BMJ Best Practice

Overview of 2019 novel coronavirus (2019-nCoV)

The right clinical information, right where it's needed

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Introduction

The 2019 novel coronavirus (2019-nCoV), also known as nCoV or Wuhan novel coronavirus (there is no internationally agreed name as yet), has been identified during an outbreak of pneumonia in Wuhan City, Hubei Province, China. Investigations to learn more about the novel coronavirus, its origin, and how it affects humans are ongoing, and the situation is evolving rapidly. Cases have now been reported in 18 countries.

China's National Health Commission has confirmed human-to-human transmission, with health care workers currently among the infected.[1] Human-to-human transmission has also been reported outside of China, with one case confirmed in Vietnam.[2] Other cases have been reported in Germany and Japan. It is possible that asymptomatic carriers may be able to infect people; however, this is yet to be confirmed.

WHO convened an emergency committee to ascertain whether the outbreak constitutes a public health emergency of international concern (PHEIC) on the 22-23rd January, 2020 and decided that the event did not constitute a PHEIC at this time; however, the committee stands to be reconvened quickly should it be deemed necessary.[3]

WHO currently assesses the risk of this event to be very high in China, high at the regional level, and high at the global level.[4] Governments around the world are currently repatriating their citizens from Hubei Province.

Epidemiology

- On the 31st December, 2019, WHO was informed of 44 cases of pneumonia of unknown microbial aetiology associated with Wuhan City, Hubei Province, China. Most of the patients in the outbreak reported a link to a large seafood and live animal market (Huanan South China Seafood Market), which has been closed since the 1st January, 2020 for environmental sanitation and disinfection.[5]
- On the 9th January 2020, WHO announced that a novel coronavirus that has not previously been identified in humans had been detected in samples taken from patients in Wuhan City. Laboratory tests ruled out SARS-CoV, MERS-CoV, influenza, avian influenza, and other common respiratory pathogens.[6]
- As of the 28th January, China's National Health Commission have reported 5974 confirmed cases and 9239 suspected cases across 30 provinces in China. The majority of cases are in Hubei Province. An additional 23 cases have been reported in Hong Kong, Macau, and Taiwan (special administrative regions of China). At least 132 deaths have been reported.[7]
- More than 70 cases have also been confirmed in the following countries:
    - United Arab Emirates
    - Germany
    - Sri Lanka
    - Cambodia
    - Canada
    - Malaysia
    - Australia
    - France
    - Nepal

- United States
- Singapore
- Vietnam
- The Republic of Korea
- Japan
- Thailand

- There have been no deaths reported outside China. The situation is evolving rapidly and the latest case counts may be higher.
- [WHO: novel coronavirus (2019-nCoV) situation reports]

Etiology

- Novel coronavirus is a betacoronavirus. Coronaviruses are a large family of viruses, some of which cause illness in people (e.g., common cold, severe acute respiratory syndrome [SARS], Middle East respiratory syndrome [MERS]), and others that circulate among animals such as bats and camels. Rarely, animal coronaviruses can spread to humans, and then spread between people as was the case with MERS and SARS.
- The majority of patients in the initial outbreak in Wuhan City reported a link to Huanan South China Seafood Market, which suggests a zoonotic origin of the virus. The animal reservoir is unknown at this point, but one study suggests that the virus may be a recombinant virus between the bat coronavirus and an origin-unknown coronavirus, possibly from snakes;[8] however, there is no evidence to support this. A growing number of patients in China have not reported exposure to live animal markets.
- The full genome of the virus has been published in GenBank. [GenBank]

Diagnosis

- Current estimates of the incubation period range from 2 to 10 days according to WHO.[9]
- Diagnosis should be suspected in patients with signs and symptoms of pneumonia who report a travel history to an affected location, or who report direct contact with a person with confirmed or suspected novel coronavirus infection in the 14 days prior to symptom onset. Suspected cases should be reported to the relevant local health authorities.
- Most patients are presenting with mild illness, with approximately 20% of cases progressing to severe disease.[4] A prospective analysis of the first 41 patients admitted to hospital with confirmed novel coronavirus infection found that most of the infected patients were men (73%) and the median age was 49 years. The most common symptoms were fever (98%), cough (76%), and myalgia or fatigue (44%). Less common symptoms included sputum production (28%), headache (8%), haemoptysis (5%), and diarrhoea (3%). Dyspnoea developed in 55% of patients (median 8 days from onset of symptoms), and 63% of patients had lymphopenia. All patients had pneumonia with abnormal findings (bilateral ground-glass opacity or consolidation) on chest CT. Complications included acute respiratory distress syndrome, acute cardiac injury, and secondary infection. Clinical presentations resembled SARS; however, fewer patients with novel coronavirus had prominent upper respiratory tract symptoms (e.g., rhinorrhoea, sneezing, sore throat) or gastrointestinal symptoms (e.g., diarrhoea).[10]
- WHO have published an interim case definition for human infection with novel coronavirus. [WHO: surveillance case definitions for human infection with novel coronavirus (nCoV)]
- WHO have published interim guidance for laboratory testing to confirm diagnosis. [WHO: laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases]

Management

- There is no evidence to recommend any specific treatment for suspected or confirmed novel coronavirus infection. Management should follow recommendations for other severe acute respiratory infections and includes isolation of suspected and confirmed cases, appropriate infection control measures (standard, droplet, airborne, and contact precautions), managing sepsis if present, supportive therapies (e.g., oxygen, fluid management, empirical antibiotics, intubation, mechanical ventilation), and close monitoring. There are no specific antiviral treatments available; however, some existing antivirals are being used as part of clinical trials.[11]
- WHO have published interim guidance on the management of patients with novel coronavirus infection. [WHO: clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected]
- WHO have published interim guidance on the management of patients with mild infection at home and contacts. [WHO: home care for patients with suspected novel coronavirus (nCoV) infection presenting with mild symptoms and management of contacts]

Prevention

- There is no vaccine available.
- WHO have published interim guidance on infection control and prevention during health care. [WHO: infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected]
- The US Centers for Disease Control and Prevention (CDC) recommend that travellers should avoid all non-essential travel to China (level 3 alert). Chinese officials have closed transport into and out of Wuhan City and other areas in Hubei Province including buses, subways, trains, and airports. Other locations may be affected. [CDC: travelers' health - novel coronavirus in China] Other countries, including the UK, are also advising citizens to avoid nonessential travel to China; check local guidance.
- WHO advise international travellers to practice usual precautions while travelling in or from affected areas, including: avoiding close contact with people suffering acute respiratory infections; frequent hand washing, especially after contact with people who are ill or their environment; practicing appropriate cough etiquette; avoiding consumption of raw or undercooked animal products; and avoiding close contact with live or dead farm or wild animals. [WHO: novel coronavirus (2019-nCoV) travel advice]
- A number of countries are actively screening incoming travellers from Hubei Province at airports for signs and symptoms of infection.
- China's National Health Commission have classified novel coronavirus as a grade A infectious disease which requires the strictest prevention and control measures, including mandatory quarantine of patients and observation for those who have had close contact with patients.[12] Numerous cities in China are now on lockdown with travel bans and public transport services suspended.

Prognosis

- The overall case fatality rate appears to be approximately 3% based on initial case reports; however, this estimate should be treated with caution as the true number of infections and disease course are still unknown at this time. Most of those who died were older and/or had underlying health conditions. Case fatality rates were approximately 37% for MERS and 10% for SARS.[13]

Other guidelines

- [CDC: interim guidance for healthcare professionals]
- [CDC: interim infection prevention and control recommendations for patients with known or patients under investigation for 2019 novel coronavirus (2019-nCoV) in a healthcare setting]

- [CDC: interim guidance for implementing home care of people not requiring hospitalization for 2019 novel coronavirus (2019-nCoV)]
- [CDC: information for laboratories]
- [Public Health England: Wuhan novel coronavirus (WN-CoV)]

Resources

- [BMJ: coronavirus]
- [WHO: novel coronavirus (2019-nCoV)]
- [CDC: 2019 novel coronavirus, Wuhan, China]
- [WHO: novel coronavirus (2019-nCoV) advice for the public]

Conditions

◊ Middle East respiratory syndrome (MERS)

» see our comprehensive coverage of Middle East respiratory syndrome (MERS)

An acute viral respiratory tract infection caused by the novel betacoronavirus MERS-CoV, first identified in Saudi Arabia in 2012. Cases have been limited to the Arabian Peninsula and its surrounding countries, and to travellers from the Middle East or their contacts.

◊ Severe acute respiratory syndrome (SARS)

» see our comprehensive coverage of Severe acute respiratory syndrome (SARS)

A viral pneumonia that rapidly progresses to respiratory failure caused by the novel SARS-CoV coronavirus. There have been no reported cases since 2004.

◊ Avian influenza A (H5N1) virus infection

» see our comprehensive coverage of Avian influenza A (H5N1) virus infection

Highly pathogenic avian influenza (HPAI) A H5N1 virus originates in poultry and wild birds can be transmitted to humans, with rare cases of infection transmitted between humans.

◊ Avian influenza A (H7N9) virus infection

» see our comprehensive coverage of Avian influenza A (H7N9) virus infection

Geographically focused in China and associated with exposure to infected poultry. Five annual epidemic waves of human cases occurred from 2013 to 2017. Case clusters of limited human-to-human transmission have been described, but there is no evidence of sustained transmission.

◊ Influenza infection

» see our comprehensive coverage of Influenza infection

Acute respiratory tract infection typically caused by seasonal influenza A or B virus. The virus is transmitted by inhalation of infected respiratory secretions that have been aerosolised through coughing, sneezing, or talking.

◊ Community-acquired pneumonia

» see our comprehensive coverage of Community-acquired pneumonia

Pneumonia acquired outside hospital or healthcare facilities. Clinical diagnosis is based on a group of signs and symptoms related to lower respiratory tract infection with presence of fever, cough, expectoration, chest pain, dyspnoea, and signs of invasion of the alveolar space.

◊ Atypical pneumonia

» see our comprehensive coverage of Atypical pneumonia

Atypical bacterial pneumonia is caused by atypical organisms that are not detectable on Gram stain and cannot be cultured using standard methods.

◊ Acute respiratory distress syndrome

» see our comprehensive coverage of Acute respiratory distress syndrome

Non-cardiogenic pulmonary oedema and diffuse lung inflammation syndrome that often complicates critical illness. Possible complication of novel coronavirus infection.

◊ Sepsis

» see our comprehensive coverage of Sepsis

Life-threatening organ dysfunction caused by a dysregulated host response to an infection. Possible complication of novel coronavirus infection.

◊ Shock

» see our comprehensive coverage of Shock

Life-threatening failure of adequate oxygen delivery to the tissues and may be due to decreased blood perfusion of tissues, inadequate blood oxygen saturation, or increased oxygen demand from the tissues that results in decreased end-organ oxygenation and dysfunction. Possible complication of novel coronavirus infection.

Online resources

1. WHO: novel coronavirus (2019-nCoV) situation reports *(external link)*
2. GenBank *(external link)*
3. WHO: surveillance case definitions for human infection with novel coronavirus (nCoV) *(external link)*
4. WHO: laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases *(external link)*
5. WHO: clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected *(external link)*
6. WHO: home care for patients with suspected novel coronavirus (nCoV) infection presenting with mild symptoms and management of contacts *(external link)*
7. WHO: infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected *(external link)*
8. CDC: travelers' health - novel coronavirus in China *(external link)*
9. WHO: novel coronavirus (2019-nCoV) travel advice *(external link)*
10. CDC: interim guidance for healthcare professionals *(external link)*
11. CDC: interim infection prevention and control recommendations for patients with known or patients under investigation for 2019 novel coronavirus (2019-nCoV) in a healthcare setting *(external link)*
12. CDC: interim guidance for implementing home care of people not requiring hospitalization for 2019 novel coronavirus (2019-nCoV) *(external link)*
13. CDC: information for laboratories *(external link)*
14. Public Health England: Wuhan novel coronavirus (WN-CoV) *(external link)*
15. BMJ: coronavirus *(external link)*
16. WHO: novel coronavirus (2019-nCoV) *(external link)*
17. CDC: 2019 novel coronavirus, Wuhan, China *(external link)*
18. WHO: novel coronavirus (2019-nCoV) advice for the public *(external link)*

Key articles

References

1. National Health Commission of the People's Republic of China. Top expert: disease spread won't be on scale of SARS. Jan 2020 [internet publication]. Full text

2. The New England Journal of Medicine. Importation and human-to-human transmission of a novel coronavirus in Vietnam. Correspondence. Jan 2020 [internet publication]. Full text

3. World Health Organization. Statement on the meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). Jan 2020 [internet publication]. Full text

4. World Health Organization. Novel coronavirus (2019-nCoV). Situation report -8. 28 Jan 2020 [internet publication]. Full text

5. World Health Organization. Pneumonia of unknown cause – China. Disease outbreak news. Jan 2020 [internet publication]. Full text

6. World Health Organization. Novel coronavirus - China. Disease outbreak news: update. Jan 2020 [internet publication]. Full text

7. National Health Commission of the People's Republic of China. Update on pneumonia of new coronavirus infection as of 24:00 on January 28. Jan 2020 [internet publication]. Full text

8. Ji W, Wang W, Zhao X, et al. Homologous recombination within the spike glycoprotein of the newly identified coronavirus may boost cross-species transmission from snake to human. J Med Virol. 2020 Jan 22. Abstract

9. World Health Organization. Novel coronavirus (2019-nCoV) situation report - 6. 26 Jan 2020 [internet publication]. Full text

10. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 Jan 24. pii: S0140-6736(20)30183-5 [Epub ahread of print]. Full text

11. Chinese clinical trial registry. A randomized, open-label, blank-controlled trial for the efficacy and safety of lopinavir-ritonavir and interferon-alpha 2b in hospitalization patients with novel coronavirus infection. Registration number: ChiCTR2000029308 .Jan 2020 [internet publication]. Full text

12. National Health Commission of the People's Republic of China. Strictest measures enacted to contain viral pneumonia. Jan 2020 [internet publication]. Full text

13. Wang C, Horby PW, Hayden FG, et al. A novel coronavirus outbreak of global health concern. Lancet. 2020 Jan 24. pii: S0140-6736(20)30185-9 [Epub ahead of print]. Full text

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