

# **Covid-19 Integrated Influenza Surveillance Guideline**

**SECOND EDITION  
2022**

**Royal Center for Disease Control  
Department of Public Health  
Ministry of Health  
Bhutan**

COVID-19 Intergrated Influenza Surveilliance Guideline second edition 2022

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## PREFACE

The COVID-19 pandemic caused by SARS-CoV-2 has demonstrated a need for Bhutan to have a comprehensive national pandemic preparedness and response plan, which can easily be adapted to respond efficiently and effectively to any pandemics. Surveillance is one of the key components of the COVID-19 national pandemic preparedness and response plan. Since, COVID-19 transmission and manifestation of the disease is similar to influenza, the influenza sentinel surveillance system was leveraged to monitor and detect COVID-19 transmission and outbreak in the community. Consequently, the third edition of flu sentinel surveillance guidance was transformed into COVID-19 integrated Influenza surveillance which was rolled out in all hospitals until its revision as second edition.

Revision of the second edition was inevitable given there was a need to recalibrate and reconfigure the surveillance objectives to cope up with the change in the COVID-19 epidemiology patterns. Besides, sustainability of the surveillance, ease of sample shipment and reduced turn-around-time for PCR test with establishment of four regional PCR laboratories, competing priorities of health facilities and the national priorities post COVID-19 epidemics were considered to have influence over revision of the third edition. Largely, the guidance document of WHO on '*End-to-end integration of SARS-CoV-2 and influenza sentinel surveillance: revised interim guidance*' has shaped this updated edition in terms of conceptualization of operational aspects of the integrated surveillance.

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## ACRONYMS

ACO	Assistant Clinical Officer
ARI	Acute Respiratory Infections
AFRIMS	Armed Force Research Institute of Medical Science
US-CDC	United states, Center for Disease Control and Prevention
CIF	Case Investigation Form
CO	Clinical Officer
EQAS	External Quality Assessment Services
GDMO	General Duty Medical Officer
GISRS	Global Influenza Surveillance and Response System
HA	Health Assistant
HPAI	Highly Pathogenic Avian Influenza
H1N1	Hemagglutinin 1, Neuraminidase 1
ICT	Information and Communications Technology
ID	Identity
IHR	International Health Regulation
ILI	Influenza-like illness
IPD	Inpatient Department
MoH	Ministry Of Health
NADSE	National Disease Surveillance and Epidemiology
NAIL	National Influenza Laboratory
NEQAS	National External Quality Assessment Scheme
NEWARSIS	National early warning and response surveillance information system
NIC	National Influenza Center
OPD	Outpatient Department
PCR	Polymerase Chain Reaction
PPE	Personnel Protection Equipment
RCDC	Royal Centre for Disease Control
RDT	Rapid Diagnostic Test

RCPA	Royal College of Pathologists of Australasia
SARI	Severe Acute Respiratory Infections
SFP	Surveillance Focal Point
SMS	Short Message Services
SOP	Standard Operating Procedure
TAT	Turn Around Time
UN	United Nation
UTM	Universal Transport Media
VTM	Viral Transport Media
WHO	World Health Organization
WHO-WCC	WHO Collaborating Center

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## CHAPTER 1: BACKGROUND

More than 90% of National Influenza Centers (NIC), WHO H5 reference laboratories and other public health laboratories in the GISRS network are conducting testing for SARS-CoV-2. Existing Global Influenza Surveillance Response system (GISRS) influenza reporting system has become the primary platform for sharing COVID-19 data at regional and global levels. Aligning with the Global strategy of data collection and sharing on COVID-19, Bhutan developed an integrated COVID-19 surveillance in the mid 2020 leveraging the national influenza sentinel surveillance system to primarily monitor community transmission of COVID-19. Then the integrated surveillance intended to capture as many cases as possible vis-a-vis as early as possible for the appropriate public health and social interventions. Therefore, the national influenza sentinel surveillance platform not only integrated COVID-19 surveillance but also expanded to nation-wide collection of data and shipment of clinical specimens to designated COVID-19 PCR facilities. Routine reporting of flu and COVID-19 cases was central to early detection of COVID-19 in the community.

The first quarter of 2022 witnessed an unprecedented surge in community transmission of COVID-19 with the emergence of Omicron as a variant of concern. Most of the households across the country have contracted the disease. Subsequently, over the past few days to weeks, there has been a significant drop in cases nationwide. The relaxation of

social measures and de-escalation of public health response globally except for very few countries have seemingly led to global consideration of COVID-19 endemicity. Therefore, there is a need to review and revise the surveillance strategy to cope up with the dynamics of the pandemic and inevitably, to revisit and prioritize the surveillance objectives. The current integrated format of surveillance includes transition from nationwide to sentinel surveillance. The integrated surveillance further intends to ensure there is a regular data collection, analysis and sharing from the sentinel hospitals which then simultaneously are being shared to regional and global platforms. This not only contributes to local risk assessments but also ensures regular provision of data for global risk assessments to inform global public health approaches for pandemic response.

The surveillance asserts its resilience through expanding prominent roles of PCR testing laboratories beyond detection of COVID-19 while enhancing efficiency of the integrated surveillance.

### **1.1 Purpose of the Document**

This document provides an operational aspect of COVID-19 integrated influenza sentinel surveillance with the revision of key primary objectives. The integrated surveillance intends to capture both COVID-19 and Influenza cases using Influenza Like Illness (ILI) and Severe Acute Respiratory Tract Infection (SARI) case definitions as recommended by WHO. It provides testing algorithms for both

influenza and SARS CoV-2. The document elaborates on the roles of the four regional COVID-19 PCR testing laboratories in the integrated sentinel surveillance. It primarily guides the health workforce involved in carrying out integrated surveillance on case enrolment, data collection and management, clinical samples shipment and reporting findings to relevant programs, Ministry of Health, for informed policy decisions. Given the disruptions caused by the current pandemics to the on-going public health surveillance, it is extremely important to design and conduct surveillance in more resilient ways, and therefore, this what the revised guidelines attempts to unfold.

## **1.2 Target Audience**

This document is intended to guide medical and health professionals involved in COVID-19 integrated influenza sentinel surveillance.

# **CHAPTER 2: OBJECTIVES OF SURVEILLANCE**

## **2.1 Primary Objectives**

1. Detection of SARS-CoV-2, Influenza and other respiratory viruses in the community including novel viruses
2. Monitor trends of SARS-CoV-2, Influenza and other respiratory viruses
3. Monitor co-circulation and understand the seasonality of SARS-CoV-2, influenza and other respiratory viruses
4. To conduct Genomic surveillance of SARS-CoV-2, Influenza

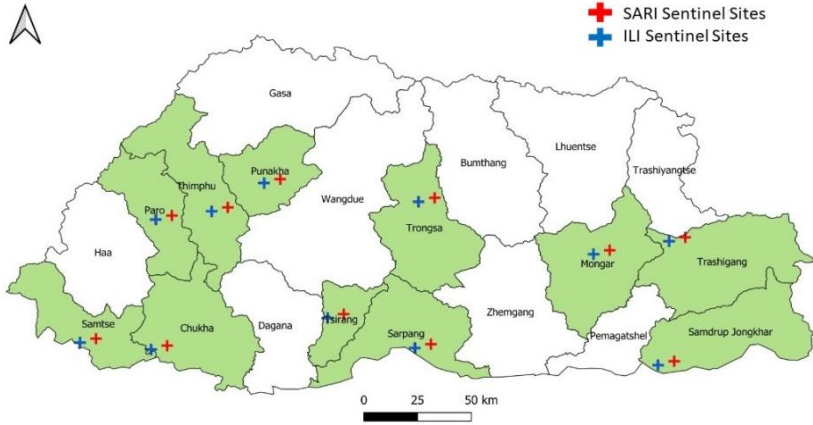
and other respiratory viruses

## 2.2 Secondary Objectives

1. Identify and monitor groups at high risk of severe disease and mortality due to SARS-CoV-2, Influenza and other respiratory viruses
2. Contribute to objectives of GISRS
3. Outbreak investigation and response to-SARS-CoV-2, Influenza and other respiratory viruses

## CHAPTER 3: OVERVIEW OF COVID-19 INTEGRATED INFLUENZA SENTINEL SURVEILLANCE SYSTEM

The sentinel sites for ILI and SARI are selected based on geographic, climatic and demographic representativeness and also the feasibility such as capacity and accessibility of a hospital. There are seven ILI and eleven SARI surveillance sites (**Figure 1 & Table 1**). Sentinel sites will detect cases, collect necessary data/information and samples, further relay the data through an electronic based system to RCDC while the samples will be referred to designated COVID-19 testing laboratory (**Table 2**). COVID-19 testing laboratory will share representative samples to RCDC for further laboratory analysis. Comprehensive data analysis and sample repository will be done at RCDC. Subsequently RCDC will share the information to relevant stakeholders and to WHO (**Figure 2&3**).



**Figure 1:** ILI Surveillance sites & SARI Surveillance Sites

**Table 1:** Sentinel Sites

Regions	Site Code
Western region	
Paro Hospital	BTC
Punakha Hospital	BTD
Phuentsholing Hospital*	BTF
Samtse Hospital	BTK
Central Region	
Trongsa Hospital	BTE
Tsirang Hospital	BTI
Gelephu Regional Referral Hospital*	BTG
JDWNR Hospital*	BTB
Eastern Region	
Trashigang Hospital	BTH
Mongar RR Hospital*	BTA
S/Jongkhar Hospital	BTJ

\*Not ILI site, however need to collect samples and ship to RCDC

**Table 2:** Sample referral system for COVID-19 integrated influenza sentinel surveillance

Sentinel sites	COVID-19 PCR laboratories	Frequency of shipment
Samtse Hospital	Phuentsholing	Weekly
Samdrup Jongkhar Hospital	Dewathang	
Trashigang Hospital	Mongar	
Tsirang Hospital	Gelephu	
Paro Hospital	RCDC	
Punakha Hospital		
JDWNRH		
Trongsa Hospital		

Note: Four peripheral COVID-19 PCR laboratories should ship samples quaterly to RCDC

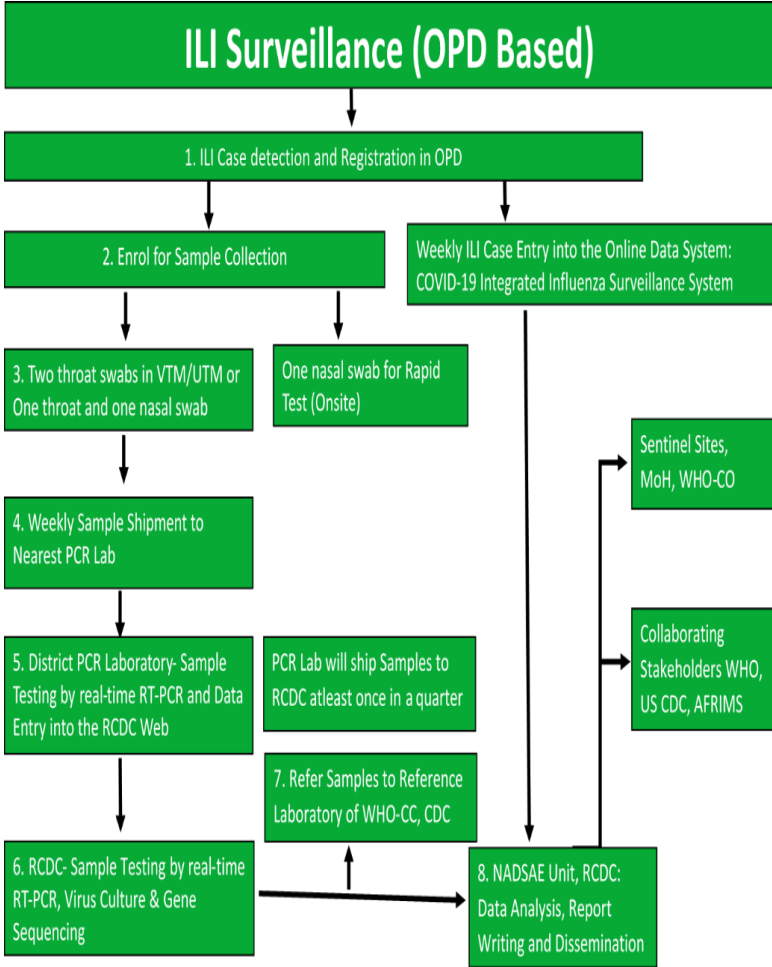
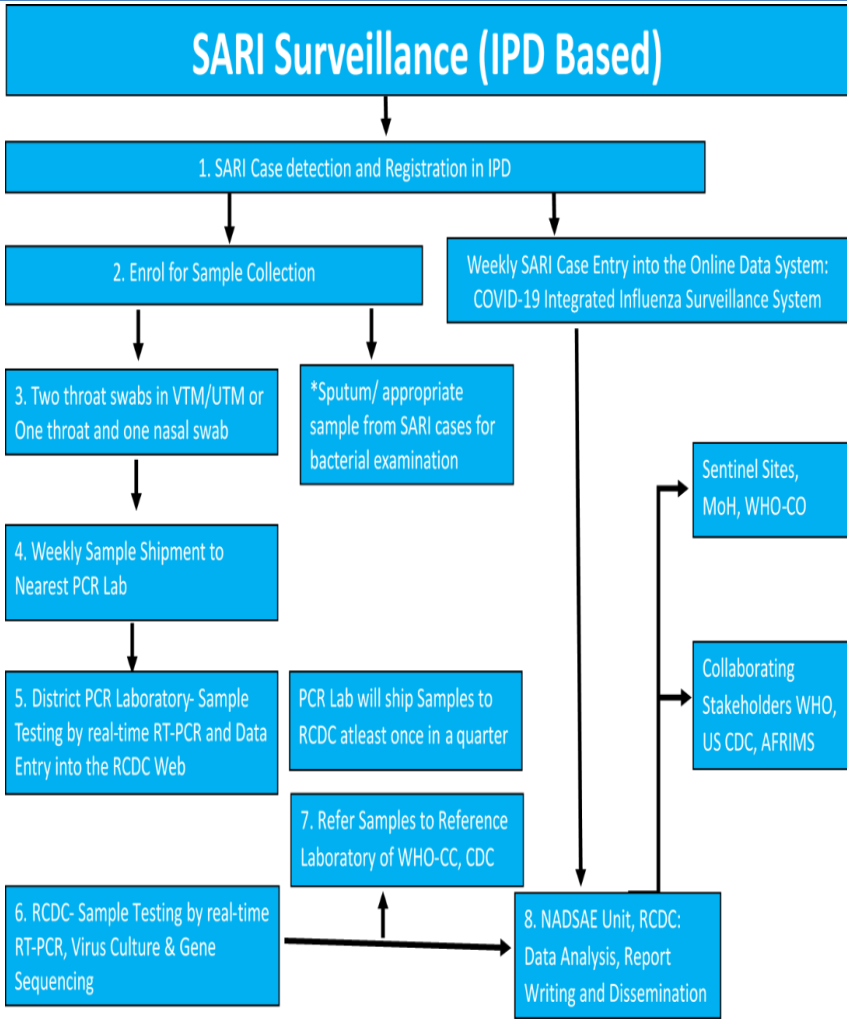


Figure 2: Flow chart of ILI surveillance



**Figure 3:** Flow chart of SARI Surveillance

## CHAPTER 4: CASE DEFINITION

### 4.1 Severe Acute Respiratory Infection (SARI)

Any person with acute respiratory infection with;

- 1) History of fever or fever  $\geq 38^{\circ}\text{C}$ , AND
- 2) Cough, AND
- 3) With onset within the last 10 days, AND
- 4) Require hospitalization.

### 4.2 Influenza-Like Illness (ILI)

Any person with acute respiratory infection with;

- 1) Fever  $\geq 38^{\circ}\text{C}$ , AND
- 2) Cough, AND
- 3) Onset within the last 10 days.

### 4.3 Case Enrollment and Sampling Strategy

#### SARI Cases

Any patient hospitalized due to respiratory illness meeting SARI case definition should be enrolled as SARI cases for the surveillance and it is mandatory to collect specimens from all the registered SARI cases.

#### ILI cases

To meet the core surveillance objectives, it is recommended to collect at least 10 specimens and ideally 15 specimens per week from each sentinel sites. The cases for specimen collection should be equally distributed between different age groups (*one case each for age group: 0-1 years, 2-4 years, 5-14 years, 15-29 years, 30-64 years and  $\geq 65$  years*) at different days of the week.

## CHAPTER 5: ROLES AND RESPONSIBILITIES

### 5.1 Influenza-Like Illness Surveillance sites

Surveillance sites must have a team identified, consisting of clinicians (GDMO, CO, ACO, HA), laboratory technicians or technologist, nurses and the case reporter. Each of these members of the team should be assigned a specific role and responsibility as follows:

#### 5.1.1 Chief Medical Officer/Medical Superintendent

Will oversee the surveillance activities along with following specific responsibilities

- Serve as a point of contact for this surveillance
- Coordinate and convene a coordination meeting on a regular basis (at least twice a year).
- Coordinate and conduct in-house sensitization training on COVID-19 integrated influenza surveillance guideline

#### 5.1.2 Clinicians<sup>1</sup>

- Identify and enroll the patients meeting the case definition of COVID-19 and ILI as prescribed in this guideline
- Properly fill up clinical and epidemiological part of Case Investigation Form (**Annexure 1**)

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<sup>1</sup> In some surveillance sites specimen from OPD also can be considered

- Send the patient for collection of respiratory specimens along with CIF
- Daily record suspected cases of COVID-19 and ILI. If no cases, ensure ‘zero reporting’ is done
- Provide the case data collected to case reporter for daily compilation and reporting

### 5.1.3 Case Reporter

- Collect and collate total number of ILI cases and OPD turns out in a week (**Annexure 2**)
- Report all cases to the RCDC on a weekly basis through a web based or SMS system. If there are no cases, ensure ‘zero reporting’

### 5.1.4 Medical Laboratory Personnel

- Ensure all sample collection forms are filled out completely and accurately
- Ensure all respiratory specimens corresponding forms are assigned with a unique ID number
- Collect respiratory specimens appropriately (**Annexure 4 & 5**)
- Enter CIF data into COVID-19 integrated influenza surveillance system
- Properly label, pack, store, and transport specimens to respective designated COVID-19 testing laboratories (**Annexure 7, 8 & 9**)
- Store the specimens in 2-8°C refrigerators for not more than 72 hours after sample collection (**Annexure 6**). If delayed, store in -20 to -40°C (*Note: Storage in the freezer compartment of the refrigerator*

*may not provide the desired temperature)*

- Ship samples along with CIF to respective designated COVID-19 Testing Laboratory
- Maintain proper laboratory inventory for surveillance activities

## 5.2 SARI Surveillance sites

### 5.2.1 Clinicians and Nurses:

- Identify and enroll the patients meeting the case definition of SARI as prescribed in this guideline
- Properly fill up CIF (**Annexure 1**)
- Collect respiratory specimens appropriately using PPE (**Annexure 4 & 5**)
- Ensure all respiratory specimens and corresponding CIF are assigned with a unique ID number
- Liaise with the laboratory for pick-up of specimens from wards, storage and shipment to designated COVID-19 testing laboratory
- Enter CIF into COVID-19 Integrated influenza surveillance system
- Collect and collate total number of cases and IPD turns out in a week (**Annexure 3**). If there are no cases, ensure ‘zero reporting’
- Report all SARI cases daily through a web based or SMS system
- Ensure adequate VTM/ UTM stock in the wards

### 5.2.2 Medical Laboratory Personnel

- Receive and store the specimens in 2-8°C refrigerators for not more than 72 hours after sample collection (**Annexure 6**). If delayed, store

in -20°C to -40°C (*Note: Storage in the freezer compartment of the refrigerator may not provide the desired temperature*)

- Ship samples along with CIF to respective designated Testing Centers
- Maintain stock of test kits, VTM, barcodes and relevant forms in the laboratory

### **5.3 COVID-19 Molecular Testing Laboratory (MRRH, Dewathang, Phuntsholing and GRRH)**

- Serve as a regional testing laboratory for SARS-CoV-2, influenza virus and other respiratory viruses
- Receive and verify samples and associated documents
- Verify CIF data in the COVID-19 integrated influenza surveillance system
- Perform molecular detection of SARS-CoV-2, influenza virus and other respiratory viruses and upload results in the web-based data management system
- Storing and archiving the specimens at -80°C
- Share representative samples to RCDC for genomic sequencing
- Immediately report to RCDC if any un-subtypable influenza virus
- Ship all samples to the RCDC monthly using the existing shipment mechanism.
- Participate in EQAS/NEQAS program

### **5.4 Virology and Molecular Laboratory, RCDC**

- Serve as National testing laboratory for SARS-CoV-2, influenza virus and other respiratory viruses

- Receive and verify samples and associated forms
- Verify data in the COVID-19 integrated influenza surveillance system
- Perform molecular detection of SARS-CoV-2, Influenza and other respiratory viruses and upload results in the web-based data management system
- Perform culture and isolation of influenza viruses
- Storing and archiving the original specimens at -80°C
- Immediate sharing of information on any unsubtypeable or suspect novel influenza viruses to WHO Collaborating Center (WCC) and referral of any unsub-typeable specimen, to a designated WCC
- Conduct NEQAS to regional COVID-19 Testing laboratories
- Participating in the international external quality assessment scheme (WHO, RCPA, CDC and AFRIMS External Quality Assessment program for the molecular detection and characterization of SARS-CoV-2 and influenza viruses)
- Provide training on COVID-19 integrated influenza surveillance guideline.
- Conduct genomic sequencing for SARS-CoV-2, Influenza and other respiratory viruses

## **5.5 National Disease Surveillance and Epidemiology (NADSAE) Unit, RCDC**

- Manage computer database of COVID-19 integrated influenza

surveillance data

- Prepare and disseminate the weekly, quarterly and annual surveillance reports to all stakeholders
- Reporting to the IHR focal point of any novel strains as per the IHR requirements
- Review and update COVID-19 integrated influenza surveillance guideline as needed
- Disseminate key findings to the general public via Facebook and other means of social media

### 5.6 Information Communication and Technology Unit, RCDC

- Technical support and review of web-based COVID-19 integrated influenza surveillance system
- Monitor and maintain web-based COVID-19 integrated influenza surveillance system
- Support NADSAE for data management and analysis

## CHAPTER 6: SPECIMEN PROCESSING

### 6.1 Sentinel sites

#### Specimen Collection

- A patient meeting the case definition should be requested to provide clinical information and sample
- Label the sample and CIF with unique sample ID
- Collect nasopharyngeal/nasal/throat swab in VTM/ UTM (**Annexure 5**)

### **Onsite Testing**

RCDC will provide all surveillance sites with rapid diagnostic test kits for antigen detection of SARS-CoV-2 and influenza virus. Sentinel site should perform rapid diagnostic test using instruction provided in package insert. The results should be provided to the attending clinicians for patient management.

### **Specimen Storage and Shipment**

All collected specimens should be properly sealed and stored in 2-8°C for not more than 72 hours after collection. If delay in shipment more than 72 hours is expected, store samples at -80°C until shipment (**Annexure:6**)

## **6.2 Regional COVID-19 Testing Laboratories**

### **Specimen Receipt**

- Verify the specimen and CIF ID labeled by hospital
- Check the quality of specimen; leakage and contamination
- Check temperature conditions of the specimen and also check shipment cold chain log for appropriate temperature during shipment (**Annexure 8**)
- Sample leakage, Miss-match between sample ID and CIF, Sample contamination, Sample without corresponding form and CIF without sample will be rejected
- Aliquot specimen for laboratory testing, and repository

### **Specimen Testing**

- Molecular detection of SARS-CoV-2, Influenza virus and other respiratory virus (**Figure 4**)
- Select representative and appropriate samples for genomic sequencing and ship to RCDC

### **Storage and Shipment**

The specimen aliquoted for repository should be stored in the freezer at -80°C until shipped to RCDC. Sample will be shipped to RCDC on quarterly basis and as and when required for further analysis (**Annexure 7**)

## **6.3 Royal Centre for Disease Control**

### **Specimen Receipt**

- Verify the specimen and CIF ID labeled by the hospital
- Check the quality of specimen; leakage and contamination
- Check temperature conditions of the specimen and also check shipment cold chain log for appropriate temperature during shipment (**Annexure 8**)
- Sample leakage, Miss-match between sample ID and CIF, Sample contamination, Sample without corresponding form and CIF without sample will be rejected

### **Specimen Testing**

- Molecular detection of SARS-CoV-2, Influenza virus and other respiratory virus (**Figure 4**)
- Perform virus culture for Influenza virus
- Select representative and appropriate samples for genomic sequencing and conduct genomic sequencing for SARS-CoV-2, Influenza and other respiratory virus

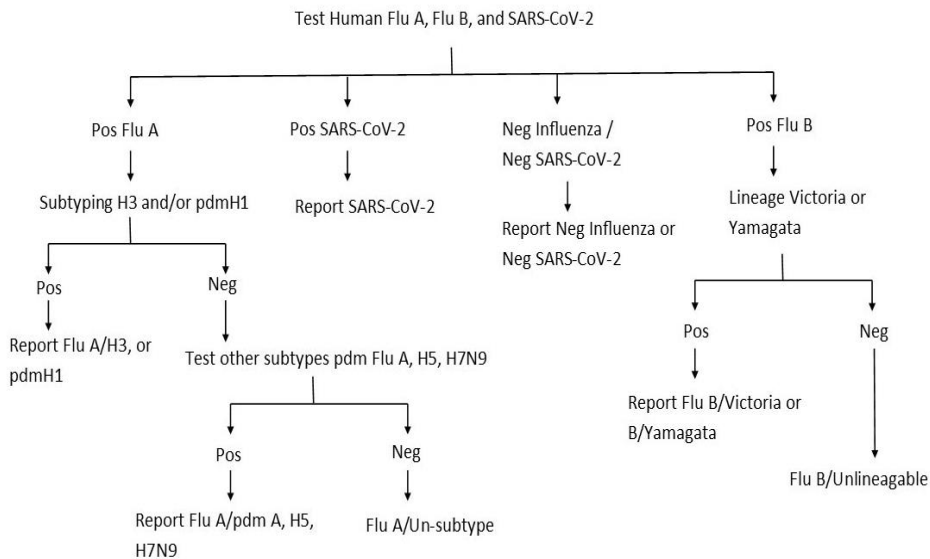
### **Storage and Shipment**

The specimen aliquoted for repository should be stored in freezer at -80°C for 10 years. Selected positive specimen should be sent to a designated WHO Collaborating Centre (WHO-CC) for further antigenic and genetic characterization of influenza virus (**Annexure 7**)

### **Disposition of Specimens**

Human respiratory specimens at RCDC should be stored at -80°C for atleast 10 years after which they should be disposed with strict adherence to `SOP`

### Testing Algorithm



**Figure 4:** Testing Algorithm

## CHAPTER 7: DATA COLLECTION, REPORTING & MANAGEMENT

### 7.1 Case-Based Data Collection

Sentinel sites will provide complete information of patients (suspect COVID-19/ILI/SARI) as required by the CIF (**Annexure 1**). The clinicians/nurse should fill up the clinical and epidemiology part of CIF and laboratory part by laboratory personnel. The original CIF should be

sent to COVID-19 testing laboratories along with the specimen. The copy of the forms should be retained at the hospital for future reference.

## 7.2 Epi-Aggregate Data Collection

Sentinel sites will collect the information of total number of ILI & SARI visiting the Outpatient Department (OPD)/Flu Clinic and Inpatient department IPD in case aggregate reporting form respectively (**Annexure 2**). The denominator for ILI should be a total number of OPD and Flu Clinic/Respiratory Disease Centre. Similarly, the total number of SARI admitted should be collected in case aggregate reporting form. (**Annexure 3**). The denominator for SARI should be a total number of admitted patients (IPD) in the reporting week.

## 7.3 Web based and SMS Reporting

Refer COVID-19 and Influenza Surveillance System User Guide for web based and SMS reporting.

## 7.4 Data Management and Disposition

All data will be maintained in the RCDC centralized web-based data management system. NADSAE will manage the database system with support from the ICT unit.

## 7.5 Analysis

Data obtained should be analyzed by NADSAE on a weekly, quarterly and annual basis.

## Weekly Report

Following parameters should be analyzed

- Trend in both COVID-19/ILI and SARI activity, compared with last weeks, previous seasons, and baseline
- Positivity rate of COVID-19/ILI and SARI specimen,
- Geographical spread
- Type and subtype of influenza viruses
- Affected age groups and deaths due to COVID-19 and influenza

## Annual Report

Following parameters should be analyzed

- Description of seasonality
- Types and subtypes of circulating influenza viruses during the season
- Comparison of data from the most recent influenza season to previous seasons
- Notable or unusual features of the season when compared to previous seasons should be highlighted
- Proportion of specimen testing positive by week or month of the year
- Description of laboratory confirmed COVID-19, SARI and ILI cases within each month or week of the year for each age group, by site and aggregate
- The proportions of influenza positive cases with underlying medical

conditions

## 7.6 Feedback

### **Weekly Report**

NADSAE will prepare a weekly report “COVID-19 Intergrated Influenza Surveillance Report ” and share with relevant stakeholders (Ministry of Health, WHO, CDC, etc).

### **Quarterly Report**

NADSAE will also prepare quarterly report and share with relevant stakeholders (Ministry of Health, WHO, CDC, etc).

### **Annual Report**

NADSAE will prepare the Annual Report and share with relevant stakeholders (Ministry of Health, WHO, CDC, etc).

## CHAPTER 8: MONITORING AND EVALUATION

A surveillance system should undergo regular evaluation to assess whether it is functioning efficiently and providing quality data to meet its objectives. Additionally, regular onsite assessments should be conducted to find out gaps needed in terms of training and logistic support (**Annexure 10**).

### 8.1 Indicators to assess the surveillance system

Surveillance data should be monitored at each administrative level,

beginning at the sentinel sites where data are collected and entered and continuing at the national levels. Monitoring should be carried out to check the compliance of the indicators shown in **Table 3**.

**Table 3:** Indicators for M&E

Indicators	Frequency	Source	NAIL	NADSAE	Sites
<b>Timeliness</b>	Monthly	Routine	Yes	Yes	Yes
<b>Completeness</b>	Monthly	Routine	Yes	Yes	Yes
<b>Consistency</b>	Monthly	Routine	Yes	Yes	Yes
<b>Number of Specimens Collected</b>	Weekly	Routine	Yes	No	Yes

### 8.1.1 Timeliness

Timeliness refers to the speed between steps in a surveillance system. Data must be timely, if it is to be useful to clinicians, public health authorities, and the community. It describes the success of the program in meeting targets for several different time intervals in the surveillance and reporting process (**Table 4**).

**Table 4:** Indicator for Timeliness

SN	Indicator	Administrative Level
1	Expected dates of data reporting from sentinel site to NAIL/NADSAE as compared to actual dates of reporting.	Sentinel Sites
2	Time elapsed from specimen collection at site to arrival at RCDC for testing.	Sentinel Sites
3	Time elapsed from receipt of specimens at RCDC to processing, testing and generating results.	NAIL
4	Time elapsed from receipt of data from sites to entering data into database by NADSAE.	NADSAE
5	Time elapsed from generation of laboratory results to notification of the clinicians.	NAIL and Sentinel Sites
6	Time elapsed from receipt of data from sites and NAIL to providing feedback by NADSAE.	NADSAE

### 8.1.2 Completeness

Completeness refers to the individual case report forms, weekly aggregate reporting forms and sample collection forms and can be measured by assessing the parameters given in **Table 5**.

**Table 5:** Completeness

SN	Indicator	Administrative Level
1	Percentage of ILI & SARI forms with complete Information.	Sentinel Sites
2	Percentage of sentinel sites reporting.	Sentinel Sites
3	Percentage of data entered from the forms (annex 1) into the database by the sites and form (Annex 2 &3) by NADSAE.	Sentinel Sites and NADSAE
4	Percentage laboratory results generated being entered into database	NAIL

### 8.1.3 Consistency

Should the RCDC observe sudden or unexpected change in pattern of the data, it must be investigated as these aberrations in data could be caused by changes in the collection system, reporting methods, recent training, etc. The unexpected change in data may also represent an unusual event of public health concern (**Table 6**).

Following are some of the possible instances of aberration in data

- Unexpected or sudden increase or decrease in number of ILI/SARI cases
- Unexpected or sudden increase or decrease in number of SARI deaths reported
- Unexpected or sudden change in the percentage of specimens testing positive for influenza.

- Unexpected or sudden shift in the type or subtype of virus detected
- Changes in the distribution of risk factors reported

**Table 6:** Indicators for Consistency

SN	Indicator	Administrative level
1	Number of sites having aberrations in the data that might be caused by a change in collection or reporting methods.	Sentinel sites
2	Number of sites having changes in the data that might indicate an outbreak or a change in disease transmission.	Sentinel sites

### 8.1.4 Number of Specimens Collected

Number of specimens collected in each site can be used to monitor surveillance (**Table 7**).

**Table 7:** Indicators for Number of Specimens Collected

SN	Indicator	Administrative Level
1	Number of ILI specimen collected as compared to the required number.	Sentinel sites
2	Number of SARI specimen collected from total SARI cases registered.	Sentinel sites

## CHAPTER 9: FLU OUTBREAK AND RESPONSE

Outbreak is defined as occurrence of more cases of disease than expected in given area (Place), over a particular period of time (Time) among a specific group of people (Person). National sentinel surveillance system will support outbreak/pandemic planning by providing country-specific data such as baselines and thresholds; establishing infrastructure such as transporting specimen and testing systems; data reporting and analysis systems and a means to monitor severity, intensity and progression of pandemic cases, further highlighting the need for routine surveillance.

Whenever there is a suspected Outbreak. Focal points at respective health care centers will report to RCDC through NEWARSIS online system at earliest. Along with this, 5-10 throat swab samples from suspected cases have to ship to nearby COVID-19 Testing laboratories for confirmation. Further, the outbreak will be investigated by the respective District Rapid Response Team (DRRT) as per the “**Disease Outbreak Investigation & Control Manual, First Edition 2015**” (available at RCDC website <http://www.recdc.gov.bt> ).

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# ANNEXURE 1 : SARI Case Investigation and Specimen Collection Form

## SARIPatientSpecimenCollectionForm

SpecimenID	
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### PATIENTINFORMATION

Patientname:	Age: Year(s)	Month(s)
Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	Residential address: Village/city	District
Occupation:	Date of onset of symptoms:	Date of hospitalization:
Outcome (To be completed upon knowing the status in SARI online system): <input type="checkbox"/> Discharged <input type="checkbox"/> Dead <input type="checkbox"/> Trans-out <input type="checkbox"/> Referred		
Date on whichdischarged/dead/trans-out/referred: _____		
Phone/ Mobile Number of patient:		

### CLINICALINFORMATION

History of fever?	Yes	No	Unknown
Fever measured : _____ °C	Yes	No	Unknown
Cough?	Yes	No	Unknown
Sorethroat?	Yes	No	Unknown
Shortness of breath or difficulty breathing?	Yes	No	Unknown
Clinical Signs of Pneumonia	Yes	No	Unknown
Others(Specify) :			

### Pre-existingmedicalconditions

Heart Disease	Yes	No	Unknown
Asthma	Yes	No	Unknown
Chronic Lung Disease	Yes	No	Unknown
Liver Disease	Yes	No	Unknown
Pregnant (if yes ) Gestational week:	Yes	No	Unknown
Diabetes	Yes	No	Unknown
Neuromuscular Dysfunction	Yes	No	Unknown
Immuno-compromised	Yes	No	Unknown
Others(Specify) :			

### EPIDEMIOLOGICAL INFORMATION

<b>Travel history</b>		
History of travel within the last 14 days?	Yes	No
If yes, specify the travel history: <input type="checkbox"/> Within country <input type="checkbox"/> Outside country		
Area and Location (specify if yes):		

### Exposure history:

Poultry	Yes	No
Swine	Yes	No
Others(specify):		

### TYPE(S) OF SPECIMEN COLLECTED IN VTM

Specimen Collection Date:	Time:	
ThroatSwab	Yes	No
NasalSwab	Yes	No
NasopharyngealSwab	Yes	No
Others:		

Reportedby: _____	Phone/MobileNo: _____
Signature: _____	Date: _____

### CaseDefinition

Any person with acute respiratory infection with;

1. History of fever or Fever≥ 38°C, AND
2. Cough, AND
3. With onset within the last 10 days AND
4. Require hospitalization.

(Note: In adult, SARI is not equivalent to classic pneumonia and would not always present as pneumonia).

## ANNEXURE 2: ILI Aggregate Surveillance Data Form

## SENTINEL INFLUENZA LIKE ILLNESS SURVEILLANCE AGGREGATED DATA

SITE NAME	
WEEK NUMBER	
YEAR	

Aggregated Number of Cases	Age Group (in Years)					
	0-1	2-4	5-14	15-29	30-64	65+
Number of Influenza like Illness (ILI) cases during the week						
Total OPD cases during the week						

Reported By: \_\_\_\_\_ Signature: \_\_\_\_\_

Mobile Number : \_\_\_\_\_ Date: \_\_\_\_\_

**Case Definition**

Any person with acute respiratory infection with;

1. Fever  $\geq 38^{\circ}\text{C}$ ; AND
2. Cough; AND
3. Onset within the last 10 days.

(Note: Consider sample collection from ILI patients only if onset of fever is within the past 72 hours/3 days)

**Case Enrollment**

All cases in OPD meeting ILI case definition should be enrolled as ILI cases. Each identified sentinel site for ILI should enroll at least 6-8 ILI cases every week.

**Reporting Schedule**

Every Week & No later than Monday of next week.

## ANNEXURE 3: SARI Aggregate Surveillance Data Form

## SENTINEL SARI SURVEILLANCE AGGREGATED DATA

SITE NAME	
WEEK NUMBER	
YEAR	

Aggregated Number of Cases	Age Group (in Years)					
	0-1	2-4	5-14	15-29	30-64	65+
Number of SARI cases during the week						
Number of deaths due to SARI/ Pneumonia during the week						
Total IPD cases during the week						

**Case Definition**

Any person with acute respiratory infection with;

1. History of fever or Fever  $\geq 38$  °C; AND
2. Cough AND
3. With onset within the last 10 days AND
4. Require hospitalization.

(Note: In adult, SARI is not equivalent to classic pneumonia and would not always present as pneumonia).

**Case Enrollment**

All cases in IPD meeting SARI case definition should be enrolled as SARI cases.

**Reporting Schedule**

Every Week & No later than Monday of next week.

## ANNEXURE 4: Personal Protective Equipment



**Figure 5:** Personal protective equipment

A designated area for putting on PPEs and removal should be identified, and all personnel should use this area to put on/remove their PPEs. This should ideally be in a clean area away from any potentially contaminated area.

### **Procedure for Donning**

1. Before you begin putting on your PPE, check for the correct size of PPE and ensure they are in good working condition
2. Wash your hands with soap and water before you begin, and remove watches and other non- smooth jewelry like bracelets.
3. Remove inner garments and wear surgical scrub
4. Put on boots if not available, put-on shoe cover
5. Perform hand hygiene and put on inner glove

6. Put on cover all/apron (Make sure it is large and allow free movement). Ensure the cuffs of inner gloves are tucked under sleeves of the cover all
7. Put on N95 respirator (cup the respirator in your hand with the nosepiece at the fingers). Position the respirator under your chin with the nosepiece up. Pull the bottom strap over your head and place it around your neck below the ears. Then pull the top strap over your head and rest it high at the top back of your head. Place your fingertips from both hands at the top of the metal nosepiece.
8. Using two hands mold the nosepiece to the shape of your nose by pushing inward while moving your fingertips down both sides of the nosepiece.
9. Perform seal check (Inhale deeply and feel the respirator slightly being sucked in. Also, exhale sharply and feel the respirator slightly bulge).
10. Put on outer gloves. Pull the edge of the gloves over the cuff of your apron.
11. Put on hair cover and put on goggles

### **Procedure for Doffing**

1. Inspect your PPE for any visible contamination or tears
2. Disinfect outer gloves and remove boot covers (touch only the inner surface of the boot cover)

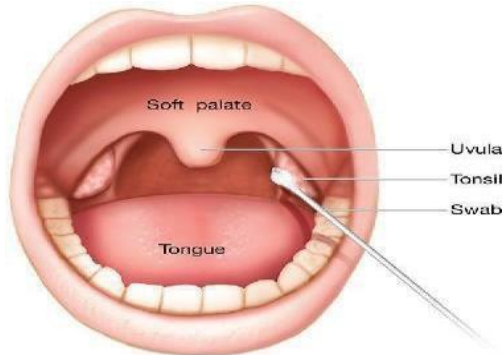
3. Remove outer gloves (Take care not to contaminate the inner gloves)
4. Inspect and disinfect inner gloves (In case your inner gloves are contaminated or torn, disinfect, remove and wear a new pair of gloves)
5. Remove goggles/face shield by lifting back of strap over your head, pull out away (Avoid touching the front portion of goggles/face shield).
6. Disinfect the inner gloves and remove coverall/gown (untie the knot first at the back) inside out by pulling the sleeve.
7. Discard the gown in the biohazard bag and disinfect inner gloves and remove it
8. Perform hand hygiene
9. Put on new pair of gloves and remove your N95 respirator by grabbing the top and then the bottom elastic bands and pulling them up over your head. Place the respirator in the biohazard bag.
10. Disinfect your gloves and remove hair cover
11. Disinfect your gloves
12. Disinfect your washable boots
13. Disinfect and remove gloves
14. Perform hand hygiene
15. Close the biohazard bag by tying a knot at the top or otherwise tying it shut. The biohazard bag should be placed at a designated location so that it can be collected and burned or buried. Wash your hands

and forearms with soap and water

## ANNEXURE 5: Sample Collection

### Throat Swab

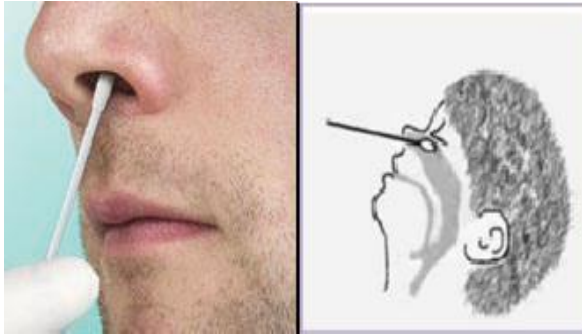
1. Label VTM/ UTM with Laboratory ID number
2. Ask patient (adults) to sit comfortably on chair or lay down the patient (infants/ young children) in a supine position on bed with extended positioning of the patient's arms above the head (**Note: throat swab from infants/ young children should be collected by Pediatrician or trained personnel only**)
3. Hold the tongue with a tongue depressor
4. Use a sweeping motion to swab the posterior pharyngeal wall and tonsillar pillars (**Figure 6**). Have the subject say "aahh" to elevate the uvula. Avoid swabbing the soft palate and do not touch the tongue with the swab tip. Note: This procedure can induce the gag reflex
5. Open and put the swab into VTM
6. Immediately close the VTM tube and store in 2-4°C till the sample is processed or transported to RCDC. If delay in shipment for more than seven days is expected, then place the specimen in preferably in -80°C. (If -80°C deep freezer is not available, -40°C deep freezer should be satisfactory).



**Figure 6:** Position of tonsil (Source: [www.webmd.com](http://www.webmd.com))

### **Nasal Swab (For Rapid Test)**

1. Label VTM tube with Lab ID number
2. Ask patient to sit comfortably on chair and hold patient's head slightly back by one hand
3. Advance the swab tip past the vestibule (anterior nares) to the nasal mucosa, approximately 2-3 cm from the nostrils in adults (**Figure 7**)
4. Gently rotate to collect nasal secretions from the anterior portions of the turbinate and septal mucosa
5. Perform the rapid test as per the instructions prescribed in the package insert

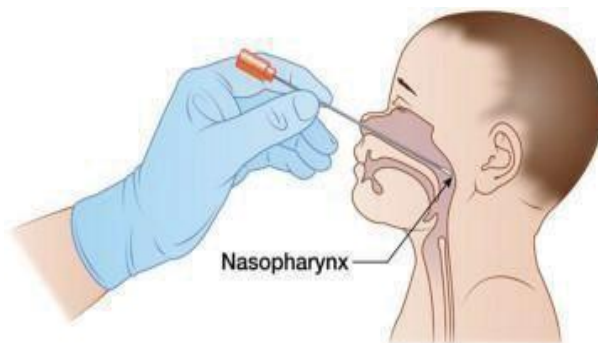


**Figure 7:** Position of nasal mucosa (Source: [www.webmd.com](http://www.webmd.com))

### **Nasopharyngeal Swab**

1. Label VTM tube with Lab ID number.
2. Ask patient (adults) to sit comfortably on chair and hold the patient's head slightly back with your left hand.
3. Insert a flexible, fine-shafted polyester swab into the nostril and back to the nasopharynx (**Figure 8**). The swab is inserted following the base of the nostril towards the auditory pit till resistance is met. (Need to insert at least 5 - 6 cm in adults to ensure that it reaches the posterior pharynx). (DO NOT use rigid shafted swabs for this sampling method).
4. Leave the swab in place for a few seconds and withdraw slowly with a rotating motion.
5. Open and put the swab into VTM.

6. Immediately close the VTM tube and store in 2-4°C till the sample is processed or transported to RCDC.



**Figure 8:** Position of nasopharynx (Source: [www.quidel.com](http://www.quidel.com))

## ANNEXURE 6: Sample Storage

### Sentinel Surveillance sites

1. Wear an apron and gloves
2. Seal the VTM tubes with parafilm airtight after collection
3. Arrange specimens in serial order based on sample ID number in storage rack
4. Label storage racks with detailed information of specimens it contains
5. Arrange specimens in serial order based on sample ID number in storage rack
6. Place the specimen racks in a refrigerator at 2- 8°C until ready to transport to RCDC

7. Ship the specimens to RCDC within 48 hours of collection

### **COVID-19 Testing laboratories**

1. Wear an apron, gloves and other protective barriers
2. Seal the remaining specimen in VTM tubes with parafilm
3. Arrange specimens in serial order based on sample ID number in storage rack
4. Label storage rack with detailed information of specimens it contains
5. Store the specimens in  $-70^{\circ}\text{C}$

### **RCDC**

6. Wear an apron, gloves and other protective barriers Aliquot specimen (140 $\mu\text{l}$  of the specimen for PCR and 420  $\mu\text{l}$  for stock)
7. Seal the remaining specimen in VTM tubes with parafilm
8. Arrange specimens in serial order based on sample ID number in storage rack
9. Label storage rack with detailed information of specimens it contains
10. Store the specimens in  $-70^{\circ}\text{C}$

## **ANNEXURE 7: Sample Packaging and Transportation**

### **Sentinel Sites to COVID-19 testing centers**

1. Prepare the line list of specimens to be shipped (**Annexure 9**)
2. Arrange documents for specimen accordingly. Documents to be sent are as follows:

- Specimen log form
- Cold- chain maintenance form
- Copy of CIF

3. Follow WHO Triple Packaging System (**Figure 9**): Use 3 packaging layers

- Primary receptacle holds respiratory specimens i.e., VTM tube wrapped with parafilm
- Secondary container durable, watertight, leak- proof, several primary receptacles can go into secondary container
- An outer container should be rigid, durable and insulated e.g., Styrofoam box



**Figure 9:** Triple Packaging System

## Steps for Packing Specimens

1. Seal VTM tube with parafilm –this is primary receptacle and wrap with tissue paper to absorb the accidental leakage.
2. Place VTM in a watertight zip-lock bag.
3. Place up to 10 single VTM in a zip-log bag within another watertight container depending on size of the container (e.g. Sturdy plastic container with lid) – this is a secondary container.
4. Place absorbent, cushioned material between primary and secondary containers.
5. Put the secondary container in a “Wizard Box” or any other shipment box provided by the RCDC for shipment of influenza specimens.
6. Place ice/cold packs between secondary and outer containers.
7. Complete the Cold Chain Maintenance Table forms (**Annexure 8**)
8. Place all documents between the secondary and outer container in a plastic zip-lock bag or polythene bag to avoid getting wet.
9. Mark and label the outer container properly, this should include:
10. Address of the shipper and the consignee.
11. Biohazard label Orientation label (Note: UN number is not necessary for in-country shipment.)
12. Send the specimens on ice or frozen ice packs to RCDC within 48 hours from the date of sample collection.
13. Ensure the packing box contains enough ice packs to keep the specimens for few days.

14. Transport specimen to RCDC. Ship the specimen from the hospital to your nearest Bhutan Post on scheduled time provided to you by RCDC.
15. Collect the empty box from the same Post Office every week for the next shipment.

### **RCDC to Reference Laboratory**

1. Prepare the line list of specimens to be shipped (**Annexure 9**)
2. Arrange documents for specimens accordingly.
3. Follow packaging steps to describe under Sample packaging and transportation (Sentinel sites to RCDC).
4. Place dry ice between the secondary and transport container to keep the sample at the required temperature during transportation.
5. Place specimen data forms, letters and other relevant documents in a waterproof bag (preferably sealed plastic bag) carefully taped either to the outside of the secondary receptacle or inside of the transportation container.
6. The outer shipping or transportation container should be labeled with the name of the receiver, indication of storage conditions required during transport, and bear any additional labels or stickers (biohazard sign) as per the national/international regulations. (Ensure that copies are made and retained at RCDC for all the forms that are being sent).
7. The following documents are required while shipping samples to

reference laboratories outside the country:

- Specimen log form
- Cold- chain maintenance form
- Copy of CIF
- Airway bill
- Shipment invoice

## ANNEXURE 8: Cold Chain Maintenance Form

SN	Specimen ID	Collection Date	Temperature History			Transferred			
			2-8°C Duration	-70°C Freezer	LN	DI	WI	LN	DI

**Note:** Specimens can be kept in a refrigerator (Between (between 2- 8°C) for not more than 72 hours. Demographic/ Clinical form should accompany this form. LN: Liquid nitrogen, DI: dry ice, WI: ice or frozen ice pack

Shipment Prepared at Site By: \_\_\_\_\_ Date: \_\_\_\_\_

Shipment Received at RCDC By: \_\_\_\_\_ Date: \_\_\_\_\_

Shipment Inventory \_\_\_\_\_ Date: \_\_\_\_\_



## ANNEXURE 10: Monitoring and Evaluation Form

Name of the Hospital: \_\_\_\_\_ Date of Evaluation \_\_\_\_\_

**Table 8: Timeliness**

SN	Attributes	Target	Time Elapsed in Days
1	Time taken for weekly data form to reach RCDC	Report reaches by fax or mail or is entered into online system latest by Monday of every next week	
2	Time taken for specimen from sentinel site to arrive at RCDC	Within 3-4 days of sample collection	
3	Time taken to process, test and generate results by RCDC	Within 1 week of sample receipt	
4	Time taken to notify SFP after result generation	Within 1 day of report	
5	Time taken to generate report by RCDC	Every Tuesday of next week	
6	Time taken to disseminate report to the sentinel sites by RCDC	Every Tuesday of next week	

**Table 9: Completeness**

SN	Attributes	Target	Percent
1	Percentage of forms received with complete information from sites	At least 80% of the reports have all data fields completed	
2	Percentage of sentinel sites reporting regularly?	At least 80% of all sentinel sites deliver every reporting interval	
3	Percentage of data forms entered from the forms into the database.	At least 80% of cases from which specimens are collected have data collected	

**Table 10:** Consistency in Data or Aberrations

SN	Attributes	Target	Number
1	Unexpected or sudden increase or decrease in number of SARI, ILI, or SARI deaths reported		
2	Unexpected or sudden change in the specimens testing positive for influenza		
3	Unexpected or sudden shift in the type or subtype of virus detected		
4	Changes in the distribution of risk factors reported		
5	Change in the age distribution of cases reported		

**Table 11:** Specimen Collected

SN	Attributes	Target	Numbers
1	Numbers of ILI specimen collected and sent	10-15 specimen per week	
2	Numbers of SARI specimen collected and sent	Samples from all registered cases	

This guideline is the Second Edition of COVID-19 Intergrated Influenza surveillance with several changes incorporated. This edition comprise of refinements of surveillance objectives, redefining the roles and responsibilities of surveillance focal points and elaborates on the roles of the four regional COVID-19 PCR testing laboratories in the integrated sentinel surveillance.

This document describes surveillance objectives, standards and a framework adopted from the WHO ‘*End-to-end integration of SARS-CoV-2 and influenza sentinel surveillance: revised interim guidance*’ for a minimal basic surveillance system for the monitoring of influenza virus, SARS-CoV-2 and other respiratory viruses. This standard will help us to understand the epidemiology, transmission, and impact of influenza in the country and compare with other countries. The data generated and analyzed from the surveillance system can help to make well-informed policy decisions, and also providing feedbacks to those who are involved in surveillance will help improve patient care.



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