

**Cover Letter**

**Clinical Characteristics, Transmission Methods and Laboratory Diagnosis of COVID-19**

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We affirm that the submission represents work that has not been published previously and is not currently being considered by another journal. Also, I confirm that each author has seen and approved the contents of the submitted manuscript.

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Received: 14 April 2020 Revised and Accepted: 8 August 2020

**Abstract:**

A number of 2019 Revised Coronavirus Pneumonia (SARS-CoV-2) reports in Wuhan, China, have been stirring around the world outrage in late December 2019. Previous reports of coronavirus disease 2019 have identified epidemiological and clinical characteristics. Considered a subset of extreme Acute Respiratory Syndrome (SARS), and Middle East Respiratory Syndrome (MERS), COVID-19 is caused by a SARS-CoV-2 betacoronavirus which affects the lower respiratory tract and is present in humans as a pneumonia. Given extensive isolation and quarantine globally measures, COVID-19 appears to escalate in occurrence, with 1,119,702 laboratory-confirmed cases and more than 59,245 fatalities, and 229,338 worldwide retrieved. The aim of this brief analysis is to summarize certain existing reports on the clinical characteristics and COVID-19 epidemiology and dissemination and laboratory research as of late February 2020.

**key words:**COVID-19.SARS-CoV-2.Epidemiology. Viral.Novel Coronavirus.pneumonia.

**Introduction:**

Tyrrell and Bynoe had identified the first coronavirus in 1966. (1) They isolated the virus from human patients with the common cold. (2) Corona is a Latin word that is mean a crown. Coronavirus as a spherical virion was shown depending on the morphological characteristics of the virus. Coronaviruses are the OrthocoronavirinaeCoronaviridae family subfamily, Nidovirales order and Kingdom of Ribovirius. (3) They found four subfamilies of Coronavirus (alpha, beta, gamma, delta). (4) The Beta and the Alpha are infected mammals, especially from bats while, the gamma and delta infect the birds and pigs. (1) In the last two decades, the two viruses belong to the beta coronavirus have shown to be successful to infect and transmission to the human as well.(5)SARS – Severe acute respiratory syndrome (SARS) epidemic in Southern China(2002) with rapid spread led to a global issue with lethality about 774 from a total of 8000 human cases.(6)Furthermore this issue becomes too epidemic by SARS-CoV.(7)Advanced coronavirus speciesMERS-CoV (Middle East Respiratory Coronavirus) epidemic in 2012 during KSA (Saudi Arabia);and 17 countries and more than MERS-CoV classify as zoonotic diseases).(8)Middle East Coronavirus Respiratory Transmission Successful from camels into a human to human. The cases fatality about 36% with 919 deaths from total 2521 cases in the worldwide. (9)The data indicate that the SARS-CoV and MERS-CoV were seen as possible species that could be implicated in future corona virus-related human pandemic. (10)A new form of coronavirus has recently been identified in December 2019 as a Novel Corona Virus (2019-nCoV) or (COVID 19) (is the coronavirus last name mentioned) epidemic. Human patients from Wuhan China of uncertain etiology have been separated from acute pneumonia. (11)These coronaviruses are covered with a strong, single-stranded RNA genome and helical symmetry. nucleocapsid is named.(12)Furthermore, the severity from the common cold to beLethal ones like SARS, MERS, the clinical characteristics of COVID-19 are cough, fever followed by vomiting, diarrhea, hemorrhage, a deficit in metabolic acidosis, coagulation dysfunction, and finally, it may cause an organic failure in the lungs and kidneys. (13)Figure:1 indicates how many situations China has with other nations. (14)The aim of this brief analysis is to summarize certain existing reports on the clinical characteristics and COVID-19 epidemiology and dissemination and laboratory research as of late February 2020.

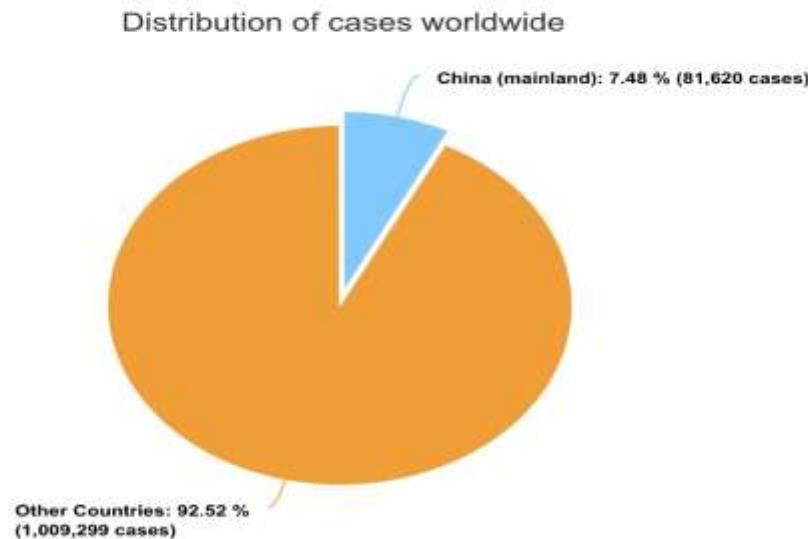


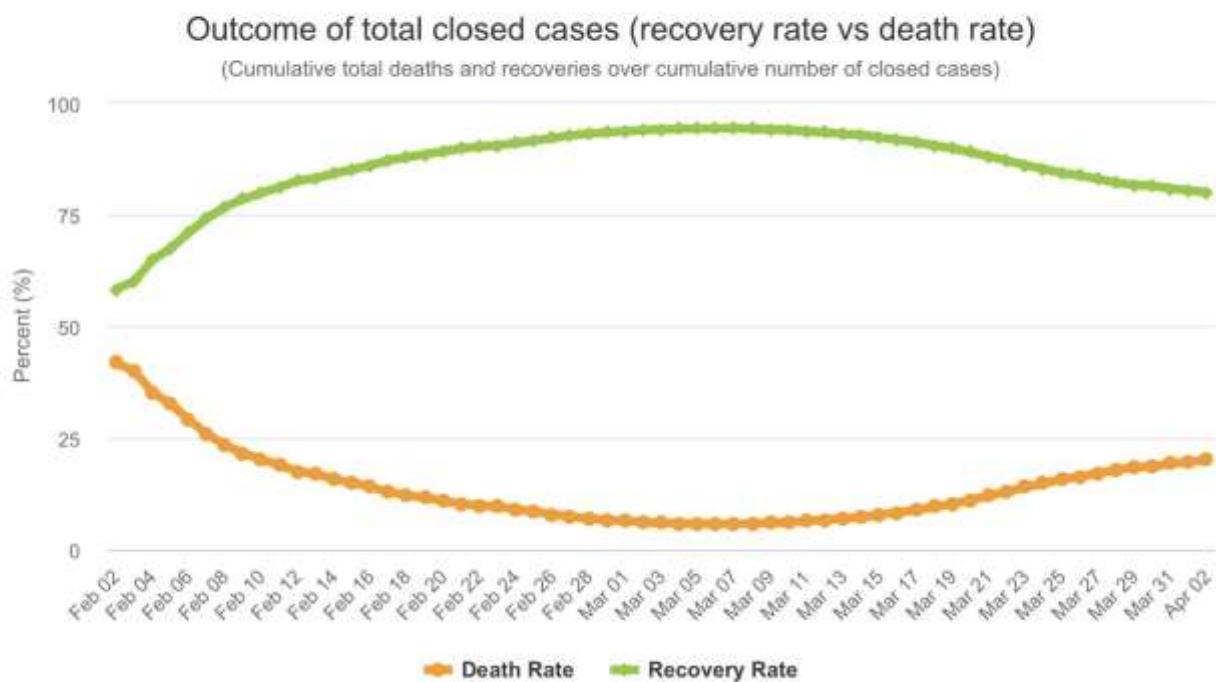
Figure 1:number of cases between China and other countries of COVID-19

#### Clinical characteristics and Epidemiology:

Human coronavirus has been validated as Most of the most significant breathing infection pathogens; SARS-CoV and MERS-CoV, two relatively pathogenic viruses; reason the extreme breathing syndrome in people and 4 other Human coronary viruses (HCoV-OC43, HCoV-229E, HCoV-NL63 and HCoVHKU1) caused relatively higher respiratory diseases. (15)WHO information was provided the fitness emergency Dashboard (March 14, 06.00 am CET) file 142.320 confirmed cases in the worldwide because the beginning of the epidemic (3.78%) of instances have been fatal. COVID-19 sufferers have been the primary source of contamination, and the severe patients were considered the most contagious than the moderate ones. Asymptomatically affected persons or patients with a period of incubation who have reported no signs or symptoms of respiratory infection indicated by the release of the infectious virus can be additionally capable properties. (16)In fact, samples obtained from patients who recovered from COVID-19 consistently confirmed a great RT-PCR analysis. (17)That was never seen in human infectious disease records. Even as asymptomatically infectious individuals and patients During incubation or recuperation with COVID-19 will present significant challenges to disease prevention and control. Infection continuum COVID-19 was treated as a method of infectious disease self-prescribing, and much of patients with moderate symptoms will recover within 1 to 2 weeks. Contamination of SARS-CoV-2 will affect five separate outcomes: asymptomatically contaminated individuals in (1.2%); mild to medium in (80.9%); severe instances in (13.8%); important case in (4.7%) and death in (2.3%) of all suggested cases. (18)Figure 2 There are reportedly 228,001 recovered and 58,392 fatalities as of April 03, 2020, 20:03 GMT from the COVID-19 coronavirus outbreak (19)Some studies indicate that the Viruses 2020, 12, 372 6 of 17 percentage of asymptomatic infection in kids under the 10-years vintage is as high as (15.8%). (20)So that, the proportion of asymptomatic contamination have to be more uncovered within the future. The preliminary outbreak (eight December 2020) most effective came about in Wuhan and its environment in Hubei Province earlier than an imported instance had been first pronounced in Guangdong Region, January 19, 2020. (21)As of 30 January 2020, although the first imported cases had been registered in the Tibet Region, COVID-19 has spread to all 31 regions across the mainland of China. (22)Patients with basic structural conditions display Bad foresight. Event – Fatality in events without major diseases was the lowest at 0.9 per cent, while case-fatality at

patients of asthma, coronary disease, chronic respiratory disease, cancer and hypertension have been 7.3%, .5%, 6.3%, 5.6%, and 6.0%, respectively; In addition to the important Cases have the highest case-lapse performance of (49%). (23) Smoking and obesity are also prone factors (24). Between Jan 14, 2020 and Feb 12, 2020 the Shenzhen CDC (6%) showed 391 instances of SARS-CoV-2 contamination of 379 with a recognized mode of detection, 77% have been detected thru symptom-primary based surveillance. Moreover, there have been approximately identical numbers of male and female cases. The results had been regarded The ratio of instances between males and females among living instances was similar (25), At 58%, at most ages 30–59 (statistics incomplete in 9 cases). The dead

## Outcome of Cases (Recovery or Death)



events were higher than males (70%) and elderly (85% were 60 years of age or more).(26)

Figure 2: Coronavirus recovery and deaths from COVID-19 epidemic as of April 03, 2020, 20:03 GMT

### Transmission:

As coronaviruses are a wide family of viruses that are present in several distinct animal groups, these include camels, goats, cats and bats. Rarely, coronaviruses in animals will spread human infection and then Transmission between human to person, such as MERS, SARS and now SARS-CoV-2. (27) The source of this coronavirus outbreak has not been determined yet. Illegal connection of bat is suspected to be the source for entrance of Covid-19 in to human. Initial investigations identified positive sample for COVID-19 cases who visited Seafood and Animal Market in Wuhan City; therefore, this has been identified with the origins of the outbreak. Nevertheless, some laboratory-diagnosed patients indicated little access to this market. A zoonotic origin to this epidemic has to identify yet. Although evidence is continuously coming up, fact till date suggests human-to-human spreading. (28) Much is

unknown about the spread of SARS-CoV-2. Recent knowledge is mainly depending on what is already known about similar coronaviruses. Centered on what is learned today about SARS-CoV-2 and what is known about other coronaviruses with epidemic potential like MERS and SARS, spreading among close contacts is thought about rising respiratory droplets further from person to individual and direct or indirect exposure to infected sources. It is unclear till now that a person can get infection of SARS-CoV-2 if he/she touch a surface or item that has infected and then touch his/her own mouth, nose, or eyes. (29)

**Laboratory screening for coronavirus disease in confirmed clinical infections (COVID-19):**

1-Nucleic acid amplification (NAAT) screens for COVID-19 virus.

The regular validation of COVID-19 cases focuses on detecting different sequences of NAAT virus RNA, such as a real-reverse polymerase chain reaction (rRT-) with nucleic acid sequencing validation if appropriate. The virus genes specifically focused are Genes N, E, S, and RdRP. RNA extraction in a Biosafety Cabinet in a BSL-2 or related plant should be completed. Heat preparation of samples is not recommended prior to RNA extraction. (30)

2-Serological checks.

Serological assessments to assist the examination of an acute epidemic and a longitudinal evaluation of the danger of an assault or the severity of the Epidemic. The outbreak. In situations where NAAT results are negative and the COVID-19 infection has a strong epidemiological link, where reliable serology tests are usable, Diagnosis can be supported by combined serum samples (both acute and convalescent) Serum extracts for certain reasons, may be maintained. Some coronaviruses may be difficult to cross-react, (30) But there are currently clinical serological and non-commercial trials under development few reports have been reported on clinical samples with COVID-19 serological results. (31,32)

3-Sequencing of Virus.

Routine analysis of a percentage of the specimens from clinical cases may be useful in addition to confirming the presence of the virus for screening for modifications in viral genomes that may influence the efficiency in therapeutic countermeasures, including diagnostic testing. Sequencing of the whole genome of viruses will also notify studies of the genetic epidemiology. There are many public access databases for the deposition of data on genetic variations, like GISAID, which is meant to secure the requesting party's interests. (33)

**Conclusion:**

With some variation of initial signs, fever and respiratory symptoms appear in most COVID-19 cases. Travel background to outbreak areas is critical for the diagnosis for now, So all those with flu-like syndromes will have this. Latest epidemic of COVID-19 is deemed a public safety emergency. The number of reported incidents has proceeded to grow worldwide, and is officially put at 1,119,702 laboratory-verified cases and more than 59,245 deaths. It is very clear that quarantine alone would not be adequate to prevent COVID-19 from spreading, and one of the growing problems is the global effect of this viral infection. There is no question that more work is needed to further establish the precise process Human-to-human and animal-to-human transmission and encourage the development of virus-specific vaccines.

**References:****References:**

1. Velavan TP, Meyer CG. The COVID-19 epidemic. Tropical medicine & international health. 2020 Mar;25(3):278. <https://dx.doi.org/10.1111%2Ftmi.13383>
2. Ye ZW, Yuan S, Yuen KS, Fung SY, Chan CP, Jin DY. Zoonotic origins of human coronaviruses. International journal of biological sciences. 2020;16(10):1686. <https://dx.doi.org/10.7150%2Fijbs.45472>

# JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125

VOL 7, ISSUE 15, 2020

3. Zhang L, Liu Y. Potential interventions for novel coronavirus in China: A systematic review. *Journal of medical virology*. 2020 May;92(5):479-90.  
<https://doi.org/10.1002/jmv.25707>
4. Tao Y, Shi M, Chommanard C, Queen K, Zhang J, Markotter W, Kuzmin IV, Holmes EC, Tong S. Surveillance of bat coronaviruses in Kenya identifies relatives of human coronaviruses NL63 and 229E and their recombination history. *Journal of virology*. 2017 Mar 1;91(5). <https://doi.org/10.1128/JVI.01953-16>
5. Chan JF, Li KS, To KK, Cheng VC, Chen H, Yuen KY. Is the discovery of the novel human betacoronavirus 2c EMC/2012 (HCoV-EMC) the beginning of another SARS-like pandemic?. *Journal of Infection*. 2012 Dec 1;65(6):477-89. <https://doi.org/10.1016/j.jinf.2012.10.002>
6. Fung SY, Yuen KS, Ye ZW, Chan CP, Jin DY. A tug-of-war between severe acute respiratory syndrome coronavirus 2 and host antiviral defence: lessons from other pathogenic viruses. *Emerging microbes & infections*. 2020 Jan 1;9(1):558-70..  
<https://doi/full/10.1080/22221751.2020.1736644>
7. Breban R, Riou J, Fontanet A. Interhuman transmissibility of Middle East respiratory syndrome coronavirus: estimation of pandemic risk. *The Lancet*. 2013 Aug 24;382(9893):694-9. [https://doi.org/10.1016/S0140-6736\(13\)61492-0](https://doi.org/10.1016/S0140-6736(13)61492-0)
8. Mohd HA, Al-Tawfiq JA, Memish ZA. Middle East respiratory syndrome coronavirus (MERS-CoV) origin and animal reservoir. *Virology journal*. 2016 Dec;13(1):1-7. <https://doi.org/10.1186/s12985-016-0544-0>
9. Liddle L. Automated search databases at the US patent and trademark office. *World Patent Information*. 1986 Jan 1;8(4):249-53.[https://doi.org/10.1016/0172-2190\(86\)90080-3](https://doi.org/10.1016/0172-2190(86)90080-3)
10. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*. 2020 Feb 15;395(10223):497-506.[https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
11. jalil AT. COVID-19 MOST Affected AGE GROUPS AND LETHALITY IN EUROPE. *Glob. j. public health med.* [Internet]. 2020Jun.1 [cited 2020Aug.21];2(SP1):179-84..<https://doi.org/10.37557/gjphm.v2iSP1.51>
12. Yin Y, Wunderink RG. MERS, SARS and other coronaviruses as causes of pneumonia. *Respirology*. 2018 Feb;23(2):130-7..<https://doi.org/10.1111/resp.13196>
13. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DS, Du B. Clinical characteristics of coronavirus disease 2019 in China. *New England journal of medicine*. 2020 Apr 30;382(18):1708-20.<https://doi.org/10.1056/NEJMoa2002032>
14. Data compiled and analyzed by Worldometer and provided by: [National Health Commission \(NHC\) of the People's Republic of China](#)
15. Su S, Wong G, Shi W, Liu J, Lai AC, Zhou J, Liu W, Bi Y, Gao GF. Epidemiology, genetic recombination, and pathogenesis of coronaviruses. *Trends in microbiology*. 2016 Jun 1;24(6):490-502.<https://doi.org/10.1016/j.tim.2016.03.003>
16. Hu B, Zeng LP, Yang XL, Ge XY, Zhang W, Li B, Xie JZ, Shen XR, Zhang YZ, Wang N, Luo DS. Discovery of a rich gene pool of bat SARS-related coronaviruses provides new insights into the origin of SARS coronavirus. *PLoS pathogens*. 2017 Nov 30;13(11):e1006698. <https://doi.org/10.1371/journal.ppat.1006698>

# JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125

VOL 7, ISSUE 15, 2020

17. Hoehl S, Rabenau H, Berger A, Kortenbusch M, Cinatl J, Bojkova D, Behrens P, Böddinghaus B, Götsch U, Naujoks F, Neumann P. Evidence of SARS-CoV-2 infection in returning travelers from Wuhan, China. *New England Journal of Medicine.* 2020 Mar 26;382(13):1278-80. <https://doi.org/10.1056/NEJMc2001899>
18. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *Jama.* 2020 Apr 7;323(13):1239-42. <https://doi.org/10.1001/jama.2020.2648>
19. Data compiled and analyzed by Worldometer and provided by: [Health Commission of Hubei Province, China.](#)
20. Wang Y, Wang Y, Chen Y, Qin Q. Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID- 19) implicate special control measures. *Journal of medical virology.* 2020 Jun;92(6):568-76. <https://doi.org/10.1002/jmv.25748>
21. Jin Y, Yang H, Ji W, Wu W, Chen S, Zhang W, Duan G. Virology, epidemiology, pathogenesis, and control of COVID-19. *Viruses.* 2020 Apr;12(4):372. <https://doi.org/10.3390/v12040372>
22. Gao Q, Hu Y, Dai Z, Xiao F, Wang J, Wu J. The epidemiological characteristics of 2019 novel coronavirus diseases (COVID-19) in Jingmen, Hubei, China. *Medicine.* 2020 Jun 5;99(23):e20605. <https://dx.doi.org/10.2139/ssrn.3548755>
23. Zou X, Chen K, Zou J, Han P, Hao J, Han Z. Single-cell RNA-seq data analysis on the receptor ACE2 expression reveals the potential risk of different human organs vulnerable to 2019-nCoV infection. *Frontiers of medicine.* 2020 Mar 12:1-8. <https://doi.org/10.1007/s11684-020-0754-0>
24. Jia JS, Lu X, Yuan Y, Xu G, Jia J, Christakis NA. Population flow drives spatio-temporal distribution of COVID-19 in China. *Nature.* 2020 Apr 29:1-5. <https://doi.org/10.1038/s41586-020-2284-y>
25. Bi Q, Wu Y, Mei S, Ye C, Zou X, Zhang Z, Liu X, Wei L, Truelove SA, Zhang T, Gao W. Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: a retrospective cohort study. *The Lancet Infectious Diseases.* 2020 Apr 27. [https://doi.org/10.1016/S1473-3099\(20\)30287-5](https://doi.org/10.1016/S1473-3099(20)30287-5)
26. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, Ren R, Leung KS, Lau EH, Wong JY, Xing X. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. *New England Journal of Medicine.* 2020 Jan 29. <https://doi.org/10.1056/NEJMoa2001316>
27. Qattan I, Aljohani A, Alfarsi M, Aljohani E, Alsubhi M. MERS-CoV: An Epidemic Whirlwind. *Biology and Medicine.* 2016;8(4):1. <http://dx.doi.org/10.4172/0974-8369.1000295>
28. Yang Y, Peng F, Wang R, Guan K, Jiang T, Xu G, Sun J, Chang C. The deadly coronaviruses: The 2003 SARS pandemic and the 2020 novel coronavirus epidemic in China. *Journal of autoimmunity.* 2020 Mar 3:102434. <https://doi.org/10.1016/j.jaut.2020.102434>
29. of the International CS. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nature Microbiology.* 2020;5(4):536. <https://dx.doi.org/10.1038%2Fs41564-020-0695-z>
30. Organization W. Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases: interim guidance, 2 March 2020 [Internet]. Apps.who.int. 2020 [cited 15 May 2020]. Available from: <https://apps.who.int/iris/handle/10665/331329>

# JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125

VOL 7, ISSUE 15, 2020

31. Fan J, Liu X, Shao G, Qi J, Li Y, Pan W, Hambly BD, Bao S. The epidemiology of reverse transmission of COVID-19 in Gansu Province, China. Travel Medicine and Infectious Disease. 2020 May 12;101741.<https://doi.org/10.1016/j.tmaid.2020.101741>
32. Xiao SY, Wu Y, Liu H. Evolving status of the 2019 novel coronavirus infection: Proposal of conventional serologic assays for disease diagnosis and infection monitoring. Journal of medical virology. 2020 May;92(5):464-7. <https://doi.org/10.1002/jmv.25702>
33. Heymann DL, Shindo N. COVID-19: what is next for public health?. The Lancet. 2020 Feb 22;395(10224):542-5.[https://doi.org/10.1016/S0140-6736\(20\)30374-3](https://doi.org/10.1016/S0140-6736(20)30374-3)