HCV Diagnosis and Linkage to Care in One Visit: HCV RNA PoC Testing in Action"

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Unconscious Bias Disclosure

- **I recognize that language is constantly evolving**, and while I make every effort to avoid bias and stigmatizing terms, I acknowledge that unintentional lapses may occur in my presentations.
- **I value your feedback** and encourage you to share any concerns related to language, images, or concepts that may be offensive or stigmatizing.
- **Your input will help me** refine and improve my presentations, ensuring they remain inclusive and respectful to participants.

Conflict of Interest Disclosures

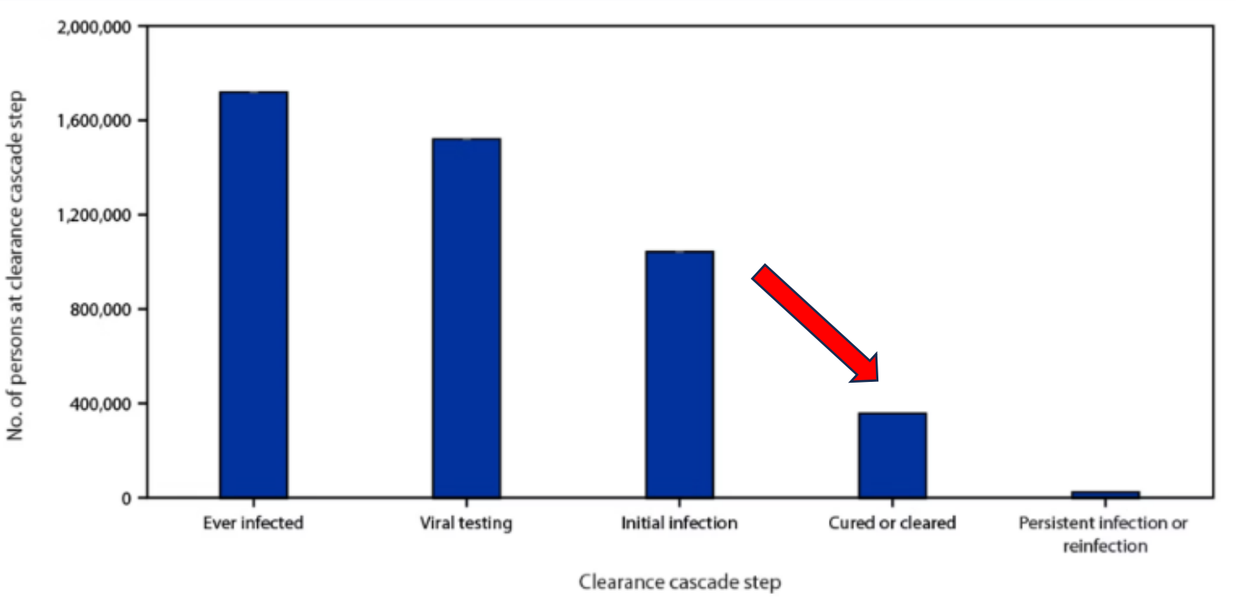
- **Dr. Jorge Mera is the Principal Investigator for grants or projects funded by AbbVie Pharmaceuticals, Gilead Sciences, Abbot Diagnostics and Cepheid Diagnostics**
- **Dr. Mera is member of the Speaker Bureau for AbbVie Pharmaceuticals**

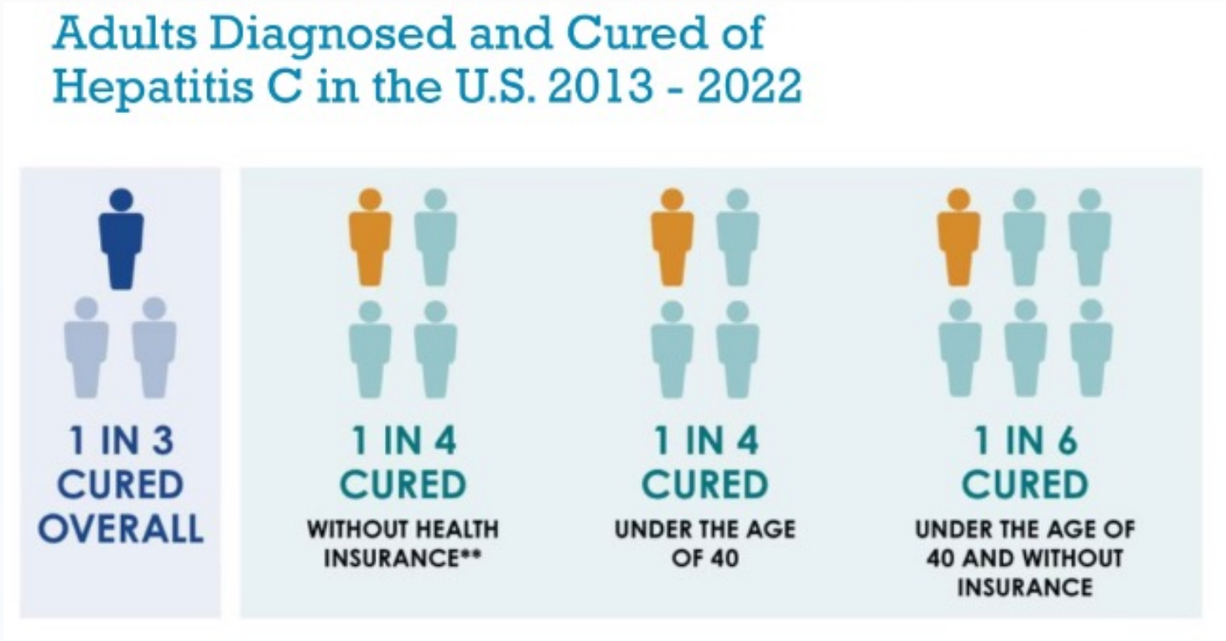
Outline

- What is the Problem
- The Test
- Clinical studies
- Cherokee Nation Experience
- Summary

HCV Elimination in the US: How Are We Doing?

Hepatitis C virus clearance cascade using national commercial laboratory data — United States, 2013–2022



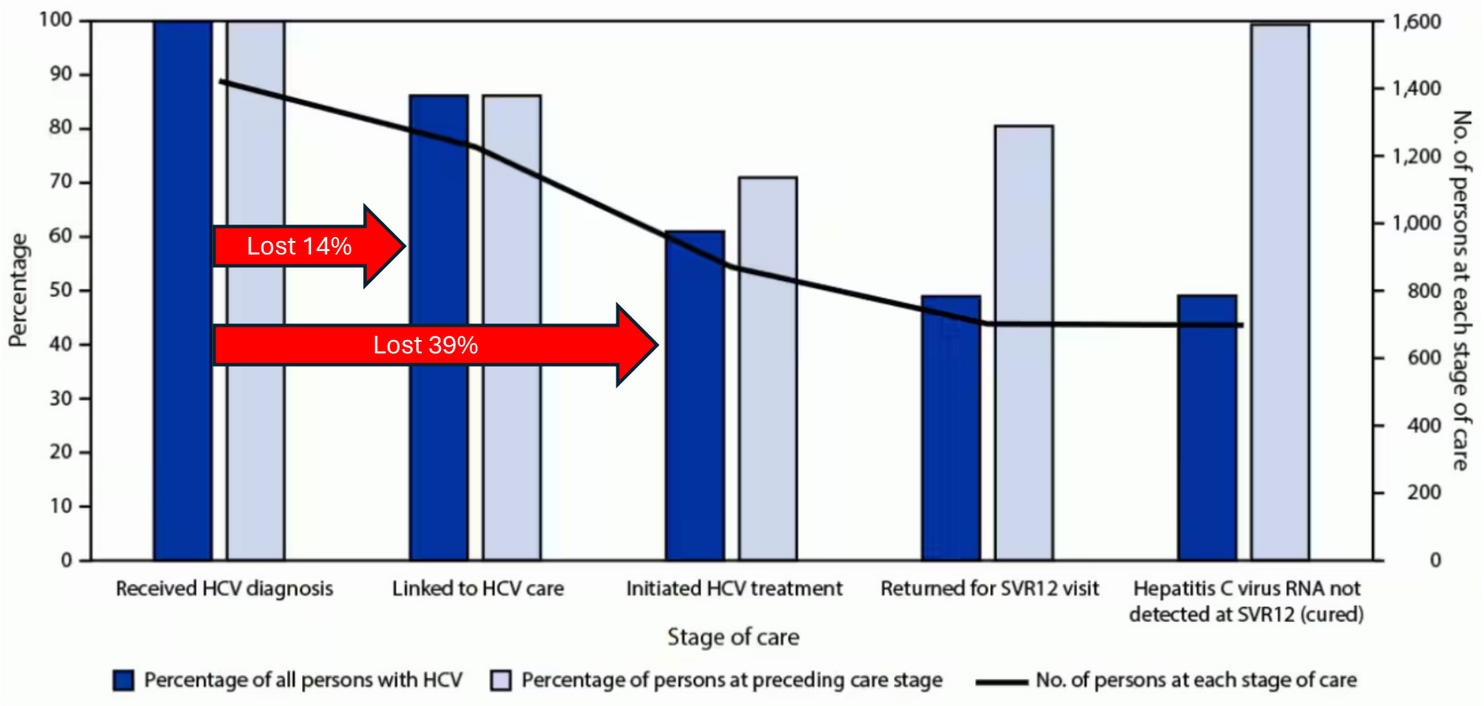


- The prevalence of viral clearance among persons with diagnosed hepatitis C was only **34% overall**
- This clearance was even lower (16%) among persons aged 20–39 years with other payor (client or self-pay) insurance.

Wester C, Osinubi A, Kaufman HW, et al. Hepatitis C Virus Clearance Cascade — United States, 2013–2022. MMWR Morb Mortal Wkly Rep 2023;72:716–720

Vital Signs: Hepatitis C Treatment Among Insured Adults — United States, 2019–2020. MMWR Morb Mortal Wkly Rep 2022;71:1011-1017.

Cascade of care among persons with hepatitis C virus infection (N = 1,423) — Cherokee Nation Health Services (CNHS), Oklahoma, November 2015–October 2020



Abbreviations: HCV = hepatitis C virus; SVR12 = sustained virologic response >12 weeks after treatment completion.

- Between November 2015 and October 2020, CNHS diagnosed HCV in 1,423 persons:
  - **86%** were linked to care.
  - **61%** initiated treatment
  - **99%** of those who completed treatment were cured.
- Barriers to HCV treatment initiation include lack of access to direct-acting antivirals at the time of HCV evaluation.

Essex W, Feder M, Mera J. Evaluation of the Cherokee Nation Hepatitis C Virus Elimination Program — Cherokee Nation, Oklahoma, 2015–2020. MMWR Morb Mortal Wkly Rep 2023;72:597–600.

Why Do So Many Patients Remain Untreated?

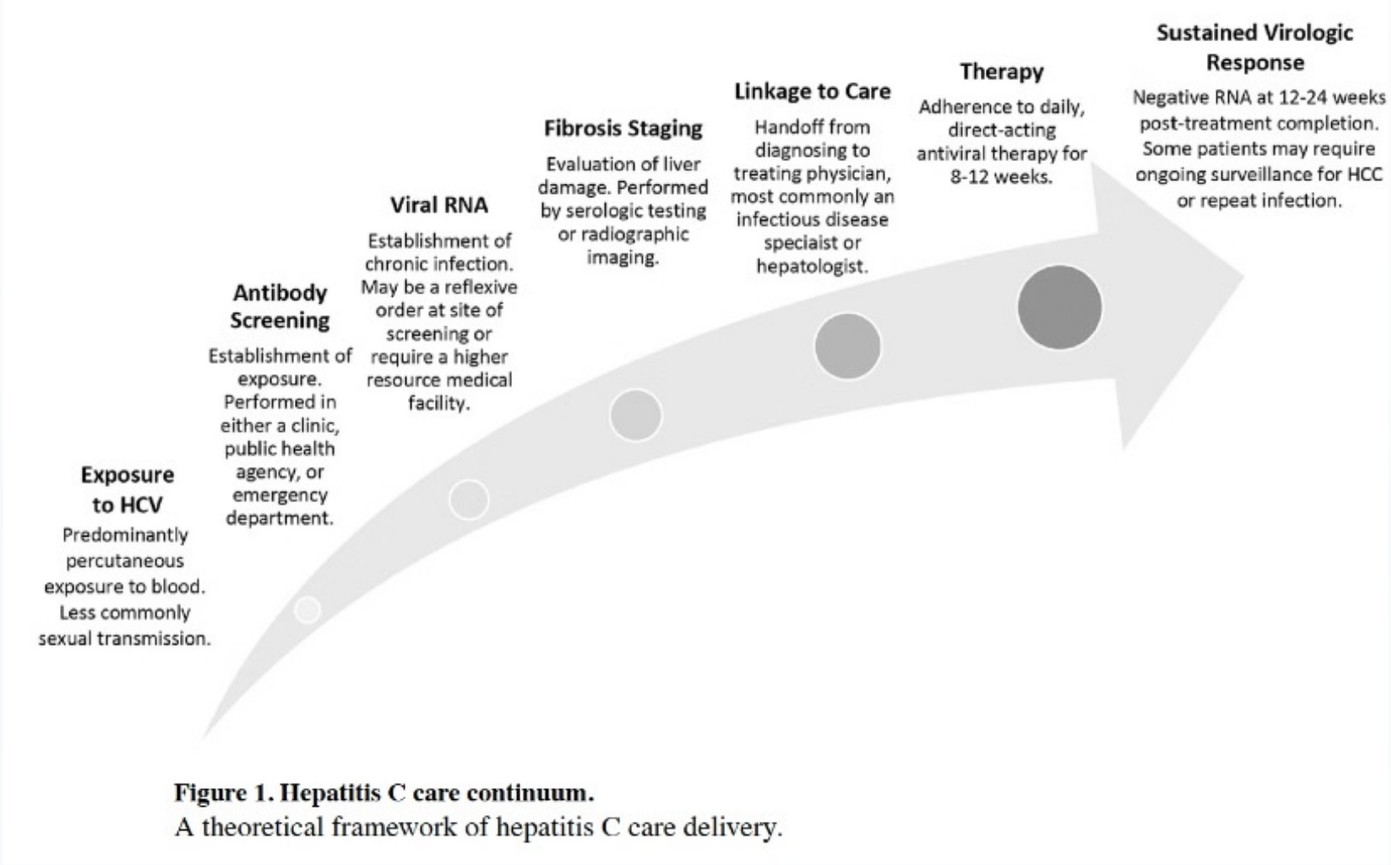


Figure 1. Hepatitis C care continuum.
A theoretical framework of hepatitis C care delivery.

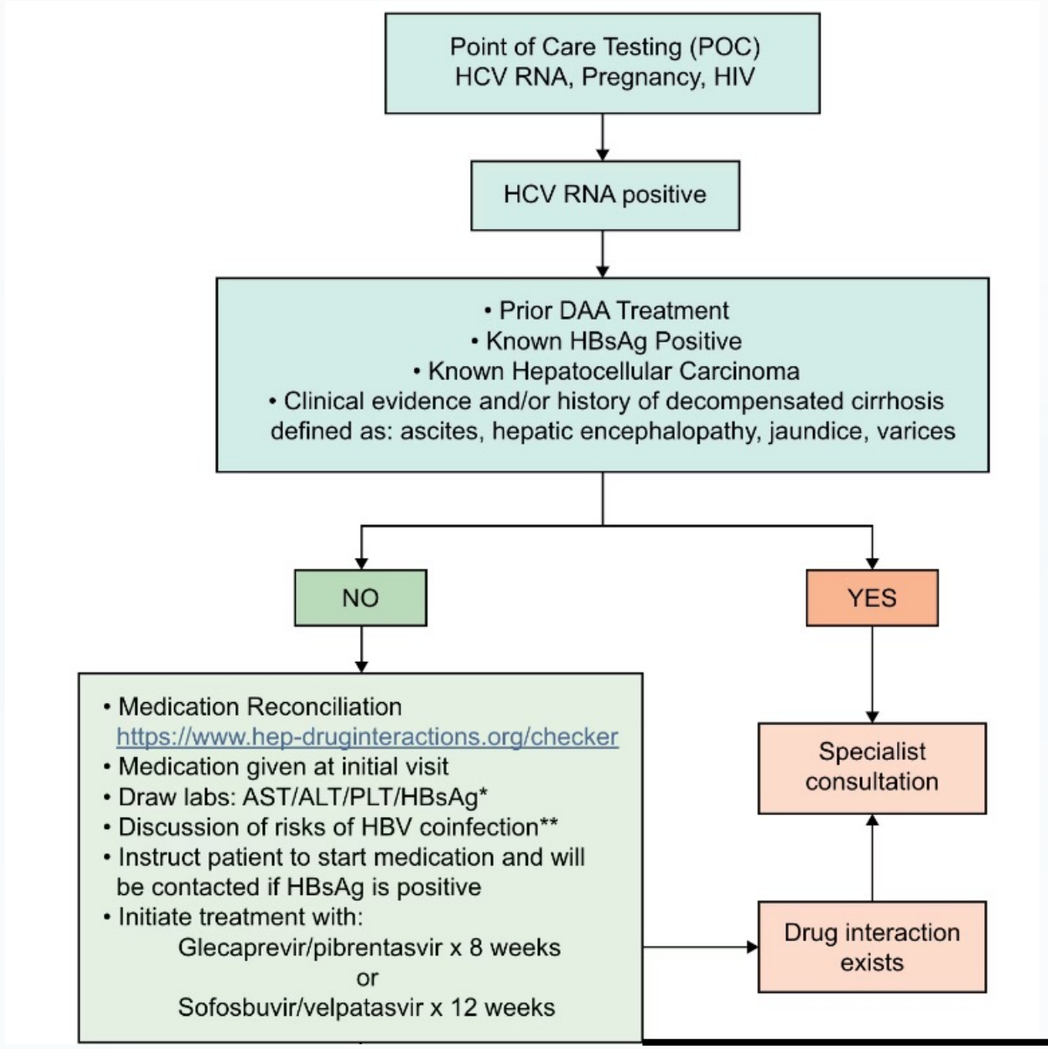
Failure to successfully complete one step in the continuum results in untreated HCV.

This model demonstrates that curing HCV is predicated on patients' access to and completion of multiple stages of specialty healthcare.

For this to happen you need to engage with the health care system in all these steps

J Viral Hepat. 2022 August ; 29(8): 588–595. doi:10.1111/jvh.13685.

Hepatitis C Test and Treat Initial Visit



Four easy steps:

1. HCV RNA (Point of Care or Laboratory)
2. Pre-Treatment assessment/labs
3. Check FIB-4 and assess for cirrhosis
4. Write Prescription/Start Treatment

Three major changes:

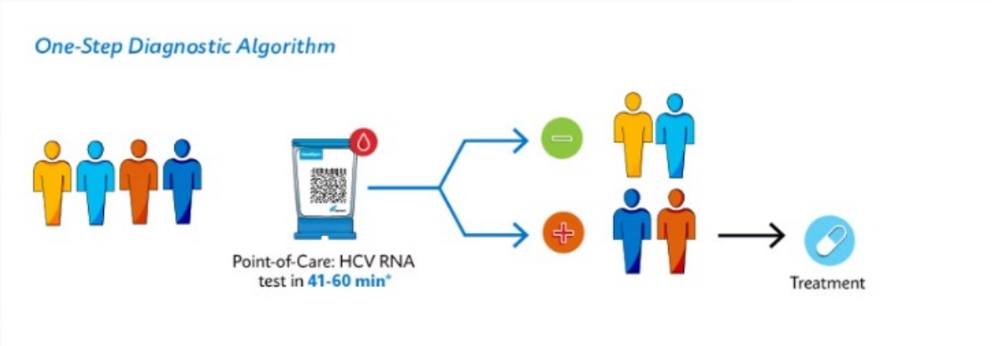
1. Start with POC RNA
2. HBV status can come after Tx initiation
3. SVR 4

AASLD Guidelines Update Coming Soon!!!

Hepatitis C Virus Diagnosis

Test Name	Clinical Utility	Turnaround Time
HCV antibody (POC)	For screening	**30 minutes**
HCV antibody Reflexed to HCV RNA (lab based)	Reflex test for screening and confirming active infection	**1-4 days**
HCV quantitative RNA (lab based)	For confirmation of active infection Determines the viral load (15-100,000,000 IU/mL	**1-4 days**
POC HCV RNA	For confirmation of active infection	**41-60 minutes**

HCV RNA Point of Care HCV Testing*

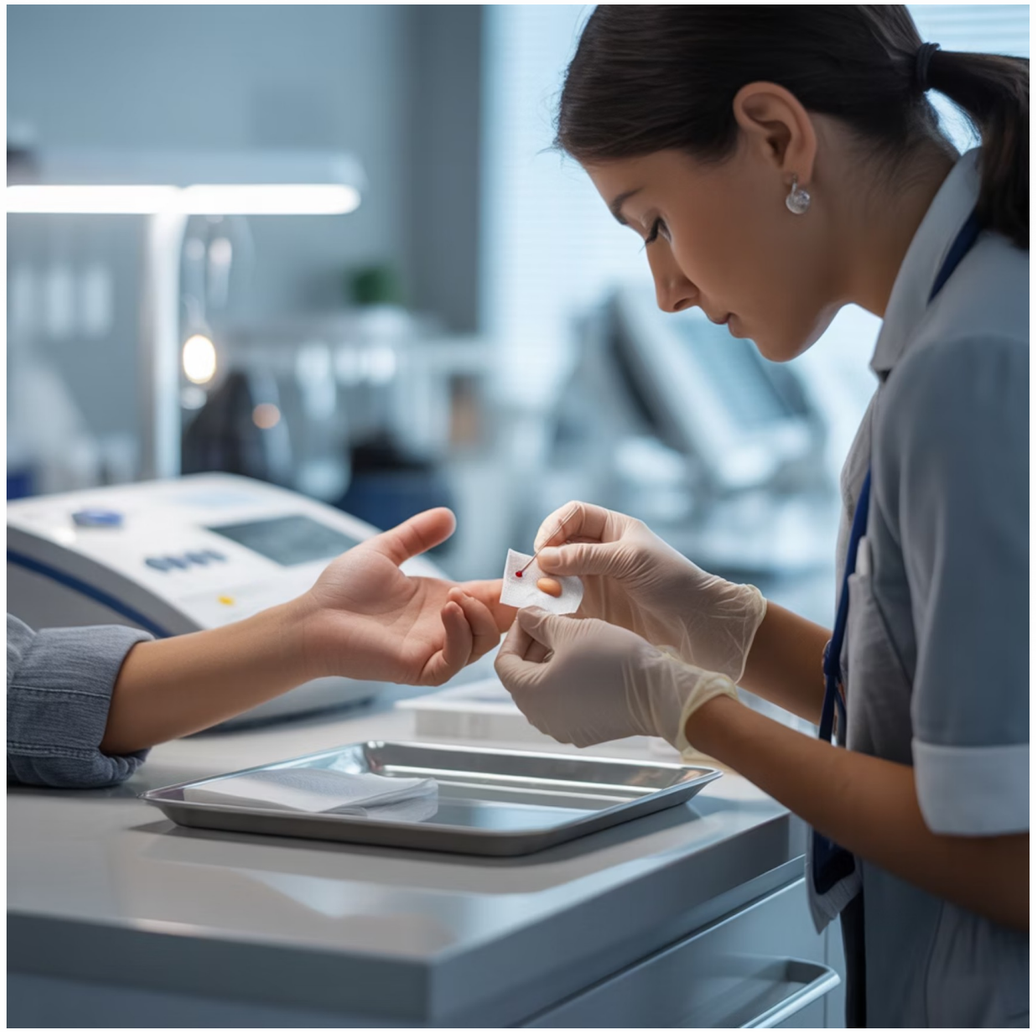


Cepheid's Xpert® HCV, June 27, 2004

*https://www.cepheid.com/en-US/tests/blood-virology-womens-health-sexual-health/xpert-hcv-info.html

Xpert HCV POC RNA

- **Xpert HCV RT-PCR**
  - FDA approved in June 2024 in the U.S
- **To be Performed on the GeneXpert® Xpress System**
- **Qualitative detection of HCV RNA**
- **Only for whole blood drawn through fingerstick**
- **Indications:**
  - Adults at risk and/or with signs and symptoms of HCV infection
  - With or without antibody evidence of HCV infection.

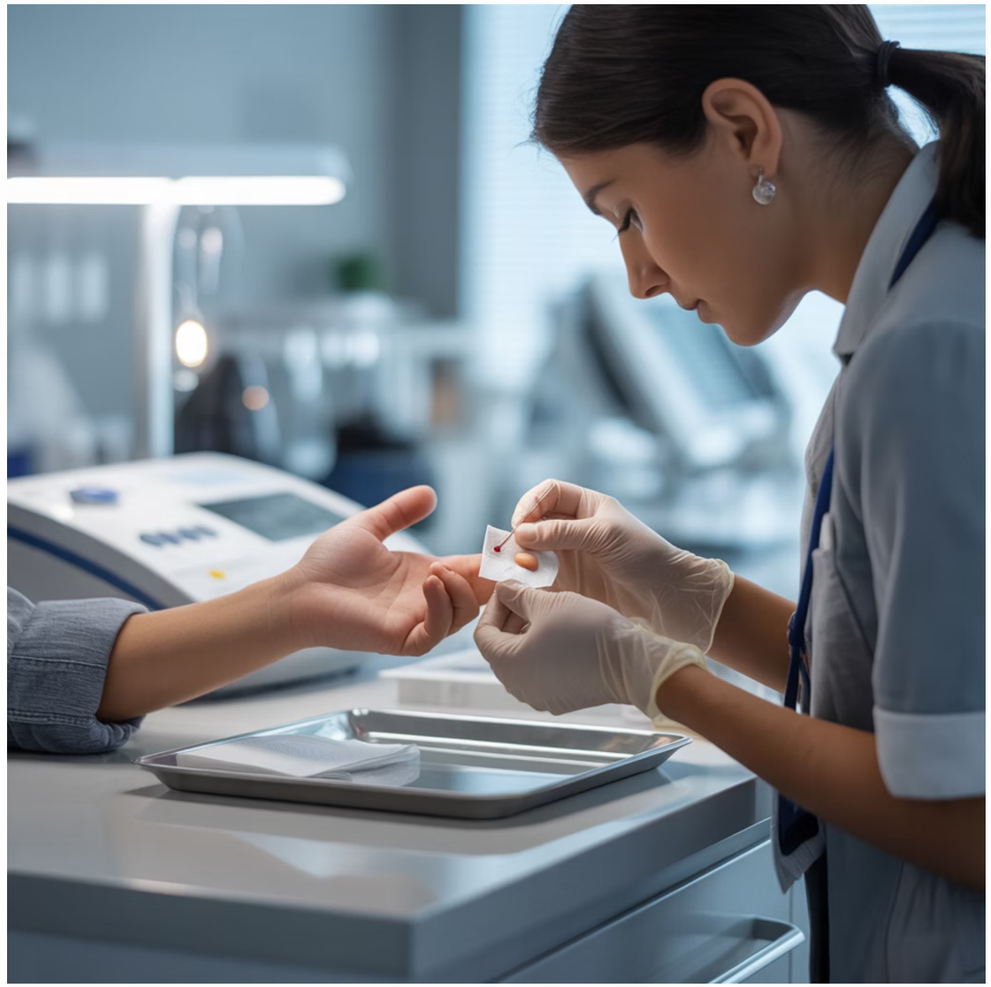


Xpert HCV POC RNA

- **Does not discriminate between acute and chronic states of infection.**

- **Not intended for:**
  - Monitoring patients undergoing treatment
  - Use in screening blood, plasma, or tissue donors.

- **Performance not established for testing:**
  - Pregnant people
  - People < than 22 years of age.



https://www.cepheid.com/content/dam/www-cepheid-com/documents/package-insert-files/303-3318%20Rev%20A%20Xpert%20HCV%20IFU%20(2).pdf

HCV POC RNA Diagnostic Accuracy
Sensitivity & Specificity of Fingerstick Assay

- **Clinical validation studies**
  - The HCV RNA fingerstick assay maintains great accuracy even when deployed in decentralized, non-laboratory settings:

98.1-100%

Sensitivity

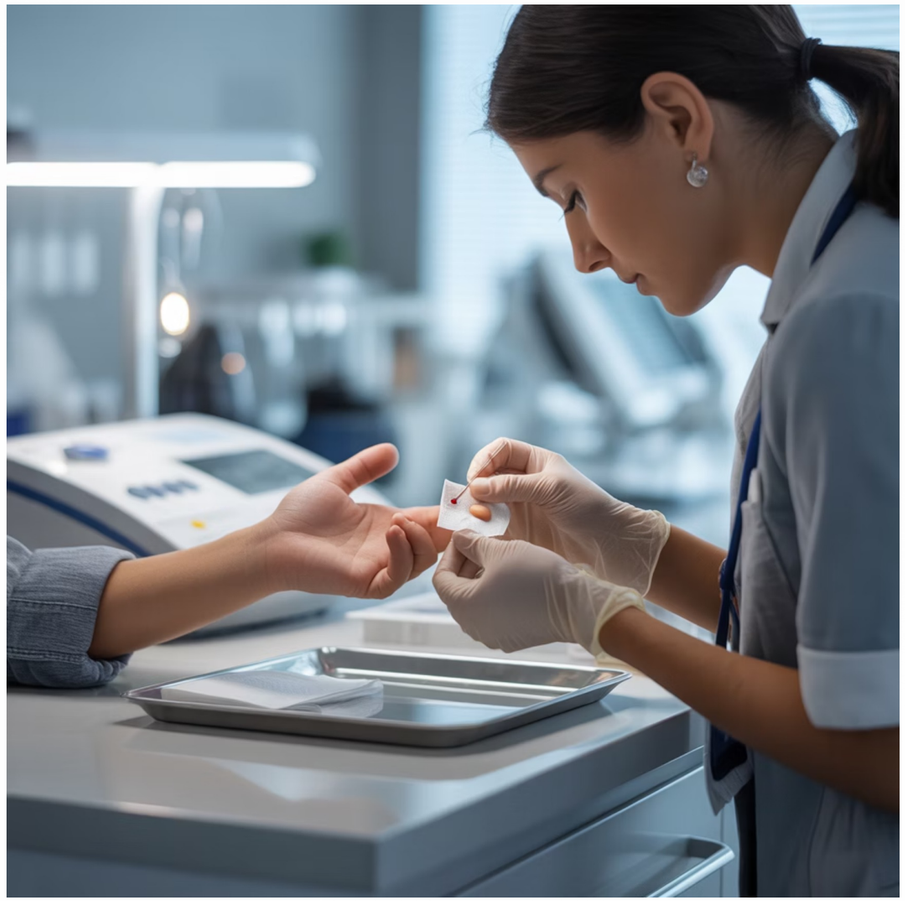
Correctly identifies positive cases with minimal false negatives

98.6-100%

Specificity

Correctly identifies negative cases with minimal false positives

PPA: 93.4% (95% CI: 87.6 – 96.6)
NPA: 99.8% (95% CI: 99.2 – 96.9)



This high level of accuracy enables healthcare providers to make immediate, evidence-based treatment decisions directly in community settings where patients are already receiving care.

PPA: Positive Percent Agreement, NPA: Negative Percent Agreement
https://www.cepheid.com/content/dam/www-cepheid-com/documents/package-insert-files/303-3318%20Rev%20A%20Xpert%20HCV%20IFU%20(2).pdf

Clinical Indications for POC HCV RNA

Confirmation of Active Infection

22 years and older
Non pregnant.

High-Risk Population Screening

Direct RNA testing in people who inject drugs (PWID), high risk communities, incarcerated individuals, homeless individuals, MAT clinics, where HCV prevalence is elevated.

Same-Day Test-and-Treat Model

Enables immediate clinical decision-making in low-barrier care settings, supporting rapid linkage to treatment and reducing loss to follow-up.

Decentralized Testing

Ideal for mobile clinics, correctional facilities, substance use disorder treatment centers, and rural/remote healthcare settings with limited laboratory access.

Impact of Hepatitis C Virus Point-of-Care RNA Viral Load Testing Compared with Laboratory-Based Testing

A systematic review and meta-analysis by Trickey A, Fajardo E, Alemu D, et al. published in Lancet Gastroenterol Hepatol (2023) examining how point-of-care (POC) RNA testing affects patient care pathways compared to conventional laboratory testing for hepatitis C virus (HCV).

Impact of Hepatitis C Virus Point-of-Care RNA Viral Load Testing Compared with Laboratory-Based Testing

Aim	• Evaluate the effect of POC vs SOC on HCV testing and treatment uptake and timing.
Methods	• 45 observational studies (2016–2022). • PWID, incarcerated, general/mixed-risk, people with HIV.
Outcomes:	• Turnaround time, uptake of RNA testing and treatment. • Care models: same-site/same-visit vs different-site/different-visit.
Analysis:	• Meta-analysis

Trickey A, Fajardo E, Alemu D, et al. Lancet Gastroenterol Hepatol. 2023 Mar;8(3):253-270.

POC: Point of Care SOC: Standard of Care

Key Findings

Turnaround Time (Ab Test → Treatment):

- Onsite POC: **19 days** (95% CI 14–53)
- Lab POC: **64 days**
- SOC: **67 days**

Treatment Uptake:

- Mobile POC: **81%** (95% CI 60–97)
- Onsite POC: **77%** (95% CI 72–83)
- SOC: **53%** (95% CI 31–75), p = 0.029

Testing & Treatment Uptake:

- Higher with same-site models **(p ≤ 0.0001)**

Simplified care models = better outcomes

Trickey A, Fajardo E, Alemu D, et al. Lancet Gastroenterol Hepatol. 2023 Mar;8(3):253-270.

POC: Point of Care SOC: Standard of Care

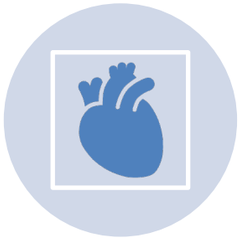
Impact of Hepatitis C Virus Point-of-Care RNA Viral Load Testing Compared with Laboratory-Based Testing

Conclusions & Implications

POC testing improves linkage to care and treatment uptake.

Greatest effect when care is same-site & same-day.

Aligns with WHO guidelines



Use in high-risk settings to support HCV elimination efforts.

Trickey A, Fajardo E, Alemu D, et al. Lancet Gastroenterol Hepatol. 2023 Mar;8(3):253-270.

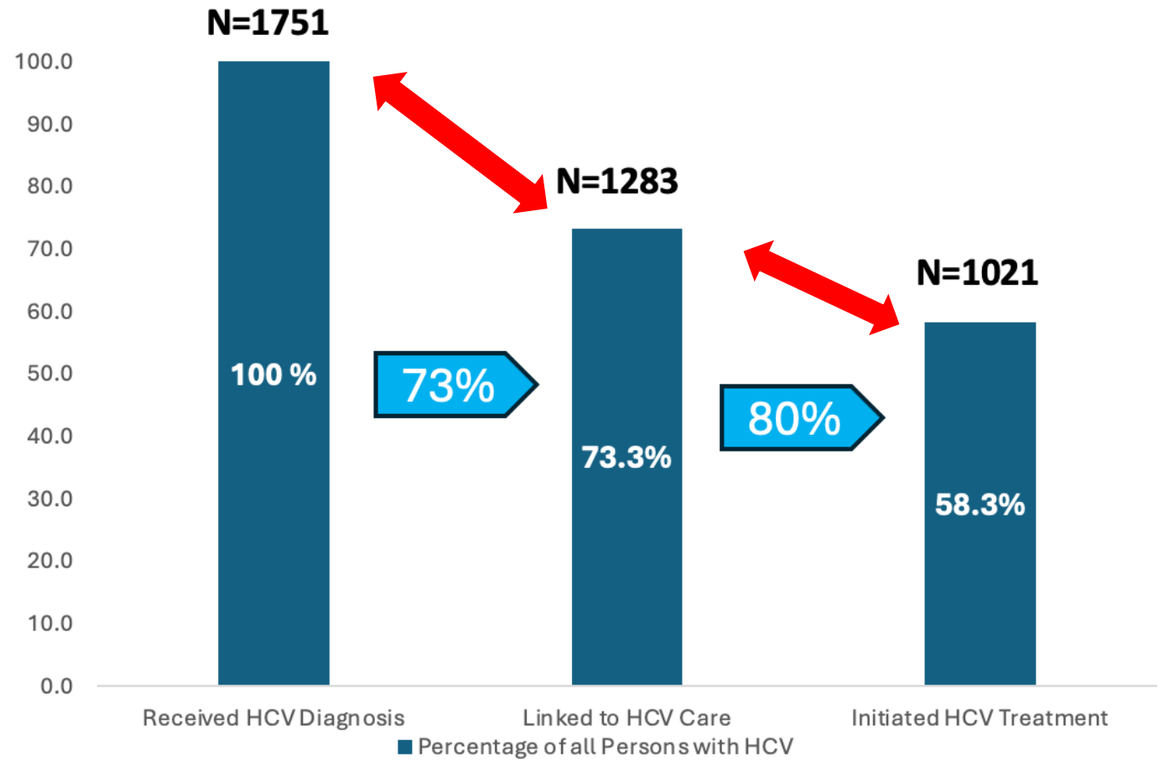
Expanding HCV/HIV/Syphilis POC Testing in The Cherokee Nation Health Services (CNHS)

Cherokee Nation

HCV Elimination Program Launched in 2015

"As Native people and as Cherokee Nation citizens, we must keep striving to eliminate hepatitis C from our population."
Chief Bill John Baker

HCV Cascade of Care Among Persons Accessing the CNHS 11/1/ 2015 - 09/ 30, 2023



Seventy-two (72%) of the population > 18 yo accessing the CNHS have been screened for HCV

Where can we identify HCV-infected individuals who are under-engaged with healthcare services?

Site	# of Individuals Screened	# of individuals with positive HCV antibody	Percentage Positive
Food distribution site*	340	11	**3.5%**
Homeless Shelter**	15	2	**13%**
Syringe service program**	162	39	**24%**
Peer Recovery**	51	14	**27%**
ED**	1830	97	5.3%
Jail***	NA	NA	**3.4 – 34%*****

* Essex, W., Mera, J., Comiford, A. *et al.* Assessing the Feasibility, Acceptability, and Effectiveness of a Pilot Hepatitis C Screening Program at Food Distribution Sites in Cherokee Nation, Oklahoma. *J Community Health* **48**, 982–993 (2023).

** Numbers are estimates from Cherokee Nation Sites obtained during our "Connecting Underserved with Resources for Elimination (C.U.R.E.) program and the HCV Engagement and Linkage Program (HELP) initiative

*** Busschots D, Kremer C, Bielen R, Bielen R. **Hepatitis C prevalence in incarcerated settings between 2013–2021: a systematic review and meta-analysis**. BMC Public Health. 2022;22(1):2159.

Expanding HCV/HIV/Syphilis POC Testing: The CNHS 2024-2025

Goals

- Test for HCV, HIV and syphilis and offer same day HCV and syphilis treatment as well as HIV prevention

Target Sites

- Harm reduction Program (HRP), men's shelter, substance use recovery center
- Mobile Unit (HRP, outlying clinics, community events)
- Hospitalized Patients
- Emergency Department **(work in (progress)**
- County Jail **(work in progress)**

Strategy

- **Implement POC: HCV RNA/Ab, HIV Ab and Syphilis Ab**
- **Personnel on site: Nurse, Provider, BHS, CHW, PRSS, Phlebotomist**
- Medications on site: DAAs, PCN, doxycycline, Truvada **(work in progress)**

Infectious Disease and Specialty Clinic

BHS: Behavioral Health Specialist, CHW: Community Health Worker, PRSS: Peer Recovery Support Specialist

Community Partnerships

Project HOPE

Muskogee Clinic MAT Program

Harm Reduction

CNHS comprehensive harm reduction services

Tahlequah Osiyo Men's Shelter

Housing and health integration

Peer Recovery Support

Peaceful Warrior's Way program

Multiplex Testing: Integrated Approaches to Diagnosis

Improved Patient Experience

Single specimen collection for multiple tests reduces patient burden.

Enhanced Efficiency

Simultaneous testing shortens time to diagnosis for multiple conditions.

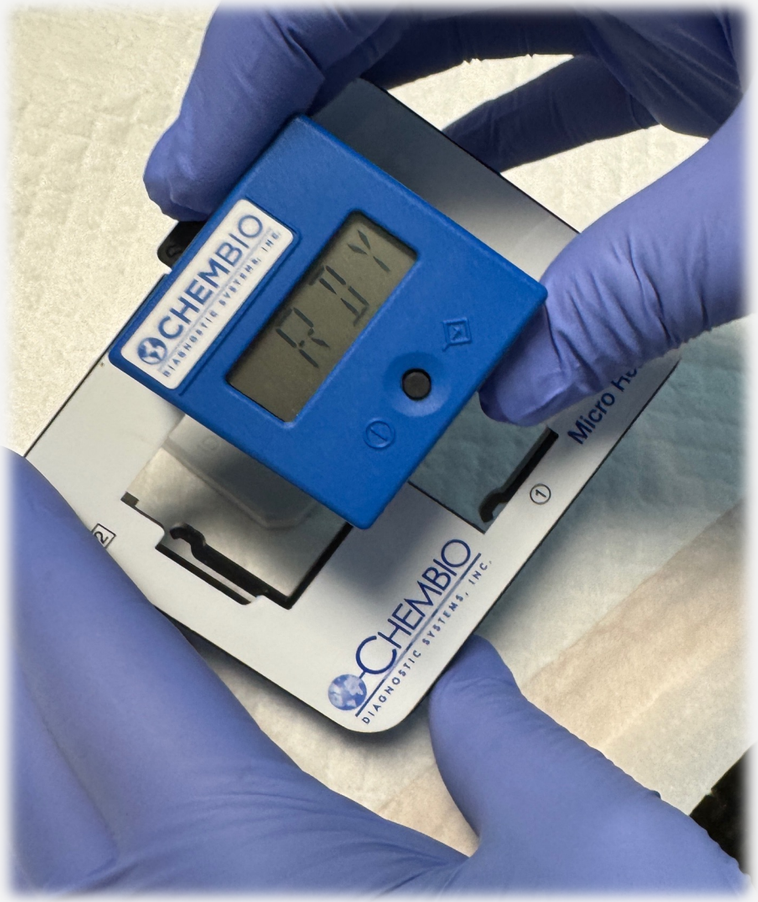
Cost Effectiveness

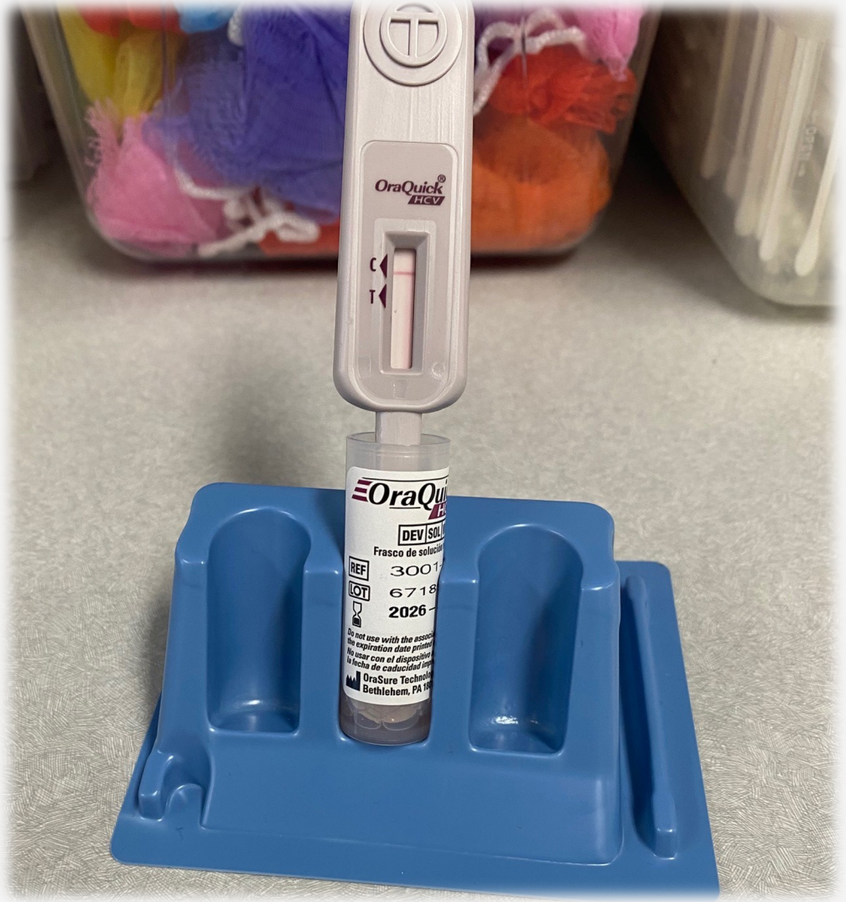
Lower per-test costs compared to multiple single tests saves resources.

Public Health Impact

Comprehensive infection status assessment in one visit improves outcomes.

HIV/HCV/Syphilis Antibody Testing





CHEMBIO: HIV and Treponema pallidum antibodies

OraQuick: HCV antibody

Initial Patient Reactions to POC testing at the Harm Reduction Site

POC Testing Barriers at the Harm Reduction Site

"I don't have time; my ride is leaving."

**Public transportation and carpools will not wait.*

***Most patients arrive in groups of two or more.*

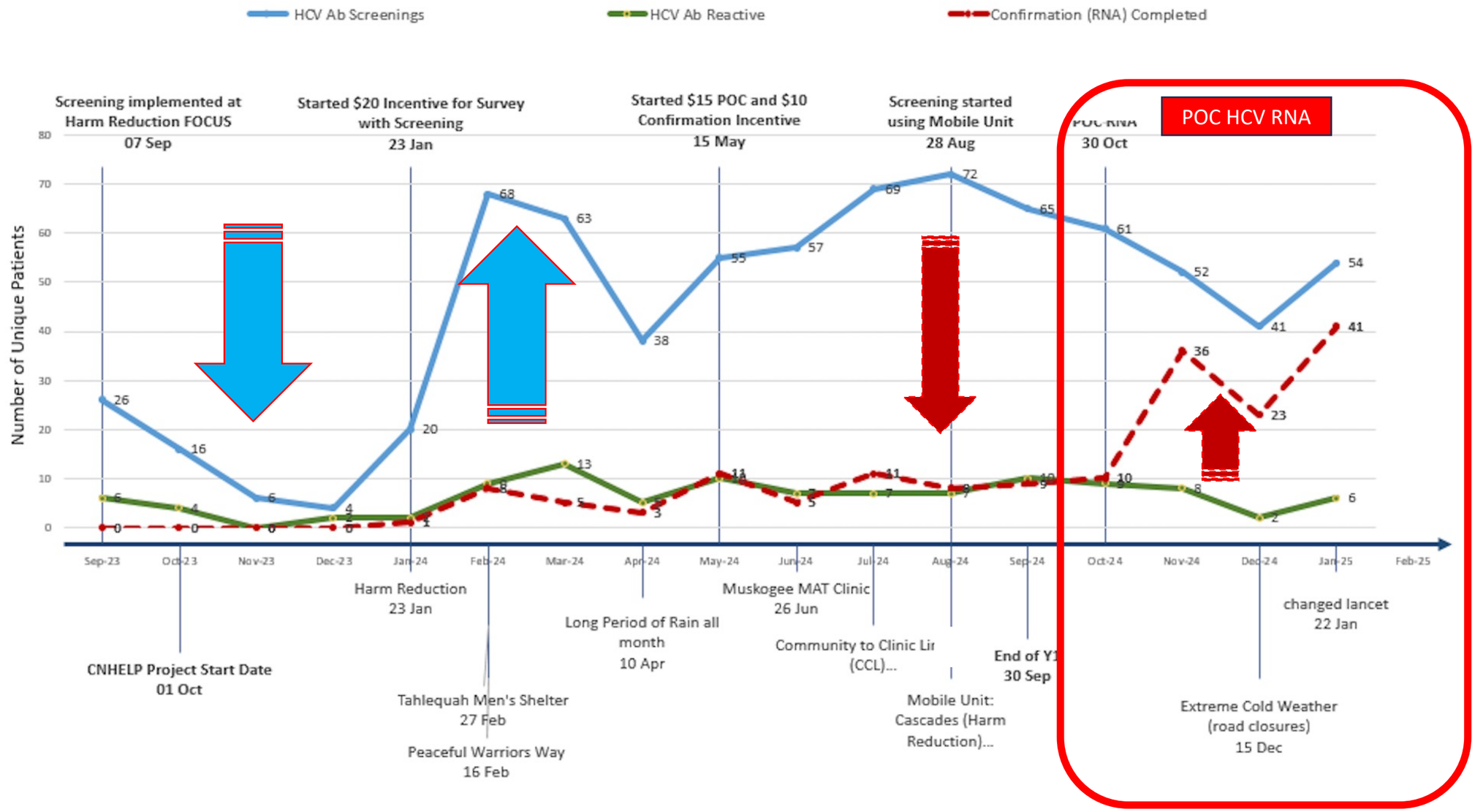
"I have to go; my friend is already done."

**Friend tested negative and need no further evaluation. Patient is afraid of being stigmatized if they take longer.*

"I don't think that your test is right, no one has told me I have HepC before."

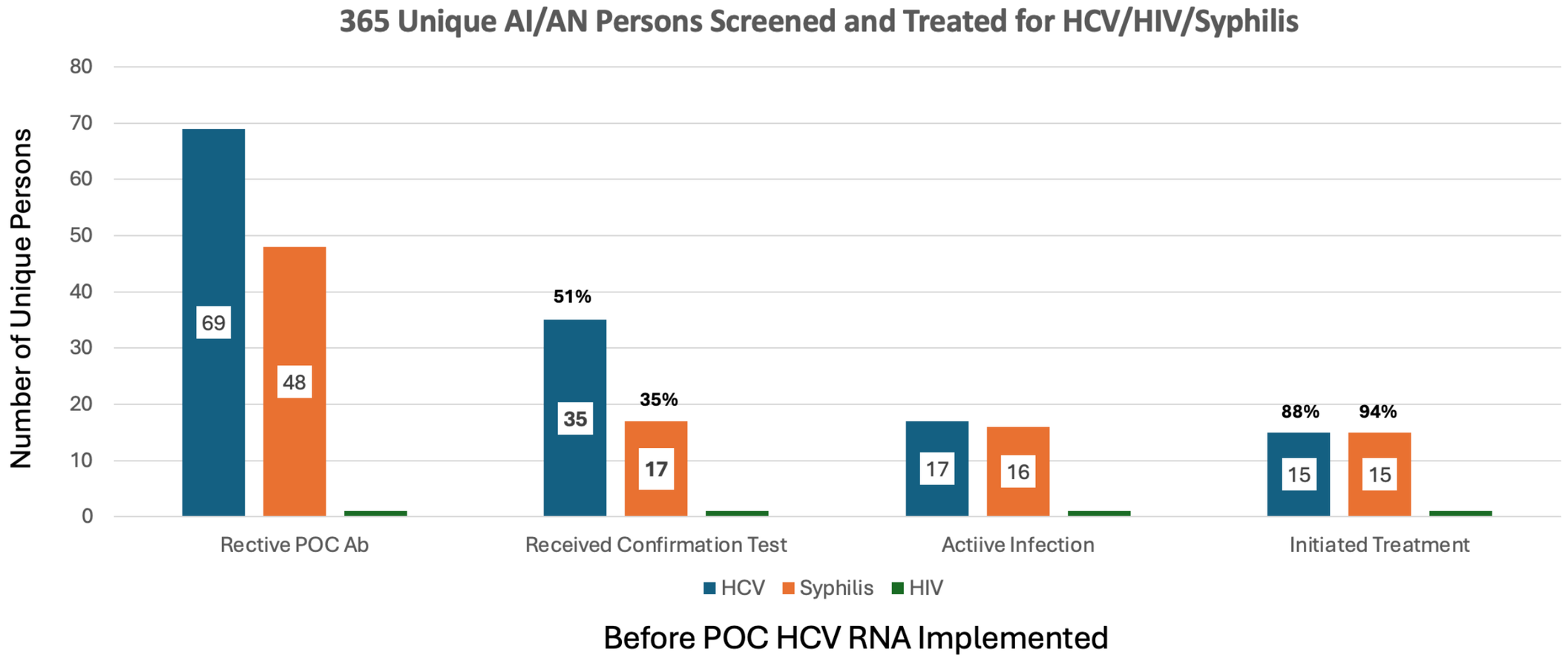
**Patient sometimes experience denial with initial results and leave without further evaluation or labs.*

HCV Testing and Linkage to Care Timeline with Interventions



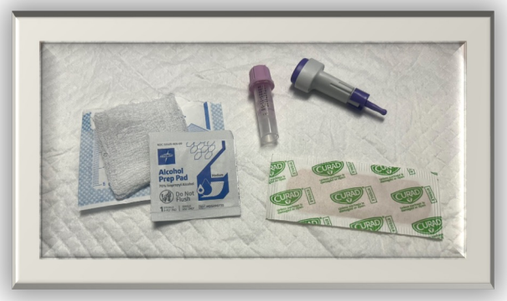
CNHS Harm Reduction Site

(January 1, 2024 – September 9, 2024)



Before POC HCV RNA Implemented

HCV POC RNA

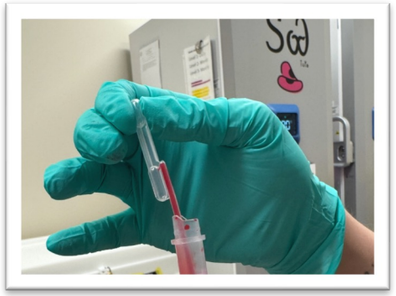


Step 1

- **Prepare for Testing**
  - EDTA K2 Blood Tube, Lancet, Alcohol wipe, Gauze, Bandage
  - Sanitize and Prepare the Testing Area

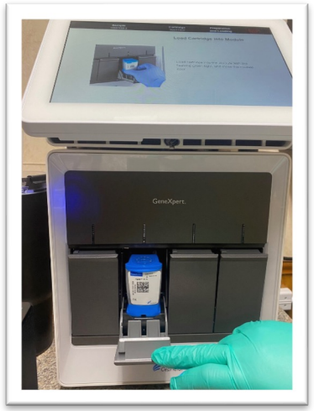
Step 2

- **Perform Fingerstick**
  - Clean site (allow alcohol to dry)
  - Puncture fingertip



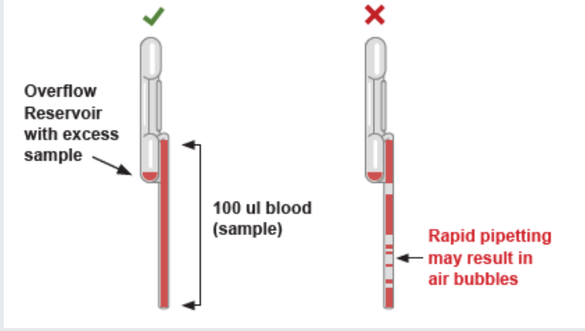
Step 3

- **Collect Sample**
  - Collect 250-500µl of blood in the EDTA K2 tube (mix tube thoroughly).
  - Fill pipette and ensure pipette is completely full, without air bubbles.

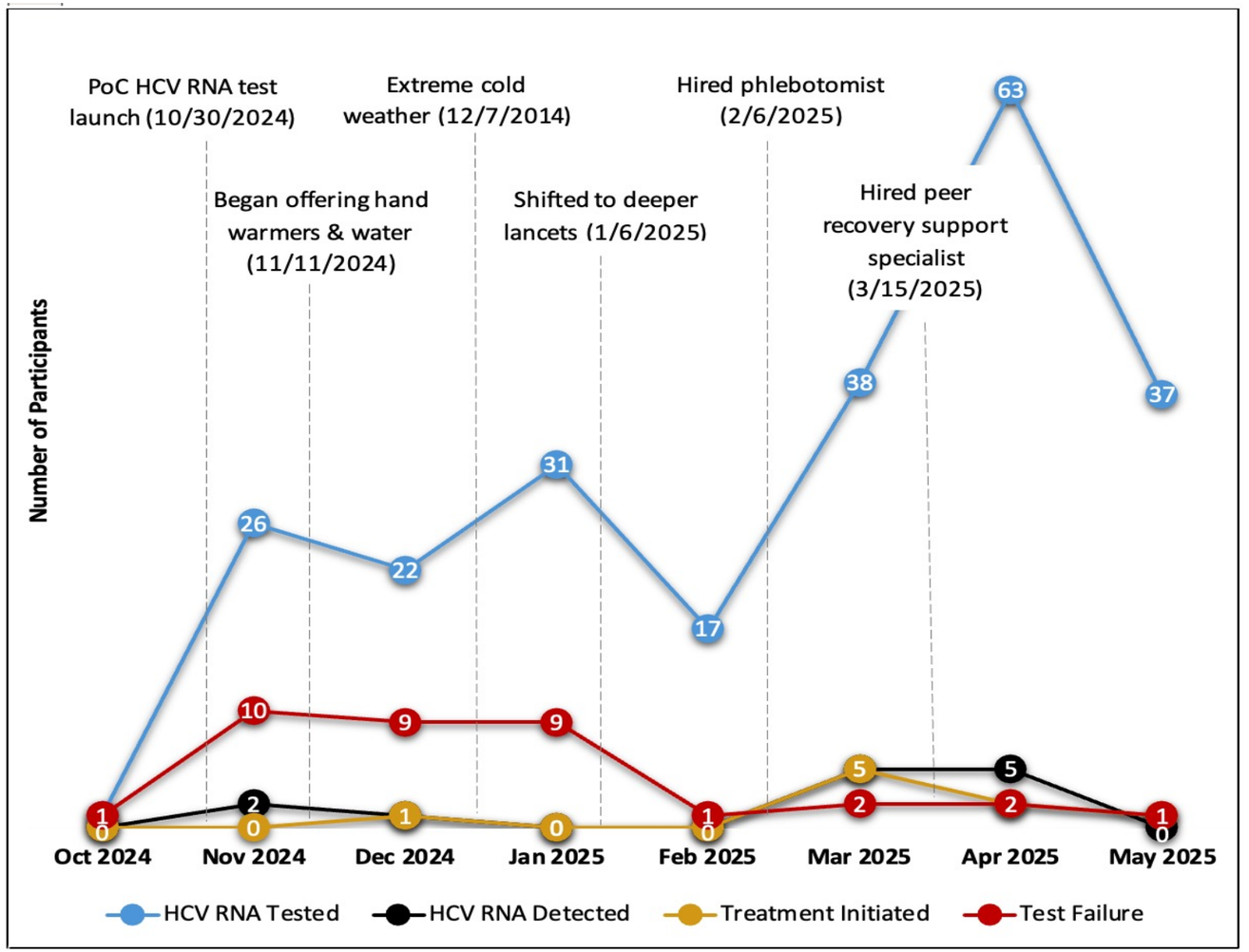


Step 4

- **Run Test & Result**
  - Transfer 100µl into the RNA GeneXpert cartridge from pipette.
  - Place the cartridge into the GeneXpert machine and initiate test
  - View and Record Results

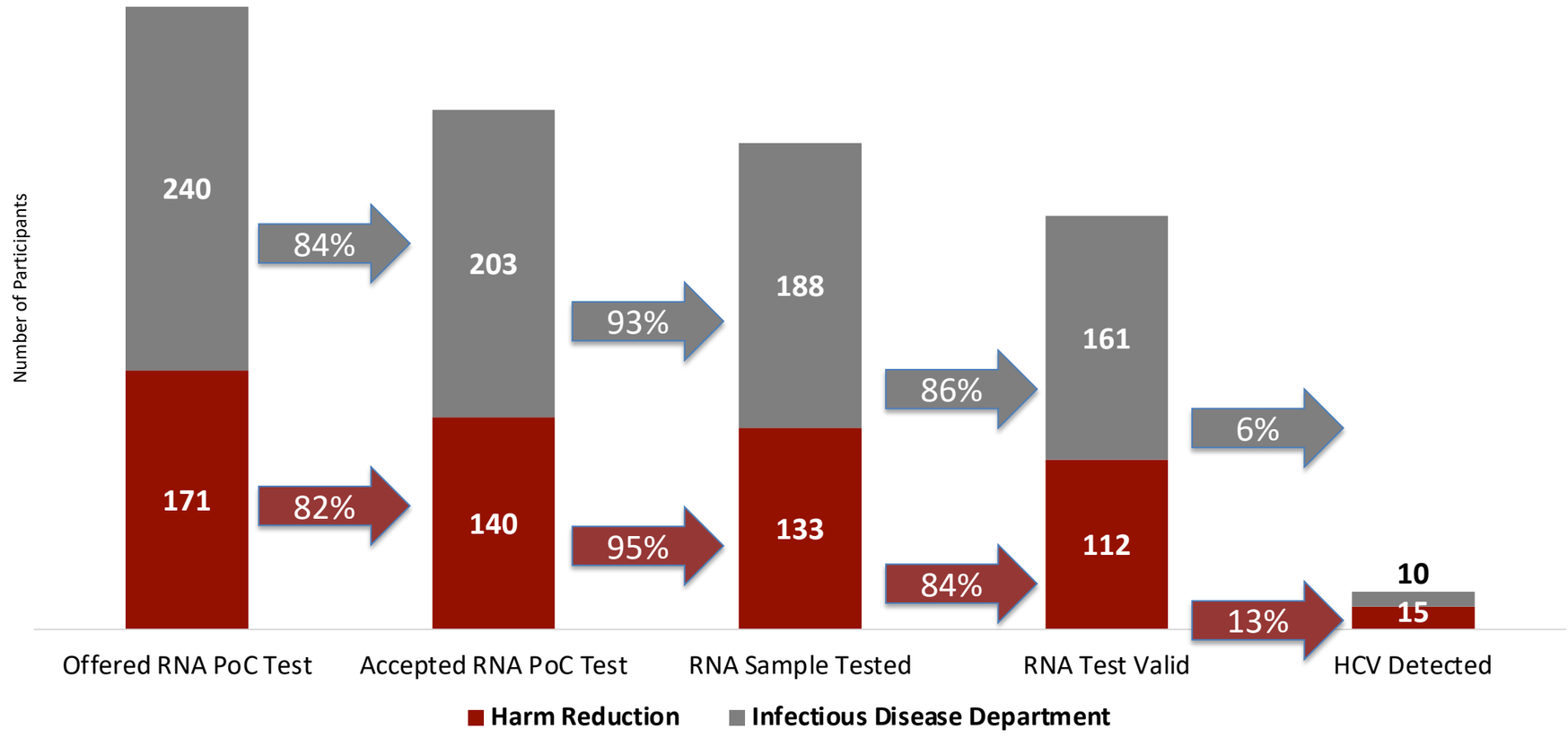
Barriers:	Intervention:
Not enough blood from a single fingerstick (in patients with calloused skin), may require multiple attempts, which can cause **patient discomfort**.	Implemented **Deeper-gaug… Lancets** from 1.8mm to **2.3** 
If the blood volume is small, it may not be adequate for testing, leading to **errors or test failure**.	**Only run the test adequate sample volume has been collected** 
Patients that are dehydrated or have **cold hands** have reduced blood volume and viscosity, this may **slow capillary refill**, making blood flow minimal after a fingerstick and more difficult to obtain an adequate blood sample volume.	**Hand warmers** and **hydrating patients befor… the fingerstick may help**  

HCV POC RNA Test Implementation Changes and Results. October 2024 – May 2025

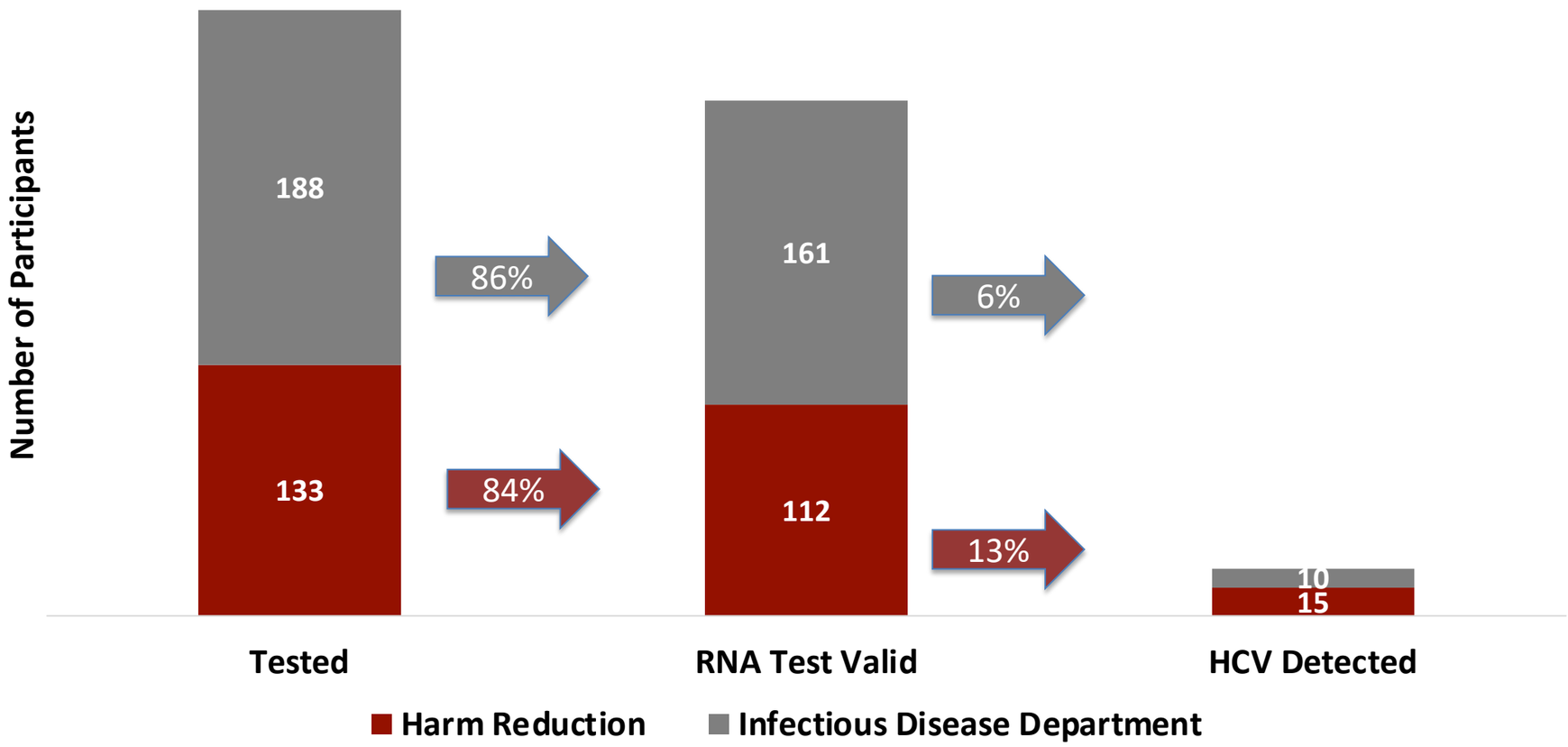


Acronyms: HCV: Hepatitis C; PoC: Point of Care

HCV RNA PoC testing and results by participating site, Cherokee Nation, October 2024-May 2025



HCV RNA PoC testing and results by participating site, Cherokee Nation, October 2024-May 2025



11/15 patients who were HCV RNA positive in the Harm Reduction Site initiated treatment
8/10 patients who were HCV RNA positive initiated treatment in the Infectious Disease Department

POC Testing at the CNHS Harm Reduction Site: Lessons Learned

POC testing is feasible in sites serving vulnerable populations

Patient incentives were important for an uptake of POC testing

POC RNA testing was feasible, although optimizing test performance required a learning curve

Before POC RNA, only ~ 50 % of persons received confirmatory HCV RNA

On-site medications must be available to enhance the uptake of HCV and syphilis treatment, as well as HIV PrEP.

Public Health Impact

Same-Day Diagnosis

Enables immediate HCV diagnosis with high accuracy (>98% sensitivity/specificity)

Rapid Treatment Initiation

Facilitates prompt linkage to care and DAA therapy initiation

HCV Elimination

Supports public health goals through expanded access to testing

Next Steps for Implementation

- *Integrate into screening algorithms for high-risk populations*
- *Deploy in underserved, mobile, and rural health programs*
- *Develop reimbursement strategies to ensure sustainability*
- *Train non-specialist providers on test interpretation*
- *Monitor performance metrics and outcomes in real-world settings*

Supporters

Indian Health Services

Cherokee Nation Health Services

Gilead (FOCUS)

Cepheid

Office of Infectious Disease and HIV/AIDS Policy (OIDP)

Health and Human Services

Cherokee Nation Syndemic Elimination Team

Contact: jorge-mera@cherokee.org

HCV Resources

Your local HCV ECHO:

https://iecho.org/home

Educational material, clinical calculators, HCV

http://www.hepatitisc.uw.edu

AASLD/IDSA HCV Treatment Guidelines:

http://www.hcvguidelines.org

HCV Drug Interactions (University of Liverpool):

http://www.hep-druginteractions.org