

# Catalytic funding for viral hepatitis elimination program in Uzbekistan

R. DUNN<sup>1</sup>, E. MUSABAEV<sup>2</sup>, S. SADIROVA<sup>2</sup>, S. BAKIEVA<sup>2</sup>, K. RAZAVI-SHEARER<sup>1</sup>, H. RAZAVI<sup>1</sup>

1 Center for Disease Analysis Foundation  
2 Uzbekistan Research Institute of Virology

## INTRODUCTION

In the absence of large-scale grant funding, the greatest barrier to elimination in low and middle-income countries (LMIC) is the lack of scalable, sustainable and transferrable funding mechanisms [1] [2].

The Center for Disease Analysis Foundation (CDAF) has developed a catalytic funding model that allows countries to fund hepatitis elimination programs without a large upfront investment, and reduces the total overall cost of the program. The model relies on the premise that, even among LMICs, most of the population can afford to pay for treatment if drug prices are kept low. Upfront costs are covered by a relatively small catalytic investment. Ongoing costs are covered by payments from 80% of patients who purchase medications; 20% who cannot afford treatment receive free medication. If successful, the initial catalytic investment is repaid at the end of the program.

In partnership with the Uzbekistan Research Institute of Virology (RIV), CDAF implemented a pilot project – Uzbekistan Hepatitis Elimination Program (UHEP) starting on December 6, 2019 to demonstrate efficacy of the funding model.

## AIMS

Demonstrate that catalytic funding, simplified test & treat guidelines and strategic cost-control strategies can:

- Greatly reduce the cost of elimination programs
- Eliminate reliance on grants and donations
- Make treatment affordable to patients in LMIC
- Achieve high screening, treatment and adherence rates.
- Repay the upfront catalytic investment

## METHOD

The study is being conducted in the capital city of Tashkent over a 12 month period with 6 months of patient follow-up and analysis. Screening and onsite follow-up testing takes place at polyclinics located in Tashkent. Program goals include screening 250,000 people for Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV).

**SIMPLIFIED TEST & TREAT:** Simplified testing algorithms were developed by a medical advisory board and approved by the Uzbekistan Ministry of Health (MOH).

**COST CONTROL:** Tests and medicines were procured at low prices by the Global Procurement Fund (GPRO) [3]. The government waived most import duties and fees and provided human resources, clinic space, and laboratory equipment and supplies. A national pharmacy chain was contracted to sell medicines at only a 5% mark-up.

**DATA COLLECTION:** A REDCap patient registry was customized and used to record patients' consent, contact information, medical history, test results, and doctors' notes using low cost handheld tablets.

**TESTING:** All patients received testing for HBsAg and anti-HCV rapid tests. HBsAg+ patients are immediately tested for HIV and creatinine levels. Anti-HCV+ patients immediately have blood drawn for off-site laboratory analysis of HCV core antigen, creatinine, aspartate aminotransferase (AST), and platelets.

**ELIGIBILITY and TREATMENT:**

- **HBV:** All patients with a positive HBsAg test, a negative HIV test and normal renal function (estimated glomerular filtration rate [eGFR] >50 mL/min/1.73 m<sup>2</sup>) were determined to be eligible for treatment for hepatitis B infection and were offered a 12-month prescription for tenofovir disoproxil fumarate with instructions to return after 12 months for free follow-up tests (HBsAg, HIV, and creatinine). All HIV-positive patients were referred to HIV clinics for treatment.
- **HCV:** Cirrhotic patients (APRI>1.5) and patients with abnormal renal function (eGFR <30 mL/min/1.73 m<sup>2</sup>) were referred to the RIV for treatment outside of the program. All other HCV core antigen-positive patients were considered eligible for treatment and offered a 3-month prescription for sofosbuvir/daclatasvir and instructed to return after 12 weeks following completion of treatment for a free SVR test.

**TASK-SHARING:** For the first 3 months of the program, patients are treated by liver specialists of the RIV. For the remainder of the program, patients are treated by trained general practitioners at their local polyclinic where screening was conducted. The cascade of care will be compared between patients treated at the RIV and those treated at the polyclinics.

## RESULTS

The cost of a *national* hepatitis elimination program in Uzbekistan was calculated under four cost and funding scenarios (Fig. 1). Utilizing simplified test & treat guidelines reduces total program cost 22.3% from \$1.3B to \$1.01B. The use of pooled procurement via GPRO combined with other cost savings measures reduces total program cost by 59.8% from \$1.3B to \$522M. By utilizing catalytic funding, a national program can be financed with only 5.1% (\$27M) of the total program costs.

UHEP utilized simplified test & treat protocols combined with pooled procurement to reduce costs. Total *pilot* program costs were estimated to be \$3.24M requiring an upfront catalytic investment of \$1.6M.

UHEP Medicines prices were calculated by summing all of the program costs and dividing by the number of patients expected to purchase medicine. These prices were then compared to current market prices in Tashkent (Table 1).

From December 6, 2019 to March 15, 2020, 24,531 people were screened for HBV and HCV. A total of 423 (39.3%) of HBV and 288 (27.2%) of HCV diagnosed already knew of their infection. A significant number (304 (1.24%)) of those tested had previously been treated.

**All Cases** (Fig. 2): Overall prevalence among all cases was 4.39% for HBsAg (7.49% among males and 3.41% among females) and 4.32% for HCV antibody (5.71% among males and 3.88% among females).

**New Cases** (Fig.2): Overall prevalence among new cases was 2.67% for HBsAg (4.68% among males and 2.10% among females) and 3.15% for HCV antibody (4.25% among males and 2.85% among females).

**HBV Cascade of Care** (Fig. 3): 1084 (4.42%) patients tested positive for HBsAg, of which 988 (91.1%) received on-site follow-up testing. However, 211 (31.5%) of those patients were lost to follow-up when they did not attend their specialist physician consultation to discuss the test results. 75.3% (510/677) of treatment-eligible HBV patients received prescriptions. A total of 275 (53.9%) patients initiated treatment for HBV. Among those on treatment, 257 (93.5%) paid for treatment and 18 (6.5%) received free treatment.

**HCV Cascade of Care** (Fig. 3): 1075 (4.38%) patients tested positive for anti-HCV and were referred to receive testing for active infection. Of those, 946 (88.0%) were tested for viremia, of which 616 (65.1%) had active HCV infection. Of viremic patients (*not shown in chart*), 582 (59.4%) consulted with a doctor. Of those, 486 (83.5%) were treatment eligible and 335 (68.9%) received a prescription. A total of 163 individuals (48.7%) initiated treatment, of which 108 (66.3%) paid for treatment, 41 (25.2%) received free treatment, and 14 (8.6%) received treatment outside of the program.

Figure 1. Estimated costs and funding required for *national* HBV and HCV elimination program in Uzbekistan under different scenarios.

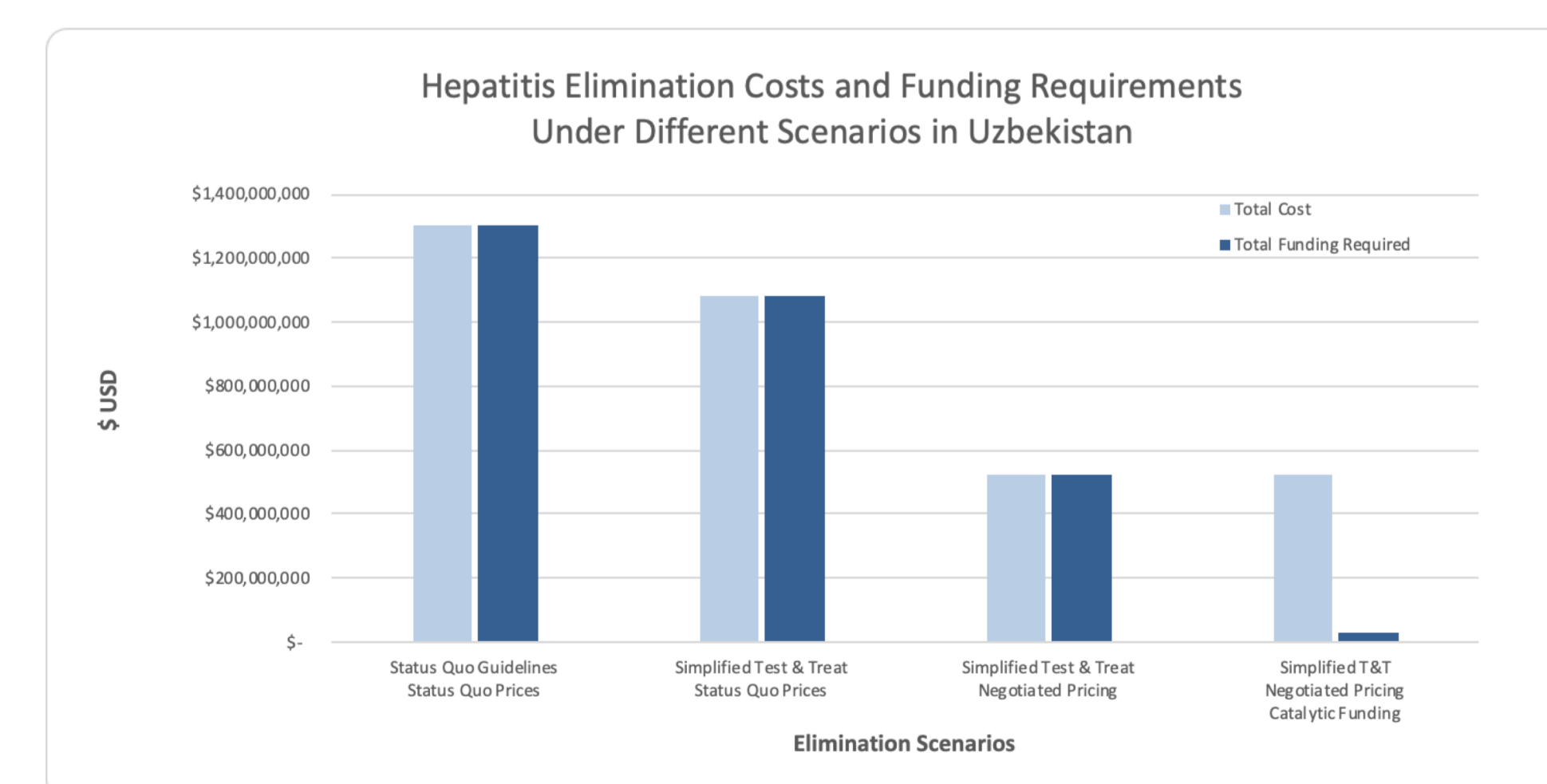


Table 1. Testing and Treatment Prices in Tashkent, Uzbekistan – Fall 2019

	Market Pricing (Fall 2019)	Global Procurement Fund Pricing (Fall 2019)
<b>Hepatitis B</b>		
Screening	\$2.30 <sup>1</sup>	Free <sup>1</sup>
Laboratory Tests	\$55.25 <sup>2a</sup>	Free <sup>2b</sup>
Treatment (20% of patients)	\$365 / yr <sup>3</sup>	Free <sup>3</sup>
Treatment (80% of patients)	\$365 / yr <sup>3</sup>	\$180 / yr <sup>3</sup>
<b>Hepatitis C</b>		
Screening	\$2.40 <sup>4</sup>	Free <sup>4</sup>
Laboratory Tests	\$43.50 <sup>5a</sup>	Free <sup>5b</sup>
Treatment (20% of patients)	\$508 <sup>6</sup>	Free <sup>6</sup>
Treatment (80% of patients)	\$508 <sup>6</sup>	\$204 <sup>6</sup>

1 HBsAg RDT, 2a HBV Elisa, Quan-PCR, Viral Load, Liver-staging, Blood Workup, 2b HIV RDT, Creatinine, 3 TDF, 4 anti HCV RDT, 5a Viral Load (x2), Blood Workup, 5b HCV cAg, Creatinine, AST, Platelet, HCV PCR (SVR), 6 SOF/DAC (3 months)

Figure 2. THBV and HCV Prevalence by Age and Gender

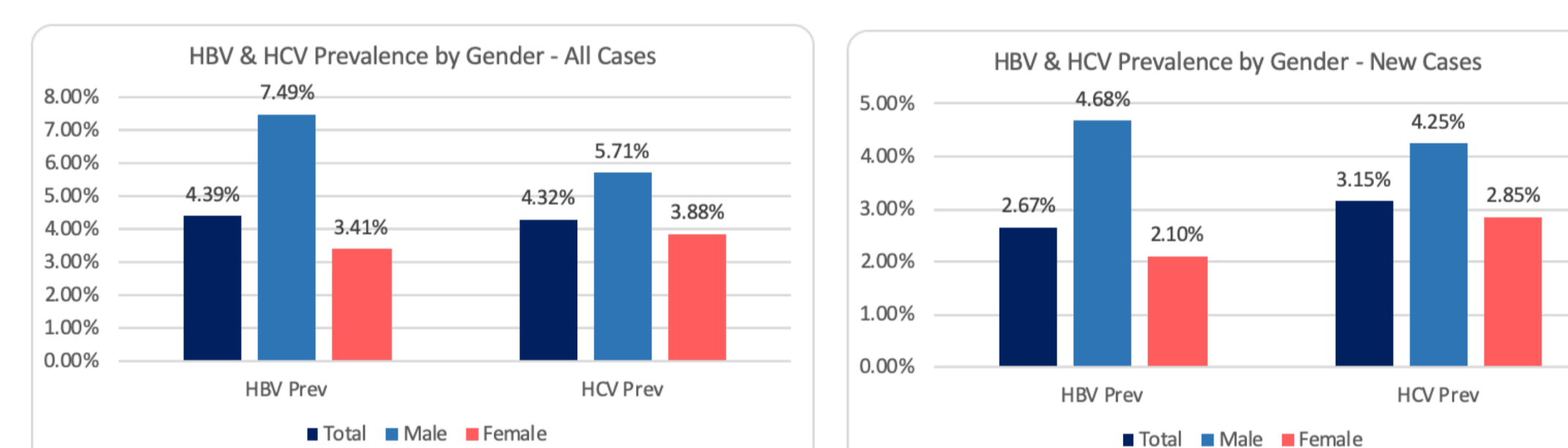
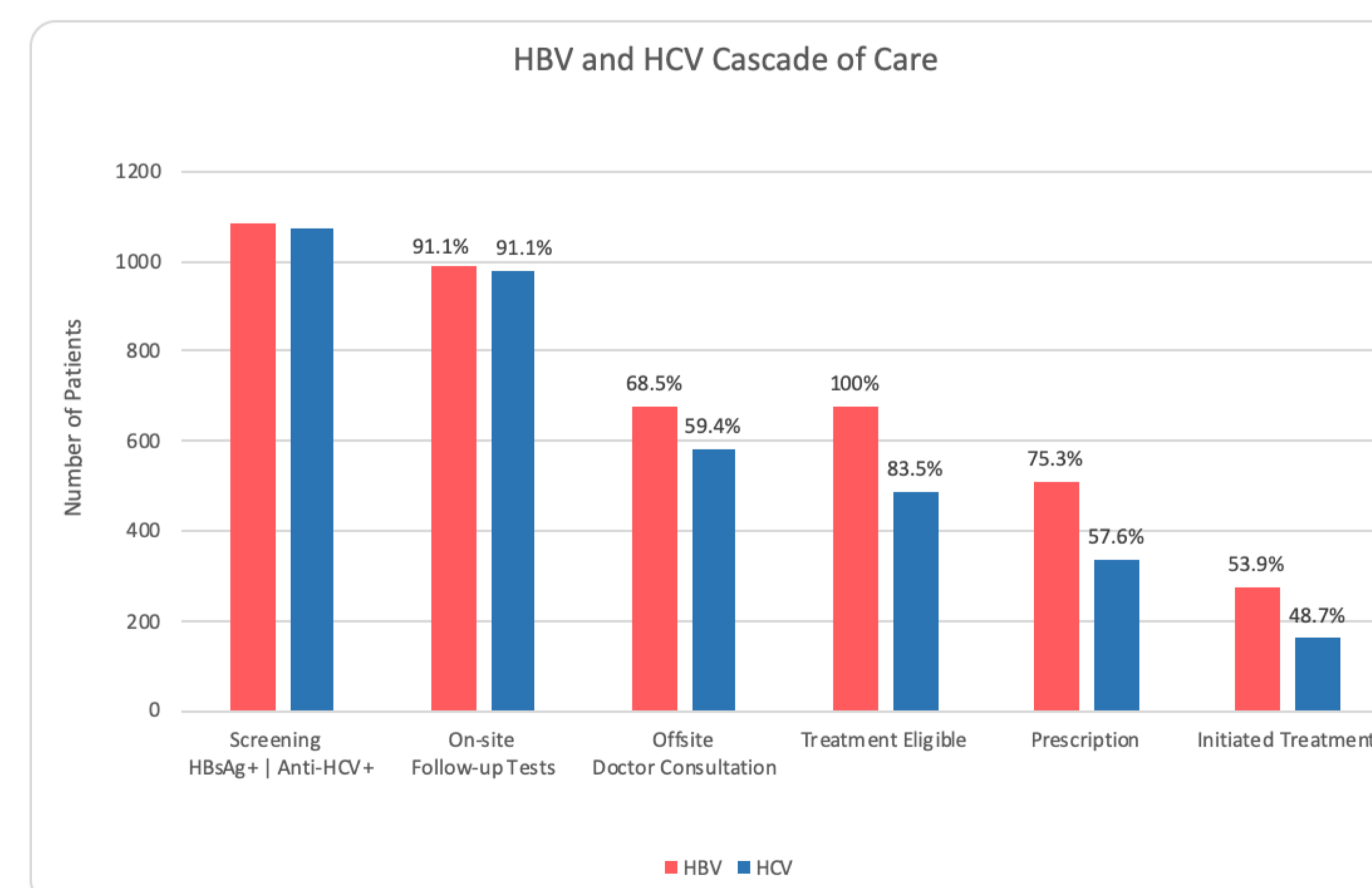


Figure 3. Preliminary Hepatitis B and Hepatitis C Cascade of Care Results



@CDAFound

## CONCLUSIONS

Data from the first three months of this 12-month program indicate that large scale general population hepatitis screening is feasible with rapid HBV and HCV diagnostic tests. However, achieving WHO 2030 hepatitis B and C elimination targets will require substantial improvement in linking all eligible patients to treatment. Linkage rates from this preliminary data, using RIV liver specialists to treat patients, will be compared to linkage rates from the final 9 months of the program where polyclinic GPs will treat patients at the same site where screening takes place.

While 93.5% of HBV patients and 66.3% of HCV patients who filled prescription paid for their medicine, efforts to reduce losses in the care cascade are needed to increase enrollment, fully recover program costs and repay the catalytic investment.

Program managers are conducting patient surveys to understand the reasons for loss to follow up and are implementing strategies to improve linkage and adherence to care rates.

Future reports will present financial results including cost recovery performance.

## ACKNOWLEDGEMENTS

We would like to thank all of our collaborators with special thanks to the RIV staff who manage daily program operations.

We would also like to thank the US Embassy to Uzbekistan and Mr. Akhror Burkhanov, Cultural Attaché at the Uzbekistan Embassy to the US, for their support in navigating political processes and obtaining necessary decrees to enable this study.

We would like to thank the Dentons law firm in Tashkent for their services in understanding and complying with Uzbekistan laws.

This study was funded by the Center for Disease Analysis Foundation and through grants from the John C. Martin Foundation and Gilead Sciences. Gilead Sciences had no influence over the design, analysis, or recommendations.

## REFERENCES

- 1 Pedrana A, et al. Eliminating viral hepatitis: the investment case. Doha, Qatar: World Innovation Summit for Health; 2018. <https://www.wish.org.qa/wp-content/uploads/2018/11/IMPJ6078-WISH-2018-Viral-Hepatitis-181026.pdf>
- 2 Cooke G, et al. Accelerating the elimination of viral hepatitis: a Lancet Gastroenterology & Hepatology Commission. Lancet Gastroenterol Hepatol 2019;4:135–84. doi:10.1016/S2468-1253(18)30270-X
- 3 Global Procurement Fund, [www.cdafound.org/gpro](http://www.cdafound.org/gpro)

## CONTACT INFORMATION

Rick Dunn, Center for Disease Analysis Foundation  
rdunn@cdafound.org