Community Preventive Services Task Force

HIV Prevention: Clinical Decision Support System to Increase HIV Screening

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Finding and Rationale Statement
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CPSTF Finding and Rationale Statement

Context

In 2018, 1.04 million adults and adolescents in the United States were living with diagnosed HIV infection, including around 38,000 new diagnoses (CDC 2020 [https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-31.pdf]). The highest rates of diagnosis were for people aged 20-29 years, Black or African American people, those who have male-to-male sexual contact, and people living in the southern states (CDC 2020 [https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-31.pdf]).

Ending the HIV Epidemic: A Plan for America [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 (DHHS) to pursue the goal to reduce new HIV infections by 75% in 5 years and 90% in 10 years. DHSS identified four key strategies to achieve these goals in the United States, including diagnosing people living with HIV as early as possible, linking them to care, and starting treatment to achieve and maintain viral suppression to prevent transmission to others. The National Strategic Plan: A Roadmap to End the Epidemic for the United States, 2021-2025 [https://www.hiv.gov/federal-response/hiv-national-strategic-plan/hiv-plan-2021-2025] (The Plan), also developed by HHS, is closely aligned with, and complements, the *Ending the HIV Epidemic*. The Plan covers the entire United States with a focus on collaboration between all sectors of society to prevent new HIV transmission, improve health outcomes of people with HIV, and reduce HIV-related disparities and health inequities. Testing for HIV is the first step for both plans. Identifying interventions that increase HIV screening, especially among population groups with the highest rates of diagnosis, can facilitate testing.

Intervention Definition

Clinical Decision Support Systems (CDSS) encompass a variety of tools to enhance decision making about patient care. These tools include computerized alerts and reminders to healthcare providers and patients, clinical guidelines, condition-specific order sets, focused patient data reports and summaries, documentation templates, and diagnostic support (Office of the National Coordinator for Health Information Technology, 2018).

To increase HIV screening, CDSS use patient data and current guidelines to identify those eligible for HIV screening and send healthcare providers computerized alerts or reminders to order tests. CDC guidelines (Branson et al. 2006) recommend routine screening for all patients aged 13-64 years and all pregnant people, and at least annual screening for people at high risk for HIV. Risk is assessed based on patients' or their partners' sexually transmitted disease diagnosis, sexual behavior, or history of injection drug use.

Patients may receive information about HIV transmission and testing prior to screening, and healthcare providers may receive education about HIV transmission, patient eligibility for screening, and how to correctly use CDSS.

CPSTF Finding (April 2020)

The Community Preventive Services Task Force recommends clinical decision support systems for HIV screening to increase screening based on strong evidence of effectiveness.

Studies included in the systematic review showed use of CDSS increases HIV screening for the general population and for people at higher risk for HIV infection. People testing positive for HIV can then be linked to care, which could lead to a

reduction in HIV transmission. CDSS for HIV screening were effective with all groups examined, including populations who are underserved. When implemented in healthcare settings serving these populations, CDSS for HIV screening could lead to improved health equity.

Rationale

Basis of Finding

The CPSTF recommendation is based on evidence from a systematic review of 23 studies [https://www.thecommunityguide.org/findings/hiv-prevention-clinical-decision-support-system-increase-hiv-screening#included-studies] (search period January 1985 to October 2019) that evaluated the effectiveness of CDSS for increasing HIV screening.

Among the included studies, CDSS alerted providers to offer testing to all eligible patients. Providers offered testing to a median of 80% of eligible patients, and a median of 30% of those patients declined the offer. Compared with no intervention, CDSS increased HIV screening and identified more HIV infections (Table). The majority of patients who tested positive were linked to care (1 study). Patients were also identified at earlier stages of HIV infection based on CD4 cell count and viral load (1 study).

Table. Intervention Effects on HIV Screening Among Eligible Patients

Outcome Measure	Screening Rates at Baseline and Follow-up	Median (IQI) Number of Studies	Direction of Effect
Percent of patients tested	Baseline: median of 6% Post intervention: 16%	Absolute percentage point change: Increase of 10.3 percentage points (6.3 to 15.5) 16 studies	Favors the intervention
Number of patients tested per month	Baseline: median of 80 tests/month Post intervention: median of 495 tests/month	Absolute change: additional 415 patients tested per month (45 to 531) 7 studies	Favors the intervention
Number of patients who tested positive per month	Baseline: median of 1.3 persons tested positive/month Post intervention: median of 2.6 persons tested positive/month	Absolute change: additional 1.3 patients tested positive per month (0.02 to 2.8) 13 studies	Favors the intervention

Percent tested = number of patients tested/number of patients eligible for testing
Number tested per month = number of patients tested/study duration in number of months
Number tested positive per month = number of patients who tested positive/study duration in number of months

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Applicability and Generalizability Considerations

Intervention Settings

The included studies evaluated interventions implemented in the United States (21 studies) and the United Kingdom (2 studies). The U.S. studies were implemented in the Western (6 studies), Midwestern (4 studies), 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]. Two of the studies were conducted in multiple regions and one study did not report on location. Interventions were implemented in urban (16 studies), rural

(2 studies), and a mix of urban, suburban, and rural (3 studies) areas. Two studies did not report information about urbanicity. Studies were implemented in clinics (8 studies), hospitals (3 studies), emergency departments (5 studies), Veterans Affairs healthcare facilities (6 studies), and managed care settings (1 study). CDSS increased HIV screening in all of these settings.

Population Characteristics

HIV screening increased for all age groups (7 studies). In four of these seven studies, patients aged 50 years or older had lower baseline HIV screening rates when compared with patients aged 18 to 30 years. They had greater increases in HIV screening with CDSS interventions, however, leading to comparable post-intervention rates for all age groups.

Interventions were effective for both males and females (5 studies), across different income levels (3 studies), and for all racial and ethnic groups examined (6 studies). One study only recruited American Indian and Alaska Native people and reported intervention effectiveness. One study that considered health coverage showed a greater increase in screening among patients without health insurance. CDSS for HIV screening were effective for underserved populations examined, suggesting this intervention has the potential to improve health equity.

Intervention Characteristics

Included studies evaluated interventions that were implemented for a median of 12 months and added HIV testing alerts to preexisting (22 studies) or new (1 study) electronic medical record (EMR) or electronic health record (EHR) systems.

HIV testing can be offered as opt-out or opt-in. CDC recommends opt-out testing, which notifies patients they will be tested for HIV as part of their standard preventive screenings unless they decline verbally or in writing. With opt-in testing, patients receive pre-test counseling and must give explicit written consent ahead of time (Branson et al., 2006). Interventions were effective with either opt-out (19 studies) or opt-in (3 studies) testing; one study did not report on this characteristic.

The review team categorized CDSS reminders as active or passive. Active reminders require providers to address an alert before moving to the next task or closing a patient's chart. Passive reminders can be ignored by providers. Interventions were effective with active (13 studies) and passive (4 studies) reminders. One study switched from passive to active reminders and reported an increase in HIV screening.

In some of the included studies, providers were educated about HIV, HIV testing, and CDSS (10 studies) prior to intervention implementation. These studies led to greater increases in screening when compared with studies that did not include an educational component (8 studies). The presence or absence of an educational component could not be determined for five of the included studies.

CDSS identified all eligible patients who had not been tested previously (12 studies), patients who were at high risk for HIV infection and had not been tested within the previous 12 months (6 studies), or both (5 studies). All three approaches showed comparable increases in HIV screening.

Data Quality Issues

In most of the included studies, the authors evaluated interventions that were already implemented and extracted data from medical records. This limited studies to mostly pre-post designs and convenience sampling.

Other Benefits and Harms

No additional benefits or potential harms were identified by the included studies.

Considerations for Implementation

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

- EMR and EHR are widely used in the United States healthcare system.
  - 96% of non-federal acute care hospitals used EMR/EHR systems by 2015 (Henry et al., 2016).
  - 85.9% of office-based physicians used an EMR/EHR system by 2017 (Myrick et al., 2017).
  - Staff members already use EMR/EHR systems to track patient services and can adopt an additional alert for HIV screening (CPSTF).
- Despite the widespread use of EMR/EHR, incorporating reminders for HIV screening poses some challenges identified by included studies or the CPSTF.
  - For CDSS to effectively identify patients at high risk for HIV infection, providers will need to collect and record information about risk behaviors (e.g., sexual behavior, drug use history). Some providers or patients may feel uncomfortable and avoid these topics (CPSTF). CDC offers guidance to providers for discussing sexual health.
  - Some risk factors may be recorded in EMR/EHR fields that are not searchable, making it difficult for CDSS algorithms to identify patients eligible for screening (Burrell et al., 2018). Modifications to electronic forms might be needed to ensure complete recording of patient conditions.
- Providers might resist HIV screening in an already busy environment and choose not to offer patients tests despite CDSS prompts.
  - It could be helpful to streamline the process by considering the timing for screening prompts. For example, CDSS might alert emergency department providers to screen patients for HIV when blood has already been drawn (Chadwick et al., 2017; Lin et al., 2017).
- Interventions that offered providers training produced greater increases in HIV screening when compared to interventions that did not. Training could improve intervention effectiveness by
  - Teaching providers how to use the system so daily interruptions are minimized, which could reduce the perceived burden of HIV screening in a busy environment (Burrell et al., 2018).
  - Providing facts about HIV transmission and prevention that could address biases and stereotypes providers may hold about patients at risk for HIV infection, including those related to age, race/ethnicity, gender, or risk behaviors (CPSTF).
- Although most studies used an opt-out approach to testing, a median of 30% of patients declined an HIV test. The included studies and experts in the field have suggested providers could try the following:
  - Ask patients detailed questions about their reasons for declining and offer alternative solutions such as oral testing rather than needles or finger-stick tests (Clarke et al., 2013).
  - Offer brief counseling when time and resources allow (CPSTF).
- CDSS interventions for HIV screening identified more patients living with HIV compared to no CDSS. Patients who test positive need to be linked with appropriate follow-up care that is affordable and accessible. Included studies offered the following suggestions to help make these connections.
  - CDSS algorithms could be established to connect patients with downstream care. CDSS could automatically order confirmatory tests and submit referrals (Conners et al., 2012), provide direct links to

downstream care facilities to set up appointments (Burrell et al., 2018), or report confirmed cases to the local health department for tracking (Sha et al., 2019).

- Outreach workers could be engaged to deliver results to patients who test positive and facilitate linkage to care (Lin et al., 2017). Patients might be more receptive to information and advice offered by community health workers (CPSTF)..

Evidence Gaps

The 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.

- Most studies reporting on HIV screening among people at high risk did not report effectiveness by specific risk behaviors. How effective are CDSS for HIV screening among people who have male-to-male sexual contact or inject drugs, and people who are transgender?
- How effective are CDSS for HIV screening in rural areas?

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Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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