

HIV Prevention and Control: Partner Services to Increase HIV Testing

Community Preventive Services Task Force Finding and Rationale Statement Ratified July 2021

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CPSTF Finding and Rationale Statement

Context

In 2019, 1.06 million adults and adolescents in the United States and six dependent areas were living with diagnosed HIV infection, including around 37,000 new diagnoses ([CDC 2021](#) [<https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-32.pdf>]). The highest rates of diagnosis were for males, people aged 20-29 years, Black or African American people followed by Hispanic or Latino, gay, bisexual, and other men who have sex with men (collectively referred to as MSM), and people living in the southern states ([CDC 2021](#) [<https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-32.pdf>]).

[Ending the HIV Epidemic in the United States](#) [<https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview>] is the operational plan developed by agencies across the U.S. Department of Health and Human Services (HHS) to pursue the goal of reducing new HIV infections by 75% by 2025 and 90% by 2030. HHS identified four key strategies to achieve these goals in the United States: diagnose people living with HIV as early as possible after infection, treat people with HIV rapidly and effectively to reach sustained viral suppression, prevent new HIV transmission through evidence-based interventions such as pre-exposure prophylaxis, and respond quickly to potential HIV outbreaks. The [HIV National Strategic Plan \(2021-2025\)](#) [<https://www.hiv.gov/federal-response/hiv-national-strategic-plan/hiv-plan-2021-2025>], also developed by HHS, is closely aligned with, and complements, *Ending the HIV Epidemic*. This plan focuses on collaboration between all sectors of society to prevent new HIV infections, improve health outcomes of people with HIV, and reduce HIV-related disparities and health inequities. Both of the HHS plans identify testing for HIV as the first step and it is important to implement interventions that increase HIV screening and testing, especially among population groups with the highest rates of diagnosis.

Intervention Definition

HIV partner services are offered to people with a diagnosis of HIV infection (index patient) and their sexual or needle-sharing partners and include notification of possible exposure, HIV testing, and related services. In the United States, HIV partner services are most often delivered by trained health department personnel (CDC 2008).

Partner notification is an essential component of partner services (CDC 2008). Trained personnel interview index patients to learn about their sexual or needle-sharing partners and work with them to develop a plan to confidentially notify partners of their potential exposure to HIV.

Patients choose to notify partners, in person or remotely, through one or more of the following.

- Provider referral: trained health department personnel notify partners
- Self-referral (also known as client or patient referral): patient accepts full responsibility for notifying partners and refers them to appropriate services
- Third-party referral: professionals other than health department staff (e.g., HIV counselors or clinicians) notify partners

Programs also offer the following services to index patients and their partners:

- Prevention counseling

- HIV testing
- Linkage to medical care
- Referral or linkage to other services (e.g., preventive services, reproductive healthcare, prenatal care, substance abuse treatment, social support, housing assistance, legal services, and mental health services)

CPSTF Finding (July 2021)

The Community Preventive Services Task Force (CPSTF) recommends partner services interventions to increase HIV testing based on sufficient evidence of effectiveness. These interventions were effective at identifying and testing sexual and needle-sharing partners of persons newly diagnosed with HIV infection, improving health for population groups disproportionately affected by HIV infection.

CPSTF finds partner services interventions to increase HIV testing are cost-effective based on cost per quality-adjusted life year (QALY) estimates that were either cost-saving or below a conservative benchmark of \$50,000 per QALY gained.

Rationale

Basis of Finding

The CPSTF recommendation is based on evidence from a review of eight studies with 11 arms (search period: January 2009 - June 2020). This recommendation updates and replaces the 2005 findings for interventions to identify people with HIV infection through partner notification by [provider referral \(recommended\)](https://www.thecommunityguide.org/sites/default/files/HIV-Partner-Notification-Provider-Referral-Archive-508.pdf) [https://www.thecommunityguide.org/sites/default/files/HIV-Partner-Notification-Provider-Referral-Archive-508.pdf], [patient referral \(insufficient evidence\)](https://www.thecommunityguide.org/sites/default/files/HIV-Partner-Notification-Patient-Referral-Archive-508.pdf) [https://www.thecommunityguide.org/sites/default/files/HIV-Partner-Notification-Patient-Referral-Archive-508.pdf], or [contract referral \(insufficient evidence\)](https://www.thecommunityguide.org/sites/default/files/HIV-Partner-Notification-Contract-Referral-Archive-508.pdf) [https://www.thecommunityguide.org/sites/default/files/HIV-Partner-Notification-Contract-Referral-Archive-508.pdf].

A team of specialists in systematic review methods and subject matter experts synthesized select dietary (e.g., fruit and vegetable intake), physical activity (e.g., time spent in physical activity), weight-related (e.g., Body Mass Index [BMI]), and clinical (e.g., cholesterol) outcomes to assess intervention effectiveness. Many of the included studies reported multiple dietary, physical activity, weight-related, and clinical outcomes.

Evidence from the eight included studies showed these interventions increased fruit and vegetable intake, decreased fat intake, and increased time spent in physical activity. See results in the Table. Interventions did not demonstrate meaningful changes in weight-related and clinical outcomes, as described below. Participants used instruments with demonstrated validity and reliability to self-report their dietary and physical activity behaviors.

Table 1. Effectiveness of Partner Services Interventions

Outcome Measure	Number of Studies	Median
Partner index ratio	12	2.4 (IQI: 1.9 to 4.9)
Percent of identified partners notified	10	59.8% (IQI: 40.7% to 77.4%)
Percent of notified partners tested	11	55.1% (IQI: 40.0% to 70.2%)
Percent of tested partners diagnosed with HIV infection	14	14.6% (IQI: 10.6% to 21.3%)
NNTInew	13	9.4 (IQI: 4.6 to 19.1)
NNTIany	8	1.7 (IQI: 1.6 to 3.2)

Partner index ratio = number of partners identified/number of index patients interviewed

Percent of identified partners notified = number partners notified/number of partners identified

Percent of notified partners tested = number partners tested/number of partners notified

Percent of tested partners diagnosed with HIV infection = number partners tested positive/number of partners tested

NNTInew = number of index patients interviewed to find one partner newly diagnosed with HIV infection

NNTIany = number of index patients interviewed to identify any partners with HIV infection (newly and previously diagnosed with HIV infection)

IQI = interquartile interval

Table 2. Effectiveness of Partner Services Interventions Stratified by Implementation Year

Outcome Measure	1985 to 2000 Median Number of Studies	2001 to 2020 Median Number of Studies
Partner index ratio	2.4 (IQI: 1.8 to 3.3) 6 studies	3.0 (IQI: 1.7 to 14.3) 6 studies
Percent of identified partners notified	73.6% (IQI: 51.8% to 78.6%) 5 studies	47.3% (IQI: 9.0% to 75.4%) 5 studies
Percent of notified partners tested	57.6% (IQI: 44.8% to 82.3%) 5 studies	52.5% (IQI: 36.8% to 70.9%) 6 studies
Percent of tested partners diagnosed with HIV infection	20.6% (IQI: 14.2% to 29.0%) 8 studies	10.6% (IQI: 6.6% to 18.4%) 6 studies
NNTInew	6.0 (IQI: 4.3 to 12.2) 8 studies	20.8 (IQI: 9.4 to 28.6) 5 studies
NNTIany	1.6 (range 1.6 to 1.6) 3 studies	3.1 (IQI: 1.7 to 3.3) 5 studies

Partner index ratio = number of partners identified/number of index patients interviewed

Percent of identified partners notified = number partners notified/number of partners identified

Percent of notified partners tested = number partners tested/number of partners notified

Percent of tested partners diagnosed with HIV infection = number partners tested positive/number of partners tested

NNTInew = number of index patients interviewed to find one partner newly diagnosed with HIV infection

NNTIany = number of index patients interviewed to identify any partners with HIV infection (newly and previously diagnosed with HIV infection)

IQI = interquartile interval

Sixteen studies examined whether intervention effectiveness varied with intervention or population characteristics and major findings are summarized below. Many characteristics were only reported by one study and are summarized in the Applicability and Generalizability Consideration section.

Provider referral was more effective at notifying partners and diagnosing partners with HIV infection when compared with self-referral or self-referral plus third-party referral. Face-to-face interview was more effective at identifying and diagnosing partners with HIV infection when compared with conducting the initial interview of index patients through telephone. One study found offering point-of-care testing was more effective at getting partners tested than referring partners to clinics for testing.

Identified partners are traditionally contacted through telephone, postal mail, and field visits to schedule appointments to deliver notifications face-to-face (Udeagu 2014a). Limited or inaccurate contact information can make it difficult to reach partners through traditional channels. Recent studies showed that using newer modes of communication (e.g., email, dating websites, text messaging) to complement traditional channels were effective at reaching those partners previously considered “unreachable”, getting them tested, and diagnosing those with HIV infection. More index patients needed to be interviewed, however, to identify one partner newly diagnosed with HIV infection when programs used these newer modes of communication as compared with traditional modes.

Applicability and Generalizability Issues

Intervention Settings

The included studies evaluated interventions implemented in the United States (22 studies), with one study each from Canada; Taiwan, China; Spain; Sweden; and the United Kingdom. The U.S. studies were implemented in the Western (9 studies), Midwestern (1 study), Northeastern (8 studies), and Southern (4 studies) regions as [defined by the U.S. Census Bureau](https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf) [https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf]. Studies evaluated state-wide interventions (5 studies) or interventions implemented in urban (21 studies) or rural (1 study) areas. Interventions were implemented by public health departments (21 studies), hospitals (3 studies), clinics (2 studies), or research teams (1 study). The CPSTF finding is considered applicable to a range of settings within or outside the United States.

Population Characteristics

The median age of index patients was 34.3 years (11 studies). Seven studies measured index patients' age in brackets and reported a median of 31% were younger than 30 years (7 studies). The median age for partners was 32 years (2 studies) and a median of 40% of partners were younger than 30 years (5 studies). There is no evidence from the included studies that intervention effectiveness differed by index patients' or partners' age.

Most index patients and partners were male (median of 86% reported by 22 studies and 81% reported by 12 studies, respectively). Transgender persons accounted for a median of 1.1% of index patients (4 studies). One study performed stratified analysis and found similar notification rates for male and female partners, though more male partners tested positive than female partners. One study found index patients who were pregnant identified more partners newly tested positive for HIV infection than did index patients who were not pregnant.

Seventeen studies conducted in the U.S. reported on racial or ethnic distributions. Index patients and partners were Black or African American (median 48% from 16 studies and 45% from 5 studies, respectively), White (median 16% from 16 studies, and 17% from 4 studies, respectively), and Hispanic or Latino (median 26% from 14 studies and 32% from 4 studies, respectively). Interventions were effective across the racial and ethnic groups examined.

Index patients and partners were exposed to HIV through MSM (median of 63% and 69%, respectively), injection drug use (median of 8% and 13%, respectively), or heterosexual contact (median of 16% and mean of 25%, respectively). The intervention was effective at diagnosing partners with HIV infection across the transmission categories. One study showed that fewer index patients needed to be interviewed to identify a partner newly diagnosed with HIV infection when exposure happened through MSM or injection drug use, compared with exposure through heterosexual contact. Another study found index patients with acute HIV infection identified more partners newly tested positive for HIV infection than did index patients with non-acute or long-standing HIV infection.

Few studies reported index patients' or partners' socioeconomic status. One study reported that index patients with incomes greater than \$30,000 per year were significantly more likely to report notifying partners than those with lower incomes.

Intervention Characteristics

Partner services interventions offered partner notification and testing (24 studies), repeat testing of partners who tested negative (3 studies), linkage to medical care (10 studies), counseling (7 studies) and scheduling and transportation assistance (2 studies). Index patients were interviewed to identify sexual partners only (7 studies), sexual or needle-sharing partners (18 studies), or sexual, needle-sharing, or social network partners (2 studies). Index patients were offered provider referral (19 studies), self and provider referral (7 studies), or a mix of self, third party, and provider

referral (1 study). Once identified, partners were notified of their potential exposure to HIV in person via face-to-face discussion (7 studies), remotely via telephone, email, text, or website (3 studies), or both (3 studies). Two studies found that shorter time between index patients' diagnosis and interview led to diagnosis of more partners with HIV infection. Interventions were effective at testing and diagnosing partners with HIV infection across all these characteristics.

Data Quality Issues

Fourteen studies assessed newly implemented programs with no baseline data and no concurrent comparison group. Partner services interventions are implemented across the United States ([CDC 2018](https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-partner-services-annual-report-2018.pdf) [https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-partner-services-annual-report-2018.pdf]), making it difficult to design a study with a comparison group not exposed to partner services.

Other Benefits and Harms

No additional benefits were identified by the included studies.

Intimate partner violence (IPV) has been discussed in the literature as a potential harm associated with partner services interventions, but none of the included studies discussed this issue. One study (Koenig et al., 2000) examining IPV found that 0.5-4% of females with HIV infection reported experiencing violence following disclosure of their HIV serostatus, and suggested fear of violence may influence some women's decision to get tested for HIV and disclose their serostatus. Another U.S. study (Maher et al., 2000) found, however, that among females, fear of potential IPV was not associated with their decision to obtain an HIV test. Studies among gay and bisexual men living with HIV showed high levels of IPV (Siemieniuk et al., 2013). IPV prevention can be incorporated into partner services interventions by training service providers to recognize signs of IPV and link index patients and partners to needed services ([CDC 2014](https://www.cdc.gov/violenceprevention/pdf/ipv/13_243567_green_aag-a.pdf) [https://www.cdc.gov/violenceprevention/pdf/ipv/13_243567_green_aag-a.pdf]).

Economic Evidence

Economic evidence shows partner services interventions to increase HIV testing are cost-effective. The economic review included 6 studies (search period January 2000 through July 2021). All monetary values are in 2020 U.S. dollars.

All six of the studies evaluated programs delivered by U.S. public health departments. Interventions were implemented for populations at risk for HIV through heterosexual contact, injection drug use, and male to male sexual contact; one study reported outcomes for these groups separately. Five studies were conducted in urban areas, two were statewide, and one was nationwide.

The economic review team assessed the quality of evidence by considering how well each estimate captured the components considered to be drivers of magnitude and the appropriateness of measurement and valuation; the lower of the two assessments was used to determine overall quality. All estimates from five studies were of good quality and all estimates from one study were of fair quality. The two most frequently reported limitations for intervention cost estimates (7 good quality, 1 fair quality) were missing overhead cost and unit prices that were not based on local data. The most frequently reported limitations for averted healthcare cost estimates (3 good quality, 1 fair quality) and net cost per QALY estimates (3 good quality, 1 fair quality) were missing intervention effect through behavior change or treatment, missing information on model calibration, or outdated QALY weights.

Intervention Cost

- The mean intervention cost per person tested was \$1,761 (range: \$891 to \$2,570), based on 3 estimates from 2 studies.

- The median intervention cost per person newly diagnosed with HIV infection was \$22,144 (IQR: \$9,384 to \$27,764), based on 5 estimates from 4 studies.

Cost-benefit

None of the included studies reported cost-benefit estimates.

Cost-effectiveness

- The mean net cost (difference between program cost per HIV infection averted and lifetime averted cost of HIV treatment) per QALY gained was \$25,526 (range: \$11,121 to \$49,378), based on 3 estimates from 2 studies.
- The net cost per QALY gained indicated cost-savings based on 2 estimates from 2 studies.

The systematic economic review finds partner services to increase HIV testing is cost-effective based on 5 estimates from 3 studies of net cost per QALY gained that were either cost-saving or below a conservative benchmark of \$50,000 per QALY gained.

Considerations for Implementation

The following considerations for implementation are drawn from studies included in the evidence review, the broader literature, and expert opinion from CPSTF deliberations, as noted below.

In 2018, CDC-funded partner services programs across the United States interviewed 33,498 index patients and identified 29,455 sexual or needle-sharing partners ([CDC 2018](https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-partner-services-annual-report-2018.pdf) [https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-partner-services-annual-report-2018.pdf]). The programs notified 63.1% of identified partners and tested 38.6% of those notified. Of those tested, 14.3% were diagnosed with HIV infection, which is comparable to findings from the current systematic review. The CDC-funded programs were able to link 47.9% of partners diagnosed with HIV infection to care ([CDC 2018](https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-partner-services-annual-report-2018.pdf) [https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-partner-services-annual-report-2018.pdf]).

Currently, partner services programs are offered across the United States for HIV infection and other sexually transmitted diseases. States offer different services, however, and use different notification methods ([The Center for HIV Law and Policy](https://www.hivlawandpolicy.org/) [https://www.hivlawandpolicy.org/]). Some states have been experimenting to find more effective ways to deliver partner services. These include establishing service units in neighborhoods with high HIV prevalence (Bocour et al., 2013), interviewing index patients face-to-face or through telephone (Heumann et al., 2017, Udeagu et al., 2014b), identifying partners from index patients' social network (Ahrens et al., 2007), using the internet or text messaging to contact partners (Hightow-Weidman et al., 2014, Udeagu et al., 2014a), and offering partners different testing options (Renaud et al., 2011). Findings from these experiments may improve the effectiveness of partner services programs.

In 2021, about 85% of adults owned a smartphone ([Statista 2021](https://www.statista.com/statistics/219865/percentage-of-us-adults-who-own-a-smartphone/) [https://www.statista.com/statistics/219865/percentage-of-us-adults-who-own-a-smartphone/]), 77% had high-speed broadband service at home and 93% used the Internet ([Pew Research Center 2021](https://www.pewresearch.org/internet/fact-sheet/internet-broadband/) [https://www.pewresearch.org/internet/fact-sheet/internet-broadband/]). Advances in communication technology have allowed more people to arrange temporary sexual relationships through the internet, making it increasingly difficult to obtain partners' full contact information (Hightow-Weidman et al., 2014, Udeagu et al., 2014a). The partner services program in New York City incorporated internet and text messaging services and were able to reach partners who were otherwise untraceable through traditional modes of communication. Internet partner services, in particular, have made it easier for health departments to contact young men exposed to HIV through MSM who were previously

untraceable (Udeagu et al., 2014a). Partner services programs adding internet or text messaging components might need to consider the investment in additional equipment, data plan, and staff time, and have staff members who are savvy with technology and social media (Hightow-Weidman et al., 2014, Udeagu et al., 2014a).

Evidence Gaps

CPSTF identified several areas that have limited information. Additional research and evaluation could help answer the following questions and fill existing gaps in the evidence base.

- How effective are partner services interventions at reconnecting persons out-of-care to HIV medical care? Partners identified by index patients may know their HIV status but out-of-care. Partner services interventions may help link these people with medical care. None of the included studies reported on this outcome.
- How effective are partner services interventions at increasing partners' access to PrEP or repeat testing? Partners who test negative for HIV and remain at high risk for exposure may be offered HIV prevention services such as PrEP or repeat HIV testing.
- How effective are partner services interventions in rural areas? Is the intervention cost-effective when used in rural settings?
- Does intervention effectiveness differ by racial and ethnic group? How effective are partner services interventions for American Indian and Alaska Native communities?
- Does intervention effectiveness differ by the socioeconomic status (SES) of index patients and partners?
- What are the economic effects of using enhanced technologies such as internet, e-mail, texts, and social media for HIV partner services?
- What are the effects of adding self-testing kits for index patients to distribute to their partners on both the effectiveness and economics of the intervention?

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Disclaimer

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