

Forensic Science Laboratory | Public Health Laboratory | Crime Scene Sciences

UTILIZATION OF ELECTRONIC TEST ORDERS AND RESULTS (ETOR) IN PUBLIC HEALTH LABORATORIES DURING THE COVID-19 RESPONSE

Clinical Laboratory Improvement Advisory Committee

October 28, 2020

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Director, DC Public Health Laboratory





THE DARK AGES

...a period of intellectual darkness and barbarity. – Britannica



Depiction of King Valdemar IV of Denmark in 1361. Painting by Carl Gustaf Hellqvist 1851-1890.





IT WAS A DARK AND STORMY

In May of 2016, DFS PHL received a complaint from DC Health in reference to missing Zika reports







WHO NEEDS LIMS WHEN YOU HAVE EXCEL?

DCDOH Zika Case	Date Approval Email	Patient First	9	Patient	Sex (1			Date	CDC report	Date fax CDC	
Number	sent	name	Patient Last Name	State of Residenc	= female	Birthdate	Provider's Facility	Shipped to CDC	CDC report Receiving date	report to DOH	Status
Z.DC.066	3/9/2016			DC		11/18/1986	Sibley Memorial Hospital Maternal Fetal				
							Medicine				Discrepant information
Z.DC.091	2/16/2016			DC	1	12/1/1976	Reiter, Hill, Johnson, Nevin (OBGYN)	2/23/2016			Specimen at CDC
Z.DC.092	2/16/2016			DC	1	10/18/1984	MedStar Washington Hospital Center Maternal- Fetal Medicine	5/3/2016			Specimen at CDC
Z.DC.094	2/22/2016			DC	1	1/21/1980	Farragut Medical	2/25/2016			Specimen at CDC
		2 S.					Sibley Memorial Hospital Maternal Fetal				No specimen received at PHL
Z.DC.097	2/17/2016			DC	1	7/25/1985	Medicine				(Clinic response: No blood draw)
7 00 400	014010040			50	75	4010014070	MedStar Washington Hospital Center Maternal-				
Z.DC.106	2/19/2016			DC	<u> </u>	10/30/1979	Fetal Medicine	5/3/2016			Specimen at CDC
Z.DC.115	2/19/2016			DC	14	9/28/1983	MedStar Washington Hospital Center Maternal-				
2.DU. 115	2/19/2016			DC	- 87	3/20/1363	Fetal Medicine	5/3/2016			Specimen at CDC
			10 M			1		Î		1	No specimens received at PHL
Z.DC.117	2/22/2016			DC	1	2/7/1981	GWUMFA				(Not listed on GWU specimens
										e	send out list)
Z.DC.127a	4/4/2016			DC	1	11/21/1978	World Bank Health Group	3/29/2016	3/29/2016	5/5/2016	CDC Report sent to DOH
Z.DC.136	2/29/2016			DC	1	4/23/1985	Private Office: Dr. Footer	3/22/2016			Specimen at CDC
Z.DC.154	3/10/2016	1 - ¹		DC	1	3/5/1982	Q Street Medical Associates	3/22/2016		5/5/2016	Specimen at CDC
Z.DC.160	3/22/2016			VA	1	5/6/1973	MGUH Dept of OB/GYN	5/3/2016			Specimen at CDC
Z.DC.162	3/11/2016			DC	1	3/1/1981	MedStar Georgetown University Hospital	27224724		Status Solida Data	PCR test completed in PHL,
2.00.102	51112010			50	~	0111001	Department of Obstetrics and Gynecology	3/22/2016		3/25/2016	report sent out to DOH
Z.DC.172	3/16/2016			DC	0	3/3/2014	Children's Pediatric Assoc				PCR test completed in PHL,
					175 C						report sent out to DOH
Z.DC.175	3/16/2016			DC	0	9/9/1980	Comprehensive Primary Care	5/5/2016			PCR testing initiated
Z.DC.182	3/17/2016			DC	1	4/4/1981	GWUMFA	3/29/2016			Specimen at CDC
Z.DC.185	3/18/2016			DC	1	7/26/1977	Farragut Medical	3/29/2016		1	Specimen at CDC
Z.DC.192	3/23/2016			DC	0	7/1/1980	Kaiser Permanente				Specimen at CDC; PCR test
			, w di ,		1			5/3/2016		5/5/2016	report sent to DOH
Z.DC.193	3/23/2016			MD	4	1/15/1988	Mary's Center				PCR test completed in PHL,
			2					-		4/22/2016	report sent out to DOH
Z.DC.194	3/23/2016			MD	1	4/22/1994	Mary's Center				PCR test completed in PHL,
	11/0/2012/02			1000	경험					4/23/2016	report sent out to DOH
Z.DC.195	3/23/2016			DC	1	9/18/1993	Georgetown Student Health Center			410010010	PCR test completed in PHL,
Press and three parts		-				1				4/22/2016	report sent out to DOH
7 00 100	010410040		2	50							No specimen received at PHL
Z.DC.199	3/24/2016			DC	1		Georgetown Student Health Center				(hospital said no record found for
											that patient)





BUT WAIT, THERE WAS MORE!

Date Received	Lab ID	LIMS ID	Specimen <	Collection Date	FIRST NAME	LAST NAME	DOB MM/DD/YYYy	SEX Ţ	SUBMITTER	TEST REQUESTED	UNIT TRANSFERRED TO	DATE SENT OUT
1/21/2016	16-084		SERUM- Z.DC.021	1/20/2015			32-Y	F	Medstar Washington Hospital Center	Zika Virus	Send out/CDC	1/21/2016
1/21/2016	16-085		SERUM-Z.DC.006	1/20/2015			35-Y	F	Foxhall OBGYN	Zika Virus	Send out/CDC	1/21/2016
1/21/2016	16-086		SERUM-Z.DC.005	1/19/2016			33-Y	F	Dr.Gary M Koritzinsky	Zika Virus	Send out/CDC	1/21/2016
1/27/2016	16-087		SERUM-Z.DC.009	1/22/2016			38-Y	F	MEDSTAR Georgetown Univ Hospital	Zika Virus	Send out/CDC	1/28/2016
1/27/2016	16-088		SERUM-Z.DC.010	1/26/2016			29-Y	F	Dr.Maximilian Oshalim	Zika Virus	Send out/CDC	1/28/2016
1/27/2016	16-089		SERUM-Z.DC.008	1/26/2016			35-Y	F	George Washington Univ Hospital	Zika Virus	Send out/CDC	1/28/2016
1/28/2016	16-102		AMNIOTIC FLUID- Z.DC.003	1/28/2016			33-Y	F	SIBLEY HOSPITAL	Zika Virus	Send out/CDC	1/28/2016
1/29/2016	16-105		SERUM-Z.DC.011	1/29/2016			41-Y	М	KAISER Permanente	Zika Virus	Send out/CDC	2/1/2016
2/1/2016	16-110		SERUM-Z.DC.012	1/28/2016			34-Y	F	Medical Faculty Assoc. Of GWUH	Zika Virus	Send out/CDC	2/2/2016
2/2/2016	16-114		SERUM-Z.DC.013	2/2/2016			36-Y	F	Medical Faculty Assoc. Of GWUH	Zika Virus	Send out/CDC	2/2/2016
2/2/2016	16-115		PLASMA-Z.DC.015	2/2/2016			15-Y	м	Childrens National Medical Center	Zika Virus	Send out/CDC	2/2/2016
2/4/2016	16-120		SERUM-Z.DC.007	1/27/2016			17-M	м	MEDSTAR Georgetown Univ Hospital	Zika Virus	Send out/CDC	2/4/2016
2/4/2016	16-121		SERUM-Z.DC.016	2/3/2016			33-Y	F	Medical Faculty Assoc. Of GWUH	Zika Virus	Send out/CDC	2/4/2016
2/4/2016	16-122		LIVER-Z.DC.003	2/3/2016			1-D	F	Childrens National Medical Center	Zika Virus	Send out/CDC	2/4/2016
2/4/2016	16-123		KIDNEY-Z.DC.003	2/3/2016			1-D	F	Childrens National Medical Center	Zika Virus	Send out/CDC	2/4/2016
2/4/2016	16-124		BRAIN-Z.DC.003	2/3/2016			1-D	F	Childrens National Medical Center	Zika Virus	Send out/CDC	2/4/2016
2/4/2016	16-125		LUNG-Z.DC.003	2/3/2016			1-D	F	Childrens National Medical Center	Zika Virus	Send out/CDC	2/4/2016





SAMPLE REPORT TEMPLATE

	IE DISTRICT OF COLUMBIA	* * *	DEPARTMENT OF FORENSIC SCIENCES
MURIEL BOWSER, MA	AYDR.		CONSOLIDATED FORENSIC LABORATORY 401 E STREET SW WASHINGTON, DC 20024
		- E	
	PUBLIC H	EALTH LABO	ORATORY
	Рном	NE #: (202) 727-	-8956
		IA # 09D09682	
	La	boratory Rep	ort
Date Submitted	1: 3/9/2016		
Submitter: MEI	DSTAR Georgetown Un	iv Hospital	
Collection Date	: 3/7/2016		
Specimen Type	: SERUM		
Test Requested	: Zika Virus		
PHL Lab Numl	ber: 16-410		
Patient First Na	ame:	Patient Las	t Name:
Age: 31-Y	Sex: F	DOH Epi I	D: -Z.DC.140
PHL Test Resul	lts:		
Molecular Diag	nostic Testing		
Test: Zika virus	PCR	Result*: Ne	gative for Zika Virus RNA
*A negative Zika any presence of Z:		orwarded to CDC	for further serological testing to rule out
0.00			
Analyzed by:			
,,		1	
Reviewed by:			
iteviewed by:			

Report Date: 03/11/16





THE RENAISSANCE

...primarily a time of revival of Classical learning and wisdom after a long period of cultural decline and stagnation-Britannica





Sistine Chapel - Javier Sánchez / Getty Images DC Department of Forensic Sciences Forensic Science Laboratory | Public Health Laboratory | Crime Scene Sciences



CHANGING THE CULTURE



"It turns out we don't know the definition of change."

The laboratory was using the LIMS but only to log specimens in, not to transfer specimens, enter results, review results, develop reports OR send-out reports

DC Department of Forensic Sciences



(RE)IMPLEMENTING THE LIMS

Set up a bold plan to upgrade HORIZON Chemware to v12.5 by Oct. 1, 2017

- Ensure that all test codes were being used appropriately
- 2. All backlogs were cleared
- 3. All staff were trained

PRODUCT UPDATE





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COVERNMENT OF THE DISTRICT OF COLUMBIA

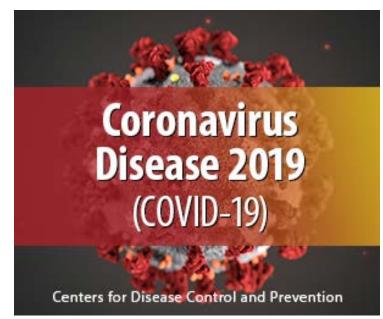
(RE)IMPLEMENTING THE LIMS







ALL IT TAKES IS A PANDEMIC



https://www.cdc.gov/coronavirus/2019-ncov/communication/graphics-buttons.html



DC HEALTH

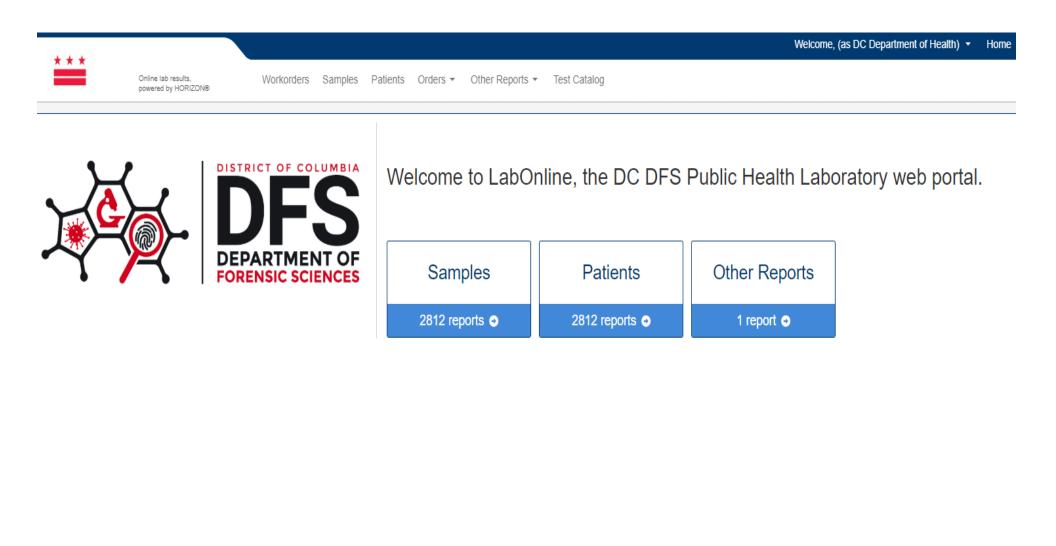


DC Office of the Chief Technology Officer





LABONLINE







LABONLINE TEST ORDERING

Workorders	Samples	Patients	Orders 🔻	Other Reports 👻	Test Catalog
			Order Te	sts	
			View Ord		

Line item: *			
[1] SARS2COV			×
Collected: *			
04/25/2020	ti i	12:00	G
Special instructions:			
special matrictions.			





LABONLINE ORDERS

Workorders	Samples	Patients	Orders 👻	Other Reports 👻	Test Catalog
			Order Te	sts	
			View Ord	ers	

Display: Current	Needs Signature	Needs Review Ordere	d Scheduled
Ship to Lab	tact Lab 🛃 Download	d 🖶 Print	
Chain of Custody 🔷 🗸	Order Status	 Ordered V 	Submitter 🗸 🗸 🗸
1309	Ordered	04/25/2020 10:14	Labonline User
1307	Ordered	04/24/2020 09:30	Labonline User





LABONLINE TEST REQUEST FORM



Public Health Laboratory Department of Forensic Sciences 401 E Street SW 4th Floor Washington, DC 20024 Phone (202)727-8956 Fax (202)481-3464

Test Request



Patient Information	Non	-human/anonymous	S	ubmitter Information			
Patient Medical Record N COVID_042520	Number		1.1	rovider/Clinic Name atabase Account Tes	t Code		Reference Number 102
Last Name Lovestrains	First Name Liam	MI	С	ollector	Phone		Collect Date 04/25/2020 12:00:00
DOB (MM/DD/YYYY) 04/25/2018	Race	Ethnicity	S	pecial Instructions/Other	Comment	8	
SSN -	-	Gender Male					
Street Address 401 E st SW, DC Publ	ic Health		In	surance Information			
DC Public Health Labo	,			Carrier	Group		ID
City Washington	State DC	ZIP 20024	1	Responsible Party	1		DOB/SSN
County	Country	Phone		Carrier	Group		ID
Maiden Name	Parent/Guardian		2	Responsible Party	1		DOB/SSN
Report Recipient Inform	nation						
Name Labonline User			S	treet Address			
Deliver Results by	🗌 Fax 🛛	Email 🚺 Web					
Phone Fax	Email		С	ity		State	ZIP

Test(s) Requested

Specimen Source: Nasopharyngeal Swab

SARSCOV2 - 2019 Novel Coronavirus





LABONLINE REPORTS

Queries Run Query Name LabOnline Patients	3		official report c ved as a PDF	an be	Search:	eria from the last 30 days n of Custody, My Sample	
QUETY: LabOnline Patien	ts				Filter: All	In Progress	Reported
Column:	Operator:	Value:					a 1 1 100
collect_date	 on or after 	• 04/02/2020			Status	Y Final Report	Y Chain d
Select	Select	•	🛞		Work in Progress		1312
analyte_name							
analyzed_date	Done	Cancel			Work in Progress		1312
cmp_text collect date							
cust_sample_id					Work in Progress		1312
lab_sample_id					V//2010/05/90/90/90/00		
matrix	•				Reported	Restricted	1308
К	L	M	N	0	Completed		Test
rix	analyte_name			wip_status	o on piere o		10.25
pharyngeal Swab opharyngeal Swab	Interpretation		SARS-COV-2 Not Detected SARS-COV-2 Not Detected	Reported Amended	Departed	Manu (umreast)	1292
opharyngeal Swab	Interpretation Interpretation		SARS-COV-2 Not Detected	Amended	Reported	View (unread)	1292
pharyngeal Swab	Interpretation		SARS-COV-2 Not Detected	Reported			
					Reported	View (unread)	1292

DC Department of Forensic Sciences

A line list can be pulled based on the patient query

DEPARTMENT OF



1292

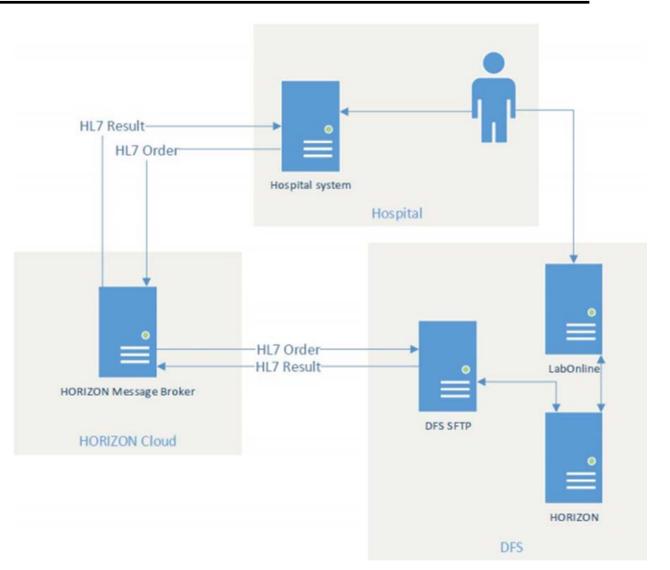
View (unread)

Reported

THE FUTURE IS INTERFACING

An LIS interface will:

- increase speed of resulting
- reduce manual entry
- reduce errors
- allow the laboratory to know what samples are in transit







APHL TO THE RESCUE

o Many of our informatics barriers deal with laboratory data exchange. o We use the AIMS platform to

1. Send influenza data via PHLIS2

2. HAI data via the IIII Messaging Services portal

AIMS





LAB WEB PORTAL

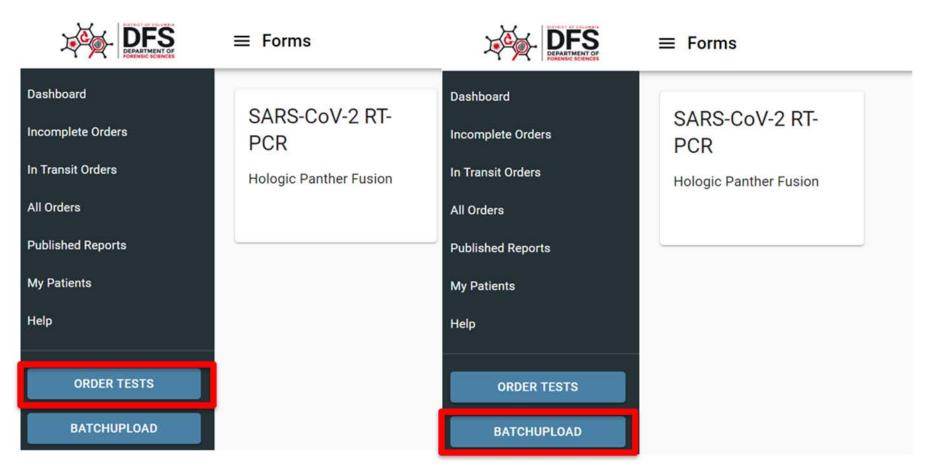
	\equiv Dashboard			MATTHEW MCCARROLL
Dashboard				
Incomplete Orders	547	564	O PUBLISHED REPORTS	0
In Transit Orders	MY PATIENTS	IN TRANSIT		NEW ORDERS
All Orders			VIEWED 0%	
Published Reports				
My Patients				
Help				
ORDER TESTS				
BATCHUPLOAD				
VIEW REPORTS				

The Lab Web Portal is a public health-focused electronic test orders and results web portal solution hosted on the AIMS Platform.





ELECTRONIC ORDERING



- Allows electronic ordering flexibility
 - Individual patient test ordering
 - Batch upload of a group of patient tests

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TRACKING ORDERS

DEPARTMENT OF FORENSIC SCIENCES		All Orders 564				
Dashboard		0				
Incomplete Orders		Q Quick Search				_
In Transit Orders			PORTAL ID _M			P
Collected	Submitted	Received	In Process	Published Report	Viewed Report	04
Jun 25 2020	Jul 15 2020					0

- Submitters have clear milestone tracking capabilities for the status of their order
- Removes the need for submitters to call to see if their results are ready yet.

BOWSER. MAYOR



LWP TEST REQUISITION FORM

- Test Requisition form is printed out and accompanies the submitted samples.
- Includes all patient information, submitter information and additional information
- Barcode in top right is scanned to auto-populate information into LIMS

District of Columbia. Department of Forensic Sciences. Public Health Laboratory 401 E Street SW, 4 th Floor Washington, DC 20024

> Novel Coronavirus 2019 Real Time RT-PCR Requisition Submitted By: Matthew McCarroll Date Submitted: 7/15/2020 10:50:50 AM





Order ID: OIDDC200000572

Last Name: Daniel	First Name: Katie
Date of Birth: 04/30/1967	
Gender: Male	
Ethnicity: Not Hispanic or Latino	
Race: White/Caucasian	
Address:	City: Washington
State: DC	Zip Code: 20060
Medical Record Number:	Sample ID: 3006954
Submitter Information	
Facility Name: Test facility	
Phone Number: 9998887777	Fax Number: 9998881111
Address: 801 Mt Vernon Pl NW	
City: Washington State: DC	Zip Code: 20001
Health Care Provider: Forrester, Julliet	Npi: 1033270160
Phone Number: 202-865-6100	Fax Number: 202-868-3612
Primary Contact: Smith, John	Phone Number:
Fax Number:	Email:
Specimen Information	
Date of Collection: 6/25/2020 12:00:00 AM	
Reason for Submission: Diagnostic	Specimen Type: Swab
Specimen Source: Nasopharyngeal	1 M ² 120. 1 100. 22 (22), 1 190. 1
Additional Comments/Information:	

Q&A

Q&A Earliest Symptom Onset Date? Has the patient experienced any symptoms If the patient has experienced symptoms, please check all that apply:





NEXT STEPS

- Continue use of Horizon LabOnline portal for ETOR
 - o Customization of ETOR process with stakeholders

BOWSER. MAYOR

- o Expansion of Phase 1(COMPLETE)
 - o Implementation of LWP with District nursing homes to test for vulnerable populations
- o Phase 2 of Lab Web Portal
 o Complete integration with hospital LIMS
 o New LIMS?



THANK YOU!





