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DOCUMENTS INSTITUTIONNELS

Using face masks in the community - Reducing COVID-19 transmission from potentially asymptomatic or pre-symptomatic people through the use of face masks

- The use of medical face masks by healthcare workers must be given priority over the use in the community.
- The use of face masks in public may serve as a means of source control to reduce the spread of the infection in the community by minimising the excretion of respiratory droplets from infected individuals who have not yet developed symptoms or who remain asymptomatic. It is not known how much the use of masks in the community can contribute to a decrease in transmission in addition to the other countermeasures. (...)

ECDC (e-date: 08/04/2020)

[Lien original](#)

Rapid risk assessment: Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – eighth update

Overall, large increases in COVID-19 cases and deaths continue to be reported from the EU/EEA countries and the UK. In addition, in recent weeks, the European all-cause mortality monitoring system showed all-cause excess mortality above the expected rate in Belgium, France, Italy, Malta, Spain, Switzerland and the United Kingdom, mainly in the age group of 65 years and above. (...)

ECDC (e-date: 08/04/2020)

[Lien original](#)

Guidance for discharge and ending isolation in the context of widespread community transmission of COVID-19 – first update.

In the context of widespread community transmission, with ongoing shortages of laboratory consumables and reagents that affect diagnostic capacity, and with significant pressure on the health systems as a whole, the former discharge criteria developed for the early stages of SARS-CoV-2 spread with no apparent sustained community transmission, no pressure on healthcare facilities and optimal laboratory testing capacity are no longer applicable at a large scale. In addition, almost all Member States have in place a stay-at-home strategy for mild cases.(...)

ECDC (e-date: 08/04/2020)

[Lien original](#)

An EU programme of COVID-19 convalescent plasma collection and transfusion . Guidance on collection, testing, processing, storage, distribution and monitored use

This guidance aims to facilitate a common approach across EU Member States to the donation, collection, testing, processing, storage, distribution and monitoring of convalescent plasma for the treatment of Covid-19 patients. The guidance, which is not legally binding, was developed in collaboration with the European Centre for Disease Prevention and Control (ECDC) and is endorsed by the 27 Member State competent authorities for blood and blood components. (...)

European Commission (e-date: 08/04/2020)

[Lien original](#)

Guidelines on the optimal and rational supply of medicines to avoid shortages during the COVID-19 outbreak

European Commission. (e-date: 08/04/2020)

[Lien original](#)

Consignes - Auto-isolement. Ce que vous devez faire si vous souffrez d'une affection aiguë des voies respiratoires et que vous êtes en isolement à la maison

Office fédéral de la santé publique (OFSP) (e-date: 06/04/2020)

[Lien original](#)

Consignes - Auto-quarantaine. Que faire si vous étiez en contact étroit avec une personne souffrant d'une affection aiguë des voies respiratoires ?

Office fédéral de la santé publique (OFSP) (e-date: 08/04/2020)

[Lien original](#)

Recommandations pour des structures telles que les homes pour personnes âgées, les établissements médico-sociaux et les institutions pour personnes handicapées

Office fédéral de la santé publique (OFSP) (e-date: 02/04/2020)

[Lien original](#)

Recommandations : dans le secteur des soins à domicile

Office fédéral de la santé publique (OFSP) (e-date: 09/04/2020)

[Lien original](#)

Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Persons for Coronavirus Disease 2019 (COVID-19)

CDC (e-date: 08/04/2020)

[Lien original](#)

New WHO tools launched to help hospitals manage surge in COVID-19 patients

Two new WHO tools launched today will assist health planners across the WHO European Region to prepare for the surge in COVID-19 patients needing acute and intensive care in hospitals as cases continue to climb. (...)

WHO Europe (e-date: 08/04/2020)

[Lien original](#)

Flowchart for COVID-19 testing for acute respiratory tract infections: general public and employees in healthcare service - NIPH

Flow charts for following up the general public and healthcare employees with acute respiratory tract infections for testing for COVID-19.

Norwegian Institute of Public Health (e-date: 08/04/2020)

[Lien original](#)

Guidance for those who provide unpaid care to friends or family

Guidance for anyone who cares, unpaid, for a friend or family member who cannot cope without their support. This may be because they have a lifelong condition, illness, disability, serious injury, mental health condition or an addiction.

Public Health England (e-date: 08/04/2020)

[Lien original](#)

Practical considerations and recommendations for religious leaders and faith-based communities in the context of COVID-19

This document and risk assessment tool provides practical guidance and recommendations to support the special role of religious leaders, faith-based organizations, and faith communities in COVID-19 education, preparedness, and response.

WHO (e-date: 07/04/2020)

[Lien original](#)

Communiqué de l'Académie : Immunoglobulines hyperimmunes anti-SARS-CoV-2, un choix stratégique urgent

Aucun traitement antiviral n'a à l'heure actuelle clairement démontré son efficacité dans le traitement du COVID-19. L'amélioration spontanée chez la plupart des malades traduit la réponse immunitaire protectrice, liée en particulier aux anticorps neutralisants. La sérothérapie, dont le principe est très ancien, a été utilisée dans les épidémies récentes par les virus Chikungunya, Ebola mais aussi SARS-CoV-1, MERS-CoV et A/H1N1. (...)

Académie de médecine (e-date: 09/04/2020)

[Lien original](#)

Communiqué des Académies nationales de Médecine et de Chirurgie : « Covid-19 et activités chirurgicales »

La pandémie de Covid-19 exerce depuis quelques semaines une très forte pression sur le système hospitalier public et privé. L'afflux de patients gravement atteints a imposé de mettre rapidement à disposition des lits pour ces patients, en particulier dans les secteurs de réanimation et de soins intensifs.

Dans ce contexte, dans de nombreux établissements de santé, la programmation de soins chirurgicaux a dû être reportée afin de mettre des lits de chirurgie à disposition des malades atteints du Covid-19 et d'éviter certaines interventions chirurgicales lourdes réclamant un séjour post-opératoire en réanimation. (...)

Académie de médecine (e-date: 09/04/2020)

[Lien original](#)

Prise en charge de l'infection due au SARS-CoV-2 chez les patients adultes transplantés d'organe solide

Agence de biomédecine (e-date: 09/04/2020)

Société Francophone de Transplantation ; Société Francophone de Néphrologie Dialyse et Transplantation ; Groupe Infection et Immunodépression - Société de pathologie infectieuse de langue française

[Lien original](#)

Recommandation concernant l'activité de prélèvement et de greffe d'organes et de tissus durant l'épidémie de coronavirus le SARS-CoV-2

Lorsque la greffe peut être différée, en particulier lorsqu'est en cause une greffe rénale ou une greffe de tissus, le risque du receveur à être infecté dépasse le bénéfice de la transplantation ; il est donc recommandé d'en repousser la date après le pic épidémique. Il est également recommandé de différer les transplantations rénales à partir de donneur vivant. (...)

Agence de biomédecine (e-date: 09/04/2020)

[Lien original](#)

COVID-19 Assessment and testing pathway for use in a Hospital setting. Version 12.1

Ireland's Health Services (e-date: 08/04/2020)

[Lien original](#)

COVID-19 Telephone assessment and testing pathway for patients who phone general practice and healthcare settings other than receiving hospitals. Version 7.1

Ireland's Health Services (e-date: 08/04/2020)

[Lien original](#)

COVID-19 : Directives de santé publique à l'intention des personnes offrant un service de répit à domicile aux familles d'enfants atteints de déficience physique, de déficience intellectuelle ou de trouble du spectre de l'autisme

En raison de la progression de la maladie à coronavirus COVID-19 au Québec, un service de répit à domicile pour les familles d'enfants présentant une déficience physique (DP), une déficience intellectuelle (DI) ou un trouble du spectre de l'autisme (TSA) peut être nécessaire afin de permettre aux familles de maintenir leurs enfants à domicile plutôt que de demander leur placement dans une ressource intermédiaire ou de type familiale (RI-RTF). (...)

INSPQ (e-date: 09/04/2020)

[Lien original](#)

COVID-19 : Port du masque de procédure en milieux de soins lors d'une transmission communautaire soutenue

La situation épidémiologique de la COVID-19 évolue au Québec. Ainsi, en date du 4 avril 2020, le Directeur national de santé publique du Québec, le Dr Horacio Arruda, annonçait qu'une transmission communautaire soutenue était confirmée dans toutes les régions du Québec.

Dans ce contexte de transmission communautaire soutenue sur tout le territoire québécois, il est nécessaire de réviser nos recommandations pour la protection des travailleurs de la santé. Celle-ci demeure prioritaire, particulièrement face à la possibilité de transmission par des personnes asymptomatiques. (...)

INSPQ (e-date: 08/04/2020)

[Lien original](#)

COVID-19 : Port du masque pour protéger les personnes vulnérables dans les milieux de vie lors de transmission communautaire soutenue

INSPQ (e-date: 09/04/2020)

[Lien original](#)

Sommaire

ARTICLES PUBLIES OU IN PRESS

Invisible spread of SARS-CoV-2 – Authors' reply

We thank Nian Xiong and colleagues for their response to our Article.

Although we separated individuals into exposed and infectious compartments in the basic model, we also considered a sensitivity analysis whereby people became infectious in the second half of their incubation period, and obtained the same conclusion (Article appendix p 12). We allowed the reproduction number, R , to vary over time in our model, rather than simply fix this value, to capture possible variation in transmission as a result of control measures and behaviour change. (...)

The Lancet Infectious Diseases. (e-date: 07/04/2020)

Kucharski AJ, Eggo RM.

[Lien original](#)

Beware of the second wave of COVID-19

The outbreak of coronavirus disease 2019 (COVID-19), which began in Wuhan, China, in late 2019, has spread to 203 countries as of March 30, 2020, and has been officially declared a global pandemic.

With unprecedented public health interventions, local transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) appears now to have been contained in China. Multiple countries are now experiencing the first wave of the COVID-19 epidemic; thus, gaining an understanding of how these interventions prevented the transmission of SARS-CoV-2 in China is urgent.

The Lancet (e-date: 08/04/2020)

Xu S, Li Y

[Lien original](#)

Pandemic school closures: risks and opportunities

The novel coronavirus disease 2019 (COVID-19) has swept across 210 countries and territories with over 1.2 million cases and 67 594 deaths reported by April 6, 2020. Most countries have implemented social distancing measures to curb the spread of infection and minimise the impact of the virus.

188 countries have implemented country-wide school closures, but a [modelling study](#) by Ferguson and colleagues concluded that in the UK, school closures alone will reduce COVID-19 deaths by only 2–4%. (...)

The Lancet Child & Adolescent Health (e-date: 08/04/2020)

[Lien original](#)

Recommendations from national regulatory agencies for ongoing cancer trials during the COVID-19 pandemic

The Lancet Oncology (e-date: 09/04/2020)

de Paula BHR, Araújo I, Bandeira L, Barreto NMPB, Doherty G.J.

[Lien original](#)

Localising an asset-based COVID-19 response in Ecuador

With 10.93 deaths per million people from coronavirus disease 2019 (COVID-19), as of April 6, 2020, Ecuador has one of the highest rates of COVID-19 mortality in Latin America.

With only 7·46 PCR tests per 10 000 people, the government is in critical need of a systematic mechanism to bolster self-reporting, contact tracing, and effective isolation of suspected cases. The Ministry of Health has focused on closing gaps in medical resources by increasing availability of personal protective equipment and hospital beds and attempting to remedy overburden of health-care facilities and mortuary services in Guayas province, the country's main hotspot of the outbreak, but 417 health personnel in Ecuador have COVID-19. (...)

The Lancet (e-date: 08/04/2020)

Torres I, Sacoto F.

[Lien original](#)

Alcohol use and misuse during the COVID-19 pandemic: a potential public health crisis?

In an attempt to control the 2019 coronavirus disease (COVID-19) pandemic, governments across the world have implemented distancing measures during the search for medical countermeasures, resulting in millions of people being isolated for long periods. Alcohol misuse is one of the leading causes of preventable mortality, contributing annually to about 3 million deaths worldwide.

In some individuals, long term, excessive alcohol misuse might escalate into an alcohol use disorder. The potential public health effects of long-term isolation on alcohol use and misuse are unknown. (...)

The Lancet Public Health (e-date: 08/04/2020)

Clay JM, Parker MO

[Lien original](#)

Respiratory health in athletes: facing the COVID-19 challenge

There are unique cohorts of individuals facing specific challenges during the current global coronavirus disease 2019 (COVID-19) crisis. When faced with a rapidly evolving pandemic associated with high morbidity and mortality in older people (>60 years), the respiratory health of a (predominantly) young and very physically fit population might, on the face of it, seem trivial or almost irrelevant. Yet, for athletes, para-athletes, and clinicians concerned with their health, it is important that targeted guidance is available to ensure the wellbeing of this population is considered. (...)

The Lancet Respiratory Medicine. (e-date: 09/04/2020)

Hull JH, Loosemore M, Schweltnus M

[Lien original](#)

Tuberculosis and HIV responses threatened by COVID-19

As the first cases of COVID-19 affect Nigeria's health-care workers, will the country's HIV and tuberculosis responses weather the pandemic? Paul Adepoju reports.

March 24, 2020, was World Tuberculosis Day 2020, but this year tuberculosis was overshadowed by the COVID-19 pandemic. By the end of that week, COVID-19 had already exceeded 600 000 confirmed cases and about 30 000 deaths worldwide. (...)

The Lancet HIV (e-date: 08/04/2020)

Adepoju P

[Lien original](#)

Clinical Characteristics of Patients Hospitalized with Coronavirus Disease, Thailand

Among 11 patients in Thailand infected with severe acute respiratory syndrome coronavirus 2, we detected viral RNA in upper respiratory specimens a median of 14 days after illness onset and 9 days after fever resolution. We identified viral co-infections and an asymptomatic person with detectable virus RNA in serial tests. We describe implications for surveillance.

Emerging Infectious Disease journal (e-date: 08/04/2020)

Wannarat AP, Joshua AM, Joseph VW, Timothy MU, John RM, Apichart V, et al

[Lien original](#)

Severe Acute Respiratory Syndrome Coronavirus. Specific Antibody Responses in Coronavirus Disease 2019 Patients

A new coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has recently emerged to cause a human pandemic. Although molecular diagnostic tests were rapidly developed, serologic assays are still lacking, yet urgently needed. Validated serologic assays are needed for contact tracing, identifying the viral reservoir, and epidemiologic studies. We developed serologic assays for detection of SARS-CoV-2 neutralizing, spike protein-specific, and nucleocapsid-specific antibodies. Using serum samples from patients with PCR-confirmed SARS-CoV-2 infections, other coronaviruses, or other respiratory pathogenic infections, we validated and tested various antigens in different in-house and commercial ELISAs. We demonstrated that most PCR-confirmed SARS-CoV-2-infected persons seroconverted by 2 weeks after disease onset. (...)

Emerging Infectious Disease journal (e-date: 08/04/2020)

Nisreen MAO, Marcel AM, Wentao L, Chunyan W, Corine HG, Victor MC, et al
[Lien original](#)

Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 â COVID-NET, 14 States, March 1â30, 2020 | MMWR

Population-based rates of laboratory-confirmed coronavirus disease 2019 (COVID-19)-associated hospitalizations are lacking in the United States. COVID-NET was implemented to produce robust, weekly, age-stratified COVID-19-associated hospitalization rates. Hospitalization rates increase with age and are highest among older adults; the majority of hospitalized patients have underlying conditions. (...)

MMWR Morb Mortal Wkly (e-date: 08/04/2020)

Garg S, Kim L, Whitaker M, O'Halloran A, Cummings C, Holstein R, et al.
[Lien original](#)

Coagulopathy and Antiphospholipid Antibodies in Patients with Covid-19

We describe a patient with Covid-19 and clinically significant coagulopathy, antiphospholipid antibodies, and multiple infarcts. He was one of three patients with these findings in an intensive care unit designated for patients with Covid-19. (...)

New England Journal of Medicine (e-date: 08/04/2020)

Zhang Y, Xiao M, Zhang S, Xia P, Cao W, Jiang W, et al
[Lien original](#)

Ensuring and Sustaining a Pandemic Workforce

Current efforts to fight the Covid-19 pandemic aim to slow viral spread and increase testing, protect health care workers from infection, and obtain ventilators and other equipment to prepare for a surge of critically ill patients. But additional actions are needed to rapidly increase health workforce capacity and to replenish it when personnel are quarantined or need time off to rest or care for sick family members. (...)

New England Journal of Medicine (e-date: 08/04/2020)

Fraher EP, Pittman P, Frogner BK, Spetz J, Moore J, Beck AJ, et al.
[Lien original](#)

“We Signed Up for This!” — Student and Trainee Responses to the Covid-19 Pandemic

On January 20, 2020, the first U.S. case of Covid-19 was reported in Washington State. Substantial challenges lay ahead. Covid-19 is highly contagious, it can cause severe illness, and no proven, effective treatments or vaccines are available. As leaders at the University of Washington (UW) and UW Medicine prepared for a tsunami of patients, there was extensive discussion about the role of students and trainees (residents and fellows) in our response. How should clinical and educational imperatives be balanced with their safety and well-being? (...)

New England Journal of Medicine (e-date: 08/04/2020)

Gallagher TH, Schleyer AM
[Lien original](#)

First-wave COVID-19 transmissibility and severity in China outside Hubei after control measures, and second-wave scenario planning: a modelling impact assessment

As of March 18, 2020, 13 415 confirmed cases and 120 deaths related to coronavirus disease 2019 (COVID-19) in mainland China, outside Hubei province—the epicentre of the outbreak—had been reported. Since late January, massive public health interventions have been implemented nationwide to contain the outbreak. We provide an impact assessment of the transmissibility and severity of COVID-19 during the first wave in mainland Chinese locations outside Hubei. (...)

The Lancet (e-date: 09/04/2020)

Leung K, Wu JT, Liu D, Leung GM

[Lien original](#)

A hundred days into the coronavirus disease (COVID-19) pandemic

On 8 April 2020, 100 days have passed since ProMed posted a ‘request for information’ about the emergence of a cluster of viral pneumonia of unknown origin in Wuhan. Back then, a number of similarities triggered memories of the beginning of the severe respiratory syndrome (SARS) epidemic caused by the SARS coronavirus (SARS-CoV) in 2003. Today, the ProMed post of 30 December 2019 appears far back in time; the coronavirus disease (COVID-19) caused by SARS-CoV-2 has far exceeded the 2003 SARS epidemic in terms of magnitude and impact.(...)

Eurosurveillance (e-date: 09/04/2020)

Steffens I

[Lien original](#)

An alternative workflow for molecular detection of SARS-CoV-2 – escape from the NA extraction kit-shortage, Copenhagen, Denmark, March 2020

Coronavirus disease (COVID-19) caused by the novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), was first detected in Wuhan, China in December 2019 and then spread worldwide in a few months. There is currently a global shortage of viral nucleic acid (NA) extraction kits, which is affecting the diagnosis of an increasing number of suspected COVID-19 cases. The aim of this study was to investigate a new simplified workflow for molecular detection of SARS-CoV-2 that does not require NA extraction and could serve as an alternative in diagnostic laboratories to overcome chemical-based kit-shortages. (...)

Eurosurveillance (e-date: 09/04/2020)

Fomsgaard AS, Rosenstjerne MW

[Lien original](#)

Roll-out of SARS-CoV-2 testing for healthcare workers at a large NHS Foundation Trust in the United Kingdom, March 2020

The coronavirus disease (COVID-19) pandemic has posed an unprecedented challenge for healthcare systems throughout the world. As at 6 April 2020, Public Health England (PHE) have reported 51,608 cases in the United Kingdom (UK) and 5,373 deaths [1]. We report the results from the first fortnight following the roll-out of staff testing for COVID-19 at Sheffield Teaching Hospitals NHS Foundation Trust, UK.

(...)

Eurosurveillance (e-date: 09/04/2020)

Keeley AJ, Evans C, Colton H, Ankcorn M, Cope A, State A, et al

[Lien original](#)

Excess cases of influenza-like illnesses synchronous with coronavirus disease (COVID-19) epidemic, France, March 2020

The Sentinelles network monitors influenza-like illnesses (ILI) and acute respiratory infections (ARI) in general practice in France. The 2019/20 influenza epidemic reached its peak in mid-February in France and it was expected that ILI incidence would decrease thereafter. However, in the first week of March 2020, we observed a renewed increase in ILI cases in some regions. (...)

Eurosurveillance (e-date: 09/04/2020)

Boëlle P-Y, Souty C, Launay T, Guerrisi C, Turbelin C, Behillil S, et al

[Lien original](#)

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Sommaire

PREPRINTS

Protocol for an Observational Study on the Effects of Social Distancing on Influenza-Like Illness and COVID-19

The novel coronavirus disease (COVID-19) is a highly contagious respiratory disease that was first detected in Wuhan, China in December 2019, and has since spread around the globe, claiming more than 69,000 lives by the time this protocol is written. (...)

arXiv (e-date: 09/04/2020)

Zhang B, Ye T, Heng S, Levy MZ, Small DS

Lien original

Wisdom of the crowds in forecasting COVID-19 spreading severity

In this work we report that the public reacted on social media at an early stage of the COVID-19 pandemic in a surprisingly accurate way, with activity levels reflecting the severity of the contagion figures registered almost a month later. (...)

arXiv (e-date: 09/04/2020)

Turiel J, Aste T.

[Lien original](#)

Projected Development of COVID-19 in Louisiana

At the time of writing, Louisiana has the third highest COVID-19 infection per capita in the United States. The state government issued a stay-at-home order effective March 23rd. We analyze the projected spread of COVID-19 in Louisiana without including the effects of the stay-at-home order. (...)

arXiv (e-date: 09/04/2020)

Tam K-M, Walker N, Moreno J

[Lien original](#)

How to Best Predict the Daily Number of New Infections of Covid-19

Knowledge about the daily number of new infections of Covid-19 is important because it is the basis for political decisions resulting in lockdowns and urgent health care measures. We use Germany as an example to illustrate shortcomings of official numbers, which are, at least in Germany, disclosed only with several days of delay and severely underreported on weekends (more than 40%).(...)

arXiv (e-date: 09/04/2020)

Skiera B, Jürgensmeier L, Stowe K, Gurevych I

[Lien original](#)

The COVID-19 pandemic: growth patterns, power law scaling, and saturation

More and more countries show a significant slowdown in the number of new COVID-19 infections due to effective governmentally instituted lockdown and social distancing measures. We have analyzed the growth behavior of the top 25 most affected countries by means of a local slope analysis and found three distinct patterns that individual countries follow depending on the strictness of the lockdown protocols: exponential rise and fall, power law, or logistic. (...)

arXiv (e-date: 09/04/2020)

Singer HM

[Lien original](#)

A Mathematical Description of the Dynamics of Coronavirus Disease (COVID-10): A Case Study of Brazil

This paper deals with the mathematical modeling and numerical simulations related to the coronavirus dynamics. A description is developed based on the framework of susceptible-exposed-infectious-recovered model. Initially, a model verification is carried out calibrating system parameters with data from China, Italy, Iran and Brazil. (...)

arXiv (e-date: 09/04/2020)

Savi PV, Savi MA, Borges B

[Lien original](#)

Assessment of 21 Days Lockdown Effect in Some States and Overall India: A Predictive Mathematical Study on COVID-19 Outbreak

As of April, 6th, 2020, the total number of COVID-19 reported cases and deaths are 4778 and 136. This is an alarming situation as with a huge population within few days India will enter in stage-3 of COVID-19 transmission. In the absence of neither an effective treatment or vaccine and with an incomplete understanding of the epidemiological cycle, predictive mathematical models can help exploring of both COVID-19 transmission and control.(...)

arXiv (e-date: 09/04/2020)

Sardar T, Shahid Nadim S, Chattopadhyay J
[Lien original](#)

Covid-19 -- A simple statistical model for predicting ICU load in exponential phases of the disease

One major bottleneck in the ongoing Covid-19 pandemic is the limited number of critical care beds. Due to the dynamic development of infections and the time lag between when patients are infected and when a proportion of them enters an intensive care unit (ICU), the need for future intensive care can easily be underestimated. (...)

arXiv (e-date: 09/04/2020)

Ritter M, Haynes J-D, Ritter K

[Lien original](#)

Word frequency and sentiment analysis of twitter messages during Coronavirus pandemic.

The Coronavirus pandemic has taken the world by storm as also the social media. As the awareness about the ailment increased, so did messages, videos and posts acknowledging its presence. The social networking site, Twitter, demonstrated similar effect with the number of posts related to coronavirus showing an unprecedented growth in a very short span of time. (...)

arXiv (e-date: 09/04/2020)

Rajput NK, Ahuja Grover B, Rathi VK

[Lien original](#)

On the problem of comparing Covid-19 fatality rates

Understanding Covid-19 lethality and its variation from country to country is essential for supporting governments in the choice of appropriate strategies. Adopting correct indicators to monitor the lethality of the infection in the course of the outbreak is a crucial issue. This work highlights how far the time-dependent case fatality rate is a misleading indicator for estimating the fatality in the course of the outbreak, even if our attention is only restricted to the subset of confirmed cases.(...)

arXiv (e-date: 09/04/2020)

Miletto Granozio F

[Lien original](#)

A machine learning methodology for real-time forecasting of the 2019-2020 COVID-19 outbreak using Internet searches, news alerts, and estimates from mechanistic models.

We present a timely and novel methodology that combines disease estimates from mechanistic models with digital traces, via interpretable machine-learning methodologies, to reliably forecast COVID-19 activity in Chinese provinces in real-time. Specifically, our method is able to produce stable and accurate forecasts 2 days ahead of current time, and uses as inputs (a) official health reports from Chinese Center Disease for Control and Prevention (China CDC), (...)

arXiv (e-date: 09/04/2020)

Liu D, Clemente L, Poirier C, Ding X, Chinazzi M, Davis JT, et al.

[Lien original](#)

COVID-Xpert: An AI Powered Population Screening of COVID-19 Cases Using Chest Radiography Images

With the increasing demand for millions of COVID-19 tests, Computed Tomography (CT) based test has emerged as a promising alternative to the gold standard RT-PCR test. However, it is primarily provided in emergency department and hospital settings due to the need for expensive equipment and trained radiologists. (...)

arXiv (e-date: 09/04/2020)

Li X, Zhu D

[Lien original](#)

The geographic spread of COVID-19 correlates with structure of social networks as measured by Facebook

We use anonymized and aggregated data from Facebook to show that areas with stronger social ties to two early COVID-19 "hotspots" (Westchester County, NY, in the U.S. and Lodi province in Italy) generally have more confirmed COVID-19 cases as of March 30, 2020. (...)

arXiv (e-date: 09/04/2020)

Kuchler T, Russel D, Stroebel J

[Lien original](#)

Estimating the number of COVID-19 infections in Indian hot-spots using fatality data

In India the COVID-19 infected population has not yet been accurately established. As always in the early stages of any epidemic, the need to test serious cases first has meant that the population with asymptomatic or mild sub-clinical symptoms has not yet been analyzed. Using counts of fatalities, and previously estimated parameters for the progress of the disease, we give statistical estimates of the infected population.(...)

arXiv (e-date: 09/04/2020)

Gupta S, Shankar R

[Lien original](#)

Robust inference for nonlinear regression models from the Tsallis score: application to Covid-19 contagion in Italy

We discuss an approach for fitting robust nonlinear regression models, which can be employed to model and predict the contagion dynamics of the Covid-19 in Italy. The focus is on the analysis of epidemic data using robust dose-response curves, but the functionality is applicable to arbitrary nonlinear regression models.

arXiv (e-date: 09/04/2020)

Girardi P, Greco L, Mamei V, Musio M, Racugno W, Ruli E, et al.

[Lien original](#)

Assessing the risks of infodemics in response to COVID-19 epidemics

Our society is built on a complex web of interdependencies whose effects become manifest during extraordinary events such as the COVID-19 pandemic, with shocks in one system propagating to the others to an exceptional extent. We analyzed more than 100 millions Twitter messages posted worldwide in 64 languages during the epidemic emergency due to SARS-CoV-2 and classified the reliability of news diffused. (...)

arXiv (e-date: 09/04/2020)

Gallotti R, Valle F, Castaldo N, Sacco P, De Domenico M

[Lien original](#)

To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic

Face mask use by the general public for limiting the spread of the COVID-19 pandemic is controversial, though increasingly recommended, and the potential of this intervention is not well understood. We develop a compartmental model for assessing the community-wide impact of mask use by the general, asymptomatic public, a portion of which may be asymptotically infectious.(...)

arXiv (e-date: 09/04/2020)

Eikenberry SE, Mancuso M, Iboi E, Phan T, Eikenberry K, Kuang Y, et al.

[Lien original](#)

Visualising the Evolution of English Covid-19 Cases with Topological Data Analysis Ball Mapper

Understanding disease spread through data visualisation has concentrated on trends and maps. Whilst these are helpful, they neglect important multi-dimensional

interactions between characteristics of communities. Using the Topological Data Analysis Ball Mapper algorithm we construct an abstract representation of NUTS3 level economic data, overlaying onto it the confirmed cases of Covid-19 in England.(...)

arXiv (e-date: 09/04/2020)

Dlotko P, Rudkin S.

[Lien original](#)

Critical community size for COVID-19 -- a model based approach to provide a rationale behind the lockdown

Background: Restrictive mass quarantine or lockdown has been implemented as the most important controlling measure to fight against COVID-19. Many countries have enforced 2 - 4 weeks' lockdown and are extending the period depending on their current disease scenario. Most probably the 14-day period of estimated communicability of COVID-19 prompted such decision. (...)

arXiv (e-date: 09/04/2020)

Das S, Ghosh P, Sen B, Mukhopadhyay I.

[Lien original](#)

Prediction of COVID-19 Disease Progression in India : Under the Effect of National Lockdown

In this policy paper, we implement the epidemiological SIR to estimate the basic reproduction number \mathcal{R}_0 at national and state level. We also developed the statistical machine learning model to predict the cases ahead of time. Our analysis indicates that the situation of Punjab ($\mathcal{R}_0 \approx 16$) is not good. It requires immediate aggressive attention. (...)

arXiv (e-date: 09/04/2020)

Das S

[Lien original](#)

Modeling strict age-targeted mitigation strategies for COVID-19.

We use a simple SIR-like epidemic model which integrates known age- contact patterns for the United States to model the effect of age- targeted mitigation strategies for a COVID-19-like epidemic. We find that, among strategies which end with population immunity, strict age- targeted mitigation strategies have the potential to greatly reduce mortalities and ICU utilization for natural parameter choices.

arXiv (e-date: 09/04/2020)

Chikina M, Pegden W

[Lien original](#)

Assessing the Efficiency of Different Control Strategies for the Coronavirus (COVID-19) Epidemic

The goal of this work is to analyse the effects of control policies for the coronavirus (COVID-19) epidemic in Brazil. This is done by considering an age-structured SEIR model with a quarantine class and two types of controls. The first one studies the sensitivity with regard to the parameters of the basic reproductive number R_0 which is calculated by the next generation method. The second one evaluates different quarantine strategies by comparing their relative total number of deaths.

arXiv (e-date: 09/04/2020)

Castilho C, Gondim JAM, Marchesin M, Sabeti M

[Lien original](#)

A simulation of a COVID-19 epidemic based on a deterministic SEIR model

An epidemic disease caused by a new coronavirus has spread in Northern Italy, with a strong contagion rate. We implement an SEIR model to compute the infected population and number of casualties of this epidemic. The example may ideally regard the situation in the Italian Region of Lombardy, where the epidemic started on

February 25, but by no means attempts to perform a rigorous case study in view of the lack of suitable data and uncertainty of the different parameters, mainly the variation of the degree of home isolation and lockdown with time, the number of initially exposed individuals and infected people, and the fatality rate.(...)

arXiv (e-date: 09/04/2020)

Carcione JM, Santos JE, Bagaini C, Ba J.

[Lien original](#)

Epidemics with containment measures

We propose a Susceptible-Infected (SI) epidemic spreading model including containment measures. In absence of containment measures the epidemics spreads exponentially fast for any value of the infectivity $\lambda > 0$. The containment measures are modeled by considering a time- dependent modulation of the bare infectivity λ leading to an effective infectivity that decays in time for each infected individual, mimicking for instance the combined effect of asymptomatic onset of the disease, testing policies and quarantine. (...)

arXiv (e-date: 09/04/2020)

Bianconi G, Krapivsky PL

[Lien original](#)

Variable pool testing for infection spread estimation

We present a method for efficient estimation of the prevalence of infection in a population with high accuracy using only a small number of tests. The presented approach uses pool testing with a mix of pool sizes of various sizes. The test results are then combined to generate an accurate estimation over a wide range of infection probabilities.(...)

arXiv (e-date: 09/04/2020)

Bergel I

[Lien original](#)

TraceSecure: Towards Privacy Preserving Contact Tracing.

Contact tracing is being widely employed to combat the spread of COVID-19. Many apps have been developed that allow for tracing to be done automatically based off location and interaction data generated by users. There are concerns, however, regarding the privacy and security of users data when using these apps. (...)

arXiv (e-date: 09/04/2020)

Bell J, Butler D, Hicks C, Crowcroft J.

[Lien original](#)

A large-scale COVID-19 Twitter chatter dataset for open scientific research -- an international collaboration

As the COVID-19 pandemic continues its march around the world, an unprecedented amount of open data is being generated for genetics and epidemiological research. The unparalleled rate at which many research groups around the world are releasing data and publications on the ongoing pandemic is allowing other scientists to learn from local experiences and data generated in the front lines of the COVID-19 pandemic. (...)

arXiv (e-date: 09/04/2020)

Banda JM, Tekumalla R, Wang G, Yu J, Liu T, Ding Y, et al.

[Lien original](#)

The Impact of Public Safety Measures on the Spread of COVID-19 in the United States Assessed By Causal Model-Based Projections of the Pandemic.

The novel coronavirus, SARS-CoV-2, and the disease it causes, COVID-19 was declared a pandemic on March 11, 2020 by the World Health Organization. Since then, the disease has spread all over the world, with the United States becoming the country with the highest number of cases. Governments around the world have undertaken varying degrees of public safety measures, including recommendations and

ad campaigns for improved hygiene practices, enacting social distancing requirements and limiting large public gatherings, and stay-at-home orders and lockdowns. (...)

arXiv (e-date: 09/04/2020)

Amla K, Amla T

[Lien original](#)

Google COVID-19 Community Mobility Reports: Anonymization Process Description (version 1.0)

This document describes the aggregation and anonymization process applied to the initial version of Google COVID-19 Community Mobility Reports (published at <http://google.com/covid19/mobility> on April 2, 2020), a publicly available resource intended to help public health authorities understand what has changed in response to work-from-home, shelter-in-place, and other recommended policies aimed at flattening the curve of the COVID-19 pandemic. (...)

arXiv (e-date: 09/04/2020)

Aktay A, Bavadekar S, Cossoul G, Davis J, Desfontaines D, Fabrikant A, et al.

[Lien original](#)

Lack of Antiviral Activity of Darunavir against SARS-CoV-2

Given the high need and the absence of specific antivirals for treatment of COVID-19 (the disease caused by severe acute respiratory syndrome-associated coronavirus-2 [SARS-CoV-2]), human immunodeficiency virus (HIV) protease inhibitors are being considered as therapeutic alternatives. Prezcofix/Rezolsta is a fixed-dose combination of 800 mg of the HIV protease inhibitor darunavir (DRV) and 150 mg cobicistat, a CYP3A4 inhibitor, which is indicated in combination with other antiretroviral agents for the treatment of HIV infection.(...)

medRxiv (e-date: 08/04/2020)

De Meyer S, Bojkova D, Cinati J, Van Damme E, Buyck C, Van Loock M, et al

[Lien original](#)

Targeting the catecholamine-cytokine axis to prevent SARS-CoV-2 cytokine storm syndrome

The mortality of Coronavirus disease 2019 (COVID-19) appears to be driven by acute respiratory distress syndrome (ARDS) and a dysregulated immune response to SARS-CoV-2. Emerging evidence suggests that a subset of COVID-19 is characterized by the development of a cytokine storm syndrome (CSS), and interleukin (IL)-6 levels are predictors of COVID-19 severity and in-hospital mortality. Targeting hyper-inflammation in COVID-19 may be critical for reducing mortality. Catecholamines enhance inflammatory injury by augmenting the production of IL-6 and other cytokines through a self-amplifying feed-forward loop in immune cells that requires alpha-1 adrenergic receptor (α 1-AR) signaling. (...)

medRxiv (e-date: 09/04/2020)

Konig MF, Powell M, Staedtke V, Bai R-Y, Thomas DL, Fischer N, et al.

[Lien original](#)

Extraction-free COVID-19 (SARS-CoV-2) diagnosis by RT-PCR to increase capacity for national testing programmes during a pandemic

Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) causes Coronavirus disease 2019 (COVID-19), a respiratory tract infection. The standard molecular diagnostic test is a multistep process involving viral RNA extraction and real-time quantitative reverse transcriptase PCR (qRT-PCR). Laboratories across the globe face constraints on equipment and reagents during the COVID-19 pandemic. We have developed a simplified qRT-PCR assay that removes the need for an RNA extraction process and can be run on a real-time thermal cycler.(...)

bioRxiv (e-date: 08/04/2020)

Grant PR, Turner MA, Shin GY, Nastouli E, Levett LJ

[Lien original](#)

Nelfinavir inhibits replication of severe acute respiratory syndrome coronavirus 2 in vitro.

In December 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in Wuhan, Hubei Province, China. No specific treatment has been established against coronavirus disease-2019 (COVID-19) so far. Therefore, it is urgently needed to identify effective antiviral agents for the treatment of this disease, and several approved drugs such as lopinavir have been evaluated. Here, we report that nelfinavir, an HIV-1 protease inhibitor, potently inhibited replication of SARS-CoV-2.(...)

bioRxiv (e-date: 08/04/2020)

Yamamoto N, Matsuyama S, Hoshino T, Yamamoto N.

[Lien original](#)

Genomic determinants of pathogenicity in SARS-CoV-2 and other human coronaviruses

SARS-CoV-2 poses an immediate, urgent and major threat to public health across the globe. Here we report an in-depth molecular analysis to reconstruct the evolutionary origins of the enhanced pathogenicity of SARS-CoV-2 and other coronaviruses that are severe human pathogens. Using integrated comparative genomics and machine learning techniques, we identify key genomic features that differentiate SARS-CoV-2 and the viruses behind the two previous coronavirus outbreaks, SARS-CoV and MERS-CoV, from less pathogenic coronaviruses.(...)

bioRxiv (e-date: 08/04/2020)

Auslander N, Gussow AB, Wolf YI, Koonin EV

[Lien original](#)

Optimize Clinical Laboratory Diagnosis of COVID-19 from Suspect Cases by Likelihood Ratio of SARS-CoV-2 IgM and IgG antibody

Objective: To optimize clinical laboratory diagnosis of COVID-19 from suspect cases by Likelihood Ratio of SARS-CoV-2 IgM and IgG antibody. Methods: By reinterpreting the data in the article "Diagnostic Value of Combined Detection of Serum 2019 novel coronavirus IgM and IgG Antibodies in novel coronavirus Infection", the positive likelihood ratio of IgM and IgG antibody in diagnosis of COVID-19 (nucleic acid positive patients) was calculated, and the posterior probability of IgM and IgG antibodies and their tandem detection to diagnose was finally calculated. (...)

medRxiv (e-date: 08/04/2020)

Yangchun F

[Lien original](#)

A model to predict SARS-CoV-2 infection based on the first three-month surveillance data in Brazil.

Background: COVID-19 diagnosis is a critical problem, mainly due to the lack or delay in the test results. We aimed to obtain a model to predict SARS-CoV-2 infection in suspected patients reported to the Brazilian surveillance system. Methods: We analyzed suspected patients reported to the National Surveillance System that corresponded to the following case definition: patients with respiratory symptoms and fever, who traveled to regions with local or community transmission or who had close contact with a suspected or confirmed case. Based on variables routinely collected, we obtained a multiple model using logistic regression. (...)

medRxiv (e-date: 08/04/2020)

Diaz-Quijano FA, Silva JMNd, Ganem F, Oliveira S, Vesga-Varela AL, Croda J

[Lien original](#)

Use Crow-AMSAA Method to predict the cases of the Coronavirus 19 in Michigan and U.S.A

The Crow-AMSAA method is used in engineering reliability world to predict the failures and evaluate the reliability growth. The author intends to use this model in the prediction of the Coronavirus 19 cases by using the daily reported data in Michigan

and U.S.A. The Crow-AMSAA model fits the data significantly since the corona virus outbreak, especially for the Michigan infected cases and death.

medRxiv (e-date: 08/04/2020)

Wang Y

[Lien original](#)

The basic reproduction number and prediction of the epidemic size of the novel coronavirus (COVID-19) in Shahroud, Iran

Objectives: To estimate the basic reproduction number (R0) of COVID-19 in the early stage of the epidemic and predict the expected number of new cases in Shahroud, Northeast of Iran. Methods: The R0 of COVID-19 was estimated using the serial interval distribution and the number of incidence cases. The serial interval was fit with a gamma distribution. The probable incidence and cumulative incidence in the next 30 days were predicted using the assumption that daily incidence follows a Poisson distribution determined by daily infectiousness. (...)

medRxiv (e-date: 08/04/2020)

Khosravi A, Chaman R, Rohani-Rasaf M, Zare F, Mehravaran S, Emamian MH

[Lien original](#)

Connecting BCG Vaccination and COVID-19: Additional Data

The reasons for a wide variation in severity of coronavirus disease 2019 (COVID-19) across the affected countries of the world are not known. Two recent studies have suggested a link between the BCG vaccination policy and the morbidity and mortality due to COVID-19. In the present study we compared the impact of COVID-19 in terms of case fatality rates (CFR) between countries with high disease burden and those with BCG revaccination policies presuming that revaccination practices would have provided added protection to the population against severe COVID-19. (...)

medRxiv. (e-date: 08/04/2020)

Dayal D, Gupta S

[Lien original](#)

Physician Deaths from Corona Virus Disease (COVID-19)

OBJECTIVE: The COVID-19 pandemic has caused much morbidity and mortality to patients but also health care providers. We tabulated the cases of physician deaths from COVID-19 associated with front-line work in hopes of mitigating future events. (...)

medRxiv. (e-date: 08/04/2020)

Ing EB, Xu AQ, Salimi A, Torun N

[Lien original](#)

Acute kidney injury in patients hospitalized with COVID-19 in Wuhan, China: A single-center retrospective observational study

Background: The kidney may be affected in coronavirus-2019 disease (COVID-19). This study assessed the predictors and outcomes of acute kidney injury (AKI) among individuals with COVID-19. Methods: This observational study, included data on all patients with clinically confirmed COVID-19 admitted to Hankou Hospital, Wuhan, China from January 5 to March 8, 2020. Data were extracted from clinical and laboratory records. Follow-up was censored on March 8, 2020. (...)

medRxiv (e-date: 08/04/2020)

Xiao G, Hu H, Wu F, Sha T, Huang Q, Li H, et al

[Lien original](#)

Chloroquine and hydroxychloroquine for the treatment of COVID-19: A living systematic review protocol

OBJECTIVE: To determine the relative impact of the use of chloroquine and hydroxychloroquine on outcomes important to patients with COVID 19. DESIGN: This is the protocol of a living systematic review. DATA SOURCES: We will conduct searches in PubMed/Medline, Embase, Cochrane Central Register of Controlled Trials

(CENTRAL), trial registries, grey literature and in a centralised repository in L-OVE (Living Overview of Evidence). L-OVE is a platform that maps PICO questions to evidence from Epistemonikos database. (...)

medRxiv (e-date: 08/04/2020)

*Bravo Jeria R, Rojas Reyes MX, Franco JV, Acuna MP, Torres Lopez LA, Rada Gr
[Lien original](#)*

Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters

OBJECTIVE: To evaluate the relative risk of COVID-19 death in people <65 years old versus older individuals in the general population, to provide estimates of absolute risk of COVID-19 death at the population level, and to understand what proportion of COVID-19 deaths occur in non-elderly people without underlying diseases in epicenters of the pandemic. (...)

medRxiv (e-date: 08/04/2020)

*Ioannidis JPA, Axfors C, Contopoulos-Ioannidis DG
[Lien original](#)*

Data-Driven Study of the the COVID-19 Pandemic via Age-Structured Modelling and Prediction of the Health System Failure in Brazil amid Diverse Intervention Strategies

In this work we propose a data-driven age-structured census-based SIRD-like epidemiological model capable of forecasting the spread of COVID-19 in Brazil. We model the current scenario of closed schools and universities and voluntary home quarantine to show that it is still not enough to protect the health system by explicitly computing the demand for hospital intensive care unit beds. We also show that an urgent intense quarantine might be the only solution to avoid the collapse of the health system and, consequently, to minimize the quantity of deaths. On the other hand, we demonstrate that the relaxation of the already imposed control measures in the next days would be catastrophic.

medRxiv (e-date: 08/04/2020)

*Canabarro A, Tenorio E, Martins R, Martins L, Brito S, Chaves R
[Lien original](#)*

Understanding the CoVID-19 pandemic Curve through statistical approach

Current research is an attempt to understand the CoVID-19 pandemic curve through statistical approach of probability density function with associated skewness and kurtosis measures, change point detection and polynomial fitting to estimate infected population along with 30 days projection. The pandemic curve has been explored for above average affected countries, six regions and global scale during 64 days of 22nd January to 24th March, 2020. The global cases infection as well as recovery rate curves remained in the ranged of 0 – 9.89 and 0 – 8.89%, respectively. (...)

medRxiv (e-date: 08/04/2020)

*Akhtar IuH
[Lien original](#)*

The impact of early social distancing at COVID-19 Outbreak in the largest Metropolitan Area of Brazil.

We evaluated the impact of early social distancing on the COVID-19 transmission in the Sao Paulo metropolitan area. Using an age-stratified SEIR model, we determined the time-dependent reproductive number, and forecasted the ICU beds necessary to tackle this epidemic. Within 60 days, these measures might prevent 89,450 deaths.

medRxiv (e-date: 08/04/2020)

*Ganem F, Mendes FM, Oliveira SB, Porto VBG, Araujo W, Nakaya H, et al.
[Lien original](#)*

Defining high-value information for COVID-19 decision-making

Initial projections from the first generation of COVID-19 models focused public attention on worst-case scenarios in the absence of decisive policy action. These underscored the imperative for strong and immediate measures to slow the spread of infection. In the coming weeks, however, as policymakers continue enlisting models to inform decisions on COVID-19, answers to the most difficult and pressing policy questions will be much more sensitive to underlying uncertainties. In this study, we demonstrate a model-based approach to assessing the potential value of reducing critical uncertainties most salient to COVID-19 decision-making and discuss priorities for acquiring new data to reduce these uncertainties.(...)

medRxiv (e-date: 08/04/2020)

Salomon JA

[Lien original](#)

Derivation of the effective reproduction number R for COVID-19 in relation to mobility restrictions and confinement

The spread of COVID-19 is posing an unprecedented threat to health systems worldwide. The fast propagation of the disease combined with the existence of covert contagions by asymptomatic individuals make the controlling of this disease particularly challenging. The key parameter to track the progression of the epidemics is the effective reproduction number R, defined as the number of secondary infections generated by an infected individual.(...)

medRxiv (e-date: 08/04/2020)

Arenas A, Cota W, Gomez-Gardenes J, Gomez S, Granell C, Matamalas JT, et al

[Lien original](#)

Interaction between malarial transmission and BCG vaccination with COVID-19 incidence in the world map: A changing landscape human immune system?

Background: COVID-19 (Corona virus Disease-2019) is a new public health emergency and is a pandemic currently. Incidence and mortality of COVID-19 vary in different geographical areas. In this study we aimed to analyse the relationship between malaria transmission and BCG vaccination with COVID-19 incidence in the world map. Materials and methods: We collected malaria cases data (World Health Organisation (WHO), 2018), worldwide COVID-19 cases and mortality data (European Centre for Disease Prevention and Control) and data on BCG vaccination. COVID-19 incidence and mortality was compared.(...)

medRxiv (e-date: 08/04/2020)

Goswami RP, Mittal DK, Goswami RP

[Lien original](#)

[Sommaire](#)

BLOG NEWS

Why measles deaths are surging - and coronavirus could make it worse

Roberts L. Why measles deaths are surging - and coronavirus could make it worse. *Nature*. 2020. <https://doi.org/10.1038/d41586-020-01011-6>

Nature (e-date: 09/04/2020)

Roberts L

[Lien original](#)

The pandemic in pictures: how coronavirus is changing the world

Nature (e-date: 09/04/2020)

Stoye E

[Lien original](#)

[Sommaire](#)

AUTRE

COVID-19 : comparaison du développement de l'épidémie et des mesures prises, entre 6 pays : Chine, Corée du Sud, Italie, France, Espagne et Allemagne. Version 2.10

Université Claude Bernard Lyon 1 (e-date: 02/04/2020)

Robin-Champigneul F

[Lien original](#)

[Sommaire](#)