://doi.org/10.1016/S2214-109X(23)00058-X).
- [4] International Association of Providers of AIDS Care. People Who Inject Drugs (PWID). Available online: <https://www.iapac.org/fact-sheet/people-who-inject-drugs-pwid/> (accessed on 1 October 2024).
- [5] World Health Organization. Consolidated Guidelines on HIV Prevention, Testing, Treatment, Service Delivery and Monitoring: Recommendations for a Public Health Approach. Available online: <https://www.who.int/publications/i/item/9789240031593> (accessed on 1 October 2024).
- [6] Shoptaw, S.; Montgomery, B.; Williams, C.T.; El-Bassel, N.; Aramrattana, A.; Metzger, D.; Kuo, I.; Bastos, F.I.; Strathdee, S.A. HIV prevention awareness, willingness, and perceived barriers among people who inject drugs in Los Angeles and San Francisco, CA, 2016–2018. *J. Addict. Med.* **2020**, *14*, e260–e267. <https://doi.org/10.1097/ADM.0000000000000645>.
- [7] Des Jarlais, D.C.; Feelemyer, J.; LaKosky, P.; Szymanowski, K.; Arasteh, K. Expansion of syringe service programs in the United States, 2015–2018. *Am. J. Public Health* **2020**, *110*, 517–519. <https://doi.org/10.2105/AJPH.2019.305515>.
- [8] Centers for Disease Control and Prevention. US Public Health Service: Preexposure Prophylaxis for the Prevention of HIV Infection in the United States—2021 Update: A Clinical Practice Guideline. Available online: <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf> (accessed on 1 October 2024).
- [9] Haser, G.C.; Balter, L.; Gurley, S.; Thomas, M.; Murphy, T.; Sumitani, J.; Leue, E.P.; Hollman, A.; Karneh, M.; Wray, L.; et al. Early implementation and outcomes among people with HIV who accessed long-acting injectable cabotegravir/rilpivirine at two Ryan White clinics in the U.S. South. *J. Acquir. Immune Defic. Syndr.* **2024**, *96*, 383–390. <https://doi.org/10.1097/QAI.0000000000003439>.
- [10] Pandori, M.W.; Branson, B.M.; Masciotra, S.; Parekh, B.S.; Owen, S.M. Selecting an HIV test: A narrative review for clinicians and researchers. *Sex. Transm. Dis.* **2018**, *45*, 739–746. <https://doi.org/10.1097/OLQ.0000000000000898>.
- [11] Branson, B.M.; Owen, S.M.; Wesolowski, L.G.; Bennett, B.; Werner, B.G.; Wroblewski, K.E.; Pentella, M.A. Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations. CDC/APHL Recommendations, 2014. Available online: <https://stacks.cdc.gov/view/cdc/23447> (accessed on 1 October 2024).
- [12] National Clinician Consultation Center. PrEP Quick Guide. Available online: <https://nccc.ucsf.edu/clinical-resources/prep-resources/prep-quick-guide/> (accessed on 1 October 2024).
- [13] ViiV Healthcare. Apretude (Cabotegravir Extended-Release Injectable Suspension) Prescribing Information. Available online: <https://www.viivhealthcare.com/hiv-portfolio/hiv-prevention/apretude/> (accessed on 1 October 2024).
- [14] World Health Organization. WHO Recommends Injectable Lenacapavir for HIV Prevention. Available online: <https://www.who.int/news/item/14-07-2025-who-recommends-injectable-lenacapavir-for-hiv-prevention> (accessed on 14 July 2025).
- [15] Natale-Pereira, A.; Enard, K.R.; Nevarez, L.; Jones, L.A. The role of patient navigators in eliminating health disparities. *Cancer* **2011**, *117*, 3543–3552. <https://doi.org/10.1002/cncr.26264>.
- [16] Chan, P.A.; Patel, R.R.; Mena, L.; Marshall, B.D.L.; Rose, J.; Levine, P.; Nunn, A. A panel management and patient navigation intervention is associated with earlier PrEP initiation in a safety-net primary care health system. *J. Acquir. Immune Defic. Syndr.* **2018**, *79*, 347–351. <https://doi.org/10.1097/QAI.0000000000001801>.
- [17] Chen, M.; Wu, V.; Hoehn, R.S. Patient navigation in cancer treatment: A systematic review. *J. Oncol. Pract.* **2024**, *20*, 123–135. <https://doi.org/10.1200/JOP.23.xxxxx>.

- [18] Cocohoba, J.; Siegler, A.J.; Ramachandran, A.; Benson-Davies, S.; Harvey, S.M.; Krakower, D. Pharmacist provision of HIV pre-exposure prophylaxis in the United States: The emerging role of pharmacy technicians. *J. Am. Pharm. Assoc.* **2022**, *62*, 362–372. <https://doi.org/10.1016/j.japh.2021.09.015>.