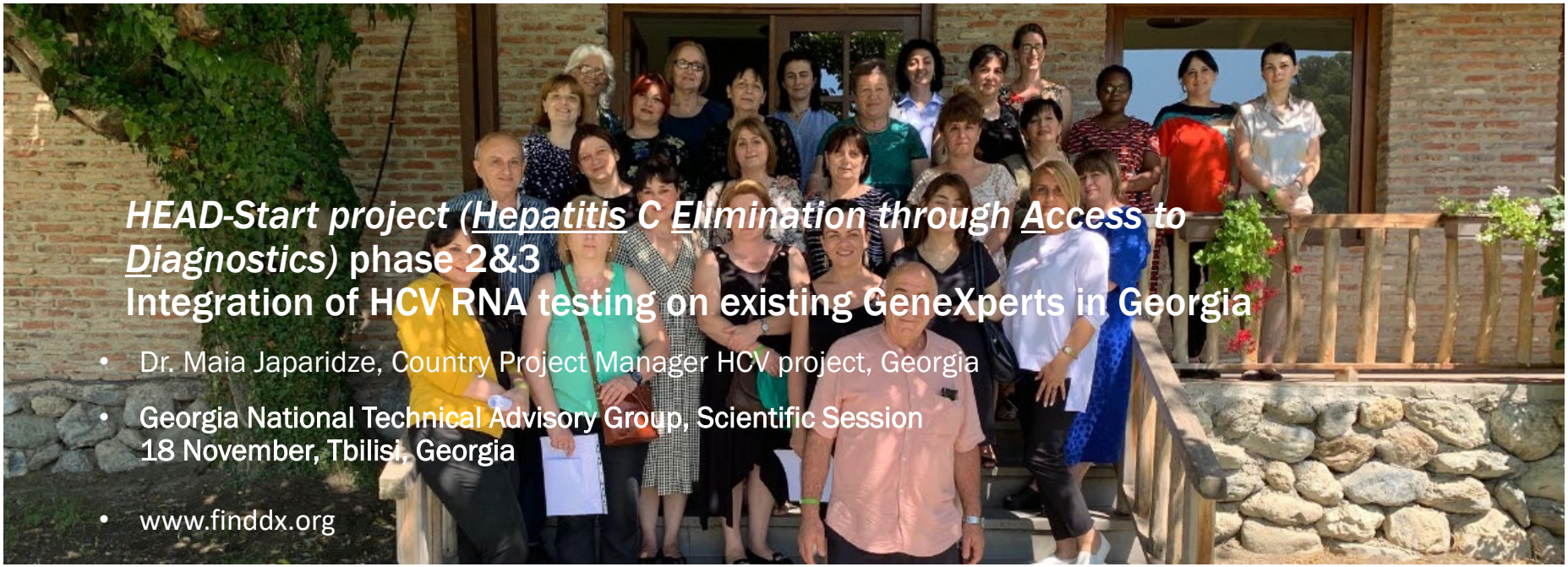
FIND

Because diagnosis matters



HEAD-Start project (Hepatitis C Elimination through Access to Diagnostics) phase 2&3
Integration of HCV RNA testing on existing GeneXperts in Georgia

- Dr. Maia Japaridze, Country Project Manager HCV project, Georgia
- Georgia National Technical Advisory Group, Scientific Session
  18 November, Tbilisi, Georgia
- www.finddx.org

Integration of HCV assay on existing GeneXperts

A project funded by Unitaid
Innovation in Global Health

Aim	• to support decentralization efforts of national program for HCV care
Objective	• to pilot use of HCV assay on existing GeneXpert machines to understand the feasibility of using the machines for HCV testing and the impact on TB testing

Integration project sites;
Phase 1 - 8 NCDC Labs; Phase 2 - 7 clinics/centers

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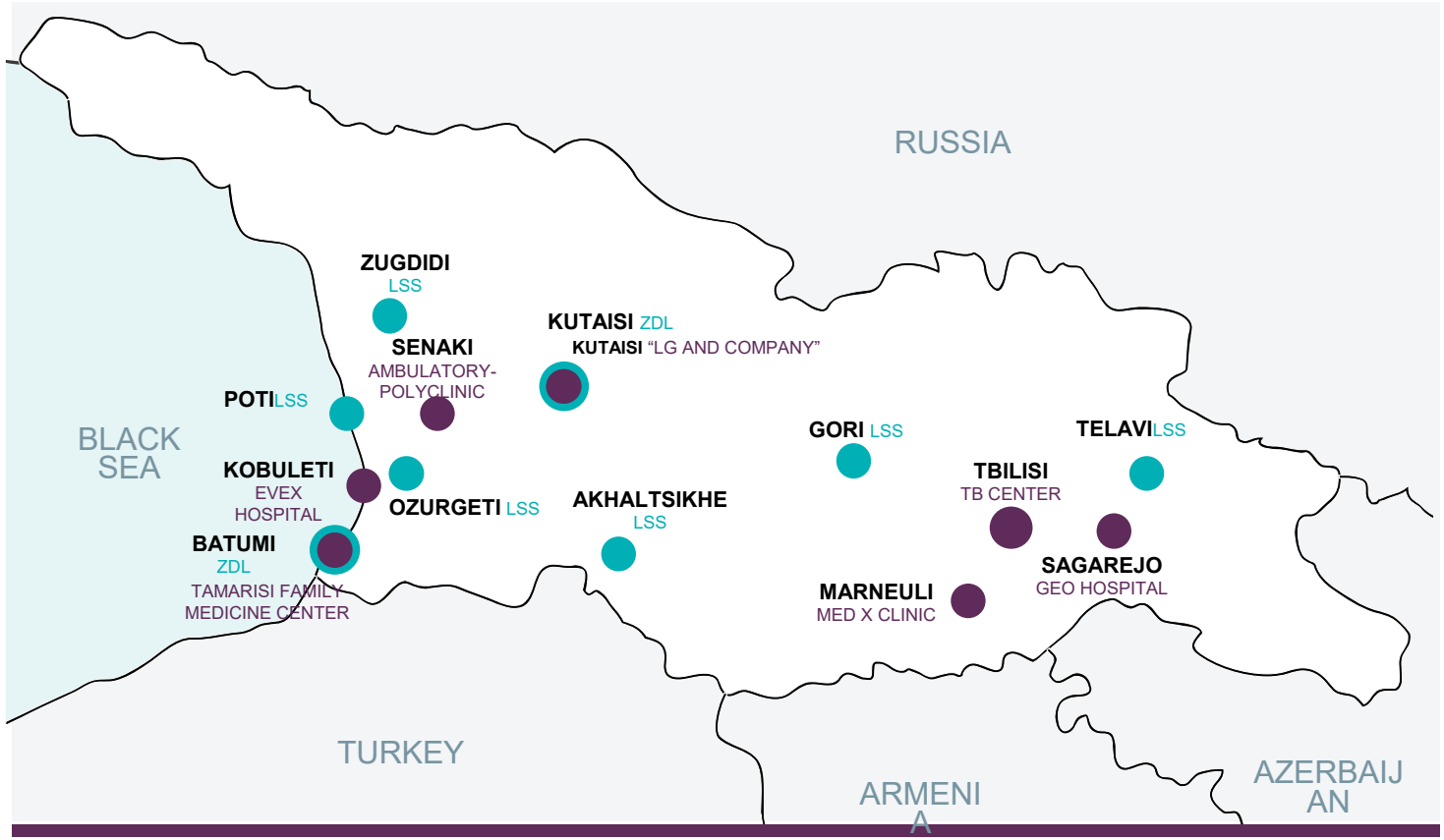


Integration project timeline

A project funded by Unitaid Innovation in Global Health

Dec 2018;
MOH, NCDC,TB program leader, stakeholders meeting

Apr-May 2019;
training of phase 1 sites
8 NCDC Labs

May 2019;
start of HCV testing on existing Xperts

Jun 2019;
roll-out review meeting for phase 1 sites

Sep-Oct 2019;
Lab POCT training HCV VL FS and starting performing testing

Dec 2019;
phase 2 training
7 clinics/center

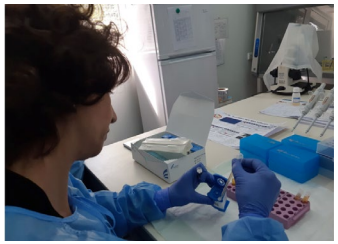
Dec 2019;
phase 2 will start HCV testing on existing Xperts

Mar 2020;
Project ends, transition to national program

HCV sample workflow of prier to HCV integration; Workflow of HCV testing for ongoing Integration project at NCDC Labs

- Blood drawing at the clinics
- The samples sending to regional NCDC Labs

- NCDC regional Lab receiving the samples from the clinics
- The samples sending to the Lugar center in Tbilisi



- Lugar center receiving the samples
- Performing the HCV cAg testing

TB testing during 6 months period before and after integration at NCDC regional Labs

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NCDC Lab	# TB tests during baseline (Nov 2018-Apr 2019)	# TB tests after integration (May-Oct 2019)	Comparison of TB testing volumes
Batumi ZDL	2925	2169	-26 %
Kutaisi ZDL	1473	1298	-12 %
Poti LSS	371	244	-34%
Gori LSS	520	376	-28 %
Telavi LSS	118	138	+17%
Zugdidi LSS	864	808	-6.5%
Ozurgeti LSS	135	162	+20 %
Akhaltsikhe LSS	110	74	-33 %
TOTAL	**6516**	**5269**	**-19%**

-19 %

Seasonal differences

TB errors during baseline and after integration at NCDC Labs

A project funded by Unitaid
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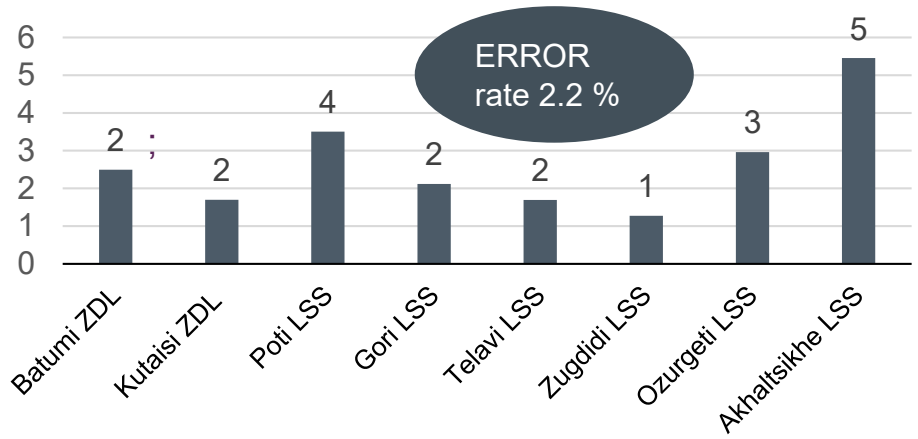
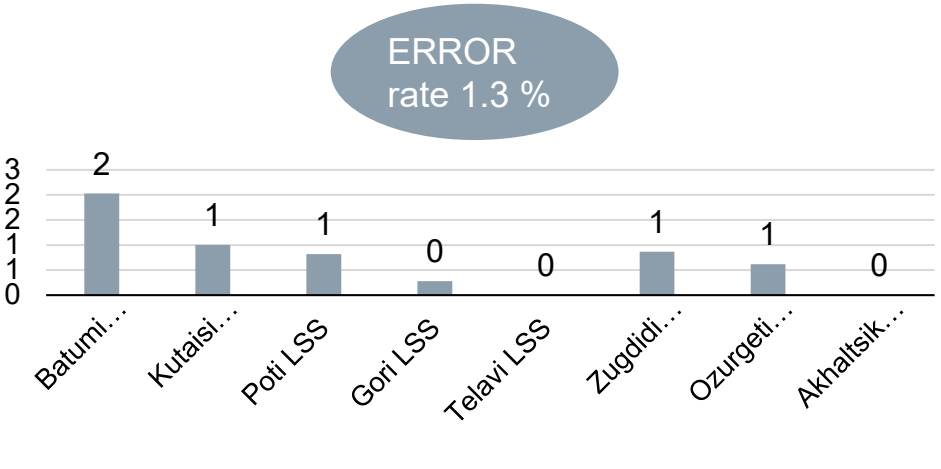
TB errors 6 months before integration
Nov 2018 – Apr 2019;
Total 6516 test;
145 Errors, 11 Invalids, 98 No results,



TB errors after integration 6 months period
May 2019 – Oct 2019;
Total 5252 tests;
68 Errors, 15 Invalids, 18 No results;



Number of HCV tests conducted on GX at NCDC labs by months; May - Oct 2019

A project funded by Unitaid
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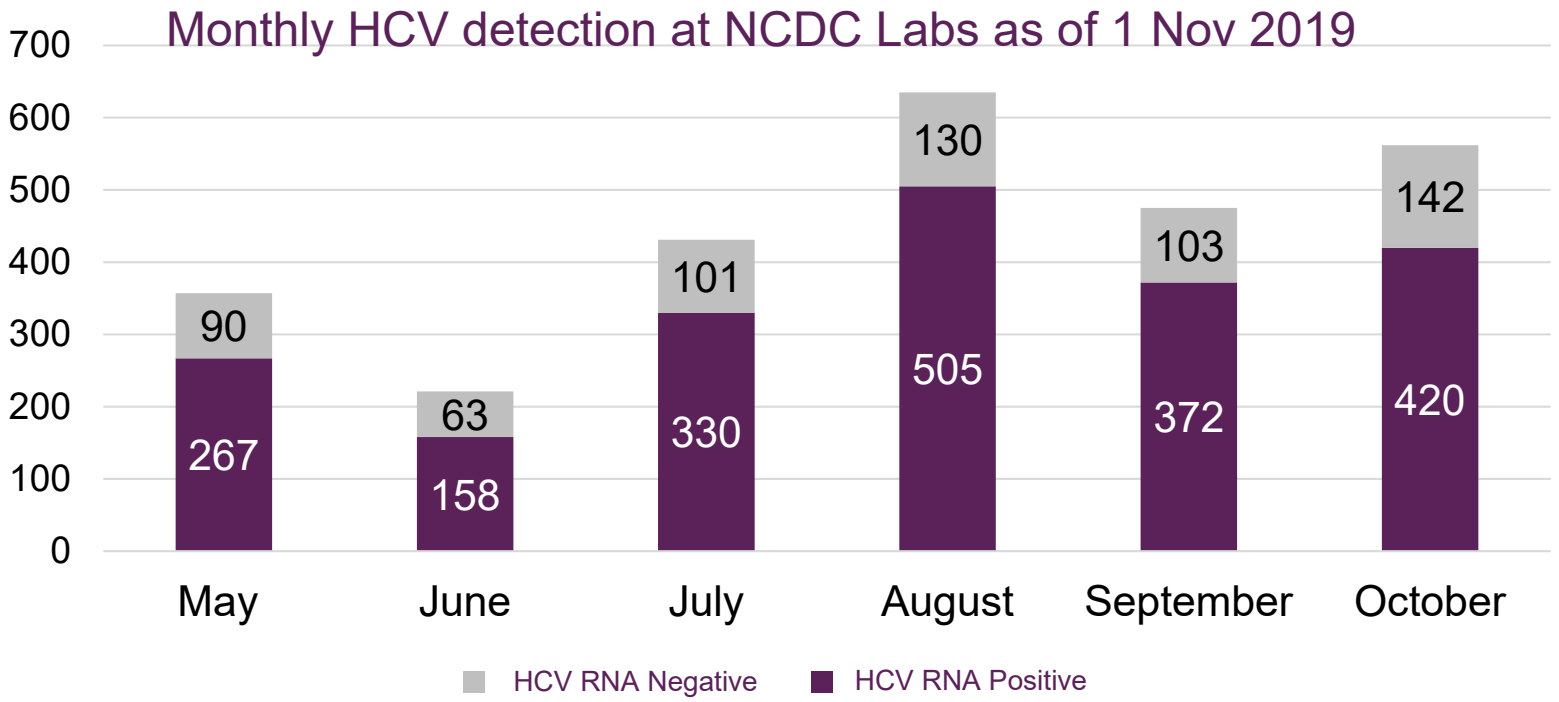

2681 –HCV confirmatory tests	
HCV RNA Positive	HCV RNA Negative
2052 (76.5%)	629 (23.5%)

Number of HCV tests conducted on GeneXpert by NCDC Labs; HCV detection rates by NCDC Labs; May-Oct 2019

A project funded by Unitaid
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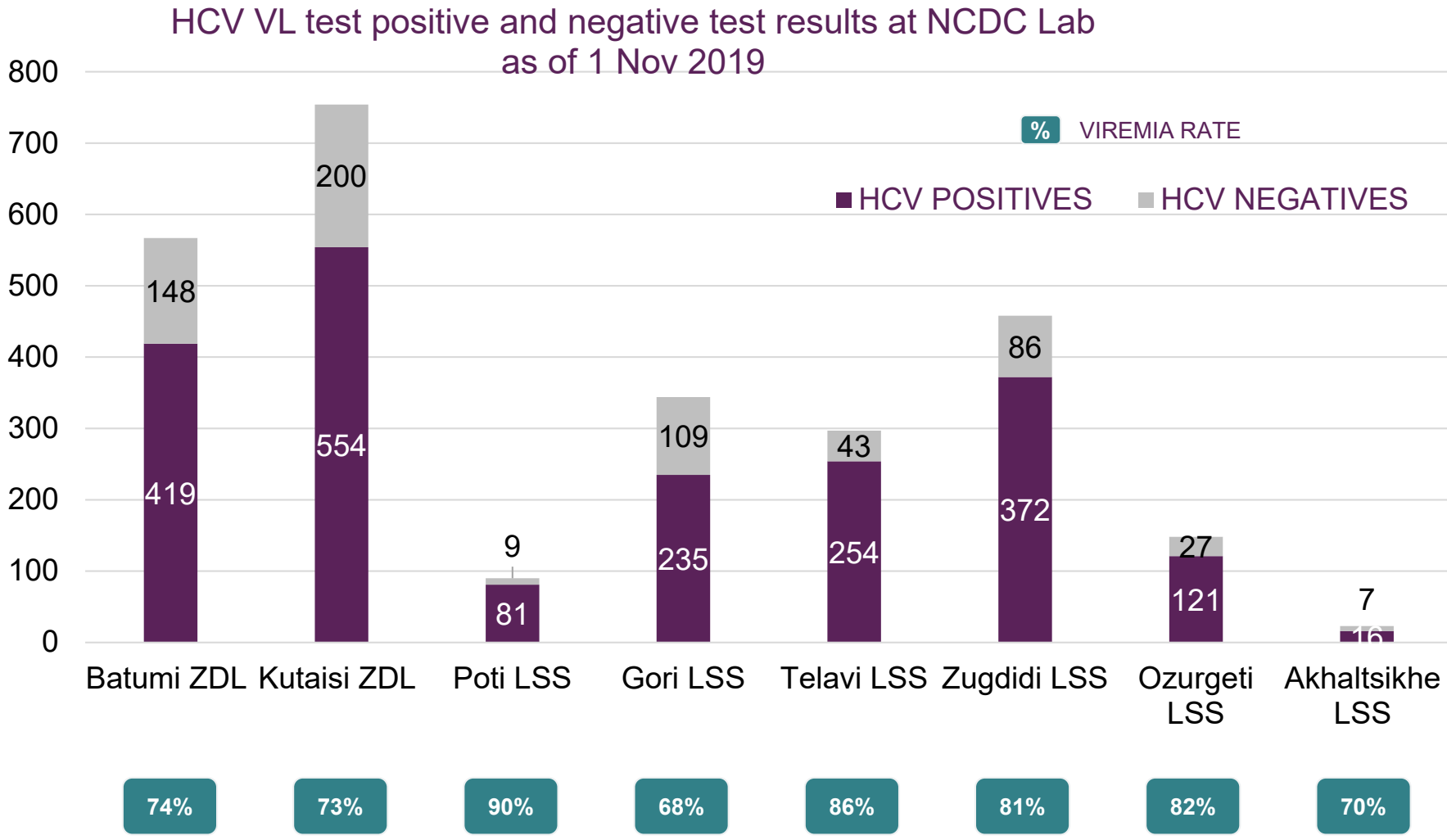
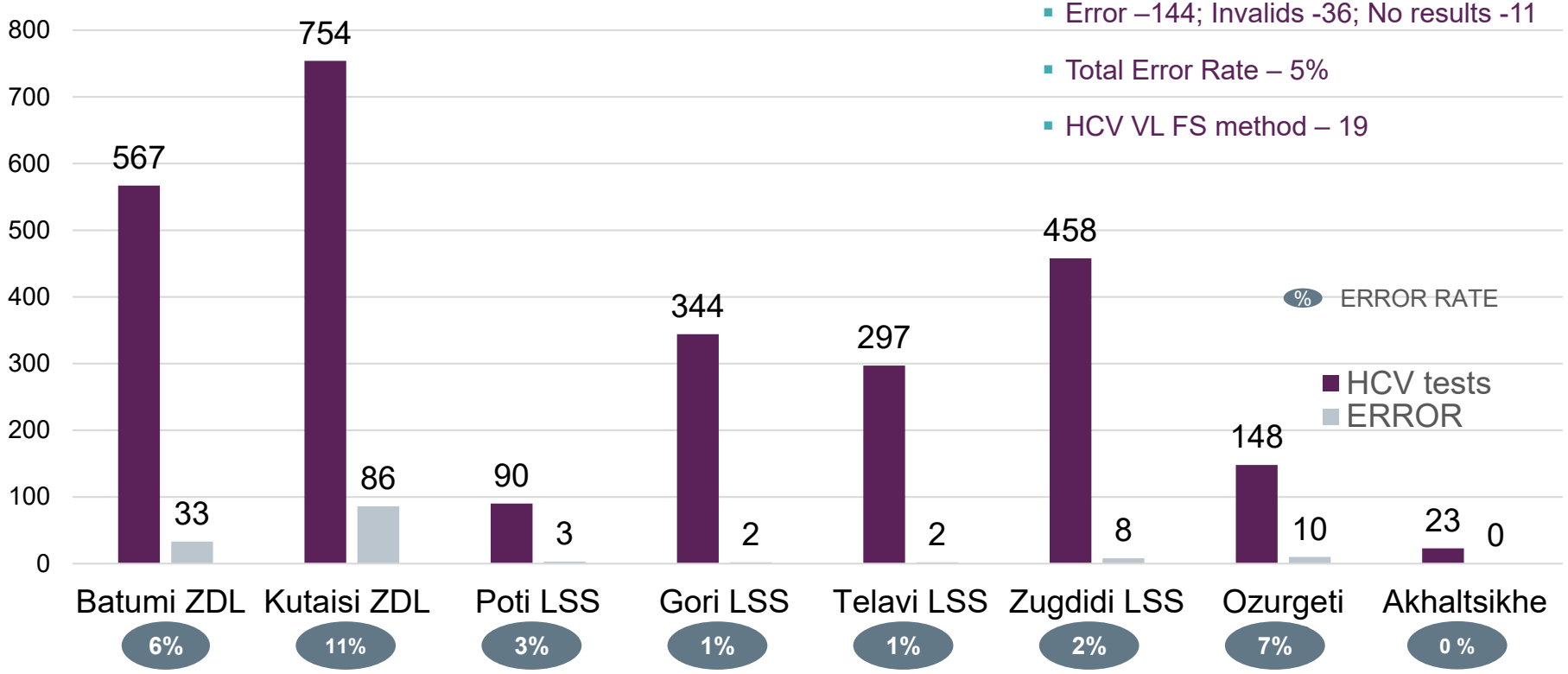


Aggregated number of HCV tests and Errors; Error Rates of HCV tests at NCDC Labs, May-Oct 2019

A project funded by Unitaid
Innovation in Global Health

Number of HCV tests and errors at Labs as of 1 Nov 2019

- Total HCV tests - 2681
- Error –144; Invalids -36; No results -11
- Total Error Rate – 5%
- HCV VL FS method – 19



Preliminary conclusions

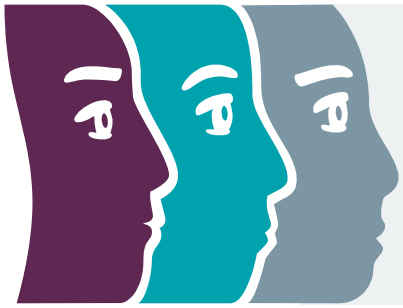
Integration of HCV assay on GeneXperts used for TB is feasible

Does not appear to negatively impact TB testing

When integrating HCV assay, which is of a different sample type than used for TB, training and spot training on sample preparation is necessary

Analysis on effect of integration on turn around time for TB and HCV is forthcoming, expected for Georgia HCV Workshop 2020

FIND's evaluation project conducted by HRU is ongoing in parallel, part of which is an acceptability survey from the lab technicians perspective



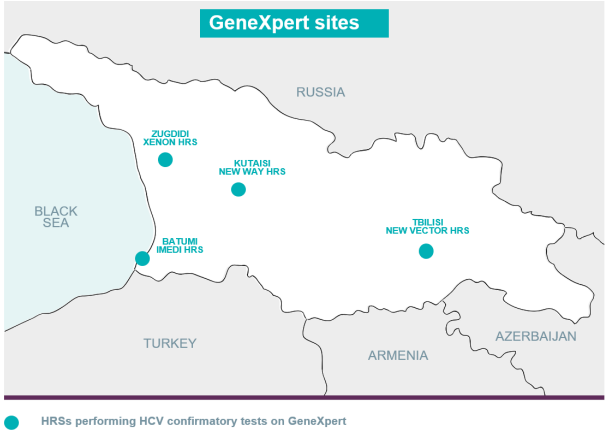
HEAD-Start phase 3;
HCV RNA testing among previously treated PWIDs at HRSs

HCV VL tests at 4 Harm Reduction Sites in Georgia

A project funded by Unitaid
Innovation in Global Health

Using GeneXperts at Harm Reduction Sites

- Placed by FIND at Tbilisi New Vector, Zugdidi Xenon, Kutaisi New Way, and Batumi Imedi for the HEAD-Start study on *Approaches to providing hepatitis C viremia testing to people who inject drugs in Georgia*



FIND has provided additional cartridges to be used for

- HCV confirmatory testing outside the study
- SVR testing (for those beneficiaries who underwent HCV treatment at the HRS)
- ‘missing SVR testing’; providing an RNA test for those persons who have completed treatment but never received an SVR
- RNA testing to those persons who have previously been treated for HCV with successful SVR but where concerned that they might have been re-exposed to HCV

Possible reinfection or late relapse cases with PWIDs, 1 Jan 2019 - 1 Oct 2019

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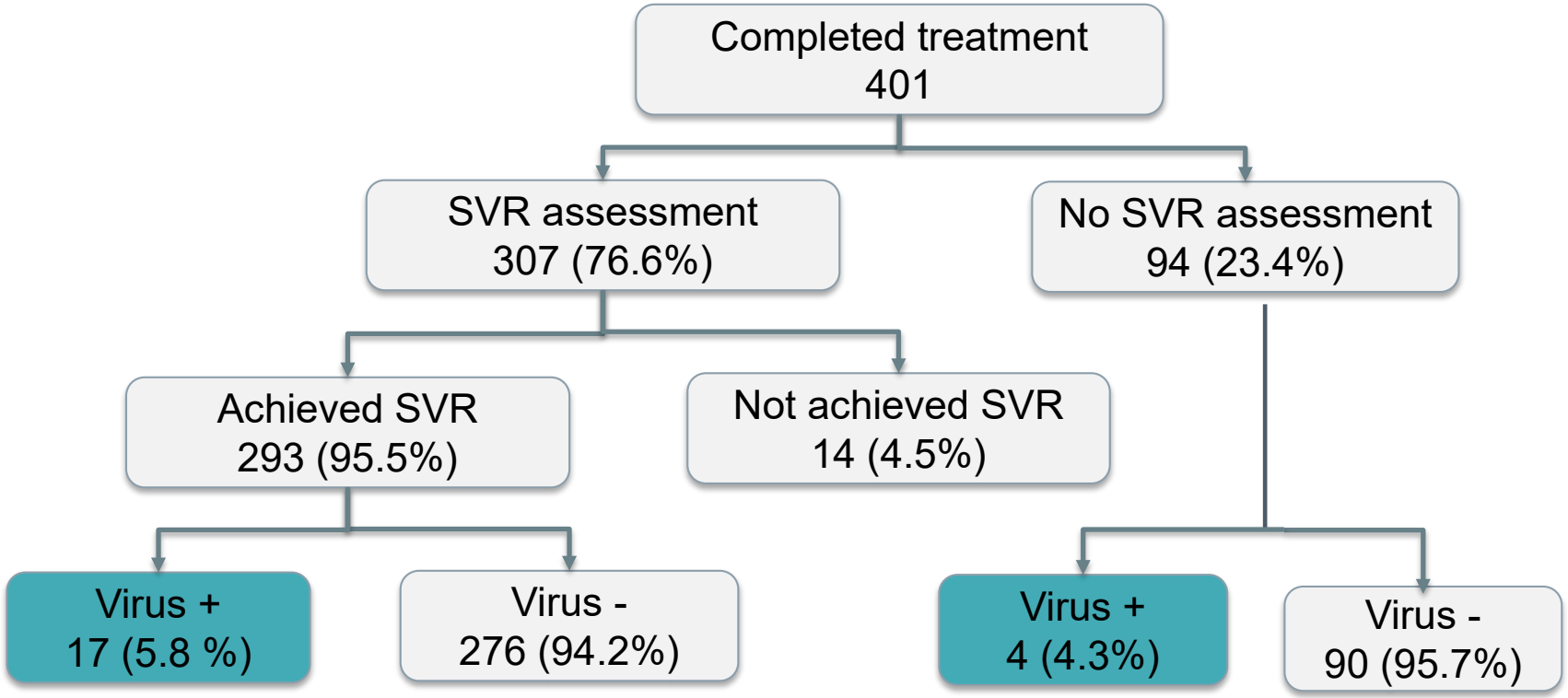

- Male – 100%
- Age range: 34 – 59
- Median: 47

- Male – 100%
- Age range: 32 - 59
- Median: 44

Possible reinfection and late relapse cases with PWIDs by HRSs
1 Jan 2019 - 1 Oct 2019

A project funded by Unitaid
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HRS	Total HCV treated	SVR achieved cases				'Missing SVR' cases		
		HCV treated	SVR achieved	HCV RNA - on GX	HCV RNA + on GX	HCV treated	HCV RNA - on GX	HCV RNA + on GX
Tbilisi New Vector	**141**	**122**	113	110	3 (3%)	**19**	19	0 (0%)
Zugdidi Xenon	**41**	**24**	23	20	3 (13%)	**17**	15	2 (12%)
Kutaisi New Way	**111**	**77**	76	75	1 (1%)	**34**	32	2 (6%)
Batumi Imedi	**108**	**84**	81	71	10 (12%)	**24**	24	0 (0%)
Total	**401**	**307**	**293**	**276**	**17 (6%)**	**94**	**90**	**4 (4%)**

For those that reached SVR, time between the treatment completion and HVC testing

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	Years between EOT and retesting		Years between first SVR and retesting	
	average	range	average	range
Total cohort (n=293)	2.3 yrs	0.2 to 3.8 yrs	2.0 yrs	0.1 to 3.5 yrs
HCV- (n=276)	2.3 yrs	0.2 to 3.8 yrs	2.0 yrs	0.1 to 3.5 yrs
HCV RNA+ (n=17)	2.5 yrs	2.0 to 3.6 yrs	2.3 yrs	1.8 to 3.3 yrs

Project Preliminary findings

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Total of 293 patients where used in this analysis; those who had successfully completed an SVR test and presented for a second HCV RNA test post SVR completion

Time range calculated from treatment completion date to second HCV RNA test post successful SVR

Patients were followed for median 2.6 years; range 0.2 years to 3.8 years

- Contributing to 674 person years

In total 17 persons had possible reinfection with an overall incidence rate of 2.5 per 100 persons years

Genotyping and gene-sequencing have not been completed on the 17 persons who have possible re-infection

დიდი მადლობა! Thank you !

Special thanks to our partners in this endeavor!

We are grateful for the input and feedback of many of the organizations also doing great work in the area of HCV elimination in Georgia

Table 1

Overview of studies of hepatitis C reinfection

Author, year	Years of Data Collection	Population	Location and Study Design	Recruitment	Number of subjects	No of reinfections	Reinfection Rate (per 100 PY (95% CI) or %)	Follow up Period (mean, median or total)
Systematic reviews and meta analyses								
Aspinall 2013		PWID	Meta-analysis 5 studies		131	7	2.4 (0.9–6.1)	
Hagan 2015		HIV infected MSM	Meta-analysis 2 studies		170	38	11.4 (7.4–17.7)	
Simmons 2016		"Low risk"	Meta-analysis 31 studies		7969	4	0.0 (0.0–0.0)	
Simmons 2016		High risk: PWID, incarcerated	Meta-analysis 14 studies		771	36	1.9 (1.1–2.8)	
Simmons 2016		HIV/HCV coinfected	Meta-analysis 4 studies		309	31	3.2 (0.0–12.3)	

Falade-Nwulia O, Sulkowski MS, Merkow A, Latkin C, Mehta SH. Understanding and addressing hepatitis C reinfection in the oral direct-acting antiviral era. *J Viral Hepat*. 2018;25(3):220–227. doi:10.1111/jvh.12859

Author, year	Years of Data Collection	Population	Location and Study Design	Recruitment	Number of subjects	No of reinfections	Reinfection Rate (per 100 PY (95% CI) or %)	Follow up Period (mean, median or total)
Interferon era studies								
Predominantly MSM studies								
Ingiliz 2014	2001 – 2013	HIV infected MSM **Acute HCV**	Retrospective Germany	HIV and hepatitis care centers	302	48	16%	Total: 12 Y
Ingiliz 2017	2002 – 2014	HIV infected MSM **Acute HCV**	Retrospective Europe	Clinical centers within the NEAT network (European AIDS Treatment Network)	Total 606 SVC 111 SVR 494	149	7.3 7.3 7.8	Mean: 3.9 Y IQR 1.6–4.9 Y
Martin 2015	2002 – 2014	HIV infected MSM	Retrospective United Kingdom	Hospital based	191	2002–2008 22 2008–2014 30	13.2 (8.7–20.1) 5.3 (3.7–7.6)	Total: 589 PY
Vanhommerig 2014	2009 – 2014	HIV infected MSM **Acute HCV**	Retrospective Netherlands	HIV outpatient clinic	48	18	29%	Median: 4.0 Y IQR 2.5–5.7 Y

Falade-Nwulia O, Sulkowski MS, Merkow A, Latkin C, Mehta SH. Understanding and addressing hepatitis C reinfection in the oral direct-acting antiviral era. *J Viral Hepat*. 2018;25(3):220–227. doi:10.1111/jvh.12859

Author, year	Years of Data Collection	Population	Location and Study Design	Recruitment	Number of subjects	No of reinfections	Reinfection Rate (per 100 PY (95% CI) or %)	Follow up Period (mean, median or total)
Predominantly PWID studies								
Weir 2016	1999 – 2012	PWID	Retrospective Scotland	Scottish HCV clinical database	277	7	1.71	Median 4.5 Y 410 PY
Islam 2017	1992 – 2013		Retrospective British Columbia	British Columbia Center for Disease Control PublicHealth database.	5915 3690 (SVC) 2225 (SVR)	452 402 50	1.27 1.59 0.48	Mean: 5.4 Y IQR: 2.9–8.7 Y
Pineda 2015	2001 – 2013	HIV infectedPWID (93%)	Retrospective Spain	Hospital based	84	4 (total) 3 (PWID) 1 (MSM)	1.21 Inhalational drug users 8.72	Mean: 2.8 Y Range: 1–12 Y
Midgard 2016	2004 – 2014	PWID	Prospective Norway and Sweden	RCT of short duration pegylated interferon and ribavirin in genotype 2 and 3 HCV	94	12	1.7 Drug use relapsers 4.9	Median: 7.1 Y
Aitken 2016	2008 – 2014	PWID, urban Acute	Prospective Australia	Community based PWID	139	39	12.4	314.5 PY
Machouf 2015		PWID (82%)	Prospective Canada	Clinic based	338	22	Former PWID 1.7 Current PWID 3.6	Median:2.7 Y IQR 1.7–4.8 Y 1175 PY
Martinello 2016	2004–2015	MSM (53%) PWID (70%)	Prospective Australia and New Zealand	Three prospective open-label studies of HCV treatment in recent (< 18 months) HCV infection	120	10	7.4	135 PY
Young[*] 2017	2003 –2016	HIV infected MSM PWID (74%) MSM (33%)	Retrospective Canada	HIV clinics across 6 Canadian provinces	257	18	3.1	Median 1.5 Y IQR 2.9–8.7 Y 589 PY
Oral DAA-era studies								
Dore 2016	2014–2016	PWID on OST	Prospective International	RCT of elbasvir/grazoprevir in patients on OST (80% adherent to OST visits)	301	6	4.6	24 weeks post EOT
Dore 2017 (A subset of Dore 2016)	2014–2017	PWID on OST	Prospective International	RCT of elbasvir/grazoprevir in patients on OST	199	10	2.3	24 months post EOT

[*]51 of 257 patients received oral-DAA therapies

Falade-Nwulia O, Sulkowski MS, Merkow A, Latkin C, Mehta SH. Understanding and addressing hepatitis C reinfection in the oral direct-acting antiviral era. *J Viral Hepat*. 2018;25(3):220–227. doi:10.1111/jvh.12859

Background information on platform

PLATFORM 	Xpert HCV VL assay 	Xpert HCV Fingerstick VL assay 
SAMPLE TYPE	Plasma	Capillary blood
SENSITIVITY	99%	98%
SPECIFICITY	100%	100%
SAMPLE PREPARATION	Integrated	Integrated
TIME TO RESULT	110 min	60 min
REGULATORY STATUS	CE-IVD, WHO PQ	CE-IVD
POWER SUPPLY	Need electricity supply	
DATA ANALYSIS	PC	
TEST MENU	TB, MDR-TB, HCV, HIV, HBV, HPV, Chlamydia, Gonorrhea, Trichomoniasis, Influenza A/B, RSV, MDR	
TEST COST (HCV)	US$ 14.95 ex works	
INSTRUMENT COST	US$ 17,500	

Terminology

Type of result read out	Meaning	Why it happened/what to do to fix	Cartridge Lost
NO RESULT	Assay aborted in the middle of the sampling	Machine and laptop lost contact, module stuck or power failure in the middle of the assay	YES
ERROR (S)	Various assay or pre sampling mistakes either operator, machine or cartridge, aborted in the middle of the procedure		YES
	ERROR: 20-21	Insufficient plasma sample	
	ERROR: 50-51	Probe check – cartridge issues, expired, bad condition of cartridge storage, control issues	
	ERROR: 27-29	Control issues, machine issue, probe pipette stuck, cleaning issues	
COMMUNICATION LOST	Machine issues during initialization and priming	Sampling not done, either result of machine did not reach desired temperature to work	NO
INVALID / INDETERMINATE	Assay completed but insufficient to quantify (Low VL)	Repeat sampling (sample not stored properly) or to repeat after 3 months (due to early infection -low VL)	YES