

Procedures in relation with the new Coronavirus identified in year 2020. (discovery, identification and report)

1. Pathogen

Coronaviruses are lipid enveloped single-stranded R.N.A. viruses. They are capable of infecting humans and a number of animal species, typically birds and mammals such as camels, cats, bats. Coronaviruses are zoonotic, that is they can spread from animal to human: the detailed epidemiological investigations in connection with the SARS coronavirus of 2003 revealed that the pathogen infecting humans originated from civet cats, while in the case of the MERS-CoV from dromedaries. Currently seven coronaviruses are known to be able to cause human infections and diseases. Coronavirus infections can be of varying severity, ranging from common cold to more severe respiratory disease. Four human coronaviruses usually cause mild to moderate upper respiratory symptoms, while the Middle East respiratory coronavirus (MERS-CoV), SARS-coronavirus can cause serious, even life-threatening respiratory illnesses. (Human cases caused by the SARS-coronavirus were eliminated by the disease control measures of 2003.)

In the background of the pneumonia epidemic developed in Wuhan in late 2019 a newly emerged virus belonging to the beta-coronavirus family, currently known as **2019-nCoV Wuhan coronavirus**, has been identified, which is genetically the closest to the SARS-coronavirus. The new-onset virus was identified from Wuhan pneumonia patient samples and direct virus cultures through next-generation sequencing; the electron microscope image shows the characteristic crown-like morphology of the pathogen.

2. The source of the infection: currently unknown.

The common epidemiological link between the initial cases and the Wuhan marine and live animal market strongly suggests the role of an animal present there as a **zoonotic source** in the outbreak of the disease, however, its identity is currently unknown. The human-to-human transmission of the new Wuhan coronavirus has been confirmed: humans can be the source of infection. To our present knowledge, human-to-human transmission occurs in close association (e.g. exposure in a healthcare system, infection in a family, collective household).

3. Method of propagation: the human to human transmission of the new Wuhan coronavirus (2019-nCoV) has been confirmed. Coronaviruses typically spread by drip infection and direct or indirect contact with infected secretions.

4. Incubation period: according to current data an average of 7 days (2-12 days).

5. Significant symptoms: to the best of our knowledge, the disease is associated with fever, cough, respiratory distress, and radiological abnormalities characteristic of pneumonia. The disease can manifest with mild, moderate and severe symptoms including severe pneumonia, ARDS, sepsis and septic shock.

6. Duration of infectivity: unknown.

7. What to do with the patient:

7.1. Report:

Patients meeting the following case definition (under investigation, probable, confirmed case) will be reported promptly, by telephone, by the attending physician (e.g. GP, outpatient specialist, ambulance service) to the Disease Control Department of the District Office of the competent county government office while in hospital, directly to the Department of Public Health of the competent county government office. Outside working hours to the county government office. The district officer responsible for public health affairs immediately informs the Department of Public Health of the County Government Office.

Immediately after assessing the information, the disease control manager of the county government office reports the case with the personal identity data to the Epidemiology and Infection Control Department of the National Centre for Public Health (NNK), outside working hours to the office on duty of NNK. The NNK forwards the data to WHO. (*WHO expects member states to report probable and confirmed cases within 24 hours of classification.*)

The data sheet compiled based on data required by WHO shall be **filled in with the available data** and sent to NKK Department of Epidemiology and Infection Control within **24 hours**; **e-mail address:** jarvany.titkarsag@nnk.gov.hu. If the laboratory data are available, the updated data sheet should be resubmitted. Further updates to the data sheet are also required when other major changes are notified.

7.1.1. Classification of cases

7.1.1.1. Suspicious case / Case under investigation

A. Serious acute respiratory disease patient (SARI) with fever ($\geq 38^{\circ}\text{C}$), cough; condition justifies hospitalization

AND

clinical condition not fully explained by other reasons (atypical clinical picture may be present in immunocompromised individuals)

AND at least one of those below:

- Travelled to or stayed in Wuhan (province Hubei) within 14 days prior to the onset of the disease, or
- patient is a healthcare professional who provides care for patients with severe acute respiratory syndrome of unknown etiology.

B. Patients with acute respiratory syndrome (regardless of the severity of the clinical picture),

AND at least one of those below:

- who was in close contact with a patient with a confirmed or suspected Wuhan New Coronavirus (2019-nCoV) syndrome within 14 days prior to the onset of the disease; or
- who visited or worked in the Wuhan live animal market in Hubei, China, in the 14 days preceding their illness; or
- who worked in or visited a health facility reporting new Wuhan coronavirus infections in the 14 days prior to their illness.

Considered as close contact: a family member or health care worker caring for or staying in the immediate vicinity of the probable or confirmed case for more than 15 minutes at the time of the symptoms. This includes anyone living with, visiting or spending 15 minutes in the presence of a patient who produces probable or confirmed symptoms of the new Wuhan coronavirus at the time.

7.1.1.2. Probable case

A suspected case, whose 2019-nCoV laboratory test result is doubtful, or whose pan-coronavirus test is positive.

7.1.1.3. Confirmed case

Any person who has been confirmed by a laboratory method to be infected with the new Wuhan coronavirus.

7.2. Isolation: Required. Even the separation of suspected and probable cases is mandatory.

Isolation within hospitals is mandatory.

Until further action, the patient should be referred to the **South Pest Central Hospital - National Institute of Hematology and Infectology (DPC)** for appropriate separation and care.

7.2.1. Infection control precautionary measures during patient care

Taking into account what is known so far about the new Wuhan coronavirus and the mode of transmission of coronaviruses, the proposed infection control practice in healthcare institutions to prevent the spread of the new coronavirus is similar to that used to prevent severe acute respiratory syndrome (SARS).

Basic principles of infection prevention in healthcare:

- A. Early detection and isolation
- B. Application of infection control precautionary measures in patient care
- C. Environmental and device disinfection
- D. Education of health workers and visitors
- E. Provision of material and personal conditions

A. Early detection and isolation

- Early identification of patients suspected of being infected, based on clinical signs and history, and immediate isolation of suspected cases are necessary. A thorough questioning of the patient is most important when recording a medical history.

- **If a suspected infection is identified, the patient should be isolated immediately.** A patient subject to suspected (under investigation), probable or confirmed infection from a new coronavirus disease should be placed in a well ventilated, preferably comfortable, single room. If no separate ward is available, cohort isolation is possible, but the beds should be at least one metre apart. The door of the ward must be kept closed. Probable or confirmed cases caused by the new coronavirus should be placed in a ward with negative pressure (lower than its surroundings), if possibilities are provided.

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If healthcare professionals treating new coronavirus patients produce respiratory symptoms within 14 days of the last contact with the case, they shall report the appearance of symptoms to the hospital hygiene service.

B. Application of infection control precautionary measures in patient care

- In addition to the basic (standard) protective measures in case of suspected (under investigation), probable or confirmed disease caused by the new coronavirus, the precautionary measures to prevent contamination caused by drip infection and direct or indirect contact should be followed. During procedures involving aerosol formation, respiratory isolation rules must be followed.

Of the precautionary measures against the basic, standard, drip and contact infection mentioned above, the following should be emphasised:

- The application of good hand hygiene practices in accordance with the "five moments of hand hygiene" principle, strictly adhering to the care of all patients.
- In the isolation ward personnel should wear personal protective equipment: face mask (surgical mask), gloves (disposable), gown (long sleeve, disposable).
- If the patient's condition permits, the patient should also wear a surgical mask.
- Only health care professionals involved in the treatment of the patient can enter the ward, the number of other hospital staff (including cleaners) must be limited, and all personnel involved must be registered.
- In the treatment of the patient, preferably disposable devices should be used. Non-disposable devices must be disinfected/sterilized according to the manufacturer's instructions.
- Continuous disinfection of the ward is required. Final disinfection should be performed in the ward after the patient leaves.
- The patient's linen should be collected in the ward in an "infectious" bag.
- Patients must not leave the ward without due reason.
- In the event of a justified departure from the ward (examination of the patient, transfer to another institution, etc.), care must be taken for the patient to wear a face mask (surgical mask). Protective equipment and hand disinfection are also mandatory for patient transport personnel. Prior consultation must take place with the examining department to make sure the disinfection site can be cleaned after the patient is examined.
- Visitors can enter the ward after registration and must use protective equipment and hand disinfection.

Of the above-mentioned precautionary rules to prevent respiratory infection the ones below are emphasised:

- Goggles or face shields should be worn when treating a patient with respiratory symptoms who needs close contact during treatment, as the patient's coughing or sneezing may result in a spray-like secretion.
- During interventions including the production of aerosol (e.g. intubation, extubation, bronchoscopy, airway aspiration, mechanical and positive pressure face mask

ventilation), the health worker should wear safety goggles, a face shield and respiratory protective equipment (N95 – N149 standard FFP3) as well as gloves (disposable) and long-sleeved protective clothing made of waterproof material. Interventions involving aerosol formation should preferably be performed in a well-ventilated, separate ward/examination room. A possible minimum of personnel should participate in the intervention.

C. Environmental and device disinfection

Continuous and final disinfection of the environment with a virucidal agent is required. The coronavirus has a lipid envelope, so most single-phase (cleaning, disinfectant) agents are effective.

D. The education of health care staff and visitors

- Personnel and visitors must be trained in proper hand hygiene, respiratory hygiene, cough etiquette, and the proper use of personal protective equipment. Education is the responsibility of the health institution.

E. Provision of material conditions

- The permanent availability of the necessary (disposable and other) equipment in the appropriate quantity for health professionals is essential for the continued application of basic (standard) precautionary measures and the prevention of drip and contact infections. It is the responsibility of the health care institution to provide the equipment.

Additional information for primary care and outpatient care providers:

- Wearing a surgical mask and ventilating the examination room whenever possible during the treatment of patients with respiratory symptoms is justifiable.
- Surgical mask, disposable gloves and gown are mandatory when treating a patient suspected of infection from the new Wuhan coronavirus.
- Other protective equipment may be warranted, subject to necessary care (see above: Infection Control Precautions).
- Good hand hygiene practices should be applied in accordance with the "five moments of hand hygiene" principle, in strict adherence to the care of all patients.
- Early detection based on symptomatology and possible travel history and other relevant information (e.g. travel of a family member) is important.
- The patient should not use public transport, but should be transported to the hospital individually by car, wearing a surgical mask and, if necessary, by ambulance.
- Adherence to environmental and device disinfection rules (e.g. patient examination table, stethoscope, thermometer, other reusable devices) during patient care.
- When examining the patient at home, the physician should make the above protective equipment and an alcoholic hand disinfectant available for themselves, and ensure the proper collection and disposal of the hazardous waste generated.

Supplementary information for the transport of a patient suspected of infection with the new Wuhan coronavirus by ambulance:

- A patient suspected of infection with the new Wuhan coronavirus should not be transported with another patient (unless the other patient being transported is suspected of having the same infection). The receiving institution must be informed of the case in advance in order to be properly prepared.
- Strict hand hygiene with alcohol-based hand disinfectant and the use of personal protective equipment such as face mask (surgical mask), gloves (disposable), cloak (long sleeves, disposable) is necessary.
- The driver of the ambulance must also wear a surgical mask during transport. During transportation, personnel should not touch their face, nose, eyes, hair, contact lenses, and should not eat, drink or smoke.
- Necessary procedures are recommended with using disposable devices. Used reusable devices must be disinfected/sterilized according to the manufacturer's instructions.
- Procedures involving aerosol formation (e.g. intubation, airway aspiration) should be performed with full mouth-nose protection, so operators should wear safety goggles, face shield and respiratory protection devices (N95 - EN 149 standard FFP3), gloves (disposable) and long-sleeved clothing made of waterproof material.
- For the hazardous waste generated, a container of suitable size must be used in the rescue vehicle.
- After transport, the ambulance car along with all its equipment must be disinfected with a virucidal agent and wearing protective equipment. The disinfection shall be documented.
- If health care staff treating a patient suffering from or suspected of suffering from the new Wuhan coronavirus disease develop respiratory symptoms within 14 days of contact, they must immediately notify their employer of the appearance of such symptoms.

7.3. Micro-biological test: Mandatory. As stated in the notice of laboratory sampling – subject to prior notice – deep airway/respiratory secretions and blood/whey should be sent to NNK Respiratory Viruses Reference Laboratory for direct detection and serological testing.

8. Action to be taken in the patient's environment

8.1. Finding persons in contact with the patient: It is mandatory to detect any person who was in close contact with the patient the time the symptoms set on. This is done by the epidemiological department of the district office competent for the patient's home address/place of residence in Hungary, in cooperation with the public health department of the competent county government office, if necessary.

Close Contact:

Family member or health care worker who cares for or stays in a closed area in the immediate vicinity of the probable or confirmed case for more than 15 minutes.

8.2. Microbiological screening for epidemiological reasons: not necessary.

8.3. Epidemiological surveillance:

Any asymptomatic person who has been in close contact with a patient suspected or confirmed of being infected with the new Wuhan coronavirus while having such symptoms must be placed

under epidemiological monitoring to detect the possible appearance of the typical fever and respiratory symptoms immediately.

In the course of an epidemiological investigation, the disease control department of the regionally competent district office will search for people who have stayed in close contact with the patient and place persons (including health workers) under 14 days' monitoring control who have stayed in close contact with a patient confirmed or suspected to produce symptoms caused by the new Wuhan coronavirus. The contacts can be isolated at home. The symptoms of the epidemiologically monitored are checked daily by a telephone call from members of the authority.

If symptoms develop within 14 days of contact, the newly diagnosed patient should be classified as a "patient under examination", regardless of the severity of the disease, and should be treated accordingly.

8.4. Post-exposure prophylaxis: -

8.5. Infectious Source Research: mandatory

8.6. Detection of infectious medium:-

9. Prevention: Travellers to China are advised to avoid contact with feverish, coughing people and to pay close attention to their personal hygiene. Avoid live animal markets, direct contact with live animals in the affected area without personal protective equipment. Avoid consuming raw or improperly heat-treated animal products. Passengers are advised to be aware of the current incidence and characteristics of the disease and to contact their GP/treating physician when experiencing upper respiratory symptoms, and to inform the health care provider about their travel history.

The above procedure has been compiled on the basis of the recommendations and regulations of the World Health Organization and the European Centre for Disease Prevention and Control and will be updated in the event of changes in the recommendations of international organizations.