

# National Public Health Laboratory and COVID-19 response

**Dr Runa Jha**  
**Director, NPHL**  
**1<sup>st</sup> August 2020**

27<sup>th</sup> Jan 2020      18<sup>th</sup> Feb 2020      1<sup>st</sup> March 2020      22<sup>nd</sup> March 2020      25<sup>th</sup> March 2020      27<sup>th</sup> March 2020

**Epid Week 5**

*NPHL confirmed the 1<sup>st</sup> laboratory confirmed COVID-19 case*

**Epid WEEK 8-10**

*Testing of repatriation cohort from China*

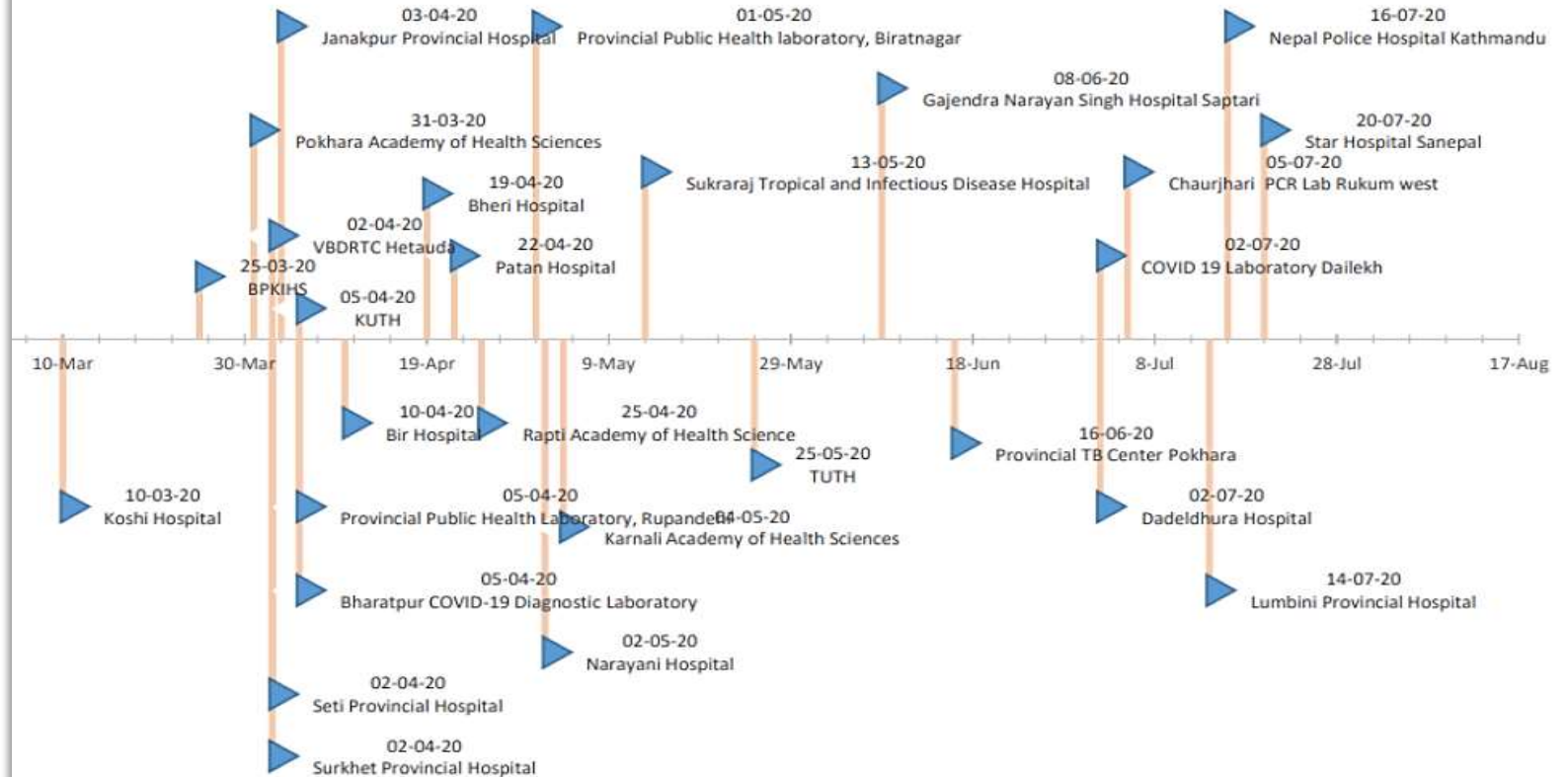
*2<sup>nd</sup> laboratory confirmed COVID-19 case*

*3<sup>rd</sup> laboratory confirmed COVID-19 case*

*4<sup>th</sup> laboratory confirmed COVID-19 case*

**Epid WEEK 13**

# Timeline for NPHL COVID-19 Response



# NPHL Initial Days in Covid-19 Response

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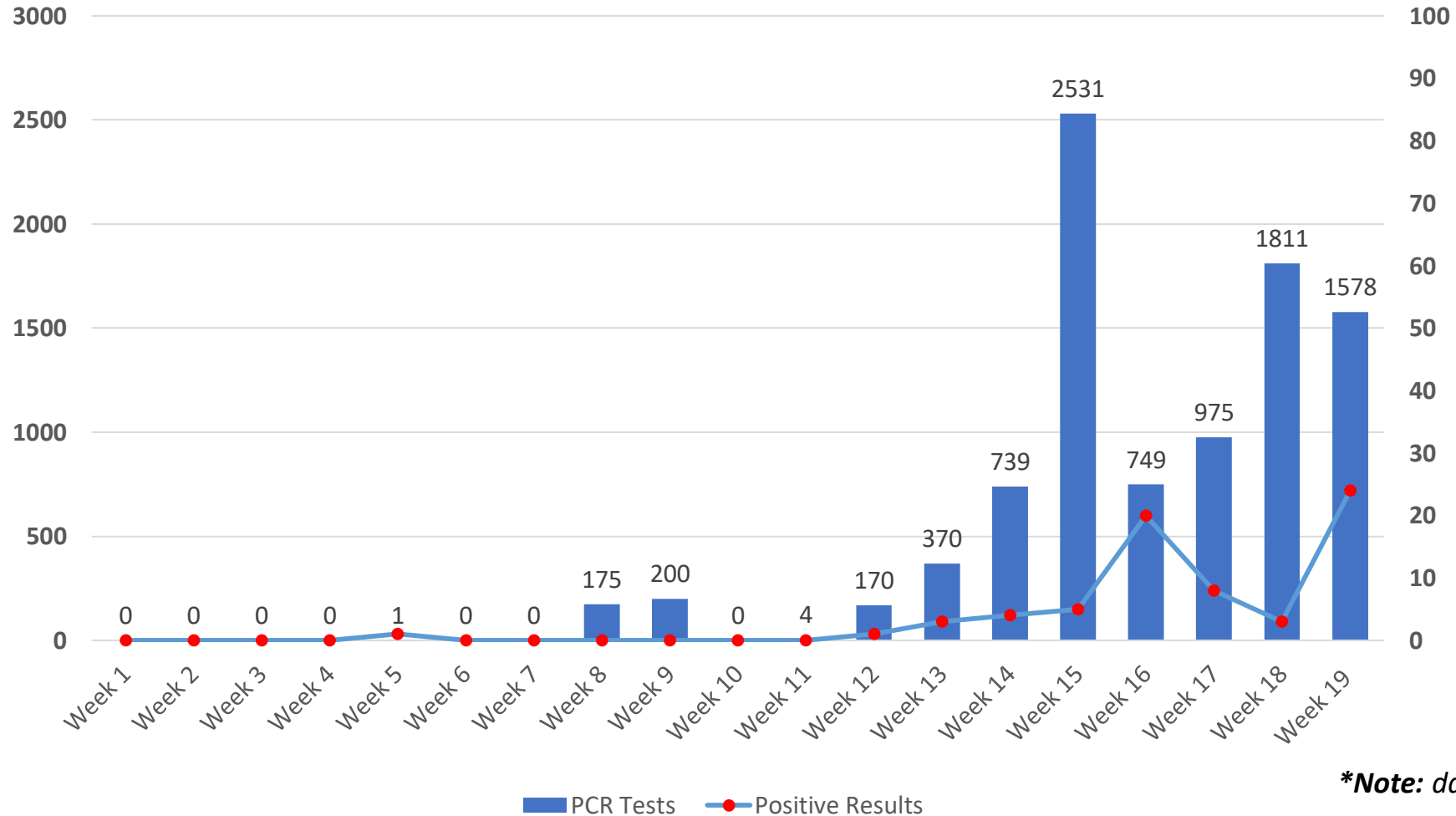


- First case → Laboratory confirmation by NPHL on 27<sup>th</sup> Jan 2020
- National Influenza Centre (NIC) unit was the only unit performing testing COVID-19 samples.
- >400 samples tested for repatriation Cohort between 18 Feb to 1<sup>st</sup> March
- Visited (Sindhupalchowk and Rasuwa) PoE with teams from (MoHP and WHO) to establish Health Desk and train HR for IPC measures.



# NPHL Initial Days In Covid-19 Response

PCR tests performed in NPHL (per week)



Epid Week	PCR Tests	Positive Results
Week 1	0	0
Week 2	0	0
Week 3	0	0
Week 4	0	0
Week 5	1	1
Week 6	0	0
Week 7	0	0
Week 8	175	0
Week 9	200	0
Week 10	0	0
Week 11	4	0
Week 12	170	1
Week 13	370	3
Week 14	739	4
Week 15	2531	5
Week 16	749	20
Week 17	975	8
Week 18	1811	3
Week 19	1578	24
<b>Total</b>	<b>9303</b>	<b>69</b>

**\*Note:** database until epid-week 19 (9<sup>th</sup> May 2020)

# NPHL Initial Days In Covid-19 Response (Cntd)..

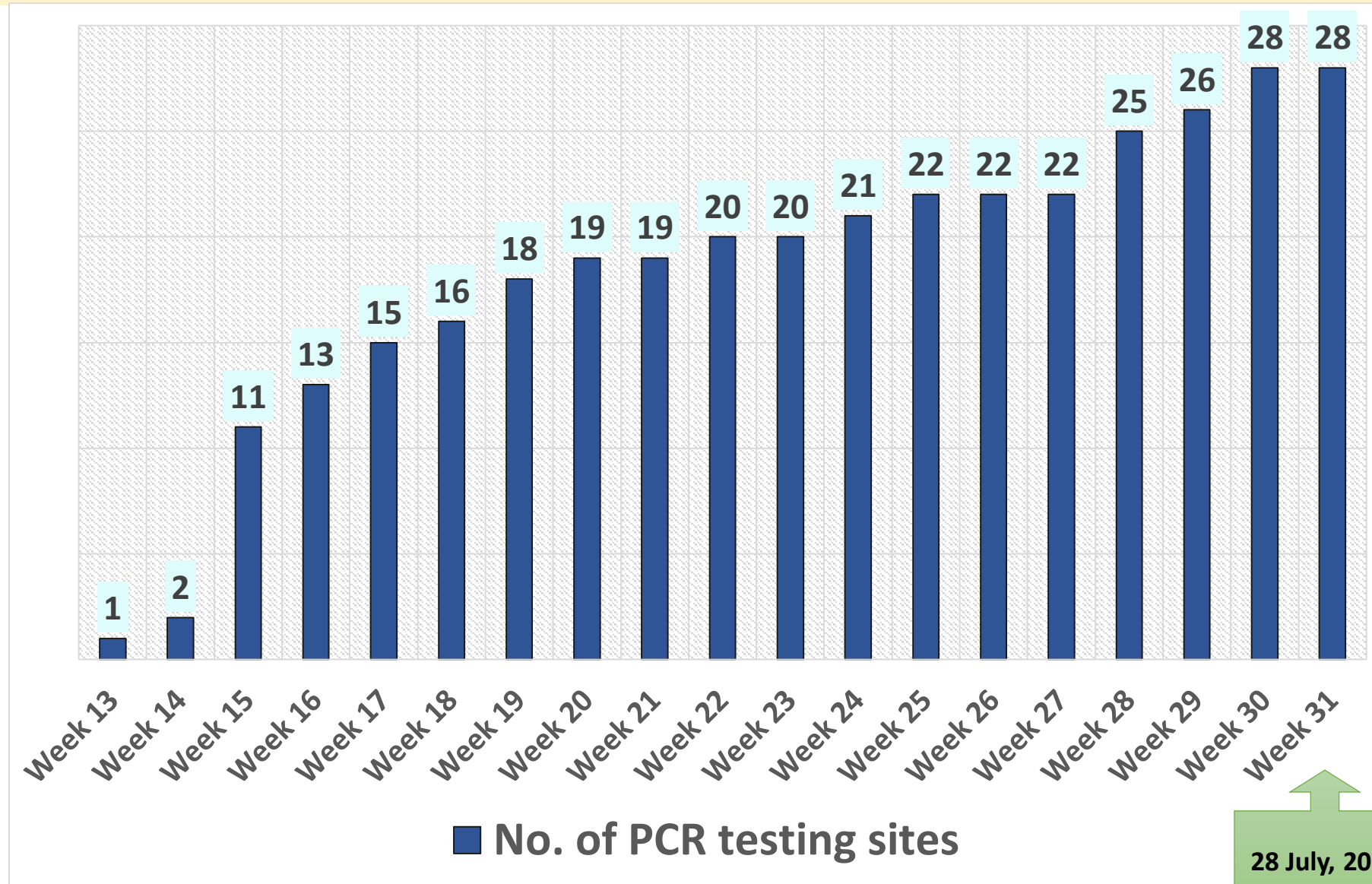
- To address the issues of transportation and shipment of COVID-19 samples → Domestic courier was identified → agreement done for 3 months.
- Agreement was done between **NPHL** and domestic courier agency (**NepXpress**) with support from **WHO Nepal**.
- Sample shipment agreement with **77 district coverage**
- Challenges: **National LOCKDOWN**



Expanding  
Laboratory Capacity  
and Network for  
Covid-19 Response

# Number of PCR Testing sites / week

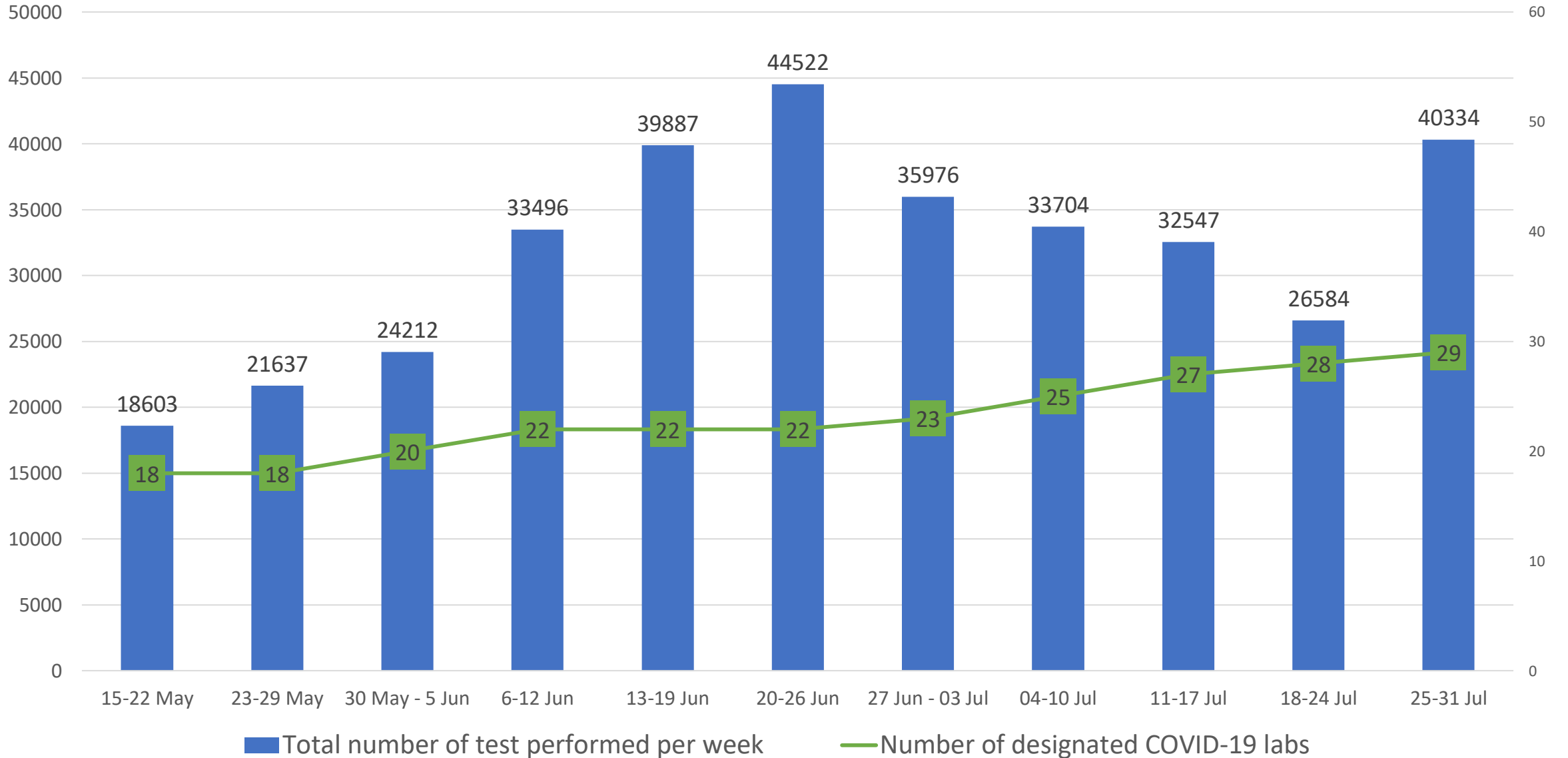
Province	Total No. of labs
Province 1	3
Province 2	3
Bagmati	10
Gandaki	2
Province 5	4
Karnali	4
Sudurpachim	2
<b>Total Labs</b>	<b>28</b>







# Total number of PCR test performed per week by designated COVID-19



# IMPLEMENTATION OF ACTIONS

# PROGRESS IN IMPLEMENTATION OF ACTIONS

## Development and review of SOPs

- Evaluation and verification of PCR kits, VTM, Extraction kit
- Biorepository management of COVID-19 samples
- Disinfection of coldbox used for shipment of COVID-19 samples
- Antigen Detection kit
- Protocol for Dry Swab and direct PCR protocol



# PROGRESS IN IMPLEMENTATION OF ACTIONS (Cntd..)

## Objective

to provide guidance to all the designated COVID-19 testing laboratories in Nepal. It provides guidelines related to collection of samples, physical infrastructures needed, workflow development, quality assurance and the communication of the results to concerned authority.

## Scope

The document aims to provide guidance to the laboratories involved in SARS-CoV-2 testing by real time PCR.

Interim Guidelines for  
SARS-CoV-2 PCR  
laboratories in National  
Public Health  
Laboratory Network,  
Nepal

Released on: 19 June 2020

*This document is subject to updates, please use the hyperlink to confirm the latest information where appropriate. <http://nphl.gov.np/>*

# PROGRESS IN IMPLEMENTATION OF ACTIONS (Cntd..)

## National Quality Assessment (NQAS) of designated COVID-19 laboratories across the country



June :

15 labs participation → outcome: satisfactory results

July :

target to capture 25 laboratories (received NQAS samples from 7 sites which has been processed with satisfactory result; *in process of receiving samples from remaining sites*).

# PROGRESS IN IMPLEMENTATION OF ACTIONS (Cntd..)

## Xpert Xpress SARs-CoV-2:

Two key technical documents have been endorsed by NTC and NPHL namely

- a) Protocol for kit verification and quality control of Xpert<sup>®</sup> Xpress SARS-CoV-2 testing using the GeneXpert Dx System in Nepal
- b) STANDARD OPERATING PROTOCOL FOR XPRT XPRESS SARS COV-2 TEST FOR DIAGNOSIS OF COVID-19, NEPAL

*The operational plan has been endorsed by MoHP and the operational plan with the testing algorithm will all be soon uploaded in Health Emergency Operation Center (HEOC) platform. National Tuberculosis Control Center (NTCC) is planning to work with HEOC to initiate letters to the GeneXpert center with the information and directives to start the testing in identified 10 centers. Testing may start from early next week.*



# CAPACITY BUILDING AND TRAININGS





# PROGRESS IN IMPLEMENTATION OF ACTIONS

*Training of laboratory personnel on sample collection, packaging and Biosafety practices for COVID-19 testing*

S.No	Name of training/orientation program	Location	Number of trained personnel
1	Training of Trainers (ToT) Sample Collection, Packaging, Transport and Biosafety for COVID-19 Testing	Kathmandu	13
2	Orientation on Sample Collection, Packaging, Transport and Biosafety Practice for COVID-19 testing	Kathmandu	15
3	Orientation on Sample Collection, Packaging, Transport and Biosafety Practice for COVID-19 testing	All seven provinces	180
	<b>TOTAL</b>		<b>208</b>



# VIRTUAL LEARNINGS AND EXPERIENCE SHARING (NATIONAL/INTERNATIONAL PLATFORM)

## At national platform:

- Virtual Meetings/Laboratory Experience sharing in COVID-19 response with designated COVID-19 testing laboratory network of Nepal
- Virtual Training for Laboratory reporting system (MIS) software
  - One on One training ( sharing screen)
  - On site (Dhangadi and Dadeldhura)



## At international level: *(with technical support from WHO CO Nepal)*

- Webinar on “Are Influenza Surveillance Systems Adapted For Co-circulation Of Influenza And Covid-19?” 30 July 2020
- Laboratory Information Management with a focus on COVID-19 response; 20 July 2020
- Laboratory Technical Webinar on the use of MGI Magnetic; 17 July 2020
- Webinar on 'Landscape of COVID-19 antigen based rapid diagnostic tests and considerations for use'; 14 July 2020
- WHO consultant Interaction with NPHL Nepal - Real time PCR assay - trouble shooting ; 9 July 2020

# Laboratory Information System-NPHL



NPHL has been currently using **DOLPHIN Software**.

Developed **MIS reporting system** in collaboration with Third party software vendor

-First phase/stage

\*act as only data repository system from all designated COVID-19 laboratory network across the country

-Working on collating data (ongoing)

Objective of MIS system:

-to have a data repository system within the COVID-19 testing laboratory network across the country,

# How NPHL-Dolphin system functions?



## Laboratory Sample Collection Form for Suspected COVID-19 Case

**Sample Collection Site**

Province	Please tick the appropriate option and specify the name	
District	1. Quarantine <input type="checkbox"/>	
Municipality	2. Home quarantine <input type="checkbox"/>	
Ward	3. Health institution <input type="checkbox"/>	
Tole	4. Other institution <input type="checkbox"/>	
Contact Person for Reporting: (for all collected sample)	Name: Ph. No.	5. Community surveillance <input type="checkbox"/>
	Email:	6. Others (Specify) <input type="checkbox"/>

**Patient's Detail:**

First Name:	Mid. Name:	Last Name:
Age: Year/month	Sex: Male <input type="checkbox"/> Female <input type="checkbox"/> Other <input type="checkbox"/>	Occupation:
Current address	District:	Municipality:
Contact No.	Ward No:	Tole:
Email, if necessary:		
If other than Nepal	Country:	Passport No.
Email:		

Was RT-PCR tested before?	1. Yes <input type="checkbox"/>	2. No <input type="checkbox"/>	If tested, mention date of latest test
Result of the latest test	Positive <input type="checkbox"/>	Negative <input type="checkbox"/>	Don't know <input type="checkbox"/>

Type of sample collected: (Please tick  the type)

Nasopharyngeal  / Oropharyngeal  / BAL  / Sputum  / Endotracheal Aspirate

If other, please specify: .....

**Type of Case (Travel, Contact and Symptoms Details)** (Please tick  in the box)

Symptomatic patient with Pneumonia <input type="checkbox"/>	Most recent travel history in the last 14 days Country: _____ If within Nepal: District: _____
ARDS <input type="checkbox"/> / Infection-like illness <input type="checkbox"/>	
If other, specify: .....	
Symptomatic patient with comorbidity Diabetes <input type="checkbox"/> , HTN <input type="checkbox"/> , Hemodialysis <input type="checkbox"/>	Screening: Pregnant / in labour: <input type="checkbox"/> > 65 Year <input type="checkbox"/>
Immuno-compromised <input type="checkbox"/> If other, specify: .....	Health care worker <input type="checkbox"/> If other, specify: .....
Death case <input type="checkbox"/>	Clinical Suspicious (not admitted/ isolated) <input type="checkbox"/>
Health care worker in contact with positive case <input type="checkbox"/>	Contact tracing: _____
Emergency surgical intervention <input type="checkbox"/>	Repeat swab for positive case: _____
ICU case <input type="checkbox"/>	If other, Specify: .....

**Note: Please fill complete information in the form before sample collection. Keep it separate and transport separately from the sample.**

Attending physician/Health worker  
Signature: \_\_\_\_\_  
Name: \_\_\_\_\_  
Phone: \_\_\_\_\_

For further information please visit [www.nphl.gov.np](http://www.nphl.gov.np) Contact Person: Mr. Rajesh Kumar Gupta, (9851239888)

Home > Bulk Patient

General Bulk Patient

Choose File No file chosen Import! TEMPLATE

Site: Select a site Tests: Select Item Name or Item code Self Discount %: 100 Site/Batch Id: 5000 - 5000

District: Ref By: Ref. By Ref Hoipita: Ref Hospital Contact: contact

Pat. Type	Pat. Id	Form No.	First Name	Middle Name	Last Name	Mobile no.	Gender	Age/Age Type	Remarks
He	0							Years	
He	0	1234	RAM		KC	9811111111	M	21 Years	

Mandatory Field

Save

## Home > Result Verification

Refresh

Patient ID or Name Search Not Verified Day: 6 Date Range: 2077-04-09 - 2077-04-15 BS Search Verify

Endocrinology  BioChemistry  JE MSL  Haematology  Histocytology  Immunology  
 Virology  Coagulation  Microbiology  Parasitology  HIV Reference Lab  Hemoglobinopathy  
 CD4 (Virology)  HBV/HCB Viral Load  Biochemistry Urine  National Influenza Centre  COVID-19 LAB

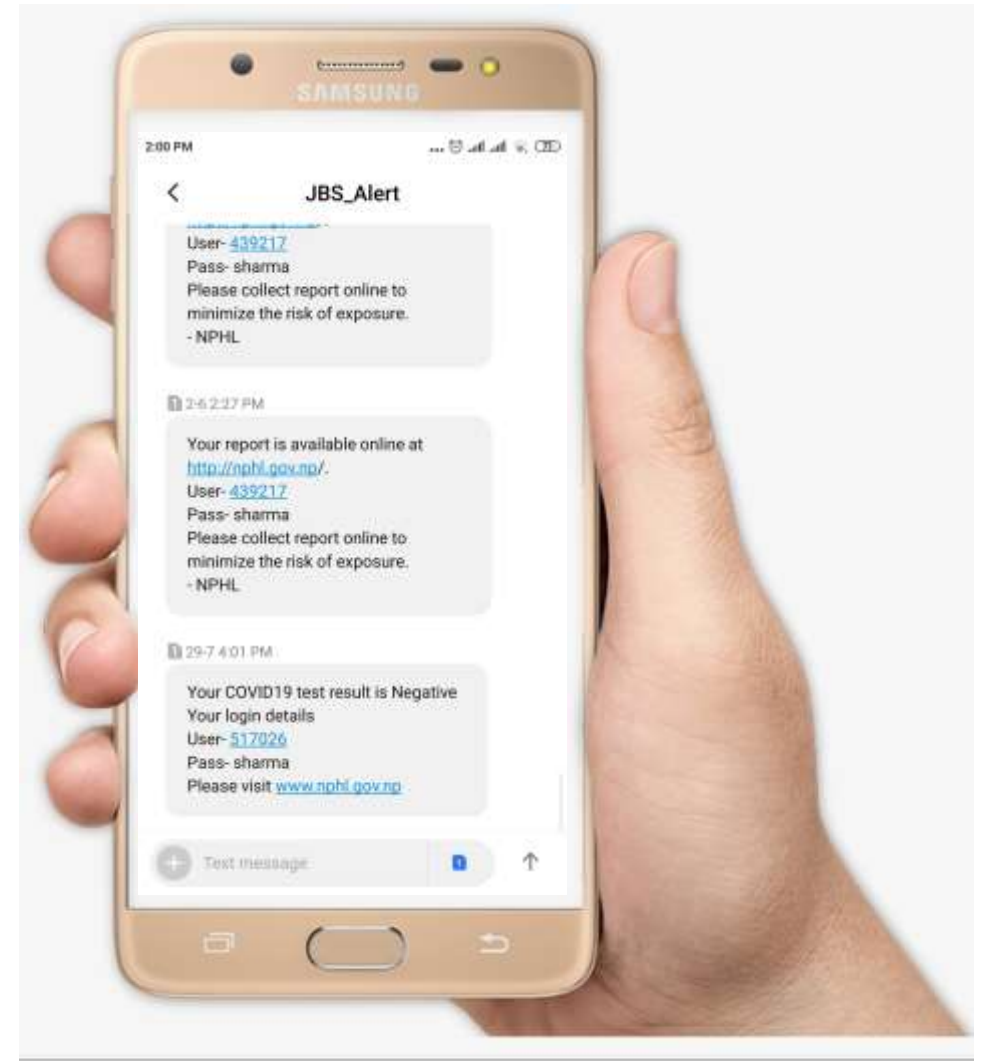
Show 25 entries Search:

Pat. ID	Patient Name	A/G	Bill No.	Result	Action
518602	Januka Bidari	1Y/F	A7778-0009011	NEGATIVE	View Edit

Showing 1 to 1 of 1 entries

# Report Dispatch

- Dispatched through SMS
- Hardcopies if the patient comes to take report physically at NPHL



## Report dispatching system of Covid-19 PCR Centers

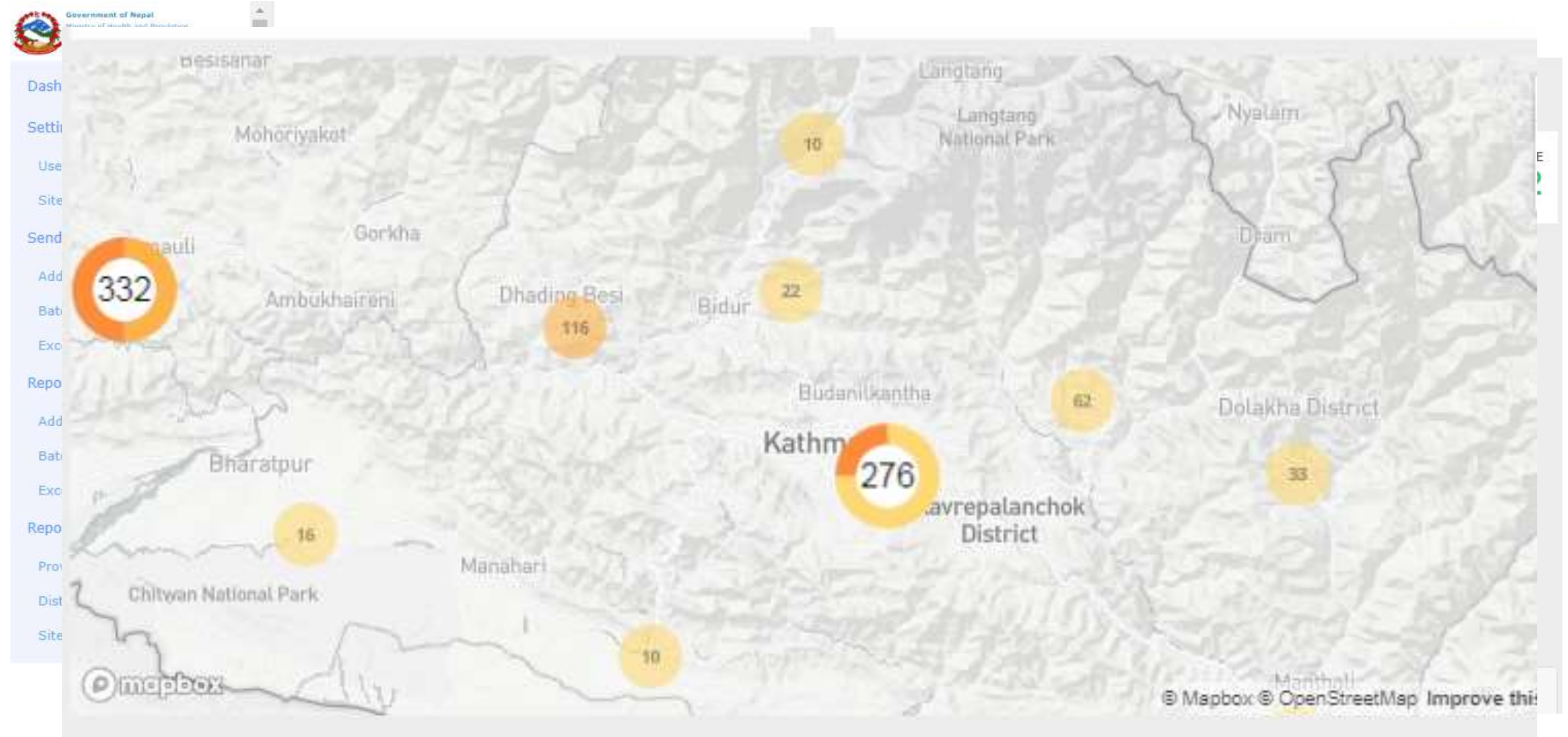
Province	S.N	Hospital Name/Center where COVID testing is done	Report dispatching system	Remarks
Province 1	1	BP Koirala Institute of Health Science, Dharan	Excel sheets are sent to local levels (printed report only on demand)	
	2	Koshi Hospital	Scanned reports (pdf file) are sent to local levels	
	3	Provincial Public Health Laboratory, Biratnagar	Excel sheets are sent to local levels (printed report only on demand)	
Province 2	4	Provincial Hospital Janakpur/Janakpur	Excel sheets are sent to local levels (printed report only on demand)	
	5	Narayani Hospital, Birgunj	Excel sheets are sent to local levels (printed report only on demand)	
	6	Sagarmatha Zonal Hospital	Excel sheets are sent to local levels (printed report only on demand)	
Province 3	7	National Public Health Laboratory (NPHL)	SMS, Printed reports and excel sheets are sent MOSD	
	8	Sukraraj Tropical and Infectious Disease Hospital (STIDH)	SMS & Printed reports	
	9	Dhulikhel Hospital	Excel sheets are sent to local levels (printed report only on demand)	
	10	Bharatpur COVID-19 Diagnostic Lab, Chitwan	Excel sheets are sent to local levels (printed report only on demand)	
	11	Bir Hospital	Printed reports	
	12	Patan Academy of Health Sciences (PAHS)	Printed reports	
	13	VBDRTC, Hetauda	Excel sheets are sent to local levels (printed report only on demand)	
Gandaki	14	Tribhuvan University Teaching Hospital (TUTH)	Printed reports	
	15	Pokhara Academy of Health Science (WR Hospital)	Excel sheets are sent to local levels (printed report only on demand)	
Province 5	16	PPHL, Pokhara	SMS (ID&PASSWORD), Excel sheets are sent to local levels	
	17	Provincial Public Health Laboratory, Bhairahawa,	SMS (ID&PASSWORD), Excel sheets are sent to local levels	
	18	Lumbini Hospital	Excel sheets are sent to local levels (printed report only on demand)	
	19	Bheri Hospital, Nepalgunj	Excel sheets are sent to local levels (printed report only on demand)	
	20	Rapti Academy of Health Sciences	Excel sheets are sent to local levels (printed report only on demand)	
Karnali	21	Chaurjahari PCR laboratory, Rukum (west)	Excel sheets are sent to local levels (printed report only on demand)	
	22	Province Hospital Surkhet	Excel sheets are sent to local levels (printed report only on demand)	
	23	Karnali Academy of Health Sciences (KAHS)	Excel sheets are sent to local levels (printed report only on demand)	
	24	COVID-19 Testing Laboratory, Dailekh	Excel sheets are sent to local levels (printed report only on demand)	
Sudurpashchim	25	Seti Provincial Hospital, Dhangadhi	Excel sheets are sent to local levels (printed report only on demand)	
	26	Dadeldhura Hospital Laboratory, Dadeldhura	Excel sheets are sent to local levels (printed report only on demand)	

# MIS reporting system

## In phase I

- Will only capture the total number of total tested, total positive and total negative.
- Virtual training done with COVID-19 testing laboratories network.
  - Laboratory focal points/data operators/managers of respective COVID-19 labs
- One on One virtual training is ongoing distantly with the laboratories who are struggling to understand the system. (sharing screens and orienting the HR)
- As of today: a total of 1,63,364 data has been entered from 24 different COVID-19 testing laboratories across the country.

# MIS reporting system





# MIS reporting system

Dashboard

Settings

Users

Sites

Send To Testing Site

Add Collection Form

Batches

Excel Import

Report Entry

Add New Report

Batches

Excel Import

Reports

Province Wise

District Wise

Site Wise



## District Wise Report

Search:

District	Total	Negative	Positive
Achham	3012	2274	738
Arghakhanchi	1675	1319	356
Baglung	4048	3801	247
Baitadi	1960	1630	330
Bajhang	1350	1117	233
Bajura	1555	1241	314
Banke	233	231	2
Bara	1826	1772	54
Bardiya	320	317	3
Bhaktapur	2407	2392	15

Previous 1 2 3 4 5 ... 8

Showing 1 to 10 of 78 entries

Next

## Province Wise Report

Search:

Province	Total	Negative	Positive
Bagmati Pradesh	35954	35393	561
Gandaki Pradesh	19152	17903	1249
Karnali Pradesh	3924	3737	187
Province No. 1	14436	14033	403
Province No. 2	35537	31737	3800
Province No. 5	21643	18981	2662
Sudurpashchim Pradesh	31607	27212	4395

Showing 1 to 7 of 7 entries

Previous 1 Next

# User Login details


## User activities

Dashboard > 

Settings > 

Users >

Sites >

Send To Testing Site 

Add Collection Form >

Batches >

Excel Import >

Report Entry 

Add New Report >

Batches >

Excel Import >

Reports 

Province Wise >

District Wise >

Site Wise >

### User List


+ Add User

Name	Role	Site Name	Email	Address	Mobile No	Action
Umesh Shrestha	Standard User	HAMS	umesh@hamshospital.com	Dhumbarahi	9801172217	 Edit  Delete
Hospital for Advanced Medicine & Surgery	Standard User	HAMS	info@hamshospital.com	Dhumbarahi	9851172217	 Edit  Delete
Abishek Tulachan	Standard User	Bharatpur COVID-19 Diagnostic Lab, Chitwan	abishektulachan13@gmail.com	Kathmandu	9849429687	 Edit  Delete
Geeta Khatiwada	Standard User	COVID-19 Testing Laboratory, Dailekh	geetakhatiwada86@yahoo.com	Kathmandu	9841626231	 Edit  Delete
Om Raj Acharya	Standard User	Province Hospital Surkhet	omrajacharya@gmail.com	Surkhet	9848050774	 Edit  Delete
Roshan Adhikari	Standard User	Narayani Hospital	roshanadhikari33@gmail.com	Narayani	9849412391	 Edit  Delete
Jamuna Bhujell	Standard User	Karnali Academy of Health Sciences (KAHS)	krijansharma@yahoo.com	PAHS support	9843002787	 Edit  Delete
Hira Lal Bhandari	Standard User	Rapti Academy of Health Sciences	rapti.academy@gmail.com	Dang	9857832924	 Edit  Delete
Suman Sapkota	Standard User	Lumbini Provincial Hospital, Butwal	sumnsap@gmail.com	Butwal	9851141577	 Edit  Delete
D Dhakal	Standard User	KMC	ddhakal93@gmail.com	Bhaktapur	9841357774	 Edit  Delete

Showing 1 to 10 of 55 entries


Previous **1** 2 3 4 5 6 Next

# Assess Login details

Settings 

Users >


Sites >

Send To Testing Site 

Add Collection Form >

Batches >


Excel Import >

Report Entry 

Add New Report >

Batches >


Excel Import >

Reports 

Province Wise >

District Wise >

Site Wise >


System Log 

Access log >

Event log >

Admin ▾

### Access Log


All Users ▾ Period 07/23/2020 - 07/30/2020  Search:

S.N.	Description	Date	User
1	Admin logged in	2020-07-30 11:26:24	Admin
2	Hospital for Advanced Medicine & Surgery logged in	2020-07-30 10:39:50	Hospital for Advanced Medicine & Surgery
3	Gopal Prasad Adhikari logged in	2020-07-30 10:20:28	Gopal Prasad Adhikari
4	Lisa Tamang logged in	2020-07-30 09:39:38	Lisa Tamang
5	Dr. Narayan Bhattarai logged in	2020-07-29 22:23:05	Dr. Narayan Bhattarai
6	Admin logged in	2020-07-29 16:21:35	Admin
7	Hospital for Advanced Medicine & Surgery logged in	2020-07-29 15:47:51	Hospital for Advanced Medicine & Surgery
8	Admin logged in	2020-07-29 15:19:35	Admin
9	Sunaina Shrestha logged in	2020-07-29 15:12:32	Sunaina Shrestha
10	Admin logged in	2020-07-29 14:56:06	Admin


Showing 1 to 10 of 203 entries

Previous **1** 2 3 4 5 ... 21 Next

Activate Windows  
Go to Settings to activate Windows.




# Sample entry (Option for single entry)

Settings 

Users >


Sites >

Send To Testing Site 

Add Collection Form >

Batches >


Excel Import >

Report Entry 

Add New Report >

Batches >


Excel Import >

Reports 

Province Wise >

District Wise >

Site Wise >




System Log 

Access log >

Event log >

Admin ▾

Laboratory Sample Collection Form

 Save & Close (F8)  Save & Next (F7)  Back

<b>Date of Collection*</b>		<b>Collection Form Sample No.*</b>		<b>Testing Site</b>
<input type="text" value="2020-07-30"/>		<input type="text"/>		<input type="text" value="Select Site"/>
<b>Site Type</b>				
Type				
<input type="text" value="Select Site Type"/>				
<b>Patient Info</b>				
<b>Full Name*</b>		<b>Age*</b>	<b>Age Type*</b>	
<input type="text"/>		<input type="text"/>	<input type="text" value="Year"/>	
<b>Gender*</b>		<b>Date of Birth</b>		
<input type="text" value="Select Gender"/>		<input type="text"/>		
<b>Patient Present Address</b>				
<b>Province*</b>		<b>District*</b>		<b>Municipality*</b>
<input type="text" value="Select Province"/>		<input type="text"/>		<input type="text"/>
<b>Ward*</b>		<b>Tole</b>		<b>House No.</b>
<input type="text"/>		<input type="text"/>		<input type="text"/>

Activate Windows  
Go to Settings to activate Windows.

# Excel Template for reporting (BULK ENTRY)

The screenshot shows an Excel spreadsheet titled "covid\_reporting\_collection\_form (10).xlsx". The ribbon includes File, Home, Insert, Page Layout, Formulas, Data, Review, and View. The active cell is W2, containing the text "Dakshinkali Municipality".

	N	O	P	Q	R	S	T	U	V	W	X	Y
1	contact_of_sample_collector	patient_name	age	age_type	sex	dob_ad	dob_bs	temp_province	temp_district	temp_municipality	temp_ward	temp_tolk
2		test user	25	Y	Male		2020-06-07	Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	1	
3		new uswer	30	Y	Male			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	2	
4		new uswer	30	M	Male			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	3	
5		new uswer	30	D	Male			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	4	
6		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	5	
7		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	6	
8		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	7	
9		new uswer	30	M	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	8	
10		new uswer	30	D	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	9	
11		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	10	
12		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	11	
13		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	12	
14		new uswer	30	M	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	13	
15		new uswer	30	D	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	14	
16		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	15	
17		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	16	
18		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	17	
19		new uswer	30	M	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	18	
20		new uswer	30	D	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	19	
21		new uswer	30	Y	Female			Bagmati Pradesh	Kathmandu	Dakshinkali Municipality	20	

The dropdown menu for 'temp\_municipality' is open, showing a list of municipalities: Dakshinkali Municipality, Kageshwari-Manohara Municipality, Kathmandu Metropolitan, Nagarjun Municipality, Shankharapur Municipality, Tarakeshwar Municipality, and Tokha Municipality. 'Dakshinkali Municipality' is selected.



## **Issue/ Challenges for MIS system**

- Completeness of Data at the lab
- Dedicated HR
- Frequent Turnover
- Willingness to send data



# ISSUES & CHALLENGES

- PCR kit validation
- Data information system
- NQAS: participation, transportation issues
- Issues of pending samples at the provinces
- Normalization/Routine functions of the labs

# WAY FORWARDS:

- Capacity and quality assessment of NPHL and other designated COVID-19 testing laboratories
- Gene Sequencing
- Laboratory Management: performance indicator; Simple worksheet
- Virtual meeting RT PCR result interpretation and troubleshooting; Targeting all 28 designated COVID-19 labs across the country.
- BSL-III lab functional



THANK YOU