

HIV Screening: Clinical Decision Support Systems to Increase HIV Screening

Summary Evidence Table

This table outlines information from the studies included in the Community Guide systematic review of Clinical Decision Support Systems to Increase HIV Screening. It details study quality, population and intervention characteristics, and study outcomes considered in this review. Complete references for each study can be found in the Included Studies section of the [review summary](#).

Abbreviations Used in This Document:

Outcomes Reported in This Review:

Percent tested
Number tested per month
Percent tested positive
Number tested positive per month
Percent of patients tested positive and linked to care
Percent of eligible patients offered HIV test
Percent of patients offered HIV test and declined

Formula used:

Percent tested: $(\text{number tested} / \text{number eligible for testing}) * 100$
Number tested per month: $\text{number tested} / \text{Number of months in intervention duration}$
Percent tested positive: $(\text{number tested positive} / \text{number tested}) * 100$
Number tested positive per month: $\text{number tested positive} / \text{number of months in intervention duration}$
Percent linked to care: $\text{number linked to care} / \text{number tested positive}$
Percent test offered: $(\text{number tests offered} / \text{number eligible}) * 100$

Percent test declined: $(\text{number test declined} / \text{number tests offered}) * 100$

Other terms:

CDC: Centers for Disease Control and Prevention
ED: emergency department
EHR: electronic health record
EMR: electronic medical record
FQHC: federally qualified health center
HCV: Hepatitis C virus
HIV: Human Immunodeficiency Virus
MSM: men having sex with men
NR: not reported
SES: socioeconomic status
STI: sexually transmitted infection
USPSTF: United States Preventive Services Task Force
VA: United States Department of Veterans Affairs
VHA: Veterans Health Administration

Notes:

- **Suitability of design** includes three categories: greatest, moderate, or least suitable design. [Read more](#) >>
- **Quality of Execution** – Studies are assessed to have good, fair, or limited quality of execution. [Read more](#) >>

- **Race/ethnicity** of the study population: The Community Guide only summarizes race/ethnicity for studies conducted in the United States.

Study	Intervention Characteristics	Population Characteristics	Results
<p>Author Year: Anaya et al., 2013</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Northeast, Southwest, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: 2 urban VA hospitals</p> <p>Intervention Duration: Site 1: 6 months Site 2: 4 months</p> <p>Screening Reminder: Nurse-initiated rapid HIV testing, using electronic reminders</p> <p>Preexisting or new EHR: preexisting Guidelines used: CDC 2006 Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: nurses Providers receiving alert: nurses under physician supervision Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results:</p> <ul style="list-style-type: none"> • Site 1, nurses forwarded results to providers who delivered results to patients during visit • Site 2, nurses delivered results to patients <p>Services for patients tested positive: automatic follow-up orders for confirmatory testing and referral to infectious disease clinic</p>	<p>Eligibility Criteria: Clinics: 2 study sites in regions with high HIV prevalence Site 1: 2 clinics participated Site 2: all 5 clinics participated</p> <p>Patients: For routine testing: all veterans visiting sites, between 18 and 64 years of age; no HIV test in past year; not previously diagnosed with HIV</p> <p>Sample Size: Clinics: 2 hospital sites with 7 clinics Providers: NR Patients: 36,036</p> <p>Demographics: Providers: NR</p> <p>Patients: post-intervention only Mean age: 60.5 Gender: 92.3% male Race/Ethnicity: 44.2% white, 45.6% African American SES: NR Education: NR Insurance: 100% insured HIV risk factor: 8.7% HCV infection, 0.5% Hep B infection, 1.6% prior STI, 10.1% illicit drug use, 5.2% homelessness</p>	<p>Outcome Measure: Percent tested</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested: Site 1 Pre: $(101/8,417) * 100 = 1.2\%$ Post: $(2364/8,265) * 100 = 28.6\%$ Absolute change: 27.4 percentage points</p> <p>Site 2 Pre: $(10/26,646) * 100 = 0.04\%$ Post: $(2522/27,771) * 100 = 9.1\%$ Absolute change: 9.1 percentage points</p> <p>Overall Pre: $(111/35,063) * 100 = 0.3\%$ Post: $(4886/36,036) * 100 = 13.6\%$ Absolute change: 13.3 percentage points</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Services for patients tested negative: NR</p> <p>Comparison: baseline only HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>		
<p>Author Year: Avery et al., 2012</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Location: Cleveland, Ohio, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: 7 primary care clinics that are part of a safety-net hospital system</p> <p>Intervention Duration: 18 months</p> <p>Screening Reminder: "HIV Testing Once" implemented in Metro Health System, a publicly funded academic teaching hospital in Cleveland</p> <p>Preexisting or new EHR: preexisting Guidelines used: CDC 2006 Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: primary care providers Providers receiving alert: primary care providers Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test result: NR</p>	<p>Eligibility Criteria: Clinic: 7 selected primary care practice sites</p> <p>Patients: For routine testing: all patients 18-64 years old with at least one office visit from January 2008 to June 2012; excluded patients aged 13-17 and patients living with HIV/AIDS</p> <p>Sample Size: Clinics: 7 Providers: NR Patients: 58,071</p> <p>Demographics: Providers: NR</p> <p>Patients: post-intervention only Mean age: 41.8 Gender: 37.9% male Race/Ethnicity: 7.9% Hispanic, 29.6% White, 53.1% African American, 6.1% other, 3.3% unknown SES: NR Education: NR Insurance: 65.6% insured</p>	<p>Outcome Measure: Percent tested Percent tested positive Number tested positive per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested: Pre: 11.7% Post: 39.7% Absolute change: 28 percentage points</p> <p>Percent tested positive remained at 0.2%</p> <p>Number tested positive per month: Pre: 14/30 months=0.5 Post: 46/18 months=2.6 Absolute change: additional 2.1 tested positive Relative change: 420%</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>		
<p>Author Year: Burrell et al., 2018</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Central Appalachia, U.S.</p> <p>Urbanicity: rural</p> <p>Setting: 3 clinics</p> <ul style="list-style-type: none"> • 2 local urgent care clinics: 1 stand alone, 1 multi-specialty based • 1 student health services clinic affiliated with a large, mid-Atlantic university <p>Intervention Duration: 12 months</p> <p>Screening Reminder: EMR-based HIV and HCV screening program that used alerts to prompt providers to order tests for eligible patients</p> <p>Preexisting or new EHR: preexisting Guidelines used: CDC 2006 Routine or targeted testing: both Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: physicians, nurses, and technicians Providers receiving alert: physicians, nurses, and technicians Physician consent for ordering test: NR</p>	<p>Eligibility Criteria: Clinic: 2 urgent care clinics and a student clinic; no detail provided on how they were chosen</p> <p>Patients: EMR identified eligible patients by searching charts of registered patients to see if they met screening guidelines</p> <p>For routine testing: general population, 13-64 years of age, at least once a year as part of routine healthcare</p> <p>For high risk: had a history of risk factors identified in the EMR; specific risk factors not reported</p> <p>Sample Size: Clinics: 3 Providers: NR Patients: 36,389</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: NR</p>	<p>Outcome Measure: Number tested per month Percent tested positive Number tested positive per month Percent of eligible patients offered HIV test Percent of patients offered HIV test and declined</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Number tested per month: Pre: 1,639/12=136.6 Post: 1,972/12=164.3 Absolute change: additional 27.7 tests per month Relative change: 20.3%</p> <p>No new HIV positive cases were found</p> <p>Percent tested positive: 0 Number tested positive per month: 0</p> <p>Post-intervention only: Percent offered: $(11,131/36,389) * 100 = 30.6\%$ Percent declined: $(3,388/11,131) * 100 = 30.4\%$</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test result: telephone call from a registered nurse</p> <p>Services for patients tested positive: scheduled follow-up appointments, referred patients to “Positive Health Clinic” for follow-up appointments, and offered transportation assistance</p> <p>Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Race/Ethnicity: NR SES: NR Education: NR Insurance: NR</p>	
<p>Author Year: Chadwick et al., 2016</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: North Yorkshire, United Kingdom</p> <p>Urbanicity: urban</p> <p>Setting: general practices, clinics</p> <p>Intervention Duration: 3 months</p> <p>Screening Reminder: Incorporating alerts for HIV testing within general practices in North Yorkshire</p> <p>Preexisting or new EHR: preexisting Guidelines used: derived from panel discussion with hospital doctors, general practitioners, specialist/practice nurses and HIV physicians both in London and North Yorkshire</p>	<p>Eligibility Criteria: Clinic: general practices; no details on how the clinics were chosen</p> <p>Patients: For high risk: patients going to the clinics during intervention period who had tests ordered (e.g. Pneumocystis stain, acid-fast bacilli stain, blood film, tests for STI) that triggered HIV testing offer</p> <p>Sample Size: Clinics: NR Providers: NR Patients: NR</p> <p>Demographics:</p>	<p>Outcome Measure: Number tested per month Percent tested positive</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Number tested per month: Pre: 502 Post: 532 Absolute change: additional 30 tested per month Relative change: 6%</p> <p>Percent tested positive/# tested positive: no new HIV positive cases were found</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Routine or targeted testing: targeted Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: nurses, physicians Providers receiving alert: nurses, physicians Physician consent for ordering test: NR Education on CDSS/HIV: no</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Providers: NR</p> <p>Patients: Mean age: NR Gender: NR Race/Ethnicity: NR SES: NR Education: NR Insurance: NR</p>	
<p>Author Year: Clarke et al., 2013</p> <p>Study Design: Pre-post with comparison group</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Good</p>	<p>Location: United Kingdom</p> <p>Urbanicity: urban</p> <p>Setting: genitourinary medicine service in a hospital</p> <p>Intervention Duration: 14 months</p> <p>Screening Reminder: Paper record system was replaced with an electronic patient record system that included a prompt to offer HIV screening</p> <p>Preexisting or new EHR: new Guidelines used: British Association for Sexual Health and HIV, Medical</p>	<p>Eligibility Criteria: Clinic: genitourinary medicine service was chosen; authors were affiliated with the hospital</p> <p>Patients: For high risk: all new and rebooked patients receiving service during the evaluation period; all patients attending the genitourinary medicine service considered at high risk for HIV infection</p> <p>Sample Size: Clinics: 2 Providers: NR Patients: 4,220</p>	<p>Outcome Measure: Percent tested Percent of eligible patients offered HIV test Percent of patients offered HIV test and declined</p> <p>How Ascertained: medical records (electronic and paper)</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested: Intervention: Pre: $(562/772) * 100 = 72.8\%$ Post: $(891/1,141) * 100 = 78.1\%$ Change: 5.3 percentage points Control: Pre: $(221/517) * 100 = 42.7\%$</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Foundation for AIDS and Sexual Health Standards for the Management of STIs, 2010 Routine or targeted testing: targeted Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: clinicians Providers receiving alert: clinicians Physician consent for ordering test: NR Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: NR Race/Ethnicity: NR SES: NR Education: NR Insurance: NR</p>	<p>Post: $(189/439) * 100 = 43.1\%$ Change: 0.4 percentage points Overall absolute difference: $5.3 - 0.4 = 4.9$ percentage points</p> <p>Percent test declined: Pre: 27.2% Post: 21.9% Absolute change: -5.3 percentage points</p> <p>Post-intervention only: Percent test offered: 100%</p>
<p>Author Year: Conners et al., 2012</p> <p>Study Design: Simple time series</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: West Coast and Northeast Region, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: 7 substance use disorder sub-clinics in 3 VHA medical centers</p> <p>Intervention Duration: 6 months</p> <p>Screening Reminder: A routine HIV rapid test clinical reminder and documentation template was installed into the VHA Computerized Patient Record System</p>	<p>Eligibility Criteria: Clinic: VHA substance use disorder clinics with high to medium HIV prevalence</p> <p>Patients: For high risk: veterans who attended the clinics during the intervention period, 18 years or older, had no HIV positive record, and had not been tested for HIV in the past year; population considered at high risk due to substance use disorder</p> <p>Sample Size:</p>	<p>Outcome Measure: Percent tested</p> <p>How Ascertained: VHA electronic database</p> <p>Follow-up Time: immediately after intervention ended (0 months) and 6 months following</p> <p>Results: Percent tested Pre: $(15/1,291) * 100 = 1.2\%$ Post, 0 months: $(226/1,146) * 100 = 19.7\%$ Absolute change: 18.5 percentage points</p> <p>Pre: $(15/1,291) * 100 = 1.2\%$ Post, 6 months: $(128/872) * 100 = 14.7\%$</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Preexisting or new EHR: preexisting Guidelines used: CDC 2006 Routine or targeted testing: targeted Opt-out or opt-in: NR</p> <p>Provider Characteristics: Providers involved: nurses Providers receiving alert: nurses Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results: rapid testing delivered results in 20 minutes</p> <p>Services for patients tested positive: CDSS automatically ordered a confirmatory Western blot, CD4 cell count and viral load, and submitted a referral to infectious disease clinics</p> <p>Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Clinics: 7 Providers: 18 Patients: 1,538</p> <p>Demographics: Providers: NR</p> <p>Patients: patients from 3 sites reported here Mean age: 52.5 Gender: 96.1% male Race/Ethnicity: 2.2% Hispanic, 46.6% White, 46.7% African American, 0.9% Asian, 3.6% unknown SES: NR Education: NR Insurance: 100% insured</p>	<p>Absolute change: 13.5 percentage points</p>
<p>Author Year: Crumby et al., 2006</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p>	<p>Location: 2 arms Southside Medical Center, Atlanta, Georgia. U.S. Central Care, Houston, Texas, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: FQHC</p> <p>Intervention Duration: 12 months</p> <p>Screening Reminder:</p>	<p>Eligibility Criteria: Clinic: 2 FQHC in U.S. southern region, part of a larger collaborative, HIV on the Frontlines of Communities in the United States; HIV prevalence relatively high in the U.S. south</p> <p>Patients: For routine testing: 13-64 years of age, visited clinics during evaluation period, and did not</p>	<p>Outcome Measure: Number tested per month Number tested positive per month Percent of patients tested positive and linked to care Percent of eligible patients offered HIV test Percent of patients offered HIV test and declined</p> <p>How Ascertained: EMR records</p> <p>Follow-up Time: intervention ongoing</p>

Study	Intervention Characteristics	Population Characteristics	Results
<p>Quality of Execution: Fair</p>	<p>Alert for HIV testing incorporated into routine testing</p> <p>Preexisting or new EHR: preexisting Guidelines used: CDC 2006 Routine or targeted testing: targeted Opt-out or opt-in: NR</p> <p>Provider Characteristics: Providers involved: Southside, medical assistants and medical providers; Central Care, nurses and providers Provider receiving alert: nurses and medical assistants Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results: Southside, letter sent to all patients with abnormal test results requesting them to come in for results, people not in within a week are referred to local health departments; Central Care, results given during same visit</p> <p>Services for patients tested positive: confirmatory tests offered and patients tested positive linked to care</p> <p>Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: no</p>	<p>have HIV test documented in EMR in past year and those not previously diagnosed</p> <p>Sample Size: Clinics: 2 Providers: NR Patients: Southside Medical Center: 52,437 eligible Central Care: 22,658 eligible</p> <p>Demographics: Providers: NR</p> <p>Patients: data for patients who received HIV test only</p> <p>Southside: Age: 13.6% 13-22, 25.2% 23-30, 24.9% 31-40, 18.6% 41-50, 17.7% 51+ Gender: 29.6% male Race/Ethnicity: 7.5% Hispanic, 11.4% White, 83.2% African American, 2.9% other/multiracial, 2.5% NR SES: NR Education: NR Insurance: NR</p> <p>Central Care: Age: 22.7% 13-22, 24.5% 23-30, 20.5% 31-40, 16.1% 41-50, 16.3% 51+ Gender: 36.8% male Race/Ethnicity: 16.9% Hispanic, 4.8% White, 63% African American, 5.7% other/multiracial, 26.5% NR SES: NR Education: NR Insurance: NR</p>	<p>Results: Number tested per month Southside: Pre: 812/12=67.7 Post: 6,767/12=563.9 Absolute change: additional 496.2 tests per month Relative change: 693.1%</p> <p>Central Care: Pre: 738/12=61.5 Post: 5,297/12=441.4 Absolute change: additional 379.9 tests per month Relative change: 617.7%</p> <p>Number tested positive per month Southside: Pre: 13/12=1.1 Post: 44/12=3.7 Absolute change: additional 2.6 tested positive per month Relative change: 236.4%</p> <p>Central Care: Pre: 6/12=0.5 Post: 42/12=3.5 Absolute change: additional 3.0 tested positive per month Relative change: 600.0%</p> <p>Post-intervention only, 23 months follow-up Percent linked to care Southside: (74/75)*100=99% Central Care: (41/52)*100=79%</p> <p>Percent offered Southside: (41,720/52,437)*100=80% Central Care: (10904/22,658)*100=48%</p> <p>Percent declined Southside: (30,628/41,720)*100=73%</p>

Study	Intervention Characteristics	Population Characteristics	Results
<p>Author Year: Federman et al., 2012</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Connecticut, U.S.</p> <p>Urbanicity: NR</p> <p>Setting: VA Connecticut Healthcare System</p> <p>Intervention Duration: 7 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: CDC 2006 Routine or targeted testing: both Opt-out or opt-in: assume opt-out</p> <p>Provider Characteristics: Providers involved: NR Provider receiving alert: NR Physician consent for ordering test: NR Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Eligibility Criteria: Clinic: NR</p> <p>Patients: For routine testing: people visiting the VA without a prior diagnosis of HIV For high risk: recently diagnosed STI, hepatitis, high-risk sexual behavior, illicit drug use, and/or alcohol abuse</p> <p>Sample Size: Clinics: NR Providers: NR Patients: NR</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: NR Race/Ethnicity: NR SES: NR Education: NR Insurance: NR</p>	<p>Central Care: $(995/10,904) * 100 = 9\%$</p> <p>Outcome Measure: Number tested per month Percent tested positive Number tested positive per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Number tested per month: Pre: 149.4 Post: 701.1 Absolute change: additional 551.7 tests per month Relative change: 369.3%</p> <p>Percent tested positive Pre: 0.83% Post: 0.18% Absolute change: -0.7 percentage points</p> <p>Number tested positive per month: Pre: 1.25 Post: 1.29 Absolute change: additional 0.04 tested positive per month Relative change: 3.2%</p>
<p>Author Year: Felsen et al., 2017</p> <p>Study Design:</p>	<p>Location: New York City, New York, U.S.</p> <p>Urbanicity: urban</p>	<p>Eligibility Criteria: Clinic: CDSS implemented in hospitals that serve mostly underserved population in an area with 2% HIV prevalence; all</p>	<p>Outcome Measure: Percent tested Number tested positive per month</p> <p>How Ascertained: medical records</p>

Study	Intervention Characteristics	Population Characteristics	Results
<p>Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Setting: 3 adult hospitals included in Montefiore Medical Center (MMC), largest provider of medical care in Bronx, NY</p> <p>Intervention Duration: 199 days or 6.6 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: NR Routine or targeted testing: both Opt-out or opt-in: opt-in</p> <p>Provider Characteristics: Providers involved: providers and HIV counselors Provider receiving the alert: providers Physician consent for ordering test: yes Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>sites share an EMR first implemented in 1997</p> <p>Patient: patients 21 to 64 who were admitted into any of the MMC adult hospitals during study period</p> <p>General group: no HIV test results in the EMR High-risk group: had a high-risk diagnosis subsequent to last documented negative HIV test High-risk diagnoses: STIs, Hep B or C, substance use, HIV indicator conditions, AIDS-related conditions</p> <p>Sample Size: Clinics: 3 Providers: NR Patients: 18,943</p> <p>Demographics: Providers: NR</p> <p>Patients: post-intervention only Age: median of 51 Gender: 44.6% male Race/Ethnicity: 43.5% Hispanic, 35.6% Black, 10.4% White, 2% Asian, 5.2% other, 3.3% unknown or missing SES: NR Education: NR Insurance: 69.6% public, 26.1% private, 1.5% uninsured, 2.7% unknown or missing</p>	<p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: $(3,486/36,610) * 100 = 9.5\%$ Post: $(4,122/18,943) * 100 = 21.8\%$ Absolute change: 12.3 percentage points</p> <p>Number tested positive per month Pre: $(48/12.6) * 100 = 3.8$ Post: $(27/6.6) * 100 = 4.1$ Absolute change: additional 0.3 tested positive per month Relative change: 7.9%</p>
<p>Author, Year:</p>	<p>Location: Nevada and California, U.S.</p>	<p>Eligibility Criteria: Clinic: NR</p>	<p>Outcome Measure: Percent tested</p>

Study	Intervention Characteristics	Population Characteristics	Results
<p>Goetz et al., 2008</p> <p>Study Design: Pre-post with comparison group</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Good</p> <p>Linked Study: Goetz 2009</p>	<p>Urbanicity: NR</p> <p>Setting: 5 VHA facilities; 2 intervention healthcare systems had 18 facilities, and the 3 controls had 19 facilities</p> <p>Intervention Duration: 12 months</p> <p>Screening Reminder: Preexisting EHR or new: pre-existing Guidelines used: USPSTF, CDC, VHA Routine or targeted testing: targeted Opt-out or opt-in: opt-in</p> <p>Provider Characteristics: Providers involved: academic and non-academic staff physicians, postgraduate medical trainees, and mid-level providers Provider receiving alert: academic and non-academic staff physicians, postgraduate medical trainees, and mid-level providers Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results: telephone notification if they were negative test results. Not reported how patients with positive test results were informed Services for patients tested positive: NR Services for patients tested negative: yes; brief post-test counseling</p> <p>Comparison: HIV testing offered: yes Reminders used: no</p>	<p>Patients: For high risk: patients receiving healthcare between August 2004 and September 2006 at the 5 selected VHA regional healthcare systems; at risk for HIV but not previously tested for HIV, OR evidence of prior Hep B or C infection, illicit drug use, STDs (gonorrhea, chlamydia, syphilis, genital herpes), homelessness, and certain behavioral risk factors</p> <p>Sample Size: Clinics: 2 intervention healthcare systems with 18 facilities; 3 control healthcare systems with 19 facilities Providers: 4,321 (pre-intervention only) Patients: 29,885 post-intervention</p> <p>Demographics: Providers: NR</p> <p>Patients: Age: 42.9% in 51-64 age group Gender: NR Race/Ethnicity: 17.8% White, 8.8% African American, 3.6% Hispanic, 8% Asian/Native American, 61.8% missing data. SES: 69.8% low income Education: NR Insurance: NR</p>	<p>Percent tested positive Number tested positive per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Intervention: Pre: 5.2% Post: 11.8% Absolute change: 6.7 percentage points Control: Pre: 3.8% Post: 3.8% Absolute change: 0 percentage points Overall absolute difference: 6.7-0=6.7 percentage points</p> <p>Percent tested positive Pre: 0.5% Post: 0.5% Absolute change: 0 percentage points</p> <p>Number tested positive per month Pre: 15/12=1.3 Post: 30/12=2.5 Absolute change: additional 1.2 tested positive per month Relative change: 92.3%</p>

Study	Intervention Characteristics	Population Characteristics	Results
	Other interventions to increase screening: NR		
<p>Author, Year: Goetz et al., 2011</p> <p>Study Design: Pre-post with comparison group</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Location: Southern Nevada and California, U.S.</p> <p>Urbanicity: NR</p> <p>Setting: major VHA healthcare system sites</p> <p>Intervention Duration: 12 months</p> <p>Screening Reminder: Preexisting EHR or new: pre-existing Guidelines used: NR Routine or targeted testing: targeted Opt-out or opt-in: opt-in</p> <p>Provider Characteristics: Providers involved: academic and non-academic staff physicians, postgraduate medical trainees, and midlevel providers Provider receiving the alert: academic and non-academic staff physicians, postgraduate medical trainees, and midlevel providers Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results: nurse-led telephone counseling after negative test results were encouraged</p> <p>Services for patients tested positive: NR</p> <p>Services for patients tested negative: nurse-led counseling encouraged</p>	<p>Eligibility Criteria: Clinic: two major VHA healthcare system sites chosen as intervention site</p> <p>Patients: For high risk: veterans with no record of previous HIV testing; at risk status determined by presence of prior hep B virus infection or positive HBV core antibody test or positive surface antigen, HCV infection, illicit drug use, a STD, homelessness, and behavioral risk factors (excessive alcohol use, lack of housing, unexplained liver disease and exposure to blood products, lab tests, or data captured in specified "Hep C risk factor" fields in the VHA electronic medical record)</p> <p>Sample Size: Clinics: 3 (2 intervention sites and 1 control site) Providers: 1,070 (intervention sites only) Patients: 25,654 (intervention sites only)</p> <p>Demographics: Providers: NR</p> <p>Patients: only intervention sites were reported Mean age: 60 years Gender: NR</p>	<p>Outcome Measure: Percent tested</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Intervention: Pre: $(986/20,254) \times 100 = 4.9\%$ Post: $(3,183/20,254) \times 100 = 15.7\%$ Absolute change: 10.8 percentage points Control: Change: 0 percentage points Overall absolute difference: $10.8 - 0 = 10.8$ percentage points</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Race/Ethnicity: 22% White, 3.7% Black, 8% other, 63% unknown or missing data, 4% Hispanic SES: 38% low-income Education: NR Insurance: NR Baseline screening of intervention group: 4.9%</p>	
<p>Author, Year: Goetz et al., 2013</p> <p>Study Design: Pre-post with comparison group</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Location: South Central and Northeastern region, U.S.</p> <p>Urbanicity: NR</p> <p>Setting: VHA; facilities in Veterans Integrated Service Networks (VISN), consisting of a main clinic often co-located with a hospital and several satellite outpatient clinics</p> <p>Intervention Duration: 6 months</p> <p>Screening Reminder: Intervention separated into 2 arms: Central arm: receiving ongoing support from Project Management Team Local arm: no continued support</p> <p>Preexisting or new EHR: preexisting Guidelines used: CDC and VHA Routine or targeted testing: both Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: interns, residents, attending physicians, physicians Provider receiving the alert: interns, residents, attending physicians, physicians Physician consent for ordering test: NR</p>	<p>Eligibility Criteria: Clinic: facilities in South Central and Northeastern VHA networks who consented to join as intervention facilities; facilities with similar baseline HIV testing rates and complexity in 2 other VISNs were selected as controls</p> <p>Patients: data from June 2009 to Sept 2011 assessed For high risk: Phase I: veterans visiting clinics during intervention period and at higher risk for HIV infection For routine testing: Phase II: all veterans visiting clinics during intervention period without previous test recorded</p> <p>Sample Size: Clinics: 21 Providers: 529 (control), 554 (local), 381 (central) Patients: post-intervention only HIV testing among people with higher risk for HIV infection: 14,698(control), 12,554(local), and 6,659(central).</p>	<p>Outcome Measure: Percent tested</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested High risk population Intervention, Central arm: Pre: 5.1% Post: 15.2% Absolute change: 10.1 percentage points Intervention, Local arm: Pre: 6.0% Post: 11.6% Absolute change: 5.6 percentage points Control: Pre: 4.4% Post: 4.8% Change: 0.4 percentage points Overall absolute difference between Central arm and control arm: 10.1-0.4=9.7 percentage points Overall absolute difference between Local arm and control arm: 5.6-0.4=5.2 percentage points</p> <p>General population Intervention, Central arm: Pre: 3.6% Post: 12.7% Absolute change: 9.1 percentage points</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results: patients were informed through telephone</p> <p>Services for patients tested positive: post-test counseling strongly encouraged</p> <p>Services for patients tested negative: telephone post-test counseling after HIV negative results</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>HIV screening for general population: 67,118(control) and 29,617(central)</p> <p>Demographics: Providers: 46% male</p> <p>Patients: post-intervention only Mean age: 64.2 years Gender: 96.6% male Race/Ethnicity: 25.8% Black SES: NR Education: NR Insurance: NR Baseline screening of intervention group: ranges from 3.6% to 6%</p>	<p>Control: Pre: 3.9% Post: 4.4% Absolute change: 0.5 percentage points Overall absolute difference: 9.1-0.5=8.6 percentage points</p>
<p>Author, Year: Golden et al., 2017</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Location: Seattle, Washington, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: 3 primary care clinics (Harborview Medical Center)</p> <p>Intervention Duration: 30 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: CDC and USPSTF Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: nurses; medical providers; medical assistants pre-enter test orders</p>	<p>Eligibility Criteria: Clinic: no details provided; 3 clinics affiliated with Harborview Medical Center, a public hospital owned by King County and managed by the University of Washington</p> <p>Patient: For routine testing: persons 18-65 who visited clinics and no record of HIV testing</p> <p>Sample Size: Clinics: 3 Providers: NR Patients: 16,784</p> <p>Demographics: Providers: NR</p>	<p>Outcome Measure: Percent tested Number tested positive per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: (1,094/7,331)*100=14.9% Post: (2,193/7,112)*100=30.8% Absolute change: 15.9 percentage points</p> <p>Number tested positive per month Pre: 5/30=0.17 Post: 5/30=0.17 Absolute change: 0 Relative change: 0%</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Provider receiving alert: medical assistants Physician consent for ordering test: yes Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Patients: Age: 13% 18-29, 18% 30-39, 5% 40-49, 32% 50-59, 14% 60-70 Gender: 62% male Race/Ethnicity: 13% Hispanic, 41% White, 32% African American, 7% Asian American, 2% American Indian, 4% other, 1% Pacific Islander SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 14.9% tested among eligible, previously untested persons</p>	
<p>Author, Year: Hechter et al., 2018</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Location: Southern California, U.S.</p> <p>Urbanicity: NR</p> <p>Setting: integrated healthcare system (Kaiser Permanente Southern California [KPSC])</p> <p>Intervention Duration: 30 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: CDC Routine or targeted testing: targeted Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: clinicians Provider receiving the alert: NR Physician consent for ordering test: NR Education on CDSS/HIV: NR</p>	<p>Eligibility Criteria: Clinic: NR</p> <p>Patient: all KPSC members, greater than or equal to 14 years old, received at least one other STI test (ordering tests for syphilis, chlamydia, gonorrhea, hep B surface antigen, or hep C antibody), unknown HIV status or no HIV test result in past 30 days</p> <p>Sample Size: Clinic: all healthcare facilities within KPSC network Providers: NR Patients: 885,439 post-intervention</p> <p>Demographics: Providers: NR</p>	<p>Outcome Measure: Percent tested Percent tested positive Number tested positive per month Percent tested positive with CD4 cells/mm³ <200 Percent tested positive with viral load <200 copies/mL</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: (854,925/2,326,701)*100=36.7% Post: (600,719/1,362,479)*100=44.1% Absolute change: 7.4 percentage points</p> <p>Percent tested positive Pre: (141/854,925)*100=0.016% Post: (245/600,719)*100=0.04% Absolute change: 0.02 percentage points</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Patients: post-intervention only Age: 37.8% of participants are in the 25-39 age range Gender: 31.1% male Race/Ethnicity: 43.7% Hispanic, 29.6% White, 11.2% African American, 10.2% Asian, 3% unknown, 2.2 multiple/other SES: NR Education: NR Insurance: 6.2% Medicaid insured Baseline screening of intervention group: 36.7%</p>	<p>Number tested positive per month Pre: 141/54=2.6 Post: 245/30=8.2 Absolute change: additional 5.6 tested positive per month Relative change: 215%</p> <p>Percent tested positive with CD4 cells/mm³ <200 Pre: (37/135)*100=27.4% Post: (23/236)*100=9.7% Absolute change: -17.7 percentage points</p> <p>Percent tested positive with viral load <200 copies/mL Pre: (6/134)*100=4.5% Post: (125/239)*100=52.3% Absolute change: 47.8 percentage points</p>
<p>Author, Year: Kershaw et al., 2018</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Location: Boston, Massachusetts, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: Beth Israel Deaconess Medical Center (large academic medical center)</p> <p>Intervention Duration: 24 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: NR Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: attending physicians and resident physicians Provider receiving the alert: NR Physician consent for ordering test: NR</p>	<p>Eligibility Criteria: Clinic: NR</p> <p>Patients: For routine testing: between the ages of 18-65 years with at least one visit to the clinic from January 2012 through October 2015, with no previous HIV screening; excluded if no demographic information available</p> <p>Sample Size: Clinic: 1 Providers: NR Patients: 20,640</p> <p>Demographics: Providers: NR</p> <p>Patients: post-intervention only</p>	<p>Outcome Measure: Percent tested Percent tested positive Number tested positive per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: 15.3% Post: 30.7% Absolute change: 15.4 percentage points</p> <p>Percent tested positive Pre: 0.3% Post: 0.7% Absolute change: 0.4 percentage points</p> <p>Number tested positive per month Pre: 12.7/22=0.6</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Age: 8% <25, 22% 26-35, 19% 36-45, 51% 46-65 Gender: 41.7% male Race/Ethnicity: 62.1% White, 16.8% African American, 7.4% Asian, 12.4% Other SES: median income \$67,338 Education: NR Insurance: NR Baseline screening of intervention group: 15.3% among previously untested and 22.5% among new patients</p>	<p>Post: $44.4/24=1.9$ Absolute change: additional 1.3 tested positive per month Relative change: 216.7%</p>
<p>Author, Year: Lin et al., 2017</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Chicago, Illinois, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: emergency department of University of Illinois Hospital and Health Sciences System</p> <p>Intervention Duration: 8 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: CDC Routine or targeted testing: both Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: nurses Provider receiving alert: nurses Physician consent for ordering test: no Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: patients informed by outreach workers</p>	<p>Eligibility Criteria: Clinic: emergency department of a hospital</p> <p>Patients: all patients who visit ED were checked for eligibility for HIV testing For routine testing: ages 13-64, no HIV testing recorded in EMR</p> <p>For high risk: recorded in EMR one of the following risks: living in zip codes with >1% HIV prevalence; MSM; intravenous drug use; homelessness; unsafe sex; no HIV test within past 365 days</p> <p>Sample Size: Clinic: 1 Providers: NR Patients: 15,928 (post only)</p> <p>Demographics: Providers: NR</p>	<p>Outcome Measure: Number tested per month Percent of patients tested positive and linked to care Percent of patients offered HIV test and declined</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Number tested per month Pre: 7 Post: 550 Absolute change: additional 543 tested per month Relative change: 7,757%</p> <p>Post-intervention only: Percent linked to care: $(8/12)*100=67\%$ Percent declined: $(2,353/9,177)*100=25.6\%$</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Services for patients tested positive: pharmacists receive all HIV positive results and notify a designated outreach worker who delivers test results in person, facilitates linkage to care, and records linkage in the EMR</p> <p>Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Patients: post-intervention only Age: 12% 13-19, 23% 20-29, 20% 30-39, 19% 40-49, 26% 50-64 Gender: 43% male Race/Ethnicity: 24% Hispanic, 11% White, 54% African American, 3% Asian, <1% American Indian, 7% missing SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 7 HIV tests per month</p>	
<p>Author, Year: Marcelin et al., 2016</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Location: Rochester, Minnesota, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: Primary Care Internal Medicine, Mayo Clinic</p> <p>Intervention Duration: 8 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: CDC Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: internists, nurse practitioners, physician assistants, internal medicine residents Provider receiving alert: internists, nurse practitioners, physician assistants, internal medicine residents Physician consent for ordering test: NR Education on CDSS/HIV: yes</p>	<p>Eligibility Criteria: Clinic: NR</p> <p>Patients: For routine testing: patients visiting the clinic during the study period who are between the ages of 18-65 and had never been screened for or diagnosed with HIV</p> <p>Sample Size: Clinic: 1 Providers: 43 internists, 9 nurse practitioners/physician assistants, 96 internal medicine residents Patients: 6,526 post-intervention</p> <p>Demographics: Providers: NR</p> <p>Patients: post-intervention only Mean age: 48.4 Gender: 45.8% male Race/Ethnicity: 84.8% White</p>	<p>Outcome Measure: Percent tested</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: $(109/6,070) * 100 = 1.8\%$ Post: $(218/6,526) * 100 = 3.3\%$ Absolute change: 1.5 percentage points</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 1.8%</p>	
<p>Author, Year: Rodriguez et al., 2016</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Bronx, Queen, New York, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: Urban Health Plan (UHP), federally qualified health centers</p> <p>Intervention Duration: 24 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: NR Routine or targeted testing: routine Opt-out or opt-in: NR</p> <p>Provider Characteristics: Providers involved: physicians, physician assistants, nurse practitioners, gynecologists, obstetric providers, and medical assistants Provider receiving alert: medical assistants offer the test to patients Physician consent for ordering test: NR Education on CDSS/HIV: yes</p> <p>Follow-up Care: Patients informed of test results: NR</p>	<p>Eligibility Criteria: Clinic: clinics associated with UHP, serving low-income and underserved populations in Bronx and Queens in NYC; 5 clinics in the beginning, expanded to 17 clinics in 2013</p> <p>Patients: For routine testing: individuals at UHP clinics, 13-64 years of age, no HIV test within the past 12 months. For pre-intervention sample, patients aged 13-64 who requested HIV testing and/or those known to be at high risk (intravenous drug use, multiple sex partners, MSM, not using condoms, existing STIs)</p> <p>Sample Size: Clinics: 5 clinics in the beginning that expanded to 17 in 2013 Providers: 25 physicians, 16 physician assistants, 8 nurse practitioners, and 8 gynecologists and obstetric providers, and their medical assistants</p>	<p>Outcome Measure: Percent tested Percent tested positive Number tested positive per month Percent of patients tested positive and linked to care</p> <p>Post only: Percent of eligible patients offered HIV test Percent of patients offered HIV test and declined</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: $(2,079/26,853) * 100 = 7.7\%$ 1st year: $(11,219/30,457) * 100 = 36.8\%$ Post (2 years): $(16,577/31,675) * 100 = 52.3\%$ Absolute change: After 12 months: 29.1 percentage points After 24 months: 44.6 percentage points</p> <p>Percent tested positive Pre: $(19/2,079) * 100 = 0.9\%$ 1st year: $(51/11,219) * 100 = 0.5\%$ Post (2 years): $(52/16,577) * 100 = 0.3\%$</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Services for patients tested positive: linkage to care Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: counselor-based HIV screening model</p>	<p>Patients: 31,675</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: 21% 13-22, 21% 23-30, 21% 31-40, 18% 41-50, 14% 1-60, 4% 61-64 Gender: 36% male Race/Ethnicity: 85% Hispanic, 1% White, 11% African American, 50% bi- or multi-racial, 36% unknown SES: NR Education: NR Insurance: 56% Medicaid, 5% Medicare, 30% self-pay, 9% other Baseline screening of intervention group: 7.7%</p>	<p>Absolute change: After 12 months: -0.4 percentage points After 24 months: -0.6 percentage points</p> <p>Number tested positive per month Pre: 19/12=1.6 Post (2 years): 52/24=2.2 Absolute change: additional 0.6 tested positive per month Relative change: 38%</p> <p>Percent linked to care Pre: (19/19)*100= 100% 1st year: (43/51)*100=84.3% Post (2 years): (41/52)*100=78.8% Absolute change: After 12 months: -15.7 percentage points After 24 months: -21.2 percentage points</p> <p>Post-intervention only: Percent offered: (79,649/100,369)*100=79.4% Percent declined: (30,003/79,649)*100=37.7%</p>
<p>Author, Year: Rudd et al., 2013</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Pacific Northwest, U.S.</p> <p>Urbanicity: rural</p> <p>Setting: U.S. Indian Health Service clinic</p> <p>Intervention Duration: 12 months</p> <p>Screening Reminder: Preexisting EHR or new: pre-existing Guidelines used: CDC 2006, USPSTF, Agency for Healthcare Research and Quality Routine or targeted testing: routine Opt-out or opt-in: opt-out</p>	<p>Eligibility Criteria: Clinic: NR Patients: For routine testing: patients visiting clinic, 13-64 age range</p> <p>Sample Size: Clinic: 1 Providers: NR Patients: NR</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: NR</p>	<p>Outcome Measure: Number tested per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Number tested per month Pre: 250/12=20.8 Post: 1340/12=111.7 Absolute change: additional 90.9 tested per month Relative change: 437%</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Provider Characteristics: Providers involved: nurses Provider receiving alert: nurses Physician consent for ordering test: no Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Race/Ethnicity: NR SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 20.8 tests per month</p>	
<p>Author, Year: Schnall et al., 2013</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Location: New York, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: adult emergency department at a large tertiary care center; this ED is a large, level-one trauma center</p> <p>Intervention Duration: 2 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: New York State legislation and CDC Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: clinicians and providers Provider receiving the alert: NR Physician consent for ordering test: NR</p>	<p>Eligibility Criteria: Clinic: NR Patients: For routine testing: all persons under the age of 65 years seeking ED services; excluded patients who left the ED before being seen by a prescribing provider</p> <p>Sample Size: Clinic: 1 Providers: NR Patients: 8,712 post-intervention</p> <p>Demographics: Providers: NR Patients: Mean age: NR Gender: NR Race/Ethnicity: NR</p>	<p>Outcome Measure: Percent tested Percent of eligible patients offered HIV test Percent of patients offered HIV test and declined</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: (136/7,048)*100=1.9% Post: (583/6,706)*100=8.7% Absolute change: 6.8 percentage points</p> <p>Percent offered Pre: (452/7048)*100=6.4% Post: (6305/6706)*100=94.0% Absolute change: 5.3 percentage points</p> <p>Percent declined Pre: (298/452)*100=65.9%</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 1.9%</p>	<p>Post: $(5348/6305) * 100 = 84.8\%$ Absolute change: 18.9 percentage points</p>
<p>Author, Year: Schnall et al., 2014</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: New York, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: 3 adult EDs that were all a part of the same hospital network and are non-profit institutions</p> <p>Intervention Duration: 6 months</p> <p>Screening Reminder: Preexisting or new EHR: preexisting Guidelines used: New York State legislation and CDC Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: physicians, residents, physician assistants, nurse practitioners Provider receiving alert: physicians, residents, physician assistants, nurse practitioners Physician consent for ordering test: NR Education on CDSS/HIV: NR</p>	<p>Eligibility Criteria: Clinic: NR Patients: For routine testing: all treat-and-release patients from the ED aged 18-64</p> <p>Sample Size: Clinics: 3 Providers: NR Patients: 49,786 post-intervention</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: 43.2% male Race/Ethnicity: NR SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 5.4%</p>	<p>Outcome Measure: Percent tested Percent tested positive Percent of eligible patients offered HIV test</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Percent tested Pre: $(1,631/30,028) * 100 = 5.4\%$ Post: $(4,353/49,876) * 100 = 8.7\%$ Absolute change: 3.3 percentage points</p> <p>Percent tested positive Pre: $(9/1,631) * 100 = 0.6\%$ Post: $(21/4,353) * 100 = 0.5\%$ Absolute change: -0.1 percentage points</p> <p>Post-intervention only Percent offered: 99.8%</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Follow-up Care: Patients informed of test results: NR Services for patients tested positive: NR Services for patients tested negative: no</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>		
<p>Author, Year: Sha et al., 2019</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Location: Chicago, Illinois, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: large urban hospital/ED (Rush University Medical Center)</p> <p>Intervention Duration: 45 months</p> <p>Screening Reminder: Active alert: May 2015 to October 2016, hard-stop alert; action must be taken to resolve the alert Passive alert: October 2016 to June 2017, no action required by provider Test algorithm: June 2017 to January 2019, persons with a complete blood count ordered would have an HIV test auto-ordered if 13-64 years of age, no HIV test in past 12 months</p> <p>Preexisting or new EHR: preexisting Guidelines used: 2006 CDC guidelines and 2013 USPSTF recommendation Routine or targeted testing: routine Opt-out or opt-in: opt-out</p>	<p>Eligibility Criteria: Clinic: NR Patients: For routine testing: any patient seen in ED between 13-64 years of age who did not have an HIV test in the EHR within the past 12 months when an order was placed, and not diagnosed with HIV</p> <p>Sample Size: Clinic: 1 Providers: NR Patients: 137,749</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: NR Race/Ethnicity: NR SES: NR Education: NR Insurance: NR</p>	<p>Outcome Measure: Number tested per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p> <p>Results: Number tested per month Active alert: Pre: 93 Post: 543 Absolute change: additional 450 tested per month Relative change: 484%</p> <p>Passive alert: Pre: 93 Post: 222 Absolute change: additional 129 tested per month Relative change: 139%</p> <p>Test algorithm: Pre: 93 Post: 654</p>

Study	Intervention Characteristics	Population Characteristics	Results
	<p>Provider Characteristics: Providers involved: nurses and providers Provider receiving alert: nurses and providers Physician consent for ordering test: NR Education on CDSS/HIV: no</p> <p>Follow-up Care: Patients informed of test results: personnel in Infectious Diseases were notified and informed the patient in person or via phone</p> <p>Services for patients tested positive: all positive patients reported to Chicago Department of Public Health (CDPH); all who did not respond after 3 calls were reported to CDPH; standard and certified letters also sent</p> <p>Services for patients tested negative: all patients notified and given an "After Services Summary" with information about testing</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: NR</p>	<p>Baseline screening of intervention group: 2.5%</p>	<p>Absolute change: additional 561 tested per months Relative change: 603%</p>
<p>Author, Year: White et al., 2018</p> <p>Study Design: Pre-post only</p> <p>Suitability of Design:</p>	<p>Location: Oakland, California, U.S.</p> <p>Urbanicity: urban</p> <p>Setting: Highland Hospital ED</p> <p>Intervention Duration: 5 months</p> <p>Screening Reminder:</p>	<p>Eligibility Criteria: Clinic: NR Patients: For routine testing: all patients 18 to 75 years of age who presented to ED, completed triage and physician evaluation, and had a lab test ordered; EHR configured to automatically order</p>	<p>Outcome Measure: Percent tested Percent tested positive Number tested positive per month</p> <p>How Ascertained: medical records</p> <p>Follow-up Time: intervention ongoing</p>

Study	Intervention Characteristics	Population Characteristics	Results
<p>Least</p> <p>Quality of Execution: Fair</p>	<p>Preexisting or new EHR: preexisting Guidelines used: CDC Routine or targeted testing: routine Opt-out or opt-in: opt-out</p> <p>Provider Characteristics: Providers involved: nurses Provider receiving alert: nurses Physician consent for ordering test: no Education on CDSS/HIV: NR</p> <p>Follow-up Care: Patients informed of test results: NR</p> <p>Services for patients tested positive: EHR reflexively ordered and processed HIV and Hep C RNA tests in case of a reactive HIV antigen-antibody test</p> <p>Services for patients tested negative: NR</p> <p>Comparison: HIV testing offered: yes Reminders used: no Other interventions to increase screening: nurse-ordered nontargeted HIV test</p>	<p>an HIV or Hep C test for age-eligible patients who had any test ordered that required lab processing of whole blood, or a urine test or urethral swab for chlamydia or gonorrhea testing</p> <p>Sample Size: Clinic: 1 Providers: NR Patients: 19,887 post-intervention</p> <p>Demographics: Providers: NR</p> <p>Patients: Mean age: NR Gender: NR Race/Ethnicity: NR SES: NR Education: NR Insurance: NR Baseline screening of intervention group: 19.6%</p>	<p>Results: Percent tested Pre: $(4,121/20,975) * 100 = 19.6\%$ Post: $(6,736/19,887) * 100 = 33.9\%$ Absolute change: 14.3 percentage points</p> <p>Percent tested positive Pre: $(34/4,121) * 100 = 0.8\%$ Post: $(59/6,736) * 100 = 0.9\%$ Absolute change: 0.1 percentage points</p> <p>Number tested positive per month Pre: $34/5 = 6.8$ Post: $59/5 = 11.8$ Absolute change: additional 5 tested positive per month Relative change: 73.5%</p>