
	महाराष्ट्र शासन, आरोग्य सेवा संचालनालय, पुणे कार्यालय	
संचालक दूरध्वनी क्रमांक कार्यालयदूरध्वनी क्र.	२६१२२२५६ (वै.) २६१२२५०८(कार्या) २६११९५७८(कार्या)	संचालक, आरोग्य सेवा, आरोग्य सेवा संचालनालय, मध्यवर्ती इमारत, पुणे ४११ ००१ (महाराष्ट्र राज्य) Email ID : dhspune1@gmail.com
आरोग्य सेवा		जाक्रं.संआसे/पुणे/नवाकरोना/मार्गदर्शकसुचना/२०२०, दि. २२/०१/२०२० 1293-1426

प्रति,

- १) जिल्हा आरोग्य अधिकारी, जिल्हा परिषद (सर्व)
- २) जिल्हा शल्य चिकित्सक, जिल्हा रुग्णालये (सर्व)
- ३) आरोग्य अधिकारी, महानगरपालिका (सर्व)
- ४) अधिष्ठाता, वैद्यकीय महाविद्यालय (सर्व)

विषय:- नव्याने आढळलेल्या करोना विषाणुबाबत (Novel Corona virus 2019-nCov) मार्गदर्शक सुचना

संदर्भ:- सचिव, आरोग्य व कुटुंब कल्याण, भारत सरकार यांचे पत्र
दि. १७/१/२०२०

प्रस्तावना :-

३१ डिसेंबर २०१९ पासून चीनमधील हुबेई प्रांतातील कहान शहरात न्युमोनियाचे अनेक रुग्ण आढळले असून सदर न्युमोनियाचे कारण नव्या प्रकारचा करोना विषाणू (Novel Corona virus 2019- nCov) असल्याचे सिध्द झाले आहे. या nCov विषाणूचे ४१ रुग्ण या शहरात आतापर्यंत रिपोर्ट झाले असून त्या पैकी एकाचा मृत्यू झाला आहे. थायलंड व जपान मधुनही या आजाराचा प्रत्येकी एक रुग्ण रिपोर्ट झाला आहे.

या पार्श्वभूमीवर भारत सरकारने मुंबई, दिल्ली व कलकत्ता येथील आंतरराष्ट्रीय विमानतळावर बाधित देशातून येणाऱ्या प्रवाशांचे स्क्रीनिंग सुरु केले आहे. अशा प्रवाशांमधुन आढळलेल्या संशयित रुग्णांचा व त्यांच्या निकट सहवासितांचा पाठपुरावा व आवश्यक कार्यवाही एकात्मिक रोग सर्वेक्षण कार्यक्रमांमार्फत (आयडीएसपी) करण्यात येईल राष्ट्रीय विषाणू विज्ञान संस्था पुणे येथे या आजाराच्या निदानाची सुविधा उपलब्ध आहे. सध्या तरी nCov विषाणूचा प्रादुर्भाव आपल्या राज्यात होण्याची शक्यता कमी असली तरी या अनुषंगाने आपण आपल्या कार्यक्षेत्रात पुढील बाबींवर प्राधान्याने लक्ष

देऊन आपल्या कार्यक्षेत्रातील सर्वेक्षण, निदान आणि उपचार व्यवस्था सक्षम करणे आवश्यक आहे.

- १)सर्वेक्षण - इन्फ्ल्यूएंझा सदृश्य रुग्ण (ILI) आणि श्वसन संस्थेच्या तीव्र प्रादुर्भाव (SARI) या आजारांचे सर्वेक्षण सर्व आरोग्य संस्थांनी करणे आवश्यक आहे. श्वसन संस्थेच्या गंभीर प्रादुर्भावात (Severe Acute Respiratory Infection - SARI) प्रौढ तसेच बाल वयोगटात पुढे नमूद केलेली लक्षणे आढळतात -

वर्षावरील वयोगट	५ वर्षाखालील वयोगट
<ul style="list-style-type: none">➤ अचानक येणारा तीव्र ताप ($>38^{\circ}\text{C}$)➤ खोकला, घसा बसणे.➤ दम लागणे.➤ श्वासास अडथळा.➤ रुग्णालयात भरती करावयाची आवश्यकता.	<ul style="list-style-type: none">➤ न्यूमोनिया➤ रुग्णालयात भरती करावयाची आवश्यकता

संशयित nCov आजाराच्या रुग्णांची व्याख्या जागतिक आरोग्य संघटनेमार्फत करण्यात आली असून ती या पत्रासोबत जोडण्यात आली आहे.

प्रत्येक जिल्ह्याने / मनपाने आपल्या कार्यक्षेत्रातील खाजगी वैद्यकीय व्यावसायिकांना या संदर्भातील आवश्यक माहिती द्यावी. जिल्हास्तरावर या संदर्भात जिल्हा शल्य चिकित्सक हे जिल्हा नोडल अधिकारी म्हणून काम पाहतील

- २)प्रयोगशाळा निदानाची व्यवस्था - महाराष्ट्रात राष्ट्रीय विषणू विज्ञान संस्था पुणे येथे उपलब्ध असून निदानासाठी रुग्णांचे कोणते नमुने घ्यावेत व ते प्रयोगशाळेस कसे पाठवावेत याची माहिती एनआयव्ही पुणे यांच्या संकेतस्थळावर www.niv.co.in उपलब्ध आहे. एनआयव्ही पुणे यांना रुग्ण निदानासाठी नमुने पाठवितांना ते जिल्हा शल्य चिकित्सकांमार्फत राज्य आय.डी.एस.पी. विभागाच्या अनुमतीने (ssumaharashtra@gmail.com) पाठवावेत.

- ३)संसर्ग- प्रतिबंध खबरदारी - (Infection Prevention & control) रुग्णालय स्तरावर संसर्ग प्रतिबंध यंत्रणा Universal Precaution धर्तीवर कार्यरत असणे आवश्यक आहे.

- हात धुण्याची व्यवस्था
- पी.पी.ई.ची पुरेशी उपलब्धता
- जैव-वैद्यकीय कचऱ्याची सुयोग्य विल्हेवाट

या बाबींकडे विशेष लक्ष देण्यात यावे. या दृष्टीने रुग्णालयांची तयारी आणि विलगीकरण कक्ष सुसज्ज असणे आवश्यक आहे.

- ४)गंभीर रुग्णांसाठी व्हेंटीलेटर तसेच जीवनावश्यक प्रणाली सुविधा सक्षमपणे कार्यरत राहतील, याची ही दक्षता घेण्यात यावी.

५) आरोग्य शिक्षण - सध्या तरी nCov विषाणूचा प्रादुर्भाव आपल्या राज्यात होण्याची शक्यता कमी दिसते तथापि, इन्क्ल्यूएंझा सदृश्य आजाराच्या तसेच श्वसन संस्थेच्या तीव्र आजाराच्या रुग्णांनी व नातेवाईकांनी घ्यावयाची काळजी याबाबत जनतेचे प्रबोधन करण्यात यावे. स्वाईन फ्लू संदर्भात उपलब्ध आरोग्य शिक्षण विषयक साहित्याचा वापर करावा.

तरी उपरोक्त प्रमाणे आपापल्या कार्यक्षेत्रातील सर्वेक्षण अधिक कार्यक्षम करून नव्याने उद्भवलेल्या या दोन विषाणूंचा मुकाबला करण्यासाठी आरोग्य व्यवस्था अधिक सदृढ होण्याकरीता आपण सर्वांनी योग्य ते प्रयत्न करावेत.

या आजारासंदर्भातील अधिक माहितीसाठी www.who.int या संकेतस्थळाचा उपयोग करावा.

सहपत्र: परिशिष्ट १ व २


(डॉ. अर्चना पाटील)

संचालक, आरोग्य सेवा, पुणे-१

प्रत योग्य त्या कार्यवाहीस्तव :-

- १) राज्य सर्वेक्षण अधिकारी , आयडीएसपी, पुणे.
- २) उपसंचालक, आरोग्य सेवा, मंडळे (सर्व)
- ३) सहसंचालक, आरोग्य सेवा, (हि.ह.व ज.रो.) पुणे-१
- ४) सहसंचालक, आरोग्य सेवा, (रुग्णालये) मुंबई

प्रत सविनय सादर:-

- १) संचालक, वैद्यकीय शिक्षण व संशोधन, मुंबई
- २) मा.आयुक्त, आरोग्य सेवा तथा अभियान संचालक, रा.आ.अ., मुंबई-१
- ३) मा.प्रधान सचिव, सार्वजनिक आरोग्य विभाग, मंत्रालय, मुंबई.

परिशिष्ट - १

The case definitions for surveillance currently provided by WHO are as follows:

1. A person with SARI, with history of fever and cough requiring admission to hospital, with no other etiology that fully explains the clinical presentation (clinicians should also be alert to the possibility of atypical presentations in patients who are immune compromised);

AND any of the following

- a. A history of travel to Wuhan, Hubei Province China in the 14 days prior to symptom onset.
 - b. the disease occurs in a health care worker who has been working in an environment where patients with severe acute respiratory infections are being cared for, without regard to place of residence or history of travel;
 - c. the person develops an unusual or unexpected clinical course, especially sudden deterioration despite appropriate treatment, without regard to place of residence or history of travel, even if another etiology has been identified that fully explains the clinical presentation.
2. Individuals with acute respiratory illness of any degree of severity who, within 14 days before onset of illness, had any of the following exposures:
 - a. close physical contact with a confirmed case of nCoV infection, while that patient was symptomatic;
 - b. a healthcare facility in a country where hospital associated nCoV infections have been reported;
 - c. direct contact with animals (if animal source is identified) in countries where the nCoV is known to be circulating in animal populations or where human infections have occurred as a result of presumed zoonotic transmission*.

* To be added once/if animal source is identified as a source of infection

परिशिष्ट - २ करोना विषाणूबाबत सर्वसाधारण माहिती

साध्यासुध्या सर्दी खोकल्यापासून ते मर्स किंवा सार्स सारख्या गंभीर आज्ञास कारणीभूत असणाऱ्या एका विशिष्ट प्रकारच्या विषाणू गटास करोना विषाणू असे म्हणतात. सन २००३ साली आढळलेला (SARS) सार्स हा देखील एक प्रकारचा करोना विषाणूच होता. सध्या चीनमधील उद्रेकात आढळलेला विषाणू हो करोना विषाणूच आहे. तथापि त्याची जनुकीय रचना पुर्णपणे नवीन असल्याने त्यास नॉव्हेल करोना विषाणू असे नाव देण्यात आले आहे.

• करोना विषाणू आजाराची सर्वसामान्य लक्षणे

- सर्दी, खोकला (कॉमन कोल्ड)
- गंभीर स्वरुपाची श्वसन संस्थेची लक्षणे.
- श्वास घ्यायला त्रास होणे, श्वासास अडथळा.
- न्यूमोनिया
- पचनसंस्थेची लक्षणे - अतिसार
- काही रुग्णांमध्ये - मूत्रपिंड निकामी होणे.
- प्रतिकार शक्तीची कमतरता असलेल्या व्यक्तींमध्ये असामान्य (Typical) लक्षणे

आढळू शकतात.

• रोगप्रसार -

या विषाणूचा प्रसार नक्की कशाप्रकारे होतो याची निश्चित माहिती आजच्या घडीला उपलब्ध नाही. मात्र लक्षणांचे स्वरुप पाहता, शिंकणे, खोकणे यावाटे हवेमार्फत (Droplet) या विषाणूचा प्रसार होत असावा, असा एक अंदाज आहे. या विषाणूकरीता कोणतीही लस अथवा विशिष्ट औषध उपलब्ध नाही. करोना विषाणू हा प्राणीजन्य आजार असला तरी हा नवीन विषाणू नक्की कोणत्या प्राण्याच्या संपर्कापासून पसरतो याबद्दल सध्या निश्चित माहिती नाही.

• उपचार -

- रुग्णाच्या लक्षणानुसार करावा.
- रुग्णाला साहयभूत ठरणारी निगा (Supportive Care) अत्यंत प्रभावी ठरते.

• प्रतिबंधाची खबरदारी -

या विषाणूचा उद्भव कसा झाला आणि त्याचा प्रसार कसा होतो, हे निश्चितपणे माहित नसल्याने या संदर्भात निश्चित प्रतिबंधात्मक खबरदारी कशी घ्यावी, यावर भाष्य करणे कठिण असले तरी सर्वसाधारणपणे आजाराचे स्वरूप लक्षात घेता हा आजार होऊ नये यासाठी खालीलप्रमाणे प्रतिबंधात्मक खबरदारी घेणे घेणे आवश्यक आहे-

- श्वसन संस्थेचा आजार असलेल्या व्यक्तीशी निकट सहवास टाळणे.
- हातांची नियमित स्वच्छता.
- न शिजवलेले अथवा अपुरे शिजवलेले मांस खाऊ नये.
- फळे, भाज्या न धुता खाऊ नये.
- खोकताना, शिंकताना नाका-तोंडावर रुमाल/टिशू पेपरचा वापर करावा. अशाप्रकारे वापरलेले टिशूपेपर ताबडतोब व्यवस्थित झाकण असलेल्या कचरा पेटीत टाकावेत.

खालील व्यक्तींनी विनाविलंब वैद्यकीय सल्ला घ्यावा -

- श्वसनास त्रास होणाऱ्या व्यक्ती.
- हा त्रास कोणत्या आजारामुळे /विषाणूमुळे होत आहे हे स्पष्ट होत नसल्यास आणि रुग्णाने नुकताचा मध्यपूर्वेत प्रवास केला असल्यास.
- प्रतिकार शक्ती कमी असलेल्या आजारी व्यक्ती आणि ज्यांनी नुकताच नवीन करोना विषाणू बाधित देशात प्रवास केला आहे.

रुग्णास उपचार देणाऱ्या डॉक्टर आणि आरोग्य कर्मचाऱ्यांना सदर आजाराचा प्रादुर्भाव होऊ शकतो. याकरीता रुग्णास उपचार करणाऱ्या आरोग्य सेवा कर्मचाऱ्यांनी सुयोग्य संसर्गप्रतिबंध व नियंत्रण पध्दती वापरणे आवश्यक आहे.



x=x=x=x=x=

Hospital Preparedness for n- Corona Virus Disease Hospital Assessment Checklist				
1 Generic Hospital Information				
1.1	Name of the Hospital			Comments
1.2	Address			
1.3	Contact No.			
1.4	Name of Director/ Med Supdt.			
	Contact Number			
1.4	Name of Second in Command			
	Contact Number			
1.5	Total Number of Beds in the Hospital			
2 Hospital Plan				
2.1	Hospital Disaster Plan/ Manual	Yes	No	
2.1.1	The Manual has provided for surge capacity to manage an outbreak of Emerging diseases (EVD)			
2.2	Hospital Committee/ Adhoc Group to support technical decision making	Yes	No	
3 Isolation Facility				
3.1	Location within the hospital (Away from main crown, ground floor, level etc)			
3.2	No of beds available			
3.1	No. of beds available as single isolation rooms with washroom facility.			
3.2	By use of Exhaust fans (direction must outside & not towards dormitory /patient waiting area)	Yes	No	
3.3	Ante room / changing room attached to the isolation facility	Yes	No	
3.4	Separate entry to the isolation facility	Yes	No	
4 Infection prevention and control; practices				
4.1	Hand washing Facility	Yes	No	
4.2	Hand sanitizer	Yes	No	
4.3	Availability of 24 X 7 Water & Generator Back up	Yes	No	
4.4	Availability of Sodium Hypochlorite in different strengths.	Yes	No	
4.5	Facilities for disposable of sharps, and other consumable wastes as per bio medical waste management rules.	Yes	No	
4.6	Disposable bags available at the ante rooms for bio medical hazard	Yes	No	

4.7	Decontamination of infectious waste done prior to disposal through identified waste management agency.	Yes	No	
4.8	Frequency of Disinfection of floors, door knobs, bed railings etc.			
4.9	Hospital infection Control Committee exists	Yes	No	
4.10	Frequency of meeting & last date when the committee met			
4.11	Infection Control Protocols available	Yes	No	
4.12	Hospital workers knowledgeable about hand hygiene, cough Etiquettes, distancing measures Use of PPE			
4.13	Laid down protocol for limiting entry of visitors	Yes	No	
5	ICU/ Critical care (AC)			
5.1	Number of intensive care beds available and earmarked for nCorona virus disease			
5.2	ICU beds available within the nCorona virus disease isolation facility	Yes	No	
5.3	Mode of Oxygen availability Cylinders/ Central supply with Generator backup			
5.4	Consumables: masks, respirators, ET tubes, etc for managing critical patient available.	Yes	No	
5.5	Ventilators, Monitors, Pulse, Dialysis machine, Oxymeters, Nebulizers, Syringe infusion pumps etc for managing, ECG machine critical patient available	Yes	No	
5.6	Specialists/ Physicians trained in critical care/ intensive care/ respiratory medicine to manage cases	Yes	No	
5.7	Standard case management protocol available	Yes	No	
5.8	Availability of dedicated doctor, nurses and support staff for ncorona cases			
5.9	Training on Donning and Doffing of PPE to ICU staff.			
6	Laboratory			

6.1	Laboratory with in the hospital has the required facilities to handle nasopharyngeal swab/oropharyngeal swab/ blood/serum/ bronchoalveolar lavage / tracheal or nasopharyngeal aspirate/ nasal swab/ sputum	Yes	No	
6.2	Sample collection kits available for collection, labeling and transportation	Yes	No	
6.3	Vaccine carriers available	Yes	No	
6.4	Refrigerator available for storing samples at 2-8 degree C	Yes	No	
6.5	Trained personal available for taking samples	Yes	No	
6.6	Identified laboratory personal aware of the lab where samples are to be sent and the contact details of the lab.	Yes	No	
7	PPE			
7.1	Personal Protective equipment available	Yes	No	
7.1.1	Stock available (In absolute numbers)			
7.1.2	The Personal protective kit has an outer impermeable gown	Yes	No	
7.3	3 layered surgical mask (quantity)			
7.4	N 95 Respirator (quantity)			
7.5	Surgical gloves (quantity)			
7.6	Rubber gloves (quantity)			
7.7	Gum boots (quantity)			
7.8	Availability of NIV guidelines for sample collection and transportation	Yes	No	
8	Communication			
8.1	Important contact numbers listed	Yes	No	
8.2	Networking with the attached Airports	Yes	No	
9	Training			
9.1	Hospital staff trained on nCorona virus / SARS/ H1N1/ MERS-COV Disease			
10	Ambulance			
10.1	Dedicated ambulance available for shifting of patients, with BLS/ Trasport Ventilator	Yes	No	
10.2	Driver knows how to wear 3 layered surgical mask and Gloves	Yes	No	

10.3	Stretcher Bearers are trained to wear personal protective equipment and it safe disposal	Yes	No	
11	Morgue			
11.1	Motuary staff trained in handling patients and dorning PPE	Yes	No	
11.2	Availability of body bags	Yes	No	

	महाराष्ट्र शासन, आरोग्य सेवा संचालनालय, पुणे कार्यालय	
संचालक दूरध्वनी क्रमांक कार्यालय दूरध्वनी क्र.	२६१२२२५६ (वै.) २६१२२५०८ (कार्या) २६११९५७८ (कार्या)	संचालक, आरोग्य सेवा, आरोग्य सेवा संचालनालय, मध्यवर्ती इमारत, पुणे ४११ ००१ (महाराष्ट्र राज्य) Email ID : dhspune1@gmail.com
आरोग्य सेवा		जाक्रं.संआसे/साथरोग/करोना /IMALetter/२०२० दि. ३०/०१/२०२० २१७१

प्रति,
अध्यक्ष, राष्ट्रीय वैद्यकीय परिषद,
महाराष्ट्र राज्य,
मुंबई.

विषय : कोरोना उद्रेकाच्या अनुषंगाने राज्यात करण्यात येणाऱ्या उपाययोजना.
संदर्भ : महाराष्ट्र साथरोग प्रतिबंध व नियंत्रण समिती बैठक निर्णय.
दिनांक २७/१/२०२०

सध्या चीनमध्ये कोरोना विषाणू आजाराचा उद्रेक सुरु आहे. चीन व्यतिरिक्त थायलंड, जपान, दक्षिण कोरिया, इत्यादी देशांमध्येही या आजाराचे रुग्ण आढळले आहेत. या पार्श्वभूमीवर या आजाराचा प्रवेश भारतात होऊ नये म्हणून भारतात व राज्यांमध्ये केंद्र सरकारच्या मदतीने पुढील उपाययोजना राबविण्यात येत आहेत.

- १) आंतरराष्ट्रीय विमानतळावर प्रवाशांचे स्क्रीनिंग :- केंद्र सरकारच्या निर्देशानुसार कोरोना बाधित देशातून येणाऱ्या प्रवाशांचे स्क्रीनिंग मुंबईसह देशातील ७ विमानतळावर सुरु करण्यात आले आहे. या स्क्रीनिंगमध्ये संशयित आढळलेल्या रुग्णांना भरती करण्याची सोय कस्तुरबा रुग्णालय, मुंबई व नायडू रुग्णालय, पुणे येथे करण्यात आली आहे.
- २) प्रयोगशाळा निदान व्यवस्था :- नवीन कोरोना विषाणू आजाराच्या रुग्ण निदानाची व्यवस्था राष्ट्रीय विषाणू संस्था (एन.आय.व्ही) पुणे येथे करण्यात आली आहे.
- ३) सर्वेक्षण :- इन्फ्लूएंझा सदृश्य रुग्ण (ILI) आणि श्वसन संस्थेचा तीव्र प्रादुर्भाव (SARI) या आजाराचे सर्वेक्षण सर्व आरोग्य संस्थामध्ये करण्यात येत आहे. संशयित

४) विलगीकरण व उपचार व्यवस्था :- संशयित कोरोना आजारी रुग्णांना भरती करण्यासाठी खालील रुग्णालयात सोय करण्यात आलेली आहे.

क्र	रुग्णालयाचे नाव	संपर्क अधिकाऱ्याचे नाव	मोबाईल नंबर
१	कस्तुरबा हॉस्पिटल, मुंबई	डॉ. चंद्रकांत पवार	९८६९२४६६५१
२	नायडू हॉस्पिटल, पुणे	डॉ. सुधीर पाटसुते	९६८९९३१११८

५) आरोग्य शिक्षण :- इन्प्ल्यूएंझा सदृश्य आजाराचे तसेच श्वसन संस्थेच्या तीव्र आजाराचे रुग्णांनी व नातेवाईकांनी घ्यावयाच्या काळजी बाबत आरोग्य शिक्षण विषयक साहित्य आरोग्य विभागामार्फत तयार करण्यात आले आहे. त्याच्या प्रती सोबत जोडण्यात आल्या आहेत.

६) नियंत्रण कक्ष :- राज्य स्तरावर कोरोना विषाणू नियंत्रण कक्ष स्थापन करण्यात आलेला आहे. सदर कक्षाचा संपर्क क्र ०२०-२६१२७३९४ असा आहे. तसेच अधिक तातडीची सेवा म्हणून टोल फ्री नं १०४ या क्रमांकाशी समन्वय करून या आजाराची माहिती देण्यास सुचित केले आहे.

तरी आपण आपल्या स्तरावरून सोबत जोडलेल्या जागतिक आरोग्य संघटनेच्या मार्गदर्शक सुचना आपल्या अखत्यारित असलेल्या सर्व खाजगी डॉक्टरांना वितरीत करण्यात याव्यात.

सोबत (१) परिशिष्ट क्र. १ - Case definition of suspected corona virus patients (२) परिशिष्ट-२ - कोरोना विषाणूबाबत सर्वसाधारण माहिती (३) Clinical management guideline of Corona virus by WHO (४) Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection (५) Sample collection protocol by ICMR (६) Sample Referral Transport form (७) प्रसिध्दी साहित्य माहितीसाठी जोडले आहे.

(डॉ. अर्चना पाटील)
संचालक, आरोग्य सेवा, पुणे

प्रत माहितीसाठी व योग्य त्या कार्यवाहीस्तव -

१) उपसंचालक आरोग्य सेवा, प्रभारी मंडळे (सर्व)

प्रत माहितीस्तव सविनय सादर -

१) संचालक आरोग्य सेवा, पुणे १

२) मा. आयुक्त आरोग्य सेवा तथा अभियान संचालक, राष्ट्रीय आरोग्य अभियान, मुंबई.

३) मा. प्रधान सचिव, सार्वजनिक आरोग्य विभाग, मंत्रालय, मुंबई



संचालक आरोग्य सेवा आरोग्य सेवा संचालनालय, मध्यवर्ती इमारत, पुणे-१

संचालक दूरध्वनी क्रमांक कार्यालय दूरध्वनी क्र.	२६१२२२५६ (वै) २६१२२५०८ (का) २६११९५७८ (का)	संचालक, आरोग्य सेवा, आरोग्य सेवा संचालनालय, मध्यवर्ती इमारत, पुणे ४११ ००१ (महाराष्ट्र राज्य) Email ID : dhspune1@gmail.com
आरोग्य सेवा		जा.क्र.संआसे/पुणे/करोना विषाणु/कक्ष-५८/ /२०२० दिनांक : ३० जानेवारी २०२० १९९८-२०००

प्रति,
श्रीमती नीरजा बॅकर,
ऑपरेशन हेड,
आरोग्य सल्ला व संपर्क केंद्र, (१०४),
औंध, पुणे ४११०२७.

विषय: करोना विषाणू संसर्ग टाळण्यासाठी १०४ आरोग्य सल्ला व संपर्क
केंद्रामार्फत जनतेच्या तक्रारीचे निवारण करणेबाबत

आपणांस विदितच आहे की, चीनमधील वुहान या शहरामध्ये करोना विषाणूजन्य आजाराचे
रुग्ण प्रथमतः निदर्शनास आले आहेत. करोना विषाणूजन्य आजार भारतात पसरू नये या दृष्टीने
चीन देशातून भारतात येत असलेल्या सर्व प्रवाशांचे विमानतळावर स्क्रीनिंग करण्यात येत आहे.

१०४ आरोग्य सल्ला व संपर्क केंद्रामार्फत करोना विषाणू संसर्ग टाळण्यासाठी घ्यावयाच्या
खबरदारीबाबत मार्गदर्शन करण्यासाठी खालील बाबी सोबत जोडलेल्या आहेत.

- (१) करोना विषाणू संसर्ग टाळण्यासाठी घ्यावयाच्या खबरदारीबाबत जनजागृती साहित्य (ज्यामध्ये
सर्वसामान्य नागरीक, चीनमधून परत आलेले प्रवाशी व डॉक्टरांसाठी महत्वाचे संदेश
समाविष्ट आहेत)
- (२) जागतिक आरोग्य संघटनेच्या विविध मुद्द्यांबाबतच्या मार्गदर्शक सूचना. सदर सूचना
रुग्णोपचार व्यवस्थापन, घरगुती काळजी, जैव वैद्यकीय कचऱ्याची सुयोग्य विल्हेवाट आणि
ऑपरेशनल लॉजिस्टिक्स संदर्भातील करोना विषाणू प्रतिबंध व नियंत्रणासाठी उपयुक्त
ठरणार आहेत.
- (३) आयसीएमआर या संस्थेने निर्गमित केलेल्या प्रयोगशाळा विषयक सूचना




आपणांस सुचित करण्यात येते की, १०४ आरोग्य सल्ला व संपर्क केंद्राला संपर्क साधणाऱ्या जनतेला वरील मार्गदर्शक सुचनानुसार कोरोना विषाणू संसर्ग टाळण्याकरिता सल्ला व मार्गदर्शन करण्यात यावे.



(डॉ. अर्चना पाटील)
संचालक आरोग्य सेवा, पुणे

प्रत सविनय सादर:

मा. आयुक्त आरोग्य सेवा तथा अभियान संचालक, राष्ट्रीय आरोग्य अभियान, मुंबई
मा. प्रधान सचिव, सार्वजनिक आरोग्य विभाग, गो.ते. रुग्णालय आवार, मुंबई

	महाराष्ट्र शासन, आरोग्य सेवा संचालनालय, पुणे कार्यालय	
संचालक दूरध्वनी क्रमांक कार्यालय दूरध्वनी क्र.	२६१२२२५६ (वै.) २६१२२५०८ (कार्या) २६११९५७८ (कार्या)	संचालक, आरोग्य सेवा, आरोग्य सेवा संचालनालय, मध्यवर्ती इमारत, पुणे ४११ ००१ (महाराष्ट्र राज्य) Email ID : dhspune1@gmail.com
आरोग्य सेवा		जाक्रं.संआसे/संचालक कक्ष/आय.डी.एच. रुग्णालये/ पूर्वतयारी/ 1421-27 /२०२०, दि. 22/०१/२०२०

प्रति,

- १) कार्यकारी आरोग्य अधिकारी, बृन्हमुंबई महानगरपालिका, मुंबई
- २) आरोग्य अधिकारी, पुणे महानगरपालिका, पुणे

विषय:- चीनमध्ये नवीन कोरोना विषाणूचे रुग्ण सापडल्याच्या पार्श्वभूमीवर आपल्या अधिनस्त आय.डी.एच. रुग्णालयामध्ये पूर्वतयारी करणेबाबत.

संदर्भ:- मा.सचिव, आरोग्य व कु.क., भारत सरकार यांचे पत्र दि. १७/१/२०२०

उपरोक्त संदर्भित विषयानुसार सध्या चीनमध्ये नवीन कोरोना विषाणूचे (n CoV) रुग्ण आढळले असून, जपान व थायलंड या देशांनीही या आजाराचे रुग्ण नोंदवले आहेत. मा.सचिव, आरोग्य व कु.क., भारत सरकार यांच्या उपरोक्त पत्रानुसार दि. १८/१/२०२० पासून मुंबई आंतरराष्ट्रीय विमानतळासह देशातील ३ विमानतळावर बाधित देशांमधून येणाऱ्या प्रवाशांचे स्क्रीनिंग सुरु करण्यात आले आहे. या स्क्रीनिंगमधून आढळलेले संशयित रुग्ण विलगीकरण कक्षांमध्ये भरती करण्याची आवश्यकता भासणार आहे.

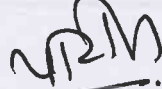
या दृष्टीने आपल्या अधिनस्त असणाऱ्या आय.डी.एच. रुग्णालयांमध्ये- कस्तुरबा रुग्णालय, मुंबई व नायडू रुग्णालय, पुणे येथे आवश्यक पूर्वतयारी करणे आवश्यक आहे. या पूर्वतयारीसाठी आपल्या माहितीस्तव जागतिक आरोग्य संघटनेने दिलेल्या तसेच सार्वजनिक आरोग्य विभागाच्या वतीने देण्यात आलेल्या मार्गदर्शक सूचना सोबत जोडल्या आहेत.

- १) संशयित रुग्ण व्याख्या.
- २) प्रयोगशाळा विषयक मार्गदर्शक सूचना.
- ३) रुग्णोपचार व्यवस्थापन मार्गदर्शक सूचना.
- ४) संसर्ग प्रतिबंध व नियंत्रण मार्गदर्शक सूचना.
- ५) सार्वजनिक आरोग्य विभागाच्या मार्गदर्शक सूचना.

कृपया मागे पहा...

या अनुषंगाने आपण सार्वजनिक आरोग्य विभाग तसेच विमानतळ आरोग्य अधिकाऱ्यांशी नियमित समन्वय ठेवावा आणि आपण केलेल्या कार्यवाहीबाबत या कार्यालयास वेळोवेळी अवगत करावे.

सुयोग्य आणि परिणामकारक समन्वयासाठी डॉ. प्रदीप आवटे, राज्य सर्वेक्षण अधिकारी, आय.डी.एस.पी. (०२०-२९७९००६६/९४२३३३७५५६) आणि डॉ. पाशी विमानतळ आरोग्य अधिकारी (९८६७१२०७१०) यांच्याशी नियमित संपर्कात रहावे.


(~~डॉ.~~ अर्चना पाटील)

संचालक, आरोग्य सेवा, पुणे-१

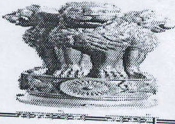


प्रत योग्य त्या कार्यवाहीस्तव :-

- १) सहसंचालक, आरोग्य सेवा, (हि.ह.व ज.रो.) पुणे-१
- २) राज्य सर्वेक्षण अधिकारी, आय.डी.एस.पी. पुणे-१

प्रत सस्नेह :- संचालक, आरोग्य सेवा, मुंबई

प्रत सविनय सादर :-

- १) मा.आयुक्त, आरोग्य सेवा तथा अभियान संचालक, रा.आ.अ., मुंबई-१
- २) मा.प्रधान सचिव, सार्वजनिक आरोग्य विभाग, मंत्रालय, मुंबई.

	महाराष्ट्र शासन, आरोग्य सेवा संचालनालय, पुणे कार्यालय	
संचालक दूरध्वनी क्रमांक कार्यालय दूरध्वनी क्र.	२६१२२२५६ (वै.) २६१२२५०८ (कार्या) २६११९५७८ (कार्या)	संचालक, आरोग्य सेवा, आरोग्य सेवा संचालनालय, मध्यवर्ती इमारत, पुणे ४११ ००१ (महाराष्ट्र राज्य) Email ID : dhspune1@gmail.com
आरोग्य सेवा		जाक्रं.संआसे/साथरोग कक्ष-५८/कोरोना /प्रति.वनियंत्रण/२०२० दि. ३०/०१/२०२० 2015-165

प्रति,

जिल्हा शल्य चिकित्सक, जिल्हा रुग्णालय,.....(सर्व)

जिल्हा आरोग्य अधिकारी, जिल्हा परिषद,..... (सर्व)

विषय : कोरोना प्रतिबंध व नियंत्रण संदर्भातील उपाययोजना

संदर्भ : १) महाराष्ट्र साथरोग प्रतिबंध व नियंत्रण समिती बैठक
दिनांक २७/१/२०२० मधील निर्णय.
२) या कार्यालयाचे पत्र दिनांक २२/१/२०२० (मार्गदर्शक सूचना)

सध्या चीनमध्ये कोरोना विषाणू आजाराचा उद्रेक सुरु आहे. चीन व्यतिरिक्त इतर १४ देशांमध्येही या आजाराचे रुग्ण आढळले आहेत. या पार्श्वभूमीवर या आजाराचा प्रवेश भारतात होऊ नये यासाठी आंतरराष्ट्रीय विमानतळावर बाधित देशातून येणाऱ्या प्रवाशांचे स्क्रीनिंग तसेच या प्रवाशांचे २८ दिवसांकरिता पाठपुरावा, लक्षणे आढळलेल्या प्रवाशांचे विलगीकरण आणि प्रयोगशाळा तपासणी इ. उपाययोजना सुरु आहेत. यापूर्वीही याबाबत वेळोवेळी सूचना देण्यात आल्या आहेतच. या अनुषंगाने पुढीलप्रमाणे सूचना देण्यात येत आहेत.

१. कोरोना प्रतिबंध व नियंत्रणासाठी जिल्हा पातळीवर जिल्हा शल्य चिकित्सक हे नोडल अधिकारी म्हणून काम पाहतील व त्यांच्या मदतीला जिल्हा सर्वेक्षण अधिकारी, एकात्मिक रोग सर्वेक्षण कार्यक्रम हे सहाय्यक अधिकारी म्हणून काम पाहतील.

२. प्रत्येक जिल्हा रुग्णालयात किमान ४ खाटांचा विलगीकरण कक्ष स्थापन करण्यात यावा.

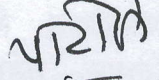
३. जिल्हा सर्वेक्षण अधिकारी यांनी दररोज सकाळी ९.०० वाजता व संध्याकाळी ५.०० वाजता त्यांच्या जिल्ह्याच्या जिल्हा रुग्णालय/वैद्यकीय महाविद्यालयाच्या विलगीकरण कक्षाला भेट द्यावी व नव्याने संशयित रुग्ण दाखल झाले असल्यास त्याबद्दल माहिती घ्यावी.

४. ज्या प्रवाशांना कोरोनासारखी लक्षणे आढळतील त्यांना विलगीकरण कक्षात भरती करणे आवश्यक आहे. अशा रुग्णांचा Throat Swab घेण्यात यावा व National Institute of Virology, Pune येथे तपासणीसाठी पाठवावा. याबाबतच्या सविस्तर सूचना यापूर्वीच देण्यात आल्या आहेत. अशा भरती केलेल्या रुग्णांना जिल्हा सर्वेक्षण अधिकारी यांनी सकाळी ९ व दुपारी ४ वाजता भेट द्यावी. या बाबतची माहिती सोबत जोडलेल्या विहित नमुना (Form-1) नुसार दररोज दोन्ही वेळेला Update करून ०२०-२६१२७३९४ या राज्य नियंत्रण कक्षाच्या दूरध्वनी क्रमांकावर तसेच ईमेल द्वारेही कळवावी.

५. आपल्या भागात जे प्रवासी कोरोना बाधीत भागातून आले आहेत व ज्यांना कोणतीही लक्षणे नाहीत त्यांचा बाधीत भागातून आलेल्या तारखेपासून पुढील २८ दिवस दूरध्वनीवर पाठपुरावा करावा व त्यांची माहिती प्रपत्र-अ (सोबत जोडले आहे) मध्ये भरून दैनंदिन स्वरूपात पाठवावी. ही जबाबदारी जिल्हा सर्वेक्षण अधिकारी यांची राहिल. रोज सकाळी १० वाजेपर्यंत प्रपत्र अ हे ssumaharashtra@gmail.com या ईमेलवर पाठवावे. याबाबतची शहरी भागातील जबाबदारी आरोग्य अधिकारी, मनपा यांची राहिल मात्र त्यांचेशी समन्वय ठेवून त्यांचा दैनंदिन अहवाल जिल्हा शल्य चिकित्सक यांनी प्राप्त करून घ्यावा.

६. राज्य स्तरावरून आपणांस पाठविण्यात आलेल्या सर्व मार्गदर्शक सूचना शासकीय आरोग्य संस्थेसोबतच आयएमए, आपी, निमा अशा डॉक्टरांच्या संस्थांच्या माध्यमातून सर्व खाजगी डॉक्टरांना मिळतील याची खातरजमा करावी.

वरील मार्गदर्शक सूचनांची अंमलबजावणी तत्परतेने व्हावी व अनुपालन अहवाल या कार्यालयास पाठवावा.


(डॉ. अर्चना पाटील)
संचालक, आरोग्य सेवा, पुणे

प्रत माहितीसाठी व योग्य त्या कार्यवाहीस्तव -

- १) जिल्हा सर्वेक्षण अधिकारी (सर्व)
- २) आरोग्य अधिकारी, महानगरपालिका (सर्व)
- ३) उपसंचालक आरोग्य सेवा, प्रभारी मंडळे (सर्व)

प्रत माहितीस्तव सविनय सादर -

- १) मा. आयुक्त आरोग्य सेवा तथा अभियान संचालक, राष्ट्रीय आरोग्य अभियान, मुंबई.
- २) मा. प्रधान सचिव, सार्वजनिक आरोग्य विभाग, मंत्रालय, मुंबई

Specimen Collection, Packaging and Transport Guidelines for 2019 novel Coronavirus (2019-nCoV)

Title: Specimen Collection, Packaging and Transport Guidelines for 2019 Novel Coronavirus (2019-nCoV)	SOP number: ICMR-NIV/2019-nCoV/Specimens_01 Prepared by: Dr. Y.K. Gurav Date: 19/01/2020 Reviewed by: Dr. V. Potdar Date: 20/01/2020 Approved by: Dr. P. Abraham Date: 20/01/2020
--	---

Scope:

To be used by the Government health authorities/ hospitals/ clinicians/ laboratories planning to collect appropriate clinical samples as indicated for diagnosis of 2019-nCoV.

Purpose:

This document describes the information for collection, packaging and transport of clinical specimens to Influenza group at ICMR-National Institute of Virology (NIV), Pune, Maharashtra for diagnosis of 2019 Novel Coronavirus (2019-nCoV)

Responsibilities:

- The clinician should decide necessity for collection of clinical specimens for laboratory testing of 2019-nCoV only after following the case definition as given by the health authorities, Government of India.
- Appropriate clinical sample need to be collected by laboratory personnel/ health care worker trained in specimen collection in presence of a clinician.
- By following all biosafety precautions and using personal protective equipment (PPEs), clinical samples need to be sent to the designated laboratory (ICMR-NIV, Pune) by following standard triple packaging.

Selection of patient:

Any person who presents with Severe Acute Respiratory Illness (SARI) AND any one of the following i.e. a history of travel from Wuhan, China in 14 days prior to symptoms onset; disease in healthcare worker working in an environment of SARI patients; unusual or unexpected clinical course, especially sudden deterioration despite appropriate treatment; should be urgently investigated. Updated case definition need to be followed as per MOHFW, Govt of India which is available on the website www.mohfw.gov.in

Specimen collection details:

(Adapted from the WHO guidelines on 2019-nCoV):

Specimen type	Collection materials	Transport to laboratory	Storage till testing	Comment
Nasopharyngeal and oropharyngeal swab	Dacron or polyester flocked swabs*	4 °C	≤5 days: 4 °C >5 days: -70 °C	The nasopharyngeal and oropharyngeal swabs should be placed in the same tube to increase the viral load.
Bronchoalveolar lavage	sterile container*	4 °C	≤48 hours: 4 °C >48 hours: -70 °C	There may be some dilution of pathogen, but still a worthwhile specimen
Tracheal aspirate, nasopharyngeal aspirate or nasal wash	sterile container*	4 °C	≤48 hours: 4 °C >48 hours: -70 °C	Not applicable
Sputum	sterile container	4 °C	≤48 hours: 4 °C >48 hours: -70 °C	Ensure the material is from the lower respiratory tract
Tissue from biopsy or autopsy including from lung	sterile container with saline	4 °C	≤24 hours: 4 °C >24 hours: -70 °C	Autopsy sample collection preferably to be avoided
Serum (2 samples – acute and convalescent)	Serum separator tubes (adults: collect 3-5 ml whole blood)	4 °C	≤5 days: 4 °C >5 days: -70 °C	Collect paired samples: • acute – first week of illness • convalescent – 2 to 3 weeks later

*For transport of samples for viral detection, use VTM (viral transport medium) containing antifungal and antibiotic supplements. Avoid repeated freezing and thawing of specimens.

Specimen labelling and processing:

- Personal protective equipment (apron, hand gloves, face shield, N95 Masks etc.) need to be used and all biosafety precautions should be followed so as to protect individuals and the environment.
- Proper labelling (name/age/gender/specimen ID) need to be done on specimen container and other details of sender (name/address/phone number) on the outer container by mentioning “To be tested for 2019-nCoV”
- For any queries, the nodal officer from ICMR-NIV Pune (Dr Yogesh K. Gurav, Scientist E) may be contacted (Phone 020-26006290/ 26006390; Email: gurav.yk@gmail.com/gurav.yk@gov.in) and need to be informed in advance before sending specimens to ICMR-NIV, Pune.

Specimen Collection, Packaging and Transport Guidelines for 2019 novel Coronavirus (2019-nCoV)

Requirements for Clinical Samples Collection, Packaging and Transport			
<p>1. Sample vials and Virus Transport Medium (VTM)</p> 	<p>2. Adsorbent material (cotton, tissue paper), paraffin, seizer, cello tape</p> 	<p>3. A leak-proof secondary container (e.g., ziplock pouch, cryobox, 50 mL centrifuge tube, plastic container)</p> 	
<p>4. Hard-frozen Gel Packs</p> 	<p>5. A suitable outer container (e.g., thermocol box, ice-box, hard-board box) (minimum dimensions: 10 x 10 x 10 cm)</p> 		
Procedure for Specimen Packaging and Transport			
<p>1. Use PPE while handling specimen</p> 	<p>2. Seal the neck of the sample vials using parafilm</p> 	<p>3. Cover the sample vials using absorbent material</p> 	<p>4. Arrange primary container (vial) in secondary container</p> 
<p>5. Placing the centrifuge tube inside a zip-lock pouch</p> 	<p>6. Placing the zip-lock pouch inside a sturdy plastic container and seal the neck of the container</p> 	<p>Note: Sample vials can also be placed inside a zip-lock pouch, covered in absorbent material and secured by heat-sealing or rubber bands. Then, the zip-lock pouch should be placed inside another plastic pouch and secured</p>	<p>7. Using a thermocol box as an outer container and placing the secondary container within it, surrounded by hard-frozen gel packs</p> 
<p>7. Using a hard card-board box as an outer container and placing the secondary container and the gel packs</p> 	<p>8. Placing the completed Specimen Referral Form (available on www.niv.co.in) and request letter inside a leak-proof, zip-lock pouch</p> 	<p>9. Securing the zip-lock pouch with the Specimen Referral Form on the outer container</p> 	<p>10. Attaching the labels:</p> <ul style="list-style-type: none"> • Senders' address, contact number; Consignee's address /contact number; • Biological substance- Category B; • 'UN 3373'; Orientation label, Handle with care 
<p>Documents to accompany:</p> <p>1) Packaging list/proforma Invoice 2) Air way bill (for air transport) (to be prepared by sender or shipper) 3) Value equivalence document (for road/rail/sea transport) [Note: 1. A vaccine-carrier/ice-box can also be used as an outer container 2. The minimum dimensions of the outer container should be 10 x 10 x 10 cm (length x width x height)]</p>			
<p>Routing of samples:</p> <ul style="list-style-type: none"> • Clinical specimens, official documents and Specimen request forms for testing of 2019-nCoV need to be sent to the ICMR-NIV address (The Director, ICMR-National Institute of Virology, 20-A, Dr Ambedkar Road, Pune, Maharashtra, Pin: 4110001). • For shipment-related queries/information, kindly contact Dr Sumit Bhargadwaj (Scientist B, Influenza Group) on email: sumitduttbhardwaj@gmail.com, phone 020-26006290/26006390 			

ICMR- National Institute of Virology, Pune
Specimen Referral Form for 2019 Novel Coronavirus (2019-nCoV)

INSTRUCTIONS:

- Inform the local / district / state health authorities, especially surveillance officer for further guidance.
- Seek guidance on requirements for the clinical specimen collection and transport from nodal officer.
- This form may be filled in and shared with the IDSP and also ICMR-NIV nodal officer in advance.

PERSON DETAILS

Name of patient:	Age:.....Yr.....Month Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>
Address:	Date of birth:/...../..... (dd/mm/yyyy)
City:	Mobile/phone:
State:	Email:

EXPOSURE HISTORY (2 WEEKS BEFORE THE ONSET OF SYMPTOMS)

Recent stay/travel in area (Wuhan, China): Yes ☐ No ☐ If yes, stay/travel duration with date
 History of visit to wet/seafood market: Yes ☐ No ☐ From:...../...../..... to:...../...../.....
Close contact with confirmed case Yes ☐ NO ☐ Close contact with animal/birds Yes / N
 Recent travel to any other country Yes ☐ NO ☐ Travel place:
Health care worker working in hospital involved in managing patients YES / NO,
 Hospitalization date:/...../..... Discharge date:/...../.....

CLINICAL SYMPTOMS AND SIGNS

Date of onset of symptoms:/...../.....		First symptom:						
Symptoms	Yes	No	Symptoms	Yes	No	Symptoms	Yes	No
Fever (<7 days)	<input type="checkbox"/>	<input type="checkbox"/>	Cough	<input type="checkbox"/>	<input type="checkbox"/>	Diarrhoea	<input type="checkbox"/>	<input type="checkbox"/>
History of fever (< 7 days)	<input type="checkbox"/>	<input type="checkbox"/>	Breathlessness	<input type="checkbox"/>	<input type="checkbox"/>	Nausea	<input type="checkbox"/>	<input type="checkbox"/>
Chest pain	<input type="checkbox"/>	<input type="checkbox"/>	Sore throat	<input type="checkbox"/>	<input type="checkbox"/>	Body-ache	<input type="checkbox"/>	<input type="checkbox"/>
			Sputum	<input type="checkbox"/>	<input type="checkbox"/>	Nasal discharge	<input type="checkbox"/>	<input type="checkbox"/>
Signs	Yes	No	Sign	Yes	No	Sign	Yes	No
Wheeze	<input type="checkbox"/>	<input type="checkbox"/>	Stridor	<input type="checkbox"/>	<input type="checkbox"/>	Lower chest indrawing	<input type="checkbox"/>	<input type="checkbox"/>
Nasal flaring	<input type="checkbox"/>	<input type="checkbox"/>	Crepitation	<input type="checkbox"/>	<input type="checkbox"/>	Accessory muscle use	<input type="checkbox"/>	<input type="checkbox"/>

UNDERLYING MEDICAL CONDITIONS

Condition	Yes	No	Condition	Yes	No	Condition	Yes	No
COPD	<input type="checkbox"/>	<input type="checkbox"/>	Bronchitis	<input type="checkbox"/>	<input type="checkbox"/>	Diabetes	<input type="checkbox"/>	<input type="checkbox"/>
Chronic renal disease	<input type="checkbox"/>	<input type="checkbox"/>	Malignancy	<input type="checkbox"/>	<input type="checkbox"/>	Heart disease	<input type="checkbox"/>	<input type="checkbox"/>
						Asthma	<input type="checkbox"/>	<input type="checkbox"/>

IMMUNOCOMPROMISED CONDITION: YES / NO Other:

HOSPITALIZATION, TREATMENT AND INVESTIGATION

HOSPITALIZATION date:/...../.....	DIAGNOSIS:							
DIFFERENTIAL DIAGNOSIS:	ETIOLOGY IDENTIFIED:							
ATYPICAL PRESENTATION: YES / NO	UNUSUAL / UNEXPECTED COURSE: YES / NO							
Outcome: Discharge / Death /	OUTCOME date:/...../.....							
Treatment	Yes	No	Treatment	Yes	No	Treatment	Yes	No
Antibiotics	<input type="checkbox"/>	<input type="checkbox"/>	Ventilation	<input type="checkbox"/>	<input type="checkbox"/>	Antivirals	<input type="checkbox"/>	<input type="checkbox"/>
Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	CPAP	<input type="checkbox"/>	<input type="checkbox"/>	Steroids	<input type="checkbox"/>	<input type="checkbox"/>
						Other:.....		

Investigation findings: Haematocrit: Hb: WBC (leukocyte count):
 Differential Leukocyte count: Lymphocytes (%): Monocytes (%): Neutrophils (%):
 Basophils (%): Eosinophil (%): Platelet (Thrombocyte) count: ESR:

Investigation details: Chest X ray: Yes ☐ No ☐ , If yes (findings):
 Blood culture findings (If any):
 Other investigation details:

SPECIMEN INFORMATION FROM REFERRING AGENCY

Specimen type	Collection date	Label	FOR* ICMR- NIV →	Specimen ID	Test performed	Result
1.						
2.						

Name of Doctor: Hospital Name/address:
 Phone/mobile number: Signature and date:

ICMR- National Institute of Virology, Pune
Specimen Referral Form for 2019 Novel Coronavirus (2019-nCoV)

CASE DEFINITION

1. Severe Acute Respiratory Illness (SARI), with

- history of fever YES / NO
- cough YES / NO
- requiring admission to hospital YES / NO

WITH

- no other etiology explains the clinical presentation YES / NO
(clinicians should also be alert to the possibility of atypical presentations in patients who are immunocompromised);

AND

any of the following

- A history of travel to Wuhan, Hubei Province China in the 14 days prior to symptom onset. YES / NO
- the disease occurs in a health care worker who has been working in an environment where patients with severe acute respiratory infections are being cared for, without regard to place of residence or history of travel YES / NO
- the person develops an unusual or unexpected clinical course, especially sudden deterioration despite appropriate treatment, without regard to place of residence or history of travel, even if another etiology has been identified that fully explains the clinical presentation. YES / NO

2. Individuals with acute respiratory illness of any degree of severity who, within 14 days before onset of illness, had any of the following exposures:

- close physical contact with a confirmed case of nCoV infection, while that patient was symptomatic; YES / NO
- a healthcare facility in a country where hospital associated nCoV infections have been reported; YES / NO
- direct contact with animals (if animal source is identified) in countries where the nCoV is known to be circulating in animal populations or where human infections have occurred as a result of presumed zoonotic transmission*. YES / NO

*** To be added once/if animal source is identified as a source of infection**

Surveillance case definitions for human infection with novel coronavirus (nCoV)

Interim guidance v2

15 January 2020

[WHO/2019-nCoV/Surveillance/v2020.2](#)



This document summarizes WHO recommendations for surveillance of the novel coronavirus (nCoV) recently identified in Wuhan, China (2019-nCoV). WHO will update these recommendations as new information becomes available on the situation.

This interim guidance was adapted from WHO's guidance materials published for Middle East Respiratory coronavirus (MERS-CoV) and will be updated regularly.

Surveillance

Objectives of surveillance

The primary objectives of surveillance are to:

1. Detect cases/clusters of nCoV infection and any evidence of amplified or sustained human-to-human transmission;
2. Determine risk factors and the geographic risk area for infection with the virus.

Additional clinical and epidemiological investigations are needed to:

1. Determine key clinical characteristics of the illness, such as incubation period, spectrum of disease, and the clinical course of the disease.
2. Determine key epidemiological characteristics of nCoV infection, such as exposures that result in infection, risk factors, secondary attack rates, and modes of transmission.

The following people should be investigated and tested for nCoV infection

Case definitions for surveillance

3. Severe acute respiratory infection (SARI) in a person, with history of fever and cough requiring admission to hospital, with no other etiology that fully explains the clinical presentation¹ (clinicians should also be alert to the possibility of atypical presentations in patients who are immunocompromised);

AND any of the following:

- a. a history of travel to or a person who lived in Wuhan, Hubei Province China in the 14 days prior to symptom onset; or
 - b. the disease occurs in a health care worker who has been working in an environment where patients with severe acute respiratory infections are being cared for, without regard to place of residence or history of travel.
2. The person develops an unusual or unexpected clinical course, especially sudden deterioration despite appropriate treatment, without regard to place of residence or history of travel, even if another etiology has been identified that fully explains the clinical presentation.
 3. A person with acute respiratory illness of any degree of severity who, within 14 days before onset of illness, had any of the following exposures:
 - a. close physical contact² with a confirmed case of nCoV infection; or
 - b. a healthcare facility in a country where hospital-associated nCoV infections have been reported; or
 - c. visiting or working in a live animal market in Wuhan, China
 - d. [direct contact with animals (if animal source is identified) in countries where the nCoV is known to be circulating in animal populations or where human infections have occurred as a result of presumed zoonotic transmission.]³

© World Health Organization 2020. All rights reserved.

This is a draft. The content of this document is not final, and the text may be subject to revisions before publication. The document may not be reviewed, abstracted, quoted, reproduced, transmitted, distributed, translated or adapted, in part or in whole, in any form or by any means without the permission of the World Health Organization.

¹ Testing should be according to local guidance for management of community-acquired pneumonia. Examples of other etiologies include *Streptococcus pneumoniae*, *Haemophilus influenzae* type B, *Legionella pneumophila*, other recognized primary bacterial pneumonias, influenza viruses, and respiratory syncytial virus.

²Close contact¹ is defined as:

- Health care associated exposure, including providing direct care for nCoV patients, working with health care workers infected with nCoV,

visiting patients or staying in the same close environment of a nCoV patient.

- Working together in close proximity or sharing the same classroom environment with a nCoV patient
- Traveling together with nCoV patient in any kind of conveyance
- Living in the same household as a nCoV patient

The epidemiological link may have occurred within a 14-day period before or after the onset of illness in the case under consideration.

³ To be added once/if animal source is identified as a source of infection

Global Surveillance for human infection with novel coronavirus (2019-nCoV)

Interim guidance

21 January 2020

WHO/2019-nCoV/SurveillanceGuidance/2020.3



Background

This document summarizes WHO's interim guidance for global surveillance of novel coronavirus infection (2019-nCoV). WHO will continue to update this guidance as new information about 2019-nCoV becomes available.

Updated information about 2019-nCoV can be found here along with other guidance documents.

<https://www.who.int/health-topics/coronavirus>

Purpose of this document

This guidance is for global surveillance of 2019-nCoV for Member States and is intended to:

- help Member States adapt existing surveillance mechanisms or implement new surveillance mechanisms for 2019-nCoV.
- facilitate the reporting of 2019-nCoV cases to WHO for the purpose of global surveillance.

Objectives

The objectives of this global surveillance guidance are to:

- Provide a mechanism for all Member States to report cases of 2019-nCoV to WHO
- Establish the basic epidemiological parameters of 2019-nCoV infection
 - Person, place, and time of cases
 - Basic clinical presentation (signs and symptoms)
 - Underlying conditions and co-morbidities
 - Patient clinical course, outcome and severity
 - Exposures and travel history

The information obtained for surveillance activities are also expected to inform national risk assessment and response decision making.

¹ clinicians should also be alert to the possibility of atypical presentations in patients who are immunocompromised;

²: Close contact² is defined as:

- Health care associated exposure, including providing direct care for nCoV patients, working with health care workers infected with novel coronavirus, visiting patients or staying in the same close environment as a nCoV patient.

Case definitions for surveillance

The case definitions are based on the current information available and may be revised as new information accumulates. Countries may need to adapt case definitions depending on their own disease situation.

Suspect case

A. Patients with severe acute respiratory infection (fever, cough, and requiring admission to hospital), **AND** with no other etiology that fully explains the clinical presentation¹ **AND** at least one of the following:

- a history of travel to or residence in the city of Wuhan, Hubei Province, China in the 14 days prior to symptom onset, **or**
- patient is a health care worker who has been working in an environment where severe acute respiratory infections of unknown etiology are being cared for.

B. Patients with any acute respiratory illness **AND** at least one of the following:

- close contact² with a confirmed or probable case of 2019-nCoV in the 14 days prior to illness onset, **or**
- visiting or working in a live animal market in Wuhan, Hubei Province, China in the 14 days prior to symptom onset, **or**
- worked or attended a health care facility in the 14 days prior to onset of symptoms where patients with hospital-associated 2019-nCoV infections have been reported.

Probable case

Probable case: A suspect case for whom testing for 2019-nCoV is inconclusive³ or for whom testing was positive on a pan-coronavirus assay.

Confirmed case

A person with laboratory confirmation of 2019-nCoV infection, irrespective of clinical signs and symptoms.

- Working together in close proximity or sharing the same classroom environment with a nCoV patient
- Traveling together with a nCoV patient in any kind of conveyance
- Living in the same household as a nCoV patient

The epidemiological link may have occurred within a 14-day period before or after the onset of illness in the case under consideration.

³ Inconclusive being the result of the test reported by the laboratory.

Link for lab page: <https://www.who.int/health-topics/coronavirus/laboratory-diagnostics-for-novel-coronavirus>

Recommendations for laboratory testing

Any suspected case should be tested. However, depending on the epidemiological situation and laboratory capacity, each country will need to adapt the testing strategy and eventually test more broadly to better assess the full extent of the circulation of the virus.

Recommendations for specimen collection

Lower respiratory specimens likely have a higher diagnostic value than upper respiratory tract specimens for detecting 2019-nCoV infection. WHO recommends that lower respiratory specimens such as sputum, endotracheal aspirate, or bronchoalveolar lavage be collected for 2019-nCoV testing, where possible. If patients do not have signs or symptoms of lower respiratory tract disease or if specimen collection for lower respiratory tract disease is clinically indicated but the collection is not possible, upper respiratory tract specimens such as a nasopharyngeal aspirate or combined nasopharyngeal and oropharyngeal swabs should be collected.

Surveillance for human infection with a novel coronavirus: Interim guidance

If initial testing is negative in a patient who is strongly suspected to have 2019-nCoV infection, the patient should be resampled and specimens collected from multiple respiratory tract sites (nose, sputum, endotracheal aspirate). Additional specimen may be collected such as blood, urine, and stool, to monitor the presence of virus of and shedding of virus from different body compartments.

When serological assays become available, WHO recommends that a paired acute and convalescent sera for antibody detection should also be collected where possible.

Public Health Actions

Minimum Reporting

WHO requests that national authorities report probable and confirmed cases of novel coronavirus infection **within 24 hours** of identification, by providing the minimum data set outlined in the “[Interim case reporting form for 2019 Novel Coronavirus of confirmed and probable cases](#)”, through the National Focal Point and the Regional Contact Point for International Health Regulations at the appropriate WHO regional office. A [template for the line listing](#) in Excel format with [the data dictionary](#), which suggests the name of the variables and their specifications is available.

© World Health Organization 2020. All rights reserved. This is a draft. The content of this document is not final, and the text may be subject to revisions before publication. The document may not be reviewed, abstracted, quoted, reproduced, transmitted, distributed, translated or adapted, in part or in whole, in any form or by any means without the permission of the World Health Organization.

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection

Version: 1.1
Date: 25 January 2020



Household transmission investigation protocol for 2019-novel coronavirus infection

Protocol summary.....	3
1 Background	4
1.1 Objectives	5
2 Study procedures.....	6
2.1 Study design.....	6
2.2 Study population.....	6
2.3 Exclusion criteria	6
2.4 Study duration.....	7
2.5 Data collection	7
2.6 Follow up of cases and contacts.....	7
2.7 Specimen collection.....	9
2.8 Specimen transport	10
2.9 Ethical considerations.....	10
3 Laboratory testing	11
4 Statistical analyses	11
4.1 Sample size	11
4.2 Epidemiological parameters	12
5 Reporting of findings	15
5.1 Reporting	15
6 References.....	16
6.1 References for 2019-nCoV	16
7 Acknowledgments.....	17
Appendices	18
Appendix A: Sample questionnaires - Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection.....	18

Protocol summary

Household transmission investigation protocol for 2019-novel coronavirus infection	
Study population	All household contacts of a confirmed 2019-nCoV case
Potential output and analysis	<p>Transmissibility in household settings</p> <p>Estimates of:</p> <ul style="list-style-type: none"> • Secondary Infection rate (SIR) among close contacts and factors associated with secondary infection • Range of clinical presentation, risk factors for infection, and the extent and fraction of asymptomatic infections • Serologic response following confirmed 2019-nCoV infection <p>Epidemiological modeling parameters:</p> <ul style="list-style-type: none"> • Reproduction numbers: R_0 and R • Serial intervals specific to household setting • Incubation period • Infection attack rates
Study design	Prospective study of household contacts of confirmed 2019-nCoV cases, ideally before widespread community transmission occurs
Study duration	At a minimum, enrolled household contacts will complete four home visits within 28 days of enrolment/follow-up
Minimum information and specimens to be obtained from participants	<p>Data collection: Epidemiological data including: clinical symptoms, exposures, including contact with confirmed case.</p> <p>Specimens: Respiratory (and other) to diagnose current 2019-nCoV infection, serum to inform seroepidemiological inferences</p>

1 Background

The detection and spread of an emerging respiratory pathogen are accompanied by uncertainty over the key epidemiological, clinical and virological characteristics of the novel pathogen and particularly its ability to spread in the human population and its virulence (case-severity). This is the case for the novel coronavirus (2019-nCoV), first detected in Wuhan city, China in December 2019 (1).

Closed settings, such as the household, have a defined population that do not mix readily with the larger surrounding community, and therefore such settings provide a strategic way to track emerging respiratory infections and characterize virus transmission patterns because the denominator can be well defined. Also, exposure is within the setting, and follow-up of household contacts is generally more feasible in this well-defined setting as compared to an undefined one. Household setting studies allow us to determine transmission dynamics (reproduction number and serial interval) of the virus as well as to understand the clinical spectrum of illness in secondary cases (2). Closed settings are also useful to observe chains of transmission in an epidemic as the pool of susceptible, exposed individuals is larger. Therefore, in the case of multiple waves of infection through the closed setting, unique insight into transmission dynamics can be derived in the early epidemic stages.

To date initial surveillance has focused primarily on patients with severe disease, and, as such, the full spectrum of the disease, including the extent and fraction of mild or asymptomatic infection that do not require medical attention are not clear. Infections identified in close contacts may potentially be generalizable to naturally-acquired infections (in contrast to cases presenting for emergency care among which there would be fewer mild cases). Following close contacts with similar levels of exposure to infection from primary cases can also permit identification of the asymptomatic fraction. Principally, follow-up and testing of respiratory specimens and serum of close contacts can provide useful information about newly identified cases, as well as the spectrum of illness and frequency (by for example age) of asymptomatic and symptomatic infection.

With the emergency of a novel coronavirus, initial seroprevalence in the population will be low due to the virus being new in origin. Therefore, surveillance of antibody seroprevalence in a population can allow inferences to be made about the cumulative incidence of infection in the population. Household transmission studies also can provide the opportunity to follow-up confirmed cases to understand antibody kinetics.

The following protocol has been designed to investigate household transmission of 2019-nCoV in any country in which 2019-nCoV infection has been reported and households are exposed. Each country may need to tailor some aspects of this protocol to align with public health, laboratory and clinical systems, according to capacity, availability of resources and cultural appropriateness. However, using a standardized protocol such as the protocol described below, epidemiological exposure data and biological samples can be systematically collected and shared rapidly in a format that can be easily aggregated, tabulated and analyzed across many different settings globally for timely estimates of 2019-nCoV infection severity and attack rates, as well as to inform public health responses and policy decisions. This is particularly important in the context of a novel respiratory pathogen, such as 2019-nCoV.

Comments for the user's consideration are provided in purple text throughout the document as the user may need to modify methods slightly because of the local context in which this study will be carried out.

1.1 Objectives

There are three primary objectives of this household transmission study:

1. To better understand the extent of transmission within a household by estimating the secondary infection rate¹ for household contacts at an individual level, and factors associated with any variation in the secondary infection risk.
2. To characterize secondary cases including the range of clinical presentation, risk factors for infection, and the extent and fraction of asymptomatic infections.
3. To characterize serologic response following confirmed 2019-nCoV infection (highly encouraged, but optional depending on laboratory capacity and resources)

Household transmission studies provide rich data that can permit evaluation of secondary objectives such as, but not limited to:

1. To estimate the serial interval² in a household setting.
2. To estimate incubation period³, duration of infectiousness⁴ and duration of detected shedding⁵
3. To characterize duration and severity of 2019-nCoV-associated disease.
4. Others (context specific/ optional)

¹ In this context the **secondary infection rate (SIR)** is a measure of the frequency of new cases of 2019-nCoV infection among the household contacts of a primary confirmed case in a defined period of time, as determined by a confirmed 2019-nCoV positive lab result. In simple terms: the proportion of household contacts of a primary case who subsequently become infected with 2019-nCoV

² The **serial interval** is defined as the period of time from the onset of symptoms in the primary case to the onset of symptoms in a contact case.

³ **Incubation period** is defined as the period of time between an exposure resulting in infection and the onset of clinical symptoms of disease.

⁴ The **duration of infectiousness** is the time which virus is shed and able to be transmitted regardless of clinical symptoms

⁵ It is currently not known how long **detectable 2019-nCoV virus shedding** lasts; information from this study would help to clarify the duration of shedding among individuals with confirmed infection.

2 Study procedures

2.1 Study design

The household transmission investigation is a case-ascertained prospective study of all identified household contacts of a laboratory confirmed 2019-nCoV infection (see 2.2 Study population). It is intended to provide rapid and early information on the clinical, epidemiological and virological characteristics of 2019-nCoV.

This investigation should be conducted following the identification of a laboratory-confirmed 2019-nCoV infection in any country. It should also ideally be conducted before widespread community transmission occurs. That is, within the early phases of an epidemic following the identification of a laboratory confirmed 2019-nCoV infection.

2.2 Study population

The study population is derived from the identification of any laboratory confirmed 2019-nCoV infection. This is distinct from a household cohort study in which a group of disease-free households are recruited and then followed over time. Every effort should be made to include all identified household contacts of cases of a laboratory confirmed 2019-nCoV infection.

For the purpose of this investigation, primary cases will be identified through surveillance of individuals who are diagnosed with laboratory confirmed 2019-nCoV infection. 2019-nCoV case definitions for reporting are available on the [WHO website](#), although they are subject to further updates as more information becomes available.

COMMENT: All WHO guidance material for 2019-nCoV is available on the [WHO website](#). This currently includes case definitions, laboratory guidance, infection prevention and control and travel guidance.

For the purpose of this investigation, a **household** is defined as a group of people (2 or more) living in the same residence. In practice, the technical definition may vary due to social, political and cultural practices.

Definitions of a household which may be used (but are not limited to):

- Two or more people living together in a domestic residence (residential institutions, such as boarding schools, dormitories, hostels or prisons will be excluded).
- A dwelling or group of dwellings with a shared kitchen or common opening onto a shared household space.

For the purpose of this investigation, a **household contact** is defined as a person who has resided in the same household as the primary 2019-nCoV case while the case was symptomatic.

COMMENT: For the purposes of comparability between investigations, it is important that whichever definition of a household contact is well detailed in any reporting on the investigation.

2.3 Exclusion criteria

Households may need to be excluded (or not, if it is possible to tease out the transmission dynamics) if:

- Date of onset is the same for more than one family member

2.4 Study duration

The investigation can continue for as long as is determined feasible by the country implementing the investigation. However, ideally, enrolled household contacts will complete **four home visits within 28 days of enrolment/follow-up**. Specimens, and information on risk factors and symptoms will be collected from primary cases and from each of his/her household contacts. The duration of follow-up may vary depending on further secondary objectives.

Study enrolment **could be extended as far as desired, however** the most valuable period in order to use data for targeted public health action is in the early phases of the epidemic.

2.5 Data collection

Information on primary cases and their close contacts should be sought through a combination of face-to-face or telephone interview of the case (or family members if the case is too ill to be interviewed), household members, self-reporting, interview of health care providers and/or review of medical records where required.

An investigation questionnaire can be found in Appendix 1 of this document. These forms are not exhaustive, but outline the data collection required for insight into the epidemiology of 2019-nCoV and may be updated further. This will still need to be adapted based on the local setting, and outbreak characteristics.

Once a case of 2019-nCoV infection has been identified and recruited into the investigation, a home visit will need to be conducted to identify all eligible household contacts, to collect relevant socio-demographic and clinical information and to allow molecular confirmation of secondary infections and establish baseline antibody status, [\(or at a minimum to collect serum to test seroprevalence once serology capacity is available\)](#).

2.6 Follow up of cases and contacts

For the purposes of this investigation, data and specimens will be collected through home visits from cases and contacts on the day of recruitment (Day 1), followed by home visits on day 7, day 14, and day 28 if possible.

[COMMENT: For surveillance, follow up needs to be more frequent. The specimen collection schedule for the household transmission investigation described here, is added on top of normal follow up of contacts.](#)

For cases, data will be collected using [Form 1a](#) for the first visit, followed by [Forms 2, 3 and 4](#). For contacts, data will be collected using [Form 1b](#) for the first visit, followed by [Forms 2, 3 and 4](#).

Symptom diaries (template available in Appendix 1 of this protocol) will be provided for all household contacts to complete for up to 28 days after the administration of the baseline questionnaire, with a minimum of 14 days, to record presence or absence of various signs or symptoms. A proxy may fill out the symptom diaries on behalf of those unable to complete the form themselves.

Any household contact with clinical symptoms within 14 days of the last exposure/contact with the primary case should be considered as a symptomatic contact and so a possible/suspected case, and therefore managed as such.

The table below provides an overview of the follow-up procedures

	Purpose of form	Collecting from whom?	When should it be collected?
Confirmed cases			
Form 1a	Minimum data reporting form	For confirmed cases	As soon as possible after laboratory confirmation of a case (Day 1)
Forms 2, 3 and 4	Case follow-up forms	For confirmed cases (outcomes)	At home visits (Days 7, 14 and 28) respectively
Household contacts			
Form 1b	Contact data reporting form	For households contacts	As soon as possible, ideally within 24 hours after laboratory confirmation of the primary case (Day 1)
Forms 2, 3 and 4	Contact follow-up forms	For households contacts (outcomes)	At home visits (Days 7, 14 and 28) respectively
Symptom diaries	Record presence or absence of various signs or symptoms.	For confirmed cases (if possible) and households contacts	For up to 28 days after the administration of the baseline questionnaire (Form 1b), with a minimum of 14 days
Confirmed cases and household contacts			
Laboratory results report	Track and summarize all laboratory results (and methods used)	For confirmed cases and households contacts	This table will need to be filled/ updates to at each specimen collection time point above

2.7 Specimen collection

COMMENT: The following is intended to guide minimum specimen collection from confirmed cases and their household contacts. It may be more useful to collect respiratory specimens from study participants at a more frequent interval to provide more detailed insight into the duration of shedding and the serial interval (not just the symptomatic serial interval).

2.7.1 *Confirmed cases*

All baseline respiratory and serum samples (as directed by specimen collection guidance in the country) should be collected from confirmed cases, as soon as possible after laboratory confirmation. Liaise with the relevant local public health laboratory or the nearest relevant laboratory to determine which specimens have already been collected for confirmed cases and if they are of sufficient quality and quantity for this investigation.

Follow-up samples (and other samples) may include upper respiratory tract samples, clotted blood, but also oral fluid, urine, feces and should be collected at a frequency described in Figure 1. Lower respiratory tract samples can also be collected, if feasible but recommended infection prevention and control precautions should be in place prior to collection (see 2.9.3 Prevention of 2019-nCoV infection in investigation personnel). Appropriate PPE should be worn when specimens are being collected from confirmed cases.⁶

2.7.2 *Household contacts*

All baseline upper respiratory specimens (nasopharyngeal/oropharyngeal swab) and serum samples should be collected at the initial home visit. Respiratory specimens should be collected for molecular testing, as well as serum samples for serology, from all members of the household, regardless of symptoms, together with the administration of the baseline questionnaire. At the day 7 and day 14 visits, respiratory samples (and other relevant specimens) will be collected from all members of the household for virologic testing, regardless of symptoms, and at the day 28 visit, serum sample, (and other potentially relevant specimens) could be collected from all household contacts – see Figure 1

Paired serological samples from all household contacts allow for confirmation of seroconversion, and are useful to confirm the secondary-infection attack rate and the proportion of infections that are asymptomatic. They can be taken regardless of symptoms.

Other specimens (as described for confirmed cases) may be collected according to clinical presentation, resources and observed patterns of viral shedding (described earlier) and may be collected by research staff depending on resources, logistics and training.

2.7.3 *Note on serology*

Paired clotted blood samples should be taken for serology and handled and separated correctly by the laboratory. Paired serological samples from confirmed cases are needed to aid the development of serological testing, to determine an accurate secondary-infection attack rate.

Serum samples should be taken on all 2019-nCoV confirmed cases.

- An acute baseline clotted blood sample should be taken as soon as possible, and ideally no later than 7 days after symptom onset.
- A follow up (or convalescent) clotted blood sample should be taken:
 - o at least 14 days after the baseline sample,

⁶ Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care - WHO Guidelines. Geneva, World Health Organization, 2014. Available at http://apps.who.int/iris/bitstream/10665/112656/1/97892_41507134_eng.pdf

- OR 28 days after symptom onset if an acute sample couldn't be taken when the case was symptomatic.

Figure 1: Timeline of data and specimen collection in the household transmission study

Day since recruitment	0 (± 1)	...	7	...	14	...	28
Home visit and data collection							
Respiratory sample		(optional)		(optional)		(optional)	(optional)
Serum sample (dependent on country)			(optional)		Highly encouraged		
Other specimens (if relevant)	(optional- situation dependent)						
Symptom diaries						Highly encouraged	

Legend:

Blue boxes indicate activities which are needed for the study

Light blue boxes indicate when serum collection (or symptom diaries) is highly encouraged, but not essential according to resources and capacity.

Green boxes indicate where additional specimens could be collected above the minimum specimen requirements of this study to increase information available. Please note that this could also include collecting specimens from household contacts when they first become symptomatic.

2.8 Specimen transport

All those involved in collection and transporting specimens should be trained in safe handling practices and spill decontamination procedures. For details regarding the transport of samples collected and infection control advice, please refer to case management algorithm and laboratory guidance in the country or WHO laboratory guidance, available on the [WHO website](#).

For each biological sample collected, the time of collection, the conditions for transportation and the time of arrival at the study laboratory will be recorded. Specimens should reach the laboratory as soon as possible after collection. If the specimen is not likely to reach the laboratory within 72 hours, specimens should be frozen, preferably at -80°C , and shipped on dry ice. It is, however, important to avoid repeated freezing and thawing of specimens. The storage of respiratory and serum specimens in domestic frost-free freezers should be avoided, owing to their wide temperature fluctuations. Serum should be separated from whole blood and can be stored and shipped at 4°C or frozen to -20°C or lower and shipped on dry ice.

Transport of specimens within national borders should comply with applicable national regulations. International transport of specimens should follow applicable international regulations as described in the [WHO Guidance on Regulations for the Transport of Infectious Substances 2013- 2014](#).

2.9 Ethical considerations

Ethical requirements will vary by country. In some countries, this investigation may fall under public health surveillance (emergency response) acts and may not require ethical approval from an Institutional Review Board.

2.9.1 Informed consent

The purpose of the investigation will be explained to all known contacts of a confirmed 2019-nCoV infected patient. Informed consent will be obtained from all cases and contacts willing to participate in the investigation before any procedure is performed as part of the investigation by a trained member of the investigation team. Consent for children under the legal age of consent will be obtained from a parent or legal guardian. Each participant must be informed that participation in the investigation is voluntary and that s/he is free to withdraw, without justification, from the investigation at any time without consequences and without affecting professional responsibilities.

COMMENT: The age of consent may vary by country. Check the requirements of local, regional or national authorities.

Informed consent will seek approval to collect blood, respiratory samples and epidemiological data for the intended purpose of this investigation, that samples may be shipped outside of the country for additional testing and that samples may be used for future research purposes.

2.9.2 Risks and benefits for subjects

This investigation poses minimal risk to participants, involving the collection of a small amount of blood and respiratory specimens. The direct benefit to the participant is the possibility for early detection of 2019-nCoV infection which would allow for appropriate monitoring and treatment. The primary benefit of the study is indirect in that data collected will help improve and guide efforts to understand transmission of 2019-nCoV and prevent further spread of 2019-nCoV.

2.9.3 Prevention of 2019-nCoV infection in investigation personnel

All personnel involved in the investigation need to be trained in infection prevention and control procedures (standard contact, droplet or airborne precautions, as determined by national or local guidelines). These procedures should include proper hand hygiene and the correct use of surgical or respiratory face masks, if necessary, not only to minimize their own risk of infection when in close contact with 2019-nCoV infected patients, but also to minimize the risk of spread among contacts of 2019-nCoV infected patients.

WHO technical guidance on infection prevention and control specific to 2019-nCoV can be found on the [WHO website](#).

3 Laboratory testing

Laboratory guidance for 2019-nCoV can be found on the [WHO website](#).

Several assays that detect the novel coronaviruses detected in Wuhan, China have been recently developed and the protocols or SOPs can also be found on the [WHO website](#).

4 Statistical analyses

4.1 Sample size

This investigation is intended to be implemented to provide rapid and early information on the clinical, epidemiological and virological characteristics of 2019-nCoV. Larger studies will undoubtedly permit more robust analysis of potential factors affecting the secondary infection risk, more precise estimation of the asymptomatic fraction, and more detailed characterization of serologic responses following infection

4.2 Epidemiological parameters

The table below provides an overview of the epidemiological parameters that can be measured as part of this investigation

Parameter	Definition (<i>in bracket: "simplified" expression of it</i>)	Form and questions where to get the data to calculate the parameters concerned	Comments, limitations
Course of disease	A description of the distribution of cases by time, person and place	Form 1: Q3, Q4, Q5 Form 2: Q3 Form 3,4,5	*Location will need to be supplemented by notification data to recognize geospatial trends
Symptomatic proportion of cases (asymptomatic fraction)	The proportion of cases who show symptoms or signs of 2019-nCoV infection	Form 1: Q6 Form 2: Q5 Form 3,4,5 Form 6	*The numerators of interest are the numbers of those contacts reporting various signs and symptoms of infection (e.g. fever, cough) and the number/proportion of those contacts reporting no signs or symptoms (i.e. the asymptomatic fraction); the denominator is the total number of cases.
Secondary infection rate (also called secondary infection incidence)	A measure of the frequency of new cases of 2019-nCoV infection among the close contacts of confirmed cases in a defined period of time (<i>The rate of contacts being infected. Assessed through serological assays on paired samples</i>)	Form 3,4,5	*The numerator will be determined as the number of household contacts with confirmed 2019-nCoV infection, while the denominator will be determined as the total number of household contacts. *represents an overall risk of infection among household contacts for a defined time period.
Clinical presentation	The range of clinical symptoms in cases and contacts. (<i>Severity</i>)	Form 1: Q6 Form 2: Q5	*In-hospital clinical studies will enhance understanding of clinical course, severity and risk determinants, as well as case fatality.
Serological response to infection	Change in serum level of specific antibodies to 2019-nCoV (<i>Increase in titre</i>)	Form 3,4,5	*This will only be able to be calculated with the addition of laboratory data *Will be supplemented by findings of clinical studies and first few outbreak studies to confirm that seroconversion

			following an infection is anticipated
Incubation period	The time period between 2019-nCoV exposure and the appearance of the first sign or symptom of the disease (from infection to disease)	Form 6	
Serial interval distribution	The time between onset of symptoms in the case to onset of symptoms in the close contact	Form 1: Q6 Form 2: Q5 Form 3,4,5 Form 6	*Will be greatly enhanced by information from first few outbreaks where transmission chains may be more identifiable and prolonged
Generation time distribution	Time between infection in the case and infection in the close contact	Form 3,4,5	*Will be greatly enhanced by information from first few outbreaks where transmission chains may be more identifiable and prolonged
Population groups most at risk	Determining the groups who are most vulnerable to 2019-nCoV infection (e.g. age groups, gender, occupation)	Form 1: Q4, Q5 Form 2: Q3, Q4	*May only be an early signal, other sources of information will need to be used to inform decision making (line listing of cases and other clinical case series) *This may be biased from this study, as we are recruiting on the basis of being detected and confirmed to have 2019-nCoV and healthcare seeking behaviour may vary between population groups
Genomic data		Form 3,4,5	*An alternate means to estimate the reproduction number *May supplement other transmission data to inform transmission parameter estimates, although likely to be delayed beyond the initial public health response phase.
Basic reproduction number R_0	A measure of the number of infections produced, on average, by an infected individual in the early stages of the epidemic, when	Form 2: Q5 Form 3,4,5 Form 6	*Can be calculated using different approaches; identifying clusters and cluster size (using epi methods and

	<p>virtually all contacts are susceptible. <i>(average number of infections/disease arising from one infection)</i> Reminder: Basic reproductive ratio (R_0) – everyone is susceptible and there is no control, maximum value that R can take is equal to the transmission potential.</p>		<p>potentially genetic information to identify how many secondary cases are occurring), and using the epidemic curve and how steep it is *R can be calculated using multiple sources of information incident case notifications, incident hospitalisation by age (as a potentially more stable alternative) or genomic data, all of which will be taken together as an estimate of transmissibility.</p>
Reproductive ratio (R)	<p>Ever-changing quantity of the amount of secondary cases produced by a primary case across time and space (i.e. context-specific)</p>	<p>Form 2: Q5 Form 3,4,5 Form 6</p>	<p>*Not the main aim of household transmission studies, but if the study is continued and transformed into a long-term “cohort” study we may be able to calculate it.</p>

5 Reporting of findings

5.1 Reporting

Any investigation of this nature should include reporting on the following information:

- (1) the number of households, the number of household contacts included;
- (2) the number of PCR-confirmed 2019-nCoV cases among the household contacts;
- (3) the number of symptomatic household contacts;
- (4) the number of household contacts with serologic evidence of 2019-nCoV infection. If sample size permits, these numbers should be stratified by age.

It is also important to fully document the study design, including the definition of households and household contacts, the approach to ascertainment of primary cases and secondary cases, the duration of follow-up, and the laboratory methods used to ensure that data can be pooled to increase power in estimating epidemiological parameters.

Ideally, information would be collected in a standardized format according to the questionnaires and tools in this generic protocol to assist with data harmonization and comparison of results (see forms in Appendix A).

If the data is shared by the implementing organization to WHO or any agency or institution providing support for data analysis, data shared will include only the study identification number and not any personally identifiable information.

6 References

1. World Health Organization. Disease Outbreak News: Pneumonia of unknown cause – China https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/?fbclid=IwAR2v89e9lp70O6GTra13FIPHCLw4WJ8kL20Uylx5zZNtWAYYvbR0sEATr_rg (Accessed 22 January 2020)
2. Lau LL, Nishiura H, Kelly H, Ip DK, Leung GM, Cowling BJ. Household transmission of 2009 pandemic influenza A(H1N1): a systematic review and meta-analysis. *Epidemiology* 2012 (in press)

6.1 References for 2019-nCoV

WHO Disease Outbreak News

<https://www.who.int/csr/don/en/>

Surveillance and case definitions

[https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-\(2019-ncov\)](https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-(2019-ncov))

Laboratory guidance

<https://www.who.int/health-topics/coronavirus/laboratory-diagnostics-for-novel-coronavirus>

Clinical management

[https://www.who.int/internal-publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/internal-publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)

Infection prevention and control

[https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected)

Risk communications

[https://www.who.int/publications-detail/risk-communication-and-community-engagement-readiness-and-initial-response-for-novel-coronaviruses-\(-ncov\)](https://www.who.int/publications-detail/risk-communication-and-community-engagement-readiness-and-initial-response-for-novel-coronaviruses-(-ncov))

7 Acknowledgments

This generic protocol was adapted from the protocol entitled “Household Transmission Investigation Protocol for pandemic influenza A(HxNy) in Country X” and “Prospective Study of household transmission of Influenza” by the Consortium for the Standardisation for Influenza Seroepidemiology (CONSISE). CONSISE is a global partnership aiming to develop influenza investigation protocols and standardise seroepidemiology to inform public health policy for pandemic, zoonotic and seasonal influenza. This international partnership was created out of a need, identified during the 2009 H1N1 pandemic, for better (standardised, validated) seroepidemiological data to estimate infection attack rates and severity of the pandemic virus and to inform policy decisions.

WHO staff: Isabel Bergeri, Kaat Vandemaele, Maria Van Kerkhove, Ann Moen, Wenqing Zhang, Aspen Hammond, Julia Fitzner, John Watson, Anne Perrocheau, Yuka Jinnai, Stéphane Huggonnet, Oliver Morgan, Sooyoung Kim, Rebecca Grant and John Watson (US CDC).

Outside WHO, a large number of extra non-WHO individuals were involved in the creation and revision of this protocol as part of the WHO expert working Group on Pandemic Influenza Special Investigation Studies (by alphabetical order). These include: Silke Buda (RK Institute, Germany), Cheryl Cohen (MoH South Africa), Ben Cowling (Hong Kong University, Jeffery Cutter (MoH Singapore), Vernon Lee (MoH Singapore), Rodrigo Fasce (NIC Chile), Gail Garson (GOARN operational support team- Research sub-group chair, United Kingdom), Jean-Michel Heraud (Institut Pasteur de Madagascar), Peter Horby (ISARIC, United Kingdom), Sue Huang (NIC, Institute of Environmental Science and Research, New Zealand), Arunkumar Govindakarnavar (Manipal Institute of Virology Manipal, Academy of Higher Education), Bryan Kim (WHO GOARN operational support team, Switzerland), Vernon Lee (MoH Singapore), Adrian Marcato (University of Melbourne, Australia), Jodie McVernon (Peter Doherty Institute, Australia), Richard Pebody (Public Health England, United Kingdom), Melissa Rolf (US CDC), Hassan Zaraket (American University of Beirut, Lebanon), Lei Zhou (China CDC).

A special mention to Ben Cowling for his guidance throughout the development of this protocol and to Adrian Marcato, who during his internship in WHO, supported the development of this protocol.

Appendices

Appendix A: Sample questionnaires - Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection

Form 1a : Report Form for cases - Day 1

Form 1b : Report Form for household contacts - Day 1

Form 2: Report Form for cases and household contacts – Day 7

Form 3: Report Form for cases and household contacts – Day 14

Form 4: Report Form for cases and household contacts – Day 28

Form 5: Laboratory results

Form 6: Symptom diary

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 1a : Report Form for cases - Day 1

Unique Primary Case ID / Household Number	
---	--

1. Current Status	<input type="checkbox"/> Alive <input type="checkbox"/> Dead
--------------------------	--

2. Data Collector Information	
Name of data collector	
Data collector Institution	
Data collector telephone number	
Mobile number	
Email	
Form completion date (DD/MM/YYYY)	___/___/___
Date of interview with informant (DD/MM/YYYY)	___/___/___

3. Interview respondent information (if the persons providing the information is not the primary case)	
First name	
Surname	
Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known
Date of Birth (DD/MM/YYYY)	___/___/___
Relationship to primary case	
Respondent address	
Telephone (mobile) number	

4. Primary case Identifier Information	
First name	
Surname	
Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known
Date of Birth (DD/MM/YYYY)	___/___/___
Telephone (mobile) number	
Age (years, months)	
Email	
National social number/ identifier (if applicable)	
Country of residence	
Nationality	
Ethnicity (optional)	
Responsible Health Centre	
Nursery/School/College if appropriate Work/ Stay home etc	

5. Household information	
Location of household / Address of primary case	
Household size (number of people who usually live in the house, this will be varied depending on culture)	
Number of rooms in house	

Number of bedrooms	
Age of each household member	<div></div> <div></div> <div></div> <div></div> <div></div>

6a. Primary case symptoms from onset of illness	
Date of first symptom onset* (DD/MM/YYYY)	<div>___/___/___</div> <input type="checkbox"/> Asymptomatic <input type="checkbox"/> Unknown
Fever ($\geq 38^{\circ}\text{C}$) or history of fever*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify maximum temperature from onset of illness:
Date of first health facility visit (including traditional care)* (DD/MM/YYYY)	<div>___/___/___</div> <input type="checkbox"/> NA <input type="checkbox"/> Unknown
Total number of visits to health facilities since onset of illness	
Total number of health facilities visited since onset of illness	<input type="checkbox"/> NA <input type="checkbox"/> Unknown Specify:
6b. Respiratory symptoms	
Sore throat*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date (DD/MM/YYYY): ___/___/___
Cough*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date (DD/MM/YYYY): ___/___/___
Runny nose*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Shortness of breath*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date (DD/MM/YYYY): ___/___/___
6c. Other symptoms	
Chills	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Vomiting	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Nausea	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Diarrhoea	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Headache	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Neurological signs If Yes, specify	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Rash	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Conjunctivitis	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Muscle ache	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Joint ache	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Loss of appetite	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Nose bleed	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Fatigue	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
General malaise	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Seizures	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Altered consciousness	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown

Other symptoms	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify:
----------------	---

7. Primary case pre-existing condition(s)	
Obesity	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Cancer	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Diabetes	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
HIV/other immune deficiency	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Heart disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Asthma (requiring medication)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic lung disease (non-asthma)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic liver disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic haematological disorder	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Pregnancy	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify trimester: <input type="checkbox"/> First <input type="checkbox"/> Second <input type="checkbox"/> Third <input type="checkbox"/> NA Estimated delivery date (DD/MM/YYYY) ____/____/____
Chronic kidney disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic neurological impairment/disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Organ or bone marrow recipient	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Other pre-existing condition(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify:
Primary case was vaccinated for influenza in the 12 months prior to onset of illness	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date of vaccination, (DD/MM/YYYY) ____/____/____ Country of vaccination:
Primary case was vaccinated with pneumococcal vaccine If Yes, date (DD/MM/YYYY)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown (DD/MM/YYYY) ____/____/____

8. Case specimen collection (Day 1- baseline)	
Date baseline respiratory sample collected (DD/MM/YYYY)	(DD/MM/YYYY) ____/____/____ <input type="checkbox"/> NA
What type of respiratory sample was collected?	<input type="checkbox"/> Nasal swab <input type="checkbox"/> Throat swab <input type="checkbox"/> Nasopharyngeal swab <input type="checkbox"/> Others
Has baseline serum been taken?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify date (DD/MM/YYYY):
Which laboratory was the specimen sent to?	
Date sent to other laboratory with coronavirus expertise (if applicable) (DD/MM/YYYY)	____/____/____
9. Laboratory results reporting	

Please impute laboratory results once they become available in the “Laboratory results report”

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 1b : Report Form for household contacts - Day 1

Unique Primary Case ID / Household Number	
---	--

1. Current Status	<input type="checkbox"/> Alive <input type="checkbox"/> Dead
--------------------------	--

2. Data Collector Information	
Name of data collector	
Data collector Institution	
Data collector telephone number	
Mobile number	
Email	
Form completion date (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__
Date of interview with informant (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__

3. Contact Identifier Information	
First name	
Surname	
Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known
Date of Birth (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__
Relation to confirmed case	
Telephone (mobile) number	
Age (years, months)	
Email	
National social number/ identifier (if applicable)	
Country of residence	
Nationality	
Ethnicity (optional)	
Responsible Health Centre	
Nursery/School/College if appropriate	
Work/ Stay home etc	

4. Household information	
Location of household / Address of contact if different to address of primary case	
Date of last contact with the confirmed case (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__
Does the contact share a room (or usually does) with the primary case?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Number of days during the time the case was ill at home that were spent in contact with case (refer to household contact definition)	
Did the contact take care of the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact hug the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact kiss the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact shake hands with the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown

Did the contact share a meal with the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact eat from the same plate with hands with the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact share a drinking cup/glass with the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact share utensils with the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact sleep in the same room as the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Did the contact share a toilet with the case during the time he/she was ill at home before hospitalization?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown

5a. Contact symptoms	
Has the contact experienced any respiratory symptoms (sore throat, cough, running nose, shortness of breath) in the period from 10 days before onset in the confirmed case until the present?	<input type="checkbox"/> Yes <input type="checkbox"/> No If no, please skip to next section 5c
Date of first symptom onset (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__ <input type="checkbox"/> Asymptomatic <input type="checkbox"/> Unknown
Fever ($\geq 38^{\circ}\text{C}$) or history of fever	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify maximum temperature:
5b. Respiratory symptoms	
Sore throat	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date (DD/MM/YYYY): __/__/__
Cough	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date (DD/MM/YYYY): __/__/__
Runny nose	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Shortness of breath	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date (DD/MM/YYYY): __/__/__
5c. Other symptoms	
Chills	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Vomiting	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Nausea	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Diarrhoea*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Headache*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Neurological signs* If Yes, specify	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Rash*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Conjunctivitis*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Muscle aches*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Joint ache	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Loss of appetite	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown

Nose bleed	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Fatigue	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
General malaise	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Seizures	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Altered consciousness	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Other symptoms*	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify:

6. Contact pre-existing condition(s)	
Obesity	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Cancer	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Diabetes	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
HIV/other immune deficiency	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Heart disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Asthma (requiring medication)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic lung disease (non-asthma)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic liver disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic haematological disorder	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Pregnancy	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify trimester: <input type="checkbox"/> First <input type="checkbox"/> Second <input type="checkbox"/> Third <input type="checkbox"/> NA Estimated delivery date (DD/MM/YYYY) ____/____/____
Chronic kidney disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Chronic neurological impairment/disease	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Organ or bone marrow recipient	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Other pre-existing condition(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify:
Contact was vaccinated for influenza in the 12 months prior to onset of illness in the case	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If Yes, date of vaccination (DD/MM/YYYY) ____/____/____ Country of vaccination:
Contact was vaccinated with pneumococcal vaccine If Yes, date (DD/MM/YYYY)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown (DD/MM/YYYY) ____/____/____

7. Contact specimen collection (Day 1- baseline)	
Date baseline respiratory sample collected* (DD/MM/YYYY)	(DD/MM/YYYY) ____/____/____ <input type="checkbox"/> NA
What type of respiratory sample was collected?	<input type="checkbox"/> Nasal swab <input type="checkbox"/> Throat swab <input type="checkbox"/> Nasopharyngeal swab <input type="checkbox"/> Others
Has baseline serum been taken?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, specify date (DD/MM/YYYY):
Which laboratory was the specimen sent to?	
Date sent to other laboratory with coronavirus expertise (if applicable) (DD/MM/YYYY)	____/____/____
8. Laboratory results reporting	
<i>Please impute laboratory results once they become available in the "Laboratory results report"</i>	

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 2: Report Form for cases and household contacts – Day 7

10. Respiratory specimen collection (Day 7)	
Unique Primary Case ID / Household number	<input type="checkbox"/> NA
Date of sample collection (DD/MM/YYYY)	(DD/MM/YYYY)___/___/___ <input type="checkbox"/> NA
What type of respiratory specimen was collected?	<input type="checkbox"/> Nasal swab <input type="checkbox"/> Throat swab <input type="checkbox"/> Nasopharyngeal swab <input type="checkbox"/> Others
Who collected the respiratory specimen?	<input type="checkbox"/> Study staff/ research nurse <input type="checkbox"/> Self-collected
Which laboratory was the specimen sent to?	
Date sent to other laboratory with coronavirus expertise (if applicable) (DD/MM/YYYY)	___/___/___ Specify laboratory:
11. Laboratory results reporting	
<i>Please impute laboratory results once they become available in the "Laboratory results report"</i>	
12. Outcome (Day 7)	
Outcome	<input type="checkbox"/> Alive <input type="checkbox"/> Died <input type="checkbox"/> NA <input type="checkbox"/> Unknown If dead, cause:
Outcome current as of date (DD/MM/YYYY)	___/___/___ <input type="checkbox"/> Unknown <input type="checkbox"/> NA
Hospitalization	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, date of first hospitalization ___/___/___ <input type="checkbox"/> Unknown If yes, specify reason for hospitalisation:

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 3: Report Form for cases and household contacts – Day 14

13. Respiratory specimen collection (Day 14)	
Unique Primary Case ID / Household number	<input type="checkbox"/> NA
Date of sample collection (DD/MM/YYYY)	(DD/MM/YYYY) ____/____/____ <input type="checkbox"/> NA
What type of respiratory specimen was collected?	<input type="checkbox"/> Nasal swab <input type="checkbox"/> Throat swab <input type="checkbox"/> Nasopharyngeal swab <input type="checkbox"/> Others
Who collected the respiratory specimen?	<input type="checkbox"/> Study staff/ research nurse <input type="checkbox"/> Self-collected
Which laboratory was the specimen sent to?	
Date sent to other laboratory with coronavirus expertise (if applicable) (DD/MM/YYYY)	(DD/MM/YYYY) ____/____/____ Specify laboratory:
14. Laboratory results reporting	
<i>Please impute laboratory results once they become available in the "Laboratory results report"</i>	
15. Outcome (Day 14)	
Outcome	<input type="checkbox"/> Alive <input type="checkbox"/> Died <input type="checkbox"/> NA <input type="checkbox"/> Unknown If dead, cause:
Outcome current as of date (DD/MM/YYYY)	____/____/____ <input type="checkbox"/> Unknown <input type="checkbox"/> NA
Hospitalization	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, date of first hospitalization ____/____/____ <input type="checkbox"/> Unknown If yes, specify reason for hospitalisation:

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 4: Report Form for cases and household contacts – Day 28

16. Respiratory specimen collection (Day 28)	
Unique Primary Case ID / Household number	<input type="checkbox"/> NA
Date of sample collection (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__ <input type="checkbox"/> NA
What type of respiratory specimen was collected?	<input type="checkbox"/> Nasal swab <input type="checkbox"/> Throat swab <input type="checkbox"/> Nasopharyngeal swab <input type="checkbox"/> Others
Who collected the respiratory specimen?	<input type="checkbox"/> Study staff/ research nurse <input type="checkbox"/> Self-collected
Which laboratory was the specimen sent to?	
Date sent to other laboratory with coronavirus expertise (if applicable) (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__ Specify lab:
17. Laboratory results reporting	
<i>Please impute laboratory results once they become available in the "Laboratory results report"</i>	
18. Outcome (Day 28)	
Outcome	<input type="checkbox"/> Alive <input type="checkbox"/> Died <input type="checkbox"/> NA <input type="checkbox"/> Unknown If dead, cause:
Outcome current as of date (DD/MM/YYYY)	(DD/MM/YYYY) __/__/__ <input type="checkbox"/> Unknown <input type="checkbox"/> NA
Hospitalization	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown If yes, date of first hospitalization __/__/__ <input type="checkbox"/> Unknown If yes, specify reason for hospitalisation:

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 5: Laboratory results

This table will need to be completed for every specimen collection at each point in the follow-up, depending on the chosen specimen collection schedule.

19a. Molecular testing methods and results:	
Lab identification number	
Date sample collected (DD/MM/YYYY)	(DD/MM/YYYY)___/___/___
Date sample received (DD/MM/YYYY)	(DD/MM/YYYY)___/___/___
Type of sample	<input type="checkbox"/> Nasal swab <input type="checkbox"/> Throat swab <input type="checkbox"/> Nasopharyngeal swab <input type="checkbox"/> Others, specify:
Type of test	<input type="checkbox"/> PCR <input type="checkbox"/> Whole genome sequencing <input type="checkbox"/> Partial genome sequencing <input type="checkbox"/> Other, specify
Result	<input type="checkbox"/> 2019-nCoV <input type="checkbox"/> Others, specify:
Date of result (DD/MM/YYYY)	___/___/___
Specimen shipped to other laboratory for confirmation - Date (DD/MM/YYYY)	<input type="checkbox"/> Yes <input type="checkbox"/> No (DD/MM/YYYY)___/___/___

19b. Serology testing methods and results:	
Lab identification number	
Date sample collected (DD/MM/YYYY)	(DD/MM/YYYY)___/___/___
Date sample received (DD/MM/YYYY)	(DD/MM/YYYY)___/___/___
Type of sample	<input type="checkbox"/> Serum <input type="checkbox"/> Others, specify:
Result (2019-nCoV antibody titres)	
Date of result (DD/MM/YYYY)	___/___/___
Specimen shipped to other laboratory for confirmation - Date (DD/MM/YYYY)	<input type="checkbox"/> Yes <input type="checkbox"/> No (DD/MM/YYYY)___/___/___

Household transmission investigation protocol for 2019-novel coronavirus (2019-nCoV) infection
Form 6: Symptom diary

Each household contact will be asked to record the presence or absence of various signs or symptoms each day for up to 28 days after the administration of the baseline questionnaire (minimum 14 days).

With 2019-nCoV, the extent of clinical presentation and spectrum remains unclear, so symptom diaries may be broadened to include vomiting, diarrhea, abdominal pain, etc., as relevant and may need to be altered to include symptom data for longer than 14 days.

If no symptoms are experienced, ensure that *None* is selected in the second column.

Day	Symptoms						
	No symptoms (check if none experienced)	Fever $\geq 38^{\circ}\text{C}$	Sore throat	Cough	Runny nose	Shortness of breath	Other symptoms: specify
0	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
...							
28	<input type="checkbox"/> None	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Clinical management of severe acute respiratory infection when novel coronavirus (2019-nCoV) infection is suspected

Interim guidance

28 January 2020

[WHO/nCoV/Clinical/2020.2](#)



Introduction

This is the first edition of this document for novel coronavirus, an adaption of WHO Clinical management of severe acute respiratory infection when MERS-CoV infection is suspected publication (2019).

This document is intended for clinicians taking care of hospitalised adult and paediatric patients with severe acute respiratory infection (SARI) when 2019-nCoV infection is suspected. It is not meant to replace clinical judgment or specialist consultation but rather to strengthen clinical management of these patients and provide to up-to-date guidance. Best practices for SARI including IPC and optimized supportive care for severely ill patients are essential.

This document is organized into the following sections:

1. Triage: recognize and sort patients with SARI
2. Immediate implementation of appropriate infection prevention and control (IPC) measures
3. Early supportive therapy and monitoring
4. Collection of specimens for laboratory diagnosis
5. Management of hypoxemic respiratory failure and acute respiratory distress syndrome (ARDS)
6. Management of septic shock
7. Prevention of complications
8. Specific anti-nCoV treatments
9. Special considerations for pregnant patients

These symbols are used to flag interventions:

- ✓ Do: the intervention is beneficial (strong recommendation) **OR** the intervention is a best practice statement
- ✗ Don't: the intervention is known to be harmful.
- ! Consider: the intervention may be beneficial in selected patients (conditional recommendation) **OR** be careful when considering this intervention.

This document aims to provide clinicians with updated interim guidance on timely, effective, and safe supportive management of patients with 2019-nCoV and SARI, particularly those with critical illness.

The recommendations in this document are derived from WHO publications.¹⁻⁴ Where WHO guidance is not available, we refer to evidence-based guidelines. Members of a WHO global network of clinicians, and clinicians who have treated SARS, MERS or severe influenza patients have reviewed the recommendations (see Acknowledgements). For queries, please email outbreak@who.int with '2019-nCoV clinical question' in the subject line.

1. Triage: early recognition of patients with SARI associated with 2019-nCoV infection

✓ **Triage: recognize and sort all patients with SARI at first point of contact with health care system (such as the emergency department). Consider 2019-nCoV as a possible etiology of SARI under certain conditions (see Table 1). Triage patients and start emergency treatments based on disease severity.**

Remarks: 2019-nCoV infection may present with mild, moderate, or severe illness; the latter includes severe pneumonia, ARDS, sepsis and septic shock. Early recognition of suspected patients allows for timely initiation of IPC (see Table 2). Early identification of those with severe manifestations (see Table 2) allows for immediate optimized supportive care treatments and safe, rapid admission (or referral) to intensive care unit according to institutional or national protocols. For those with mild illness, hospitalization may not be required unless there is concern for rapid deterioration. All patients discharged home should be instructed to return to hospital if they develop any worsening of illness.

Table 1. Definitions of patients with SARI, suspected of 2019-nCoV infection*

SARI	An ARI with history of fever or measured temperature $\geq 38\text{ }^{\circ}\text{C}$ and cough; onset within the last ~10 days; and requiring hospitalization. ⁵ However, the absence of fever does NOT exclude viral infection. ⁶
Surveillance case definitions for 2019-nCoV*	<p>A. Patients with severe acute respiratory infection (fever, cough, and requiring admission to hospital), <u>AND</u> with no other etiology that fully explains the clinical presentation¹ <u>AND</u> at least one of the following:</p> <ul style="list-style-type: none"> • a history of travel to or residence in the city of Wuhan, Hubei Province, China in the 14 days prior to symptom onset, or • patient is a health care worker who has been working in an environment where severe acute respiratory infections of unknown etiology are being cared for. <p>B. Patients with any acute respiratory illness AND at least one of the following:</p> <ul style="list-style-type: none"> • close contact² with a confirmed or probable case of 2019-nCoV in the 14 days prior to illness onset, or • visiting or working in a live animal market in Wuhan, Hubei Province, China in the 14 days prior to symptom onset, or • worked or attended a health care facility in the 14 days prior to onset of symptoms where patients with hospital-associated 2019-nCoV infections have been reported.

*see <https://www.who.int/health-topics/coronavirus> for latest case definitions

¹ clinicians should also be alert to the possibility of atypical presentations in patients who are immunocompromised;

²: Close contact² is defined as:

- Health care associated exposure, including providing direct care for nCoV patients, working with health care workers infected with novel coronavirus, visiting patients or staying in the same close environment as a nCoV patient.
- Working together in close proximity or sharing the same classroom environment with a nCoV patient
- Traveling together with a nCoV patient in any kind of conveyance
- Living in the same household as a nCoV patient

The epidemiological link may have occurred within a 14-day period from onset of illness in the case under consideration.

Table 2. Clinical syndromes associated with 2019-nCoV infection

Uncomplicated illness	Patients with uncomplicated upper respiratory tract viral infection, may have non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain or malaise. The elderly and immunosuppressed may present with atypical symptoms. These patients do not have any signs of dehydration, sepsis or shortness of breath.
Mild pneumonia	Patient with pneumonia and no signs of severe pneumonia. Child with non-severe pneumonia has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): <2 months, ≥ 60 ; 2–11 months, ≥ 50 ; 1–5 years, ≥ 40 and no signs of severe pneumonia.
Severe pneumonia	Adolescent or adult: fever or suspected respiratory infection, plus one of respiratory rate >30 breaths/min, severe respiratory distress, or $\text{SpO}_2 < 90\%$ on room air (adapted from [1]). Child with cough or difficulty in breathing, plus at least one of the following: central cyanosis or $\text{SpO}_2 < 90\%$; severe respiratory distress (e.g. grunting, very severe chest indrawing); signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest indrawing, fast breathing (in breaths/min): <2 months, ≥ 60 ; 2–11 months, ≥ 50 ; 1–5 years, ≥ 40 . ² The diagnosis is clinical; chest imaging can exclude complications.
Acute Respiratory Distress Syndrome⁷⁻⁹	Onset: new or worsening respiratory symptoms within one week of known clinical insult. Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules. Origin of oedema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of oedema if no risk factor present. Oxygenation (adults): <ul style="list-style-type: none"> Mild ARDS: $200 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ (with PEEP or CPAP $\geq 5 \text{ cmH}_2\text{O}$,⁷ or non-ventilated⁸) Moderate ARDS: $100 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 200 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$,⁷ or non-ventilated⁸) Severe ARDS: $\text{PaO}_2/\text{FiO}_2 \leq 100 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$,⁷ or non-ventilated⁸) When PaO_2 is not available, $\text{SpO}_2/\text{FiO}_2 \leq 315$ suggests ARDS (including in non-ventilated patients) Oxygenation (children; note $\text{OI} = \text{Oxygenation Index}$ and $\text{OSI} = \text{Oxygenation Index using SpO}_2$): <ul style="list-style-type: none"> Bilevel NIV or CPAP $\geq 5 \text{ cmH}_2\text{O}$ via full face mask: $\text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ or $\text{SpO}_2/\text{FiO}_2 \leq 264$ Mild ARDS (invasively ventilated): $4 \leq \text{OI} < 8$ or $5 \leq \text{OSI} < 7.5$ Moderate ARDS (invasively ventilated): $8 \leq \text{OI} < 16$ or $7.5 \leq \text{OSI} < 12.3$ Severe ARDS (invasively ventilated): $\text{OI} \geq 16$ or $\text{OSI} \geq 12.3$
Sepsis^{10,11}	Adults: life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection, with organ dysfunction*. Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, or laboratory evidence of coagulopathy, thrombocytopenia, acidosis, high lactate or hyperbilirubinemia. Children: suspected or proven infection and ≥ 2 SIRS criteria, of which one must be abnormal temperature or white blood cell count.
Septic shock^{10,12}	Adults: persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP $\geq 65 \text{ mmHg}$ and serum lactate level $> 2 \text{ mmol/L}$. Children (based on [12]): any hypotension ($\text{SBP} < 5^{\text{th}}$ centile or $> 2 \text{ SD}$ below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia ($\text{HR} < 90 \text{ bpm}$ or $> 160 \text{ bpm}$ in infants and $\text{HR} < 70 \text{ bpm}$ or $> 150 \text{ bpm}$ in children); prolonged capillary refill ($> 2 \text{ sec}$) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.

Abbreviations: ARI, acute respiratory infection; BP, blood pressure; bpm, beats/minute; CPAP, continuous positive airway pressure; FiO_2 , fraction of inspired oxygen; MAP, mean arterial pressure; NIV, noninvasive ventilation; OI, Oxygenation Index; OSI, Oxygenation Index using SpO_2 ; PaO_2 , partial pressure of oxygen; PEEP, positive end-expiratory pressure; SBP, systolic blood pressure; SD, standard deviation; SIRS, systemic inflammatory response syndrome; SpO_2 , oxygen saturation. *If altitude is higher than 1000m, then correction factor should be calculated as follows: $\text{PaO}_2/\text{FiO}_2 \times \text{Barometric pressure}/760$.

* The SOFA score ranges from 0 to 24 and includes points related to 6 organ systems: respiratory (hypoxemia defined by low $\text{PaO}_2/\text{FiO}_2$), coagulation (low platelets), liver (high bilirubin), cardiovascular (hypotension), central nervous system (low level of consciousness defined by Glasgow Coma Scale), and renal (low urine output or high creatinine). Sepsis is defined by an increase in the Sequential [Sepsis-related] Organ Failure Assessment (SOFA) score¹³ of ≥ 2 points. Assume the baseline score is zero if data are not available

2. Immediate implementation of appropriate IPC measures

IPC is a critical and integral part of clinical management of patients and should be initiated at the point of entry of the patient to hospital (typically the Emergency Department). Standard precautions should always be routinely applied in all areas of health care facilities. Standard precautions include hand hygiene; use of PPE to avoid direct contact with patients' blood, body fluids, secretions (including respiratory secretions) and non-intact skin. Standard precautions also include prevention of needle-stick or sharps injury; safe waste management; cleaning and disinfection of equipment; and cleaning of the environment.

Table 2. How to implement infection prevention and control measures for patients with suspected or confirmed 2019-nCoV infection
14,15

At triage	Give suspect patient a medical mask and direct patient to separate area, an isolation room if available. Keep at least 1 meter distance between suspected patients and other patients. Instruct all patients to cover nose and mouth during coughing or sneezing with tissue or flexed elbow for others. Perform hand hygiene after contact with respiratory secretions
Apply droplet precautions	Droplet precautions prevent large droplet transmission of respiratory viruses. Use a medical mask if working within 1-2 metres of the patient. Place patients in single rooms, or group together those with the same etiological diagnosis. If an etiological diagnosis is not possible, group patients with similar clinical diagnosis and based on epidemiological risk factors, with a spatial separation. When providing care in close contact with a patient with respiratory symptoms (e.g. coughing or sneezing), use eye protection (face-mask or goggles), because sprays of secretions may occur. Limit patient movement within the institution and ensure that patients wear medical masks when outside their rooms.
Apply contact precautions	Droplet and contact precautions prevent direct or indirect transmission from contact with contaminated surfaces or equipment (i.e. contact with contaminated oxygen tubing/interfaces). Use PPE (medical mask, eye protection, gloves and gown) when entering room and remove PPE when leaving. If possible, use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers). If equipment needs to be shared among patients, clean and disinfect between each patient use. Ensure that health care workers refrain from touching their eyes, nose, and mouth with potentially contaminated gloved or ungloved hands. Avoid contaminating environmental surfaces that are not directly related to patient care (e.g. door handles and light switches). Ensure adequate room ventilation. Avoid movement of patients or transport. Perform hand hygiene.
Apply airborne precautions when performing an aerosol generating procedure	Ensure that healthcare workers performing aerosol-generating procedures (i.e. open suctioning of respiratory tract, intubation, bronchoscopy, cardiopulmonary resuscitation) use PPE, including gloves, long-sleeved gowns, eye protection, and fit-tested particulate respirators (N95 or equivalent, or higher level of protection). (The scheduled fit test should not be confused with user seal check before each use.) Whenever possible, use adequately ventilated single rooms when performing aerosol-generating procedures, meaning negative pressure rooms with minimum of 12 air changes per hour or at least 160 litres/second/patient in facilities with natural ventilation. Avoid the presence of unnecessary individuals in the room. Care for the patient in the same type of room after mechanical ventilation commences.

Abbreviations: ARI, acute respiratory infection; PPE, personal protective equipment

3. Early supportive therapy and monitoring

✓ Give supplemental oxygen therapy immediately to patients with SARI and respiratory distress, hypoxaemia, or shock.

Remarks: Initiate oxygen therapy at 5 L/min and titrate flow rates to reach target SpO₂ ≥90% in non-pregnant adults and SpO₂ ≥92-95 % in pregnant patients.^{1,2} Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive oxygen therapy during resuscitation to target SpO₂ ≥94%; otherwise, the target SpO₂ is ≥90%.⁴ All areas where patients with SARI are cared for should be equipped with pulse oximeters, functioning oxygen systems and disposable, single-use, oxygen-delivering interfaces (nasal cannula, simple face mask, and mask with reservoir bag). Use contact precautions when handling contaminated oxygen interfaces of patients with nCoV infection.

✓ Use conservative fluid management in patients with SARI when there is no evidence of shock.

Remarks: Patients with SARI should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation, especially in settings where there is limited availability of mechanical ventilation.¹⁶

✓ Give empiric antimicrobials to treat all likely pathogens causing SARI. Give antimicrobials within one hour of initial patient assessment for patients with sepsis.

Remarks: Although the patient may be suspected to have nCoV, administer appropriate empiric antimicrobials within **ONE hour** of identification of sepsis.¹⁷ Empiric antibiotic treatment should be based on the clinical diagnosis (community-acquired pneumonia, health care-associated pneumonia [if infection was acquired in healthcare setting], or sepsis), local epidemiology and susceptibility data, and treatment guidelines. Empiric therapy includes a neuraminidase inhibitor for treatment of influenza when there is local circulation or other risk factors, including travel history or exposure to animal influenza viruses.¹⁸ Empiric therapy should be de-escalated on the basis of microbiology results and clinical judgment.

✗ Do not routinely give systemic corticosteroids for treatment of viral pneumonia or ARDS outside of clinical trials unless they are indicated for another reason.

Remarks: A systematic review of observational studies of corticosteroids administered to patients with SARS reported no survival benefit and possible harms (avascular necrosis, psychosis, diabetes, and delayed viral clearance).¹⁹ A systematic review of observational studies in influenza found a higher risk of mortality and secondary infections with corticosteroids; the evidence was judged as very low to low quality due to confounding by indication.²⁰ A subsequent study that addressed this limitation by adjusting for time-varying confounders found no effect on mortality.²¹ Finally, a recent study of patients receiving corticosteroids for MERS used a similar statistical approach and found no effect of corticosteroids on mortality but delayed lower respiratory

tract (LRT) clearance of MERS-CoV.²² Given lack of effectiveness and possible harm, routine corticosteroids should be avoided unless they are indicated for another reason. See section 6 for the use of corticosteroids in sepsis.

- ✔ **Closely monitor patients with SARI for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately.**

Remarks: Application of timely, effective, and safe supportive therapies is the cornerstone of therapy for patients that develop severe manifestations of 2019-nCoV.

- ✔ **Understand the patient's co-morbid condition(s) to tailor the management of critical illness and appreciate the prognosis. Communicate early with patient and family.**

Remarks: During intensive care management of SARI, determine which chronic therapies should be continued and which therapies should be stopped temporarily. Communicate proactively with patients and families and provide support and prognostic information. Understand the patient's values and preferences regarding life-sustaining interventions.

4. Collection of specimens for laboratory diagnosis

WHO guidance on specimen collection, processing, and laboratory testing, including related biosafety procedures, is available.²³

- ✔ **Collect blood cultures for bacteria that cause pneumonia and sepsis, ideally before antimicrobial therapy. DO NOT delay antimicrobial therapy to collect blood cultures.**
- ✔ **Collect specimens from BOTH the upper respiratory tract (URT; nasopharyngeal and oropharyngeal) AND lower respiratory tract (LRT; expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage) for 2019-nCoV testing by RT-PCR. Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients).**
- ✔ **Serology for diagnostic purposes is recommended only when RT-PCR is not available.²³**

Remarks: Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens). When collecting URT samples, use viral swabs (sterile Dacron or rayon, not cotton) and viral transport media. Do not sample the nostrils or tonsils. In a patient with suspected novel coronavirus, especially with pneumonia or severe illness, a single URT sample does not exclude the diagnosis, and additional URT and LRT samples are recommended.²³ LRT (vs. URT) samples are more likely to be positive and for a longer period.²³ Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients). Sputum induction should be avoided due to increased risk of increasing aerosol transmission.

Remarks: Dual infections with other respiratory viral infections have been found in SARS and MERS cases. At this stage we need detailed microbiologic studies in all suspected cases. Both URT and LRT specimens can be tested for other respiratory viruses, such as influenza A and B (including zoonotic influenza A), respiratory syncytial virus, parainfluenza viruses, rhinoviruses, adenoviruses, enteroviruses (e.g. EVD68), human metapneumovirus, and endemic human coronaviruses (i.e. HKU1, OC43, NL63, and 229E). LRT specimens can also be tested for bacterial pathogens, including *Legionella pneumophila*.

- ✔ **In hospitalized patients with confirmed 2019-nCoV infection, repeat URT and LRT samples should be collected to demonstrate viral clearance. The frequency of specimen collection will depend on local circumstances but should be at least every 2 to 4 days until there are two consecutive negative results (both URT and LRT samples if both are collected) in a clinically recovered patient at least 24 hours apart. If local infection control practice requires two negative results before removal of droplet precautions, specimens may be collected as often as daily.**

5. Management of hypoxemic respiratory failure and ARDS

- ✔ **Recognize severe hypoxemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy.**

Remarks: Patients may continue to have increased work of breathing or hypoxemia even when oxygen is delivered via a face mask with reservoir bag (flow rates of 10-15 L/min, which is typically the minimum flow required to maintain bag inflation; FiO₂ 0.60-0.95). Hypoxemic respiratory failure in ARDS commonly results from intrapulmonary ventilation-perfusion mismatch or shunt and usually requires mechanical ventilation.

- ⚠ **High-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) should only be used in selected patients with hypoxemic respiratory failure. The risk of treatment failure is high in patients with MERS treated with NIV, and patients treated with either HFNO or NIV should be closely monitored for clinical deterioration.**

Remark 1: HFNO systems can deliver 60 L/min of gas flow and FiO₂ up to 1.0; paediatric circuits generally only handle up to 15 L/min, and many children will require an adult circuit to deliver adequate flow. Compared to standard oxygen therapy, HFNO reduces the need for intubation.²⁴ Patients with hypercapnia (exacerbation of obstructive lung disease, cardiogenic pulmonary oedema), hemodynamic instability, multi-organ failure, or abnormal mental status should generally not receive HFNO, although emerging data suggest that HFNO may be safe in patients with mild-moderate and non-worsening hypercapnia.²⁵ Patients receiving HFNO should be in a monitored setting and cared for by experienced personnel capable of endotracheal intubation in case the patient acutely deteriorates or does not improve after a short trial (about 1 hr). Evidence-based guidelines on HFNO do not exist, and reports on HFNO in MERS patients are limited.²⁶

Remark 2: NIV guidelines make no recommendation on use in hypoxemic respiratory failure (apart from cardiogenic pulmonary oedema and post-operative respiratory failure) or pandemic viral illness (referring to studies of SARS and pandemic influenza).²⁷ Risks include delayed intubation, large tidal volumes, and injurious transpulmonary pressures. Limited data suggest a high failure rate when MERS patients receive NIV.²⁸ Patients receiving a trial of NIV should be in a monitored setting and cared for by experienced personnel capable of endotracheal intubation in case the patient acutely deteriorates or does not improve after a short trial (about 1 hr). Patients with hemodynamic instability, multiorgan failure, or abnormal mental status should not receive NIV.

Remark 3: Recent publications suggest that newer HFNO and NIV systems with good interface fitting do not create widespread dispersion of exhaled air and therefore should be associated with low risk of airborne transmission.²⁹⁻³¹

✔ Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.

Remarks: Patients with ARDS, especially young children or those who are obese or pregnant, may desaturate quickly during intubation. Pre-oxygenate with 100% FiO₂ for 5 minutes, via a face mask with reservoir bag, bag-valve mask, HFNO, or NIV. Rapid sequence intubation is appropriate after an airway assessment that identifies no signs of difficult intubation³².

The following recommendations in this section pertain to mechanically ventilated patients with ARDS.^{17,33} These focus on adults; consensus-based recommendations for children are available.³⁴

✔ Implement mechanical ventilation using lower tidal volumes (4–8 ml/kg predicted body weight, PBW) and lower inspiratory pressures (plateau pressure <30 cmH₂O).

Remarks: This is a strong recommendation from a clinical guideline for patients with ARDS,³³ and is suggested for patients with sepsis-induced respiratory failure who do not meet ARDS criteria.¹⁷ The initial tidal volume is 6 ml/kg PBW; tidal volume up to 8 ml/kg PBW is allowed if undesirable side effects occur (e.g. dyssynchrony, pH <7.15). Hypercapnia is permitted if meeting the pH goal of 7.30–7.45. Ventilator protocols are available.³⁵ The use of deep sedation may be required to control respiratory drive and achieve tidal volume targets. Although high driving pressure (plateau pressure–PEEP) may more accurately predict increased mortality in ARDS compared to high tidal volume or plateau pressure,³⁶ RCTs of ventilation strategies that target driving pressure are not currently available.

✔ In patients with severe ARDS, prone ventilation for >12 hours per day is recommended.

Remarks: Application of prone ventilation is strongly recommended for adult and paediatric patients with severe ARDS³³ but requires sufficient human resources and expertise to be performed safely.^{37,38}

✔ Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.

Remarks: This is a strong guideline recommendation;¹⁷ the main effect is to shorten the duration of ventilation. See reference [39] for details of a sample protocol.

⚠ In patients with moderate or severe ARDS, higher PEEP instead of lower PEEP is suggested.

Remarks: PEEP titration requires consideration of benefits (reducing atelectrauma and improving alveolar recruitment) vs. risks (end-inspiratory overdistension leading to lung injury and higher pulmonary vascular resistance). Tables are available to guide PEEP titration based on the FiO₂ required to maintain SpO₂.³⁵ A related intervention of recruitment manoeuvres (RMs) is delivered as episodic periods of high continuous positive airway pressure [30–40 cm H₂O], progressive incremental increases in PEEP with constant driving pressure, or high driving pressure; considerations of benefits vs. risks are similar. Higher PEEP and RMs were both conditionally recommended in a clinical practice guideline.³³ For PEEP, the guideline considered an individual patient data meta-analysis⁴⁰ of 3 RCTs. However, a subsequent RCT of high PEEP and prolonged high-pressure RMs showed harm, suggesting that the protocol in this RCT should be avoided.⁴¹ Monitoring of patients to identify those who respond to the initial application of higher PEEP or a different RM protocol, and stopping these interventions in non-responders, is suggested.⁴²

⚠ In patients with moderate-severe ARDS (PaO₂/FiO₂ <150), neuromuscular blockade by continuous infusion should not be routinely used.

Remarks: One trial found that this strategy improved survival in patients with severe ARDS (PaO₂/FiO₂ <150) without causing significant weakness,⁴³ but results of a recent larger trial found that use of neuromuscular blockade with high PEEP strategy was not associated with survival when compared to a light sedation strategy without neuromuscular blockade⁴⁴. Continuous neuromuscular blockade may still be considered in patients with ARDS in certain situations: ventilator dyssynchrony despite sedation, such that tidal volume limitation cannot be reliably achieved; or refractory hypoxemia or hypercapnia.

⚠ In settings with access to expertise in extracorporeal life support (ECLS), consider referral of patients with refractory hypoxemia despite lung protective ventilation.

Remarks: A recent guideline made no recommendation about ECLS in patients with ARDS.³³ Since then, an RCT of ECLS for patients with ARDS was stopped early and found no statistically significant difference in the primary outcome of 60-day mortality between ECLS and standard medical management (including prone positioning and neuromuscular blockade).⁴⁵ However, ECLS was associated with a reduced risk of the composite outcome of mortality and crossover to ECLS,⁴⁵ and a *post hoc* Bayesian analysis of this RCT showed that ECLS is very likely to reduce mortality across a range of prior assumptions.⁴⁶ In patients with MERS-CoV infection, ECLS vs. conventional treatment was associated with reduced mortality in a cohort study.⁴⁷ ECLS should

only be offered in expert centres with a sufficient case volume to maintain expertise and that can apply the IPC measures required for 2019-nCoV patients.⁴⁸

- ✗ **Avoid disconnecting the patient from the ventilator, which results in loss of PEEP and atelectasis. Use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required (for example, transfer to a transport ventilator).**

6. Management of septic shock

- ✓ **Recognize septic shock in adults when infection is suspected or confirmed AND vasopressors are needed to maintain mean arterial pressure (MAP) ≥ 65 mmHg AND lactate is ≥ 2 mmol/L, in absence of hypovolemia. Recognize septic shock in children with any hypotension (systolic blood pressure [SBP] $< 5^{\text{th}}$ centile or > 2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR < 90 bpm or > 160 bpm in infants and HR < 70 bpm or > 150 bpm in children); prolonged capillary refill (> 2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.**

Remarks: In the absence of a lactate measurement, use MAP and clinical signs of perfusion to define shock. Standard care includes early recognition and the following treatments within 1 hour of recognition: antimicrobial therapy and fluid loading and vasopressors for hypotension.⁴⁹ The use of central venous and arterial catheters should be based on resource availability and individual patient needs. Detailed guidelines are available for the management of septic shock in adults¹⁷ and children.^{2,3,12}

- ✓ **In resuscitation from septic shock in adults, give at least 30 ml/kg of isotonic crystalloid in adults in the first 3 hours. In resuscitation from septic shock in children in well-resourced settings, give 20 ml/kg as a rapid bolus and up to 40-60 ml/kg in the first 1 hr.**

- ✗ **Do not use hypotonic crystalloids, starches, or gelatins for resuscitation.**

- ! **Fluid resuscitation may lead to volume overload, including respiratory failure. If there is no response to fluid loading and signs of volume overload appear (for example, jugular venous distension, crackles on lung auscultation, pulmonary oedema on imaging, or hepatomegaly in children), then reduce or discontinue fluid administration. This step is particularly important where mechanical ventilation is not available. Alternate fluid regimens are suggested when caring for children in resource-limited settings⁵⁰**

Remarks: Crystalloids include normal saline and Ringer's lactate. Determine need for additional fluid boluses (250-1000 ml in adults or 10-20 ml/kg in children) based on clinical response and improvement of perfusion targets. Perfusion targets include MAP (> 65 mmHg or age-appropriate targets in children), urine output (> 0.5 ml/kg/hr in adults, 1 ml/kg/hr in children), and improvement of skin mottling, capillary refill, level of consciousness, and lactate. Consider dynamic indices of volume responsiveness to guide volume administration beyond initial resuscitation based on local resources and experience.¹⁷ These indices include passive leg raises, fluid challenges with serial stroke volume measurements, or variations in systolic pressure, pulse pressure, inferior vena cava size, or stroke volume in response to changes in intrathoracic pressure during mechanical ventilation.

Starches are associated with an increased risk of death and acute kidney injury vs. crystalloids. The effects of gelatins are less clear, but they are more expensive than crystalloids.^{51,52} Hypotonic (vs. isotonic) solutions are less effective at increasing intravascular volume. Surviving Sepsis also suggests albumin for resuscitation when patients require substantial amounts of crystalloids, but this conditional recommendation is based on low-quality evidence.¹⁷

- ✓ **Administer vasopressors when shock persists during or after fluid resuscitation. The initial blood pressure target is MAP ≥ 65 mmHg in adults and age-appropriate targets in children.**
- ! **If central venous catheters are not available, vasopressors can be given through a peripheral IV, but use a large vein and closely monitor for signs of extravasation and local tissue necrosis. If extravasation occurs, stop infusion. Vasopressors can also be administered through intraosseous needles.**
- ! **If signs of poor perfusion and cardiac dysfunction persist despite achieving MAP target with fluids and vasopressors, consider an inotrope such as dobutamine.**

Remarks: Vasopressors (i.e. norepinephrine, epinephrine, vasopressin, and dopamine) are most safely given through a central venous catheter at a strictly controlled rate, but it is also possible to safely administer them via peripheral vein⁵³ and intraosseous needle. Monitor blood pressure frequently and titrate the vasopressor to the minimum dose necessary to maintain perfusion and prevent side effects. Norepinephrine is considered first-line in adult patients; epinephrine or vasopressin can be added to achieve the MAP target. Because of the risk of tachyarrhythmia, reserve dopamine for selected patients with low risk of tachyarrhythmia or those with bradycardia. In children with cold shock (more common), epinephrine is considered first-line, while norepinephrine is used in patients with warm shock (less common).

No RCTs have compared dobutamine to placebo for clinical outcomes.¹⁷

7. Prevention of complications

Implement the following interventions (Table 3) to prevent complications associated with critical illness. These interventions are based on Surviving Sepsis¹⁷ or other guidelines,⁵⁴⁻⁵⁷ and are generally limited to feasible recommendations based on high quality evidence.

Table 3. Prevention of complications

Anticipated Outcome	Interventions
Reduce days of invasive mechanical ventilation	<ul style="list-style-type: none"> • Use weaning protocols that include daily assessment for readiness to breathe spontaneously • Minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions
Reduce incidence of ventilator-associated pneumonia	<ul style="list-style-type: none"> • Oral intubation is preferable to nasal intubation in adolescents and adults • Keep patient in semi-recumbent position (head of bed elevation 30-45°) • Use a closed suctioning system; periodically drain and discard condensate in tubing • Use a new ventilator circuit for each patient; once patient is ventilated, change circuit if it is soiled or damaged but not routinely • Change heat moisture exchanger when it malfunctions, when soiled, or every 5–7 days
Reduce incidence of venous thromboembolism	<ul style="list-style-type: none"> • Use pharmacological prophylaxis (low molecular-weight heparin [preferred if available] or heparin 5000 units subcutaneously twice daily) in adolescents and adults without contraindications. For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices).
Reduce incidence of catheter-related bloodstream infection	<ul style="list-style-type: none"> • Use a checklist with completion verified by a real-time observer as reminder of each step needed for sterile insertion and as a daily reminder to remove catheter if no longer needed
Reduce incidence of pressure ulcers	<ul style="list-style-type: none"> • Turn patient every two hours
Reduce incidence of stress ulcers and gastrointestinal bleeding	<ul style="list-style-type: none"> • Give early enteral nutrition (within 24–48 hours of admission) • Administer histamine-2 receptor blockers or proton-pump inhibitors in patients with risk factors for GI bleeding. Risk factors for gastrointestinal bleeding include mechanical ventilation for ≥48 hours, coagulopathy, renal replacement therapy, liver disease, multiple comorbidities, and higher organ failure score
Reduce incidence of ICU-related weakness	<ul style="list-style-type: none"> • Actively mobilize the patient early in the course of illness when safe to do so

8. Specific anti-Novel-CoV treatments and clinical research

⚠ There is no current evidence from RCTs to recommend any specific anti-nCoV treatment for patients with suspected or confirmed 2019-nCoV infection.

✅ Unlicensed treatments should be administered only in the context of ethically-approved clinical trials or the Monitored Emergency Use of Unregistered Interventions Framework (MEURI), with strict monitoring.

<https://www.who.int/ethics/publications/infectious-disease-outbreaks/en/>

✅ Clinical characterization protocols are available, at the WHO 2019 nCoV website:

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>. WHO has established Global 2019-nCoV Clinical Data Platform, for member countries to contribute. Contact EDCARN@who.int for additional questions.

9. Special considerations for pregnant patients

✅ Pregnant women with suspected or confirmed 2019-nCoV infection should be treated with supportive therapies as described above, taking into account the physiologic adaptations of pregnancy.

✅ The use of investigational therapeutic agents outside of a research study should be guided by individual risk-benefit analysis based on potential benefit for mother and safety to fetus, with consultation from an obstetric specialist and ethics committee.

✅ Emergency delivery and pregnancy termination decisions are challenging and based on many factors: gestational age, maternal condition, and fetal stability. Consultations with obstetric, neonatal, and intensive care specialists (depending on the condition of the mother) are essential.

10. Acknowledgements

The original version of this document was developed in consultation with International Forum for Acute Care Trialists (InFACT), ISARIC and Surviving Sepsis Campaign. The following individuals contributed to or reviewed the current version. Confidentiality and declarations of interest were collected and reviewed.

WHO: April Baller, Janet Diaz, Dina Pfeifer, Maria Van Kerkhove, Satoko Otsu, Richard Peabody.

Non-WHO experts: Neill Adhikari, Sunnybrook Health Sciences Centre and University of Toronto; Yaseen Arabi, King Saud Bin Abdulaziz University for Health Sciences, Saudi Arabia; Kenneth Baillie, University of Edinburgh, UK; Gail Carson University of Oxford, ISARIC; Charles David Gomersall The Chinese University of Hong Kong; Jake Dunning, Public Health England, UK; Rob Fowler, University of Toronto, Canada; Susan Gerber, Centers for Disease Control and Prevention, USA; Frederick Hayden, University of Virginia, USA; Peter Horby University of Oxford, ISARIC; David Hui, Chinese University of Hong Kong, Hong Kong SAR; Yae-Jean Kim, Sungkyunkwan University, Samsung Medical Center, Korea; Srinivas Murthy, University of British Columbia, Canada; Norio Ohmagari, M.D., M.Sc., Ph.D, WHO Collaborating Centre for Prevention, Preparedness and Response to Emerging Infectious Diseases, National Center for Global Health and Medicine Hospital Toyama, Tokyo Japan; Yinzong Shen Shanghai Public Health Clinical Center, Fudan University Naoki Shimizu; Tim Uyeki, Centers for Disease Control and Prevention, USA.

References

1. Rosjo H, Varpula M, Hagve TA, et al. Circulating high sensitivity troponin T in severe sepsis and septic shock: distribution, associated factors, and relation to outcome. *Intensive Care Med* 2011;37:77-85.
2. Pocket book of hospital care for children: Guidelines for the management of common childhood illnesses [http://www.who.int/maternal_child_adolescent/documents/child_hospital_care/en/]. 2nd ed. Geneva: WHO; 2013.
3. Gunnerson KJ, Shaw AD, Chawla LS, et al. TIMP2*IGFBP7 biomarker panel accurately predicts acute kidney injury in high-risk surgical patients. *J Trauma Acute Care Surg* 2016;80:243-9.
4. Oxygen therapy for children: a manual for health workers [http://www.who.int/maternal_child_adolescent/documents/child-oxygen-therapy/en/]. Geneva: WHO; 2016.
5. Global Epidemiological Surveillance Standards for Influenza [http://www.who.int/influenza/resources/documents/influenza_surveillance_manual/en/]. Geneva: WHO; 2014.
6. Shalhoub S, Farahat F, Al-Jiffri A, et al. IFN-alpha2a or IFN-beta1a in combination with ribavirin to treat Middle East respiratory syndrome coronavirus pneumonia: a retrospective study. *J Antimicrob Chemother* 2015;70:2129-32.
7. ARDS Definition Task Force, Ranieri VM, Rubenfeld GD, et al. Acute respiratory distress syndrome: the Berlin Definition. *JAMA* 2012;307:2526-33.
8. Riviello ED, Kiviri W, Twagirumugabe T, et al. Hospital Incidence and Outcomes of the Acute Respiratory Distress Syndrome Using the Kigali Modification of the Berlin Definition. *Am J Respir Crit Care Med* 2016;193:52-9.
9. Khemani RG, Smith LS, Zimmerman JJ, Erickson S, Pediatric Acute Lung Injury Consensus Conference Group. Pediatric acute respiratory distress syndrome: definition, incidence, and epidemiology: proceedings from the Pediatric Acute Lung Injury Consensus Conference. *Pediatr Crit Care Med* 2015;16:S23-40.
10. Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA* 2016;315:801-10.
11. Goldstein B, Giroir B, Randolph A, International Consensus Conference on Pediatric Sepsis. International pediatric sepsis consensus conference: definitions for sepsis and organ dysfunction in pediatrics. *Pediatr Crit Care Med* 2005;6:2-8.
12. Davis AL, Carcillo JA, Aneja RK, et al. American College of Critical Care Medicine Clinical Practice Parameters for Hemodynamic Support of Pediatric and Neonatal Septic Shock. *Crit Care Med* 2017;45:1061-93.
13. Vincent JL, Moreno R, Takala J, et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the Working Group on Sepsis-Related Problems of the European Society of Intensive Care Medicine. *Intensive Care Med* 1996;22:707-10.
14. Infection prevention and control of epidemic-and pandemic prone acute respiratory infections in health care [http://www.who.int/csr/bioriskreduction/infection_control/publication/en/]. Geneva: WHO; 2014.
15. Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection: Interim guidance. Geneva: WHO; 2015.
16. Schultz MJ, Dunser MW, Dondorp AM, et al. Current challenges in the management of sepsis in ICUs in resource-poor settings and suggestions for the future. *Intensive Care Med* 2017;43:612-24.
17. Rhodes A, Evans LE, Alhazzani W, et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016. *Intensive Care Med* 2017;43:304-77.
18. Clinical management of human infection with pandemic (H1N1) 2009: revised guidance [http://www.who.int/csr/resources/publications/swineflu/clinical_management/en/]. Geneva: WHO; 2009.
19. Stockman LJ, Bellamy R, Garner P. SARS: systematic review of treatment effects. *PLoS Med* 2006;3:e343.
20. Rodrigo C, Leonardi-Bee J, Nguyen-Van-Tam J, Lim WS. Corticosteroids as adjunctive therapy in the treatment of influenza. *Cochrane Database Syst Rev* 2016;3:CD010406.
21. Delaney JW, Pinto R, Long J, et al. The influence of corticosteroid treatment on the outcome of influenza A(H1N1pdm09)-related critical illness. *Crit Care* 2016;20:75.
22. Arabi YM, Mandourah Y, Al-Hameed F, et al. Corticosteroid Therapy for Critically Ill Patients with Middle East Respiratory Syndrome. *Am J Respir Crit Care Med* 2018;197:757-67.
23. Laboratory testing for Middle East Respiratory Syndrome Coronavirus: Interim guidance [http://www.who.int/csr/disease/coronavirus_infections/mers-laboratory-testing/en/]. Geneva: WHO; 2018.
24. Ou X, Hua Y, Liu J, Gong C, Zhao W. Effect of high-flow nasal cannula oxygen therapy in adults with acute hypoxemic respiratory failure: a meta-analysis of randomized controlled trials. *CMAJ* 2017;189:E260-E7.
25. Lee MK, Choi J, Park B, et al. High flow nasal cannulae oxygen therapy in acute-moderate hypercapnic respiratory failure. *Clin Respir J* 2018;12:2046-56.
26. Luo Y, Ou R, Ling Y, Qin T. The therapeutic effect of high flow nasal cannula oxygen therapy for the first imported case of Middle East respiratory syndrome to China [Chinese]. *Zhonghua Wei Zhong Bing Ji Jiu Xue* 2015;27:841-4.

27. Rochwerg B, Brochard L, Elliott MW, et al. Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure. *Eur Respir J* 2017;50.
28. Arabi YM, Arifi AA, Balkhy HH, et al. Clinical course and outcomes of critically ill patients with Middle East respiratory syndrome coronavirus infection. *Ann Intern Med* 2014;160:389-97.
29. Leung CCH, Joynt GM, Gomersall CD, et al. Comparison of high-flow nasal cannula versus oxygen face mask for environmental bacterial contamination in critically ill pneumonia patients: a randomized controlled crossover trial. *J Hosp Infect* 2019;101:84-7.
30. Hui DS, Chow BK, Lo T, et al. Exhaled air dispersion during high-flow nasal cannula therapy versus CPAP via different masks. *Eur Respir J* 2019;53.
31. Hui DS, Chow BK, Lo T, et al. Exhaled air dispersion during noninvasive ventilation via helmets and a total facemask. *Chest* 2015;147:1336-43.
32. Detsky ME, Jivraj N, Adhikari NK, et al. Will This Patient Be Difficult to Intubate?: The Rational Clinical Examination Systematic Review. *JAMA* 2019;321:493-503.
33. Fan E, Del Sorbo L, Goligher EC, et al. An Official American Thoracic Society/European Society of Intensive Care Medicine/Society of Critical Care Medicine Clinical Practice Guideline: Mechanical Ventilation in Adult Patients with Acute Respiratory Distress Syndrome. *Am J Respir Crit Care Med* 2017;195:1253-63.
34. Rimensberger PC, Cheifetz IM, Pediatric Acute Lung Injury Consensus Conference G. Ventilatory support in children with pediatric acute respiratory distress syndrome: proceedings from the Pediatric Acute Lung Injury Consensus Conference. *Pediatr Crit Care Med* 2015;16:S51-60.
35. ARDS Network Tools. 2014. (Accessed 25 July, 2018, at <http://www.ardsnet.org/tools.shtml>.)
36. Amato MB, Meade MO, Slutsky AS, et al. Driving pressure and survival in the acute respiratory distress syndrome. *N Engl J Med* 2015;372:747-55.
37. Messerole E, Peine P, Wittkopp S, Marini JJ, Albert RK. The pragmatics of prone positioning. *Am J Respir Crit Care Med* 2002;165:1359-63.
38. Guerin C, Reignier J, Richard JC, et al. Prone positioning in severe acute respiratory distress syndrome. *N Engl J Med* 2013;368:2159-68.
39. National Heart L, and Blood Institute Acute Respiratory Distress Syndrome Clinical Trials Network, Wiedemann HP, Wheeler AP, et al. Comparison of two fluid-management strategies in acute lung injury. *N Engl J Med* 2006;354:2564-75.
40. Briel M, Meade M, Mercat A, et al. Higher vs lower positive end-expiratory pressure in patients with acute lung injury and acute respiratory distress syndrome: systematic review and meta-analysis. *JAMA* 2010;303:865-73.
41. Writing Group for the Alveolar Recruitment for Acute Respiratory Distress Syndrome Trial Investigators, Cavalcanti AB, Suzumura EA, et al. Effect of Lung Recruitment and Titrated Positive End-Expiratory Pressure (PEEP) vs Low PEEP on Mortality in Patients With Acute Respiratory Distress Syndrome: A Randomized Clinical Trial. *JAMA* 2017;318:1335-45.
42. Goligher EC, Kavanagh BP, Rubenfeld GD, et al. Oxygenation response to positive end-expiratory pressure predicts mortality in acute respiratory distress syndrome. A secondary analysis of the LOVS and ExPress trials. *Am J Respir Crit Care Med* 2014;190:70-6.
43. Papazian L, Forel JM, Gacouin A, et al. Neuromuscular blockers in early acute respiratory distress syndrome. *N Engl J Med* 2010;363:1107-16.
44. National Heart L, Blood Institute PCTN, Moss M, et al. Early Neuromuscular Blockade in the Acute Respiratory Distress Syndrome. *N Engl J Med* 2019;380:1997-2008.
45. Combes A, Hajage D, Capellier G, et al. Extracorporeal Membrane Oxygenation for Severe Acute Respiratory Distress Syndrome. *N Engl J Med* 2018;378:1965-75.
46. Goligher EC, Tomlinson G, Hajage D, et al. Extracorporeal Membrane Oxygenation for Severe Acute Respiratory Distress Syndrome and Posterior Probability of Mortality Benefit in a Post Hoc Bayesian Analysis of a Randomized Clinical Trial. *JAMA* 2018;320:2251-9.
47. Alshahrani MS, Sindi A, Alshamsi F, et al. Extracorporeal membrane oxygenation for severe Middle East respiratory syndrome coronavirus. *Ann Intensive Care* 2018;8:3.
48. Combes A, Brodie D, Bartlett R, et al. Position paper for the organization of extracorporeal membrane oxygenation programs for acute respiratory failure in adult patients. *Am J Respir Crit Care Med* 2014;190:488-96.
49. Levy MM, Evans LE, Rhodes A. The Surviving Sepsis Campaign Bundle: 2018 update. *Intensive Care Med* 2018;44:925-8.
50. Lamontagne F, Meade MO, Hebert PC, et al. Higher versus lower blood pressure targets for vasopressor therapy in shock: a multicentre pilot randomized controlled trial. *Intensive Care Med* 2016;42:542-50.
51. Rochwerg B, Alhazzani W, Gibson A, et al. Fluid type and the use of renal replacement therapy in sepsis: a systematic review and network meta-analysis. *Intensive Care Med* 2015;41:1561-71.
52. Rochwerg B, Alhazzani W, Sindi A, et al. Fluid resuscitation in sepsis: a systematic review and network meta-analysis. *Ann Intern Med* 2014;161:347-55.
53. Loubani OM, Green RS. A systematic review of extravasation and local tissue injury from administration of vasopressors through peripheral intravenous catheters and central venous catheters. *J Crit Care* 2015;30:653 e9-17.
54. Schmidt GA, Girard TD, Kress JP, et al. Official Executive Summary of an American Thoracic Society/American College of Chest Physicians Clinical Practice Guideline: Liberation from Mechanical Ventilation in Critically Ill Adults. *Am J Respir Crit Care Med* 2017;195:115-9.
55. Muscedere J, Dodek P, Keenan S, et al. Comprehensive evidence-based clinical practice guidelines for ventilator-associated pneumonia: prevention. *J Crit Care* 2008;23:126-37.
56. Klompas M, Branson R, Eichenwald EC, et al. Strategies to prevent ventilator-associated pneumonia in acute care hospitals: 2014 update. *Infect Control Hosp Epidemiol* 2014;35:915-36.
57. Marschall J, Mermel LA, Fakih M, et al. Strategies to prevent central line-associated bloodstream infections in acute care hospitals: 2014 update. *Infect Control Hosp Epidemiol* 2014;35:753-71.

© World Health Organization 2020. All rights reserved.

This is a draft. The content of this document is not final, and the text may be subject to revisions before publication. The document may not be reviewed, abstracted, quoted, reproduced, transmitted, distributed, translated or adapted, in part or in whole, in any form or by any means without the permission of the World Health Organization.