



CASE DETECTION ALGORITHM

COVID-19

Confirmed and Probable COVID-19

Document Version 1.0

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Section 1. Overview

The purpose of this document is to describe the criteria used to identify and report cases of COVID-19 from electronic medical records (EMR) using ESP and report them to the Massachusetts Department of Public Health (MDPH).

Section 2. Criteria used to identify cases using ESP data

CASE TYPES

This document includes an algorithm to identify confirmed and probable cases of COVID-19.

TIME WINDOW

The recurrence interval for COVID-19 is 90 days

CASE CRITERIA

1. Confirmed case – positive SARS-CoV-2 PCR, NAAT, or another molecular diagnostic test result
2. Probable case – positive SARS-CoV-2 Antigen test result and no positive SARS-CoV-2 molecular diagnostic test result in last 90 days or on case date

CRITERIA TO REVOKE A CASE

None.

Section 3. Specifications for reporting diseases/conditions to the Massachusetts Department of Public Health

I. INITIAL CASE REPORTING CRITERIA

All cases should be immediately reported to MDPH upon initial detection.

II. CASE REPORT UPDATE CRITERIA

An updated report should be set to MDPH whenever any of the following occur during the reporting window:

1. Any SARS-CoV-2 molecular diagnostic test
2. Any SARS-CoV-2 antigen test
3. ICD-10-CM diagnosis code related to signs and symptoms of COVID-19 ([Table 1](#))
4. COVID-19-related medication ([Table 2](#))

III. DATA TO INCLUDE IN REPORTS TO MDPH

Once a patient is identified, gather the following data to generate a report:



A. Demographic

Name	Last, first, middle
Date of birth	yyyy/mm/dd
Gender	Male / Female/Transgender
Race	American Indian / Asian / Black / White / Other / Unknown
Ethnicity	Hispanic / Non-Hispanic / Unknown
Address	Line 1, line 2, city, state, zip, country
Phone	xxx-xxx-xxxx
Language spoken	
Medical record number	
PCP	Name, office address, phone number, email

B. Encounter Facility Information

Facility name	
Facility address	Line 1, line 2, city, state, zip
Facility contact person	
Contact person email	
Contact person phone	xxx-xxx-xxxx
Facility phone	xxx-xxx-xxxx
Facility NPI	

C. Encounter data

Lab test ordering provider	Name, NPI, office address, phone number, email
Prescribing provider	Name, NPI, office address, phone number, email
Primary care provider	Name and NPI
Managing treatment provider	Name and NPI
Treatment encounter facility name	
Treatment encounter facility address	Line 1, line 2, city, state, zip
Treatment encounter facility NPI	

D. Laboratory Results

Please see [Table 1](#) below for specific labs that can be included in the case report

Date specimen obtained	yyyy/mm/dd
LOINC code of positive test	LOINC
Specimen source	Blood, plasma
Result	SNOMED

E. Medications

Report medications from the specified list in [Table 2](#) and the information below that occur up to 7 days before or 14 days after the case date.

Date of treatment	yyyy/mm/dd
Prescription for medication	Report drug name, dose, route, and duration.



F. Pregnancy

Pregnancy flag active	Yes or No. If EpicCare pregnancy flag active then pregnancy = yes.
Expected date of delivery	=EDD
Number of weeks pregnant	=40 – [(EDD – present date) / 7]
Date of pregnancy status	Date of medical encounter that pregnancy data was collected

G. Symptoms

Report the signs and symptoms of COVID-19 listed below (see [Table 3](#) for specific diagnosis codes) that occur up to 14 days before or 90 days after the case date.

Fever	
Pneumonia	
Bronchitis	
Lower respiratory infection	
Acute respiratory distress	
Upper respiratory infection	
Cough	
Shortness of breath	
Viral infections	
Chills	
Myalgia	
Headache	
Sore throat	
Loss of taste or smell	
Nausea	
Vomiting	
Diarrhea	
Fatigue	

IV. FUTURE CONSIDERATIONS

Data element	Next steps
Sexual orientation	<ol style="list-style-type: none"> Investigation into how sexual orientation is captured in sites' EMR and sites will need to add field to their ESP data extracts (field exists in ESP data tables) May require a new field in MAVEN/MAVEN release
Disability status	<ol style="list-style-type: none"> Investigation into how disability status is captured in sites' EMR New field(s) for ESP data tables May require a new field in MAVEN/MAVEN release
Laboratory orders (chest x-ray, chest CT, mechanical ventilation)	<ol style="list-style-type: none"> ESP would need extensive infrastructure to handle the mapping and maintenance of orders/procedures May require new field(s) in MAVEN/MAVEN release
Hospital admission and discharge dates	<ol style="list-style-type: none"> Need to work with each site to identify what is an inpatient encounter. This may require changes to site extracts and historical data may not be available. Need to determine when/how to report hospitalizations (i.e. after discharge to determine whether hospitalization was COVID-19 related) May require new field(s) added to MAVEN
Telehealth encounters	<ol style="list-style-type: none"> Determine what DPH needs for telehealth encounters via ESP (any telehealth encounters that result in a diagnosis code or medication order related to COVID-19 or most recent?) Investigation into how telehealth encounters are capture in sites' EMR New field(s) need to be added to ESP data tables New field(s) need to be added to MAVEN/MAVEN release



Underlying health conditions (see Table 4)	<ol style="list-style-type: none"> 1. New ESP infrastructure would need to be built to manage and maintain a new reportable item that identifies underlying health conditions up to 365 or 730 days before COVID-19 case date. Infrastructure relates to the ESP user interface (UI) and database 2. New field(s) need to be added to MAVEN/MAVEN release
Additional laboratory tests (see Table 5)	Determine which and where the additional labs could be reported to MAVEN. If it is not using the general lab structure, this would require significant changes to ESP and MAVEN (XSL processor)

Section 4. Codes, laboratory tests, and medications used to identify criteria listed in Section 2 and Section 3.

Table 1. COVID-19 laboratory tests

Description	Test name	LOINC	LOINC Name
COVID molecular diagnostic test	covid19_pcr		
COVID Antigen	Covid19_ag		

Table 2. Generic and brand name drugs related to COVID-19

Generic	Brand name
Remdesivir	
Prednisone	Rayos
	Sterapred
	Deltasone
Prednisolone	Flo-Pred
	Millipred
	Orapred
	Pediapred
	Veripred
	Pre lone
	Hydeltra
	Hydeltrasol
	Key-Pred
	Cotolone
	Predicort
	Predalone
	Predacort
	Predate
	Predaject
	Pred-ject
	Medicort
Pri-cortin	
Predcor	
Bubbli-Pred	
Asmalpred	



Generic	Brand name
Methylprednisolone	Medrol
Dexamethasone	Baycadron
	Decadron
	Dexpack
	Taperdex
	Zema-Pak
	Zodex
	Zonacort
Hydrocortisone IV	Cortef
Tocilizumab	Actemra
Sarilumab	Kevzara
Anakinra	Kineret
Casirivimab/imdevimab	REGEN-COV
Bamlanivimab/etesevimab	
Nirmatrelvir/ritonavir	Paxlovid
	Molnupiravir
Tixagevimab/cilgavimab	Evusheld
Sotrovimab	
Baricitinib	Olumiant

Table 3. Diagnosis codes for signs and symptoms related to COVID-19

Symptom	Code Type	Code	Description
Fever	N/A	Temperature >100.4	Measured temperature, if available
	ICD-10-CM	R50.81	Fever presenting with conditions classified elsewhere
	ICD-10-CM	R50.9	Fever, unspecified
	ICD-10-CM	R56.00	Simple febrile convulsions
Chills	ICD-10-CM	R68.83	Chills, without fever
Myalgia	ICD-10-CM	M79.1	Myalgia
	ICD-10-CM	M79.10	Myalgia, unspecified
	ICD-10-CM	M79.18	Myalgia, other site
Headache	ICD-10-CM	R51	Headache
Sore throat	ICD-10-CM	R07.0	Pain in throat
Olfactory and taste disorders	ICD-10-CM	R43.0	Anosmia
	ICD-10-CM	R43.1	Parosmia
	ICD-10-CM	R43.2	Parageusia
	ICD-10-CM	R43.8	Other disturbances of smell and taste
	ICD-10-CM	R43.9	Unspecified disturbances of smell and taste
Cough	ICD-10-CM	R05	Cough
Shortness of breath	ICD-10-CM	R06.02	Shortness of breath
	ICD-10-CM	J12.8	Other viral pneumonia
	ICD-10-CM	J12.89	Other viral pneumonia
	ICD-10-CM	J12.9	Viral pneumonia, unspecified
	ICD-10-CM	J18.8	Other pneumonia, unspecified organism
	ICD-10-CM	J18.9	Pneumonia, unspecified organism



Symptom	Code Type	Code	Description
Acute respiratory distress syndrome	ICD-10-CM	J80	Acute respiratory distress syndrome
Bronchitis	ICD-10-CM	J20.8	Acute bronchitis due to other specified organisms
	ICD-10-CM	J20.9	Acute bronchitis, unspecified
	ICD-10-CM	J21.8	Acute bronchiolitis due to other specified organisms
	ICD-10-CM	J40	Acute bronchiolitis, unspecified
Lower respiratory infection	ICD-10-CM	J22	Unspecified acute lower respiratory infection
	ICD-10-CM	J98.8	Other specified respiratory disorders
Upper respiratory infection	ICD-10-CM	J00	Acute nasopharyngitis [common cold]
	ICD-10-CM	J02.9	Acute pharyngitis, unspecified
	ICD-10-CM	J04.0	Acute laryngitis
	ICD-10-CM	J04.10	Acute tracheitis without obstruction
	ICD-10-CM	J04.11	Acute tracheitis with obstruction
	ICD-10-CM	J04.2	Acute laryngotracheitis
	ICD-10-CM	J05.0	Acute obstructive laryngitis [croup]
	ICD-10-CM	J06.0	Acute laryngopharyngitis
	ICD-10-CM	J06.9	Acute upper respiratory infection, unspecified
	ICD-10-CM	J39.8	Other specified diseases of upper respiratory tract
	ICD-10-CM	J39.9	Disease of upper respiratory tract, unspecified
Viral infections	ICD-10-CM	B33.8	Other specified viral diseases
	ICD-10-CM	B34.8	Other viral infections of unspecified site
	ICD-10-CM	B97.89	Other viral agents as the cause of diseases classified elsewhere
Nausea	ICD-10-CM	R11.0	Nausea
	ICD-10-CM	R11.2	Nausea with vomiting, unspecified
Vomiting	ICD-10-CM	R11.1	Vomiting
	ICD-10-CM	R11.10	Vomiting, unspecified
	ICD-10-CM	R11.11	Vomiting without nausea
	ICD-10-CM	R11.112	Projectile vomiting
Diarrhea	ICD-10-CM	R19.7	Diarrhea, unspecified
Fatigue	ICD-10-CM	R53.8	Other malaise and fatigue
	ICD-10-CM	R53.83	Other fatigue

Table 4. Potential underlying health conditions

Condition	Look-back period
Chronic lung or respiratory disease	365 days
Asthma	365 days
Cardiovascular disease	365 days
Hypertension	365 days
Diabetes	365 days
Immune Disorder	365 days
Obesity	365 days
Renal Disorder	365 days
Hepatic Disorder	365 days
Smoking/nicotine dependence	365 days
Altered mental status	365 days



Renal failure	365 days
Cancer	365 days
Down Syndrome	TBD
Dementia	TBD
Sickle cell	TBD
Thalassemia	TBD
Transplant recipient	TBD

Table 5. Potential COVID-19 related laboratory tests

Description	Test name	LOINC	LOINC Name
COVID IgG	covid19_igg		
COVID IgM	covid19_igm		
COVID IgA	covid19_iga		
COVID total antibody	covid19_ab_total		
Influenza (A & B)	Influenza influenza_culture		
White blood cell count	Wbc	26464-8	Leukocytes [# /volume] in Blood
Hematocrit	Hematocrit		
Platelets	platelet_count	13056-7	Platelet # Plas Auto
Lymphocytes	Lymphocytes		
Partial pressure of oxygen (arterial)	po2_art		
Partial pressure of oxygen (venous)	po2_ven		
d-dimer	d_dimer		
C-reactive protein	Crp		
Human Metapneumovirus	h_metapneumovirus		
Human Parainfluenza	Parainfluenza		
Adenovirus	Adenovirus		
Human Rhinovirus/Enterovirus	rhino_entero_virus		
Coronavirus (OC43,229E, HKU1, NL63)	coronavirus_non19		
Mycoplasma pneumoniae	m_pneumoniae_igm m_pneumoniae_pcr		
Chlamydia pneumoniae	c_pneumoniae_igm c_pneumoniae_pcr		
Respiratory Syncytial Virus	Rsv		
Bordetella parapertussis	Parapertussis		