

Planet under New Threat: 2019-nCoV





Due to the rapid development of the 2019-cCoV worldwide, data and info provided herein might change or modified



The epicenter of the outbreak







Virus classification							
unranked):	Virus						
Realm:	Riboviria						
Phylum:	Incertae sedis						
Order:	Nidovirales						
amily:	Coronaviridae						
Genus:	Betacoronavirus						
Subgenus:	Sarbecovirus						
	Wuhan						
/irus:	coronavirus						
	(2019-nCoV)						

Novel coronavirus, denoted **2019-nCoV** by the WHO and also known as **Wuhan coronavirus** and **Wuhan seafood market pneumonia virus**, is a positive-sense, singlestranded RNA coronavirus.

The first suspected cases were notified to WHO on 31 December 2019, with the first instances of symptomatic illness appearing just over three weeks earlier on 8 December 2019.

The virus was genomically sequenced after nucleic acid testing on a positive patient sample in a patient with pneumonia during the 2019–20 Wuhan coronavirus outbreak



Genomic information



The outbreak was first detected in Wuhan, China.

The virus subsequently **spread** to **27** countries:

Hong Kong 42 (1)	Japan 26*	S Korea 28
Thailand 32	Malaysia 18	Vietnam 15
Macau 10	Singapore 45	Canada 7
USA 13	Taiwan 18	Nepal 1
Australia 15	France 11	Germany 14
Sri Lanka 1	Cambodia 1	UAE 8
Finland 1	Italy 3	India 3
Philippines 3 (1)	Russia 2	UK 8
Spain 2	Sweden 1	Belgium 1

Global: 43.108 confirmed cases



Global death toll: 1.018









"For all of these reasons, I am declaring a public health emergency of international concern over the global outbreak of #2019nCoV."-@DrTedros

♡ 11.6K 9:44 PM - Jan 30, 2020

Dec 2019 PHILIP

> **CHINA: 42.644** Deaths: 1.016 Recovered: 4.059



TODAY, APRIL 15, 2020

123,920 VICTIMS IN THE WORLD 1,961,950 CASES TESTED POSITIVE USA is the most affected country followed by Italy, Spain, France and the United Kingdom





Risk of spread outside Wuhan*

- (A) Cumulative number of confirmed cases of 2019 novel coronavirus as of Jan 28, 2020, in Wuhan, in mainland China (including Wuhan), and outside mainland China.
- (B) Major routes of outbound air and train travel originating from Wuhan during chunyun, 2019. Darker and thicker edges represent greater numbers of passengers. International outbound air travel (yellow) constituted 13.5% of all outbound air travel, and the top 40 domestic (red) outbound air routes constituted 81.3%. Islands in the South China Sea are not shown.







Occurrence of a disease in a specific community in excess of what is expected in a defined area over a given period of time. A single case is enough to constitute an outbreak!

The (often rapid) spread of a disease across a larger group in excess of what is normally expected (i.e. a large outbreak). An epidemic that has spread to several countries or continents.



CHINA CORONAVIRUS The symptoms of 2019-nCoV and how it spreads



At the beginning of the outbreak

- Reported symptoms have included fever in 90% of cases, fatigue and a dry cough in 80%, and shortness of breath in 20%, with respiratory distress in 15%.
- Chest x-rays have revealed signs in both lungs.
- ✓ Vital signs were generally stable at the time of admission of those hospitalized.
- ✓ Blood tests have commonly shown low white blood cell counts (leucopenia and lymphopenia)



Reprints

Request

THE LANCET (Jan 24, 2020)

Share

With 98% showing fever, this means that **one out of 50 people infected will show no fever** and therefore easily **bypass** current screening methods that are practiced by health officials.

According to the World Health Organization, a breakdown of ili Ren, PhD * 17,000 cases provided by the Chinese government, 82 per cent of them were classified as mild, with 15 per cent severe and 3 per _5 Check for updates cent critical.

PDF [1 MB] Figures Save

Study population: 41

Sex: men 73% Underlying disease: 32%

- o Diabetes
- \circ Hypertension
- o Cardiovascular disease

Symptoms

- ✓ Fever 98%
- ✓ Cough 76%
- ✓ Dyspnea 55% (onset Day 8)
- ✓ Myalgia 44%
- ✓ Sputum production 28%
- ✓ Headache 3%
- ✓ Hemoptysis 5%
- ✓ Diarrhea 3%

Complications

- ✓ ARDS 29%
- ✓ RNAaemia 15%
- ✓ Acute cardiac injury 12%
- ✓ Secondary infection 10%

All 41 patients had pneumonia with abnormal findings on chest CT.





Transmission

Human-to-human transmission

was confirmed in Guangdong, China, according to Zhong Nanshan, Head of the Health Commission Team investigating the outbreak.

Feb 2020: Epidemic doubles in size every 6.4 days*

MailOnline

Chinese baby born to a Wuhan coronavirus patient is diagnosed with the disease, prompting fears that the killer infection can be transmitted in the WOMB

- The child was born in Wuhan on Sunday and tested positive 30 hours later
- Medics were monitoring the baby closely, but said its condition was stable
- Doctors warned the virus might be passed from mothers to unborn babies
- Another 17-day-old baby in Wuhan was also found to be infected by the virus
- Coronavirus death toll continues to soar as at least 493 people have been killed

By TRACY YOU FOR MAILONLINE PUBLISHED: 11:52 GMT, 5 February 2020 | UPDATED: 12:30 GMT, 5 February 2020



Treatment

- No specific treatment for the virus is currently available, but existing anti-virals could be repurposed.
- Scientists in the US and Russia are currently working on a new vaccine against 2019-nCov



Algorithm for management of contacts of probable or confirmed 2019-nCoV cases

Tool Patient and case management 30 Jan 2020 Econtract With Hover Concentration Cases in the European Union 30 January 2020

https://www.ecdc.europa.eu/sites/default/files/documents/Public-healthmanagement-contact-novel-coronavirus-cases-EU 0.pdf



Transmissibility: how do we meas

Two measures used to describe infectiousness:

- ✓ The secondary attack rate (2° AR) is the preexposure. It only applies to person-to-person well as the disease. It can be estimated in situ example, if 10 people in a household are exposed.
- The basic case reproduction number, R₀ (R totally susceptible population. As an infection number, R, is the average number of secondaris still susceptible.
 - **R**₀ depends on 3 factors:
 - \circ duration of infectiousness
 - o probability of infection being transmitte
- average rate of contact between susce
 It therefore varies not just from disease to disease
 contact patterns.



Shenzhen-based family visit infected relatives in Wuhan, and return with illness







A sneeze captured on high-speed video.

After a sneeze, large droplets of saliva and mucus (green) shoot out of the mouth, but fall relatively quickly.

A turbulent cloud carries smaller droplets (red) and allows them to drift for up to 8 meters.

L. Bourouiba/The Fluid Dynamics of Disease Transmission Laboratory/MIT



Incubation & Mortality









THE PREPRINT SERVER FOR HEALTH SCIENCES

Posted February 09, 2020.

Clinical characteristics of 2019 novel coronavirus infection in China

Wei-jie Guan, Zheng-yi Ni, Yu Hu, Wen-hua Liang, Chun-quan Ou, Jian-xing He, Lei Liu, Hong Shan, Chun-liang Lei, David SC Hui, Bin Du, Lan-juan Li, Guang Zeng, Kowk-Yung Yuen, Ru-chong Chen, Chun-li Tang, Tao Wang, Ping-yan Chen, Jie Xiang, Shi-yue Li, Jin-lin Wang, Zi-jing Liang, Yi-xiang Peng, Li Wei, Yong Liu, Ya-hua Hu, Peng Peng, Jian-ming Wang, Ji-yang Liu, Zhong Chen, Gang Li, Zhi-jian Zheng, Shao-qin Qiu, Jie Luo, Chang-jiang Ye, Shao-yong Zhu, Nan-shan Zhong

doi: https://doi.org/10.1101/2020.02.06.20020974

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

1,099 patients with laboratory-confirmed 2019-nCoV ARD from **552 hospitals in 31 provinces**/provincial municipalities through January 29th, 2020.

Only 1.18% of patients had a direct contact with wildlife, whereas 31.30% had been to Wuhan and 71.80% had contacted with people from Wuhan. Fever (87.9%) and cough (67.7%) were the most common symptoms.



The median incubation period was 3.0 days (range, 0 to <u>24.0</u> days).

The research was co-authored by Dr Zhong Nanshan, who discovered the SARS coronavirus in 2003 and has been appointed as a leading advisor in managing the current coronavirus crisis.



In a rare study, when aerosols of the human respiratory CoV 229E (a <u>commonly-used surrogate</u> for human respiratory CoV) were held at the air temperature of 20°C, the virus survived better at low (30%) and med (50%) relative humidity (RH) levels than at the high (80%) RH. Under these conditions, the half-lives of the virus were 27, 67 and 3 hours, respectively. However, when the air temperature was lowered to 6°C, the half-life of the virus at the high RH increased from 3 to over 86 hours! This dramatic influence of lower air temperature and high RH may enhance CoV spread under that set of conditions.

Ijaz MK et al. (1985) Survival characteristics of airborne human coronavirus 229E. J. Gen. Virol. 66: 2743-2748.

Influenza viruses

- ✓ Non-porous surfaces: 24 hours
- ✓ Paper tissues: 15 min
- ✓ Hands: 5 min



Since safety and ethical considerations would not permit the experimental contamination of human subjects with infectious CoV, the use of CoV 229E revealed that nearly 45% of infectious virus remains viable on the hands of adults after 1 hour. Such virus survival is longer than that for other enveloped respiratory viruses (e.g., parainfluenzavirus type 3), which become undetectable in about 10 minutes on human skin.

https://infectioncontrol.tips/2020/01/30/coronaviruses-understanding-their-environmentalsurvival-for-better-ipac/



What we know so far

Table I. Persistence of coronaviruses on different types of inanimate surfaces.				Table II. Inactivation of coronaviruses by different types of biocidal agents in suspension tests.					on tests.		
Type of surface	Virus	Strain / isolate	Inoculum (viral titer)	Temperature	Persistence	Biocidal agent	Concentration	Virus	Strain / isolate	Exposure time	Reduction of viral infectivity (log ₁₀)
			(20°C	48 h		95%	SARS-CoV	Isolate FFM-1	30 s	≥ 5.5
	MERS-CoV	Isolate HCoV-EMC/2012	10 ³	30°C	8 - 24 h		85%	SARS-CoV	Isolate FFM-1	30 s	≥ 5.5
		Unknown	10 ⁶	4*0	> 28 d		80%	SARS-CoV	Isolate FFM-1	30 s	≥ 4.3
	TGEV			20*0	3 - 28 d	Ethanol	80%	MERS-CoV	Strain EMC	30 s	> 4.0
Steel				200	3 - 26 U		78%	SARS-CoV	isolate FFM-1	30 s	≥ 5.0
2(66)				400	4-361		70%	MHV	Strains MHV-2 and MHV-N	10 min	> 3.9
			106	4.0	2 28 0		70%	CCV	Strain I-71	10 min	> 3.3
	MHV	Unknown	10.	20-0	4 - 28 d		100%	SARS-CoV	Isolate FFM-1	30 s	≥ 3.3
			0	40°C	4 – 96 h		75%	SARS-CoV	Isolate FFM-1	30 s	≥ 4.0
	HCoV	Strain 229E	10'	21°C	5 d	2.Pronanol	75%	MERS-CoV	Strain EMC	30 s	≥ 4.0
Aluminium	HCoV	Strains 229E and OC43	5 x 10'	21°C	2 – 8 h	2-1100	70%	SARS-CoV	Isolate FFM-1	30 s	≥ 3.3
Metal	SARS-CoV	Strain P9	105	RT	5 d		50%	MHV	Strains MHV-2 and MHV-N	10 min	> 3.7
Wood	SARS-CoV	Strain P9	10 ⁵	RT	4 d		50%	CCV	Strain I-71	10 min	> 3.7
	SARS-CoV	Strain P9	105	RT	4 – 5 d	2-Propanol and 1-	45% and 20%	SARS-CoV	Isolate FFM-1	30 s	≥ 4.3
0			10 ⁶		24 h	propanol	45/6 8/10 50/6	SARS-CoV	C Isolate FFM-1	30 s	≥ 2.8
Paper	SARS-CoV	Strain GVU6109	10 ⁵	RT	3 h		0.2%	HCoV	ATCC VR-759 (strain OC43)	10 min	0.0
			10 ⁴		< 5 min	Benzalkonium chloride	0.05%	MHV	Strains MHV-2 and MHV-N	10 min	> 3.7
	SARS-CoV	Strain P9	105	RT	4 d	penzakonium chioride	0.05%	CCV N	Strain I-71	10 min	> 3.7
Glass	HCoV	Strain 229E	103	21°C	5 d		0.00175%	CCV	Strain S378	3 d	3.0
	SARS-CoV	Strain HKU39849	105	22*-25*C	≦5 d	Didecyldimethyl	0.0025%	ccv	Strain \$378	3 d	> 4.0
	MERS-COV	Isolate HCoV_EMC/2012	105	20°C	48 h	Chlorbevidine	0.02%	MHV	Strains MHV-2 and MHV-N	10 min	07-08
Placetic	WERS-COV	Isolate Acov-Elvic/2012	10	30°C	8 – 24 h	digluconate	0.02%	001	Strain L71	10 min	0.7 0.0
Plastic	SARS-CoV	Strain P9	105	RT	4 d	uigiuconate	0.02%	 	Strain MUV_1	20 4	2.0
	SARS-CoV	Strain FFM1	107	RT	6 – 9 d		0.21%	MHV	Strains MHV-2 and MHV-N	10 min	23-28
	HCoV	Strain 229E	107	RT	2 – 6 d	Sodium hypochlorite	0.01%	CCV	Strain L71	10 min	2.5-2.0
PVC	HCoV	Strain 229E	10 ³	21°C	5 d	south hypochionte	0.001%	MHV	Strains MHV-2 and MHV-N	10 min	03-06
Silicon rubber	HCoV	Strain 229E	10 ³	21°C	5 d		0.001%	CCV	Strain I-71	10 min	0.0
Surgical glove (latex)	HCoV	Strains 229E and OC43	5 x 10 ³	21°C	≤8h	Hydrogen peroxide	0.5%	HCoV	Strain 229E	1 min	>40
and Branch and			106	•• •	2 d	Formaldehyde	1%	SARS-CoV	Isolate FFM-1	2 min	>30
Disposable gown	SARS-CoV	Strain GVU6109	105	RT	24 5	Tormeloenyoe	174	3013-6V4	1304016 LL 141-7	A 11111	r 3.v





Applied and Environmental Microbiology®

<u>Appl Environ Microbiol</u>. 2010 May; 76(9): 2712–2717. Published online 2010 Mar 12. doi: <u>10.1128/AEM.02291-09</u> PMCID: PMC2863430 PMID: <u>20228108</u>

Effects of Air Temperature and Relative Humidity on Coronavirus Survival on Surfaces^{*}

Lisa M. Casanova,^{1,*} Soyoung Jeon,² William A. Rutala,³ David J. Weber,³ and Mark D. Sobsey¹

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 Article notes
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Assessment of the risks posed by severe acute respiratory syndrome (SARS) coronavirus (SARS-CoV) on surfaces requires data on survival of this virus on environmental surfaces and on how survival is affected by environmental variables, such as air temperature (AT) and relative humidity (RH).

At 4°C, infectious virus persisted for as long as 28 days, and the lowest level of inactivation occurred at 20% RH. Inactivation was more rapid at 20°C than at 4°C at all humidity levels; the **viruses persisted for 5 to 28 days**, and the slowest inactivation occurred at low RH. Both viruses were inactivated more rapidly at 40°C than at 20°C. The relationship between inactivation and RH was not monotonic, and there was greater survival or a greater protective effect at low RH (20%) and high RH (80%) than at moderate RH (50%).







16 Jan 2020

German researchers develop first test for new coronavirus from China



German researchers said Thursday they have developed the first diagnostic test for a new virus that has emerged in central China and has spread to Japan.

The test protocol is being made available through the World Health Organization, and laboratories **can order a molecule from the German team** to compare patient samples with a positive control.

So far, doctors have only been able to perform a general virus test and then had to sequence and interpret the genome. Large, well-equipped public laboratories are able to do this but smaller labs would struggle to do so.

The two viruses (2019-nCoV and SARS) are so closely related that laboratories which have control samples for SARS in stock can use it to diagnose the new virus, cutting the time required to create a functioning test.



📥 University of Minnesota 🚽

Feb 05, 2020

CIDRAP Center for Infectious Disease Research and Policy



FEATURED NEWS TOPICS Novel Coronavirus Ebola MERS-CoV Chronic Wasting Disease

CDC sends out nCoV test kits as Wisconsin confirms case

Filed Under: Novel Coronavirus (2019-nCoV) Stephanie Soucheray | News Reporter | CIDRAP News | Feb 05, 2020 f Share y Tweet in LinkedIn Kerkerika Email

Yesterday the Food and Drug Administration (FDA) issued an Emergency Use Authorization for the Centers for Disease Control and Prevention's (CDC's) diagnostic test kit for the novel coronavirus (2019-nCoV) that originated in Wuhan, China, paving the way for the CDC to distribute the tests, as officials confirmed Wisconsin's first case. CDC's diagnostic test kits are currently en route to 100 public health labs across the country, and another 100 kits will be sent to selected international labs. Each kit contains 700 to 800 individual tests

According to the FDA, the diagnostic is a <u>reverse transcriptase polymerase chain reaction</u> (PCR) test that provides presumptive detection of 2019-nCoV from respiratory secretions, such as <u>nasal or oral swabs</u>.

The FDA has sent a blueprint of the test to 35 diagnostic manufacturers



Reservoir

Because several infected individuals worked the Huanan Seafood Market, an **epizootic origin** is suspected.

• On <u>22 January 2020</u>, the *Journal of Medical Virology* published a report with genomic analysis that reflects that snakes in the Wuhan area are "the most probable wildlife animal reservoir" for the virus, but more research is required. A homologous recombination event may have mixed a "clade A" (Bat SARS-like viruses CoVZC45 and CoVZXC21) virus with the RBD of a yet-unknown Beta-CoV.

Some scientists believe that the diseases could have originated from *Bungarus multicinctus*, a highly **venomous snake** at the Wuhan food market, where *ye wei* ("wild taste") is sold.

- A news item in *Nature* criticizes the *Journal of Medical Virology* paper; it states that snakes are highly unlikely to be the reservoir, and suggests it is more likely to be a mammal.
- An updated preprint paper published <u>January 23, 2020</u> on *bioRxiv* suggests that the coronavirus has possible bat origins, as their analysis shows that nCoV-2019 is 96% identical at the whole genome level to a **bat** coronavirus.



What we know so far



THE LANCET

ARTICLES | ONLINE FIRST

Genomic characterisation and epidemiology of 201 implications for virus origins and receptor binding Prof Roujian Lu, MSc * • Xiang Zhao, MD * • Juan Li, PhD * • Peihua Niu, PhD * • I

Α

0.05

Honglong Wu, MSc * • et al. Show all authors • Show footnotes

Published: January 30, 2020 . DOI: https://doi.org/10.1016/S0140-6736(20)30251-8

Phylogenetic analysis and homology modelling of the receptorbinding domain of the 2019-nCoV, SARS-CoV, and MERS-CoV

human-infecting betacoronavirus. Although our phyloge B SARS-COV that **bats** might be the original host of this virus, an anii market in Wuhan might represent an intermediate host emergence of the virus in humans. Importantly, structur that 2019-nCoV might be able to bind to the angioter enzyme 2 receptor in humans. The future evolution, a of this virus warrant urgent investigation.



Endangered pangolins

The world's most heavily trafficked mammal

No reliable global population estimates but drastic local declines documented



- Solitary, nocturnal
- Digs long burrows to hunt termites and for shelter
- Can climb trees
- Good swimmer
- Diet: ants, termites

Scales



- Made from keratin, the substance that also forms human hair and nails
- Sought on the black market for supposed medicinal benefits





- Rolls into a ball
- Easy to catch for illegal meat and medicine market

Trafficking

- Increasing demand for their meat and body parts is fuelling illegal hunting
- More than 1 million pangolins believed to have been poached from the wild in the past decade

CITES* in September 2016 banned all international trade

Eight species of pangolin worldwide

- Four Asian species Critically endangered
 - Chinese Malayan
 - Endangered Indian Philipine

Four African species *Vulnerable* African white-bellied Griant ground Temminck's ground Long-tailed



Young travel on mother's tail

*Convention on International Trade in Endangered Species



Source: CITES/savepangolins.org/IUCN/pangolins.orfg

C AFP



Mechanism of cell entry

The publications of the genome has led to several protein modeling experiments on the receptor binding protein (RBD) of the **nCoV spike (S) protein**.

Two Chinese groups, as of <u>23 January 2020</u>, believe that the S protein retains sufficient affinity to the **SARS receptor** (angiotensin-converting enzyme 2, ACE2) to use it as a mechanism of cell entry.





Wuhan coronavirus compared to other major viruses

VIRUS	YEAR IDENTIFIED	CASES	DEATHS	FATALITY RATE	NUMBER OF COUNTRIES
Marberg	1967	466	373	80%	11
Ebola*	1976	33,577	13,562	40.40%	9
Hendra	1994	7	4	57%	1
H5N1 Bird Flu	1997	861	455	52.80%	18
Nipah	1998	513	398	77.60%	2
SARS	2002	8,096	774	9.60%	29
H1N1**	2009	1,632,258	284,500	17.40%	214
MERS***	2012	2,494	858	34.40%	28
H7N9 Bird Flu	2013	1,568	616	39.30%	3
Wuhan*	2020	8,149	170	2%	20

*As of January 30, 2020

**Between 2009 and 2010

***As of November 2019

Sources: CDC; UN; World Health Organization; New England Journal of Medicine; Malaysian Journal of Pathology; CGTN; Johns Hopkins University; The Lancet

BUSINESS INSIDER



The <u>National</u>

TheNational.ae

Jan 27, 2020

Doctors 'cure' coronavirus patient using HIV wonder drugs

Three Beijing hospitals began administering **lopinavir/itonavir** – two antiretroviral drugs used in combination to treat HIV – to patients suffering from the coronavirus, according to a statement published by Chinese media.

The drugs work by blocking HIV's ability to reproduce by binding to healthy cells.

Antiretroviral drugs, which were used during the Sars outbreak, have 'somewhat successfully' stopped the spread of the disease to cells



Doctors 'cure' coronavirus patient using HIV wonder drugs

Antiretroviral drugs, which were used during the SARS outbreak, have 'somewhat successfully' stopped the spread of the disease to cells Doctors in China are claiming to have cured a patient suffering from the Wuhan coronavirus using a HIV wonder drug.

The Chinese authorities said the patient, who received the medication during a drug trial, had fully recovered and has since been discharged from hospital.

Shanghai's Municipal Health Commission said the drug "somewhat successfully" stopped the spread of the disease to cells, the Xinhua News Agency reported.



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One of the six high-affinity AAK1-binding drugs was the janus kinase inhibitor **baricitinib**, which also binds the cyclin G-associated kinase, another regulator of endocytosis. Because the plasma concentration of baricitinib on therapeutic dosing (either as **2 mg or 4 mg once daily**) is sufficient to inhibit AAK1, we suggest it could be trialled, using an appropriate patient population with 2019-nCoV acute respiratory disease, to reduce both the viral entry and the inflammation in patients





New vaccine process

- Process involves designing the vaccine constructs for example, producing the right target antigens, viral proteins that are targeted by the immune system, followed by testing in animal models to show that they are protective and safe.
- Once safety and efficacy are established, vaccines can advance into clinical trials in humans. If the vaccines induce the expected immune response and protection and are found safe, they can be mass produced for vaccination of the population.
- Currently, we lack virus isolates or samples of the virus to test the vaccines against. We also lack antibodies to make sure the vaccine is in good shape. We need the virus in order to test if the immune response induced by the vaccine works.
- Also, we need to establish what animals to test the vaccine on by potentially could include mice and nonhuman primates.

Vaccine development will likely take months.

MEDICAL

Sugar-derived molecules kill viruses in groundbreaking new treatment

By Michael Irving January 29, 2020

Researchers from the University of Manchester, the University of Geneva (UNIGE) and EPFL have managed to create a promising new virucidal drug. The team started with molecules called cyclodextrins, which are natural derivatives of glucose. They engineered these molecules to attract viruses, then cling to their surface and tear open their outer membranes, effectively destroying them.

The researchers tested the new treatment on several types of viruses, including herpes, HIV, hepatitis C, Zika and respiratory syncytial virus, and saw strong results across the board.

The team says that this molecule could be useful against viruses that have developed resistance against other treatments, and even future threats similar to the emerging coronavirus.









What we know so far



• Sydney food not contaminated

Facebook posts shared hundreds of times claimed t contaminated by the new coronavirus strain. Local he and the foods named did not appear in the Nev

Not Wuhan market

A video viewed more than 88,000 times on Fac materialized. In reality, it was filmed at an Indo

Fake death projections

In Sri Lanka, a Facebook post shared thousands - a city of 11 million people - would likely die of

Salt water can't kill virus

Multiple posts on Weibo, Twitter and Facebook told people to rinse their mouths with salt wate bogus; the expert's team said saline would not inaccurate online rumors.

False alarm in France

"Don't believe everything you read on the Internet just because there's a picture with a quote next to it."



d that the locations listed posed no risk to visitors, ist of recalls and advisories.

arket in Wuhan where the virus strain rovince).

projecting that the entire population of Wuhan authorities have made no such projection.

Chinese respiratory expert Zhong Nanshan had rom a new virus outbreak. But the claim is projection to believe or share medically-

In France, several social media posts with images have circulated with claims the post of the post of Val d'Oise, Savoie, Lot-et-Garonne and prese des-Orientales. However, these images were digitally manipulated. No cases have been confirmed in these departments.



Panic-stricken pet owners are starting to **throw cats and dogs out of buildings** after false reports that animals can spread the deadly coronavirus.

These shocking incidents were **triggered** after Dr. Li Lanjuan said on Chinese public television, "If pets come into contact with suspect patients, they should be quarantined."

At present, there is no evidence that companion animals / pets such as dogs or cats can be infected with the new coronavirus. However, it is always a good idea to wash your hands with soap and water after contact with pets. This protects you against various common bacteria such as E. coli and Salmonella that can pass between pets and humans.

#Coronavirus

Can pets at home spread the new coronavirus (2019-nC0V)?



prevent of action of reduce countermeasures vulnerability service services





DUSTIN HOFFMAN RENE RUSSO MORGAN FREEMAN

This animal carries a deadly virus... and the greatest medical crisis in the world is about to happen.







COTILLARD DAMON FISHBURNE LAUBENCE JUDE PALTROW WINSLET NOTHING SPREADS LIKE FEAR CON TAG TON

PARTICIPANT MEDIA AND IMAGENATION ABU DHABI A DOUBLE FEATURE FUNS/GREGORY JACOBS PRODUCTION "







Cities under quarantine in Hubei, Mainland China

Place	Province	Start date	City level	Population	Population Cases Deaths		Recoveries	
Feb 04, 2020 Border shutdown ^[15]								
Wuhan	Hubei	2020-01-23	Sub-provincial 11,081,000 6,384 313		306			
Huanggang	Hubei	2020-01-23	-01-23 Prefectural 6,630,000 1,422		19	41		
Ezhou	Hubei	2020-01-23	Prefectural	1,077,700	332	18	4	
Xiaogan	Hubei	2020-01-24	Prefectural	4,915,000	1,120	17	4	
Suizhou	Hubei	2020-01-24	Prefectural	2,580,000	641	6	3	
Jingzhou	Hubei	2020-01-24	Prefectural	5,590,200	613	7	7	
Yichang	Hubei	2020-01-24	Prefectural	4,135,900	452	3	2	
Jingmen	Hubei	2020-01-24	Prefectural	2,896,500	400	14	6	
Huangshi	Hubei	2020-01-24	Prefectural	2,470,700	405	2	9	
Xianning	Hubei	2020-01-24	Prefectural	2,543,300	348	-	1	
Shiyan	Hubei	2020-01-24	Prefectural	3,340,800	291	-	6	
Xiantao	Hubei	2020-01-24	Sub-prefectural	1,140,500	188	3	-	
Enshi	Hubei	2020-01-24	County	777,000	123	-	5	
Tianmen	Hubei	2020-01-24	Sub-prefectural	p-prefectural 1,731,500 117 10		-		
Qianjiang	Hubei	2020-01-24	Sub-prefectural	966,000	44	1	-	
Xiangyang ^[16]	Hubei	2020-01-28	Prefectural	5,164,000	632	1	1	
Quarantine total		57,040,100	13,522	414	397			



Elsewhere in China

On 2 February 2020, Wenzhou, Zhejiang, implemented a 7-day restriction where each household was only allowed to have one person leave their home for provisions every two days. 46 of the 54 highway exits in Wenzhou were also closed, effectively placing the city of about 9 million, and the first outside of Hubei, in a semi-lockdown.




CORONAVIRUS CRUISE SHIPS

Thousands of passengers have been quarantined









UNTV

Fever inspection in transportation hubs











PPE for medical personnel

October 2014

ecoc

http://ecdc.europa.eu/en/publications/Publications/safe-use-of-ppe.pdf

TECHNICAL DOCUMENT

Critical aspects of the safe use of personal protective equipment

A training tutorial for healthcare professionals

ww.ecdc.europa.eu



PAPR PPE Most confortable for medical personnel





3M 8210 N95 Particulate Respirator N95 新聞紀指口波

N95





















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HEALTH & WELLBEING

Salty masks could kill coronavirus

By Ben Coxworth January 31, 2020

Asst. Prof. Hyo-Jick Choi and colleagues (University of Alberta, Canada), designed a **virus-killing coating** that can be applied to conventional mask filtration material. He tells us that it's made up mainly of **two salts** – **sodium chloride** and **potassium chloride**.

When a droplet of any size comes into contact with the coating, the salts dissolve into it. As that droplet subsequently evaporates, the dissolved salts within it crystallize – the sharp edges of the crystals stab into any viruses that may be present, killing them.

The university is now looking for corporate partners to help commercialize the coating, with hopes of having a product on the market within 12 to 18 months.

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Protection masks against coronavirus for pets

























Medical evacuation



August 2015 Bio-transportation Units

- U.S. Department of State
- The Paul G. Allen Ebola
- Program MRIGlobal







С

Countermeasures

Medical evacuation



http://ecdc.europa.eu/en/publications/Publications/ebola-guidance-air-transport-update-decontamination.pdf

ECDC TECHNICAL REPORT

Assessing and planning medical evacuation flights to Europe for patients with Ebola virus disease and people exposed to Ebola virus

21 October 2014









Tents for hospitalization
Containers for labs, ICUs, Ors, offices, toilets, etc

For mass casualties it is better to have a hospital go to the affected area instead of patients go to the hospital









- Location of new hospital or field hospital?
- How do people go to the hospital if the do not have a car?
- Enough specialized medical personnel?
- Enough personnel for 8hrs. shifts?
- Adequate supplies (medical; consumables; food; water)?





Huoshenshan temporary field hospital in Wuhan in central China's Hubei Province

e-Doctor (USA)



and the top

2.0

1-29床 感染内科 护士站

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广东卫生在线

Deliver meals, medicine and collect bed sheets and rubbish (China)







XENEX LIGHT STRIKE



Pulsed Xenon systems produce germicidal UV at all wavelengths from 200-315nm. This broad spectrum UV light incorporates all germicidal wavelengths including those best known to deactivate the DNA and RNA of organisms.







Developer of the system (Megvil), said its engineers optimized the system for masks and hats with a margin of error within 0.3 degrees Celsius. The system also supports non-contact remote temperature screening of more than 3 meters. Once a passenger is suspected of having a fever, the system will automatically alert staff members. Person re-identification (ReID), a technology to identify and track a person of interest from group images, enables staff members to quickly locate the passenger for further tests. Megvii researchers said the system can send fever alerts for up to 15 people per second











This undercover journalist secretly filmed 8 bodies in 5 minutes in 1 hospital ward, #Wuhan, #China.

Cause of death, #coronavirus.



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Burial of contaminated corps







National burial instructions



Global Times 🔮

Bodies of #nCoV2019 victims should be cremated close by and immediately. Burials or transfer of the bodies not allowed. Funerals not allowed to avoid spread of the virus: National Health Commission (File Photo)



🛇 2,769 3:06 AM - Feb 2, 2020

First, the medical staff at the medical facility where the person was being treated are required to disinfect and seal the remains. It is forbidden to open the remains once they have been sealed.

Second, the medical staff will issue a death certificate and notify the family. At this point, the local funeral services facility will be contacted.

Third, funeral services personnel will then collect the body, deliver it to the relevant facility, and directly cremate the remains. A cremation certificate will then be issued.

Fourth, no one is permitted to visit the remains during this process. Relatives will, however, be allowed to take the remains after cremation has been completed and documented



Population surveillance

EMERGING TECHNOLOGY 🛛 🖀 Back to Home

"Auntie, Go Inside!" China Turns to Drones to Enforce Coronavirus Quarantine

+ INCREASE / DECREASE TEXT SIZE -

CONOR REYNOLDS 31ST JANUARY 2020

Yes you 'd better go back home and don't forget to wash your hands







- ✓ Guidelines (population; healthcare professionals; laboratories; travelers)
- Dissemination of guidelines (websites; social media; TV/radio; posters; leaflets)
- ✓ Awareness campaign (schools; universities; community centers; factories/industries; military personnel)
- ✓ Transform a hospital to a dedicated coronavirus hospital
- Deploy mobile field hospitals (civic; military)
- ✓ Guidelines on personnel personal protective equipment (PPE selection; donning/doffing process)
- ✓ Guidelines on transportation of infectious patients (ambulances; special stretcher-capsules)
- ✓ Guidelines for medical evacuation (airplanes)
- ✓ Guidelines for temporary storage of infectious corps (hospitals; funeral homes; refrigerated trucks; ice rinks)
- Guidelines for burial process (ethical/cultural peculiarities)
- ✓ Guidelines for coronary service (PPE selection; donning/doffing process)
- ✓ Guidelines of installation disinfection (means; processes)
- Lockdown/Quarantine/Restriction of movement guidelines (police; military)
- ✓ Fever screening in all national entry points (borders; airports; ports)
- Developing or intensification of existing syndromic surveillance systems
- ✓ International medical intelligence collaboration (WHO; CDC; ECDC; national centers)
- ✓ Plan "B" for hospital working with reduced healthcare personnel (i.e. by 10%; 25%; 50%)
- Cancel/postpone major mass gathering events (i.e. music concerts; sports events)





Sana Jamal @Sana Jamal

RIP Dr Liang Wudong. Prayers for all affected from #coronarvirus

Dr. Liang Wudong, a surgeon who was treating patients in Wuhan, become the first doctor to die from the new Coronavirus at Hubei Xinhua Hospital. A reminder that while everyone else is trying to avoid it, frontline medical staff are risking their lives to cure it and help others.



Support program for <u>healthcare</u> providers

Doctors, nurses and hospital are the only hope to those affected by the virus – therefore the following should be provided:

- $\checkmark\,$ Adequate good quality food and bottled water
- $\checkmark~$ Adequate space and time for resting/sleeping
- ✓ Adequate space for personal hygiene
- ✓ Support to their families (food, baby milk, medications, water, etc.)
- ✓ Support to their pets (or other animals) if living alone
- ✓ Adequate personal protective equipment
- ✓ Adequate single use clothing while on duty (including underwear)
- $\checkmark\,$ Free communication capabilities

In addition:

A certain protocol regarding the use of critical medical equipment (i.e. use of respirators), should be set in place

✓ Fear to don/doff to go to toilet
✓ Fear to tear the PPE
✓ Lack of PPE for replacement

pampers



For population

There is currently **no vaccine** to prevent 2019-nCoV infection. The best way to prevent infection is to avoid being exposed to this virus, but also:

- Wash your hands often with soap and water for at least 20 seconds. If soap and water are not available, use an alcohol-based hand sanitizer.
- Avoid touching your eyes, nose, and mouth with unwashed hands.
- Avoid close contact with people who are sick.
- Stay home when you are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces.



For healthcare professionals

* Fever may not be present in some patients, such as those who are very young, elderly, immunosuppressed, or taking certain fever-lowering medications.

Clinical Features	&	Epidemiologic Risk
Fever* and symptoms of lower respiratory illness (e.g., cough, difficulty breathing)	and	In the last 14 days before symptom onset, a history of travel from Wuhan City, China. – or – In the last 14 days before symptom onset, close contact with a person who is under investigation for 2019-nCoV while that person was ill.
Fever* or symptoms of lower respiratory illness (e.g., cough, difficulty breathing)	and	In the last 14 days, close contact with an ill laboratory- confirmed 2019-nCoV patient.

- The criteria are intended to serve as guidance for evaluation. Patients should be evaluated and discussed with public health departments on a case-by-case basis if their clinical presentation or exposure history is equivocal (e.g., uncertain travel or exposure)
- Healthcare providers should **immediately** notify both infection control personnel at their healthcare facility and their local or state health department in the event of a person under investigation for 2019-nCoV
- To increase the likelihood of detecting 2019-nCoV infection, it is recommended to collect and test multiple clinical specimens from different sites, including all three specimen types—lower respiratory, upper respiratory, and serum specimens. Additional specimen types (e.g., stool, urine) may be collected and stored. Specimens should be collected as soon as possible once a patient under investigation is identified regardless of time of symptom onset.





For laboratories



Guidelines for Clinical Specimens Interim guidelines for collecting, handling, and testing clinical specimens from patients under investigation.





Lab Biosafety Guidelines

Interim laboratory biosafety guidelines for handling and processing specimens associated with 2019nCoV infection.





For travelers

It is recommended to avoid non-essential travel to Wuhan, China. Chinese officials have closed transport within and out of Wuhan, including buses, subways, trains, and the airport. Remain alert if traveling to other parts of China by practicing the precautions below:

Travelers to China should

- Avoid contact with sick people.
- Avoid animals (alive or dead), animal markets, and products that come from animals (such as uncooked meat).
- Wash hands often with soap and water for at least 20 seconds. Use an alcohol-based hand sanitizer if soap and water are not available.

If you traveled to China in the last 14 days and feel sick with fever, cough, or difficulty breathing, you should:

- Seek medical care right away. Before you go to a doctor's office or emergency room, call ahead and tell them about your recent travel and your symptoms.
- Avoid contact with others.
- Not travel while sick.
- Cover your mouth and nose with a tissue or your sleeve (not your hands) when coughing or sneezing.
- Wash hands often with soap and water for at least 20 seconds. Use an alcohol-based hand sanitizer if soap and water are not available.



Influenza in Europe

Data from EU and EEA countries for the 2019–2020 season Week 3 (14 Jan–20 Jan 2020) Most program's directives are applicable to ongoing 2020 influenza outbreak





week number





Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings, 3rd Edition

April 2018



Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008

Update: May 2019

William A. Rutala, Ph.D., M.P.H.^{1,2}, David J. Weber, M.D., M.P.H.^{1,2}, and the Healthcare Infection Control Practices Advisory Committee (HICPAC)³

https://www.cdc.gov/infectioncontrol/guidelines/disinfection/

https://www.publichealthontario.ca/-/media/documents/bp-environmental-cleaning.pdf




Public disinfection



disinfectant across 16,000 square meters in just one morning







EU HEALTHY GATEWAYS JOINT ACTION GRANT AGREEMENT NUMBER: 801493 PREPAREDNESS AND ACTION AT POINTS OF ENTRY (PORTS, AIRPORTS, GROUND CROSSINGS)





EU HEALTHY GATEWAYS JOINT ACTION GRANT AGREEMENT NUMBER: 801493 PREPAREDNESS AND ACTION AT POINTS OF ENTRY (PORTS, AIRPORTS, GROUND CROSSINGS)



Co-funded by the Health Programme of the European Union

Interim advice

for preparedness and response to cases of 2019nCoV acute respiratory disease at points of entry in the European Union (EU)/EEA Member States (MS)

Public health measures at points of entry

Version 2

3 February 2020

INTERIM ADVICE FOR PREPAREDNESS AND RESPONSE TO CASES OF 2019-nCoV ACUTE RESPIRATORY DISEASE AT POINTS OF ENTRY IN THE EUROPEAN UNION (EU)/EEA MEMBER STATES (MS)

Advice for aircraft operators for preparedness and response to the outbreak of 2019-nCoV acute respiratory disease

Version 2 3 February 2020 passenger (SP)

Symptomatic

Coronavirus on board

Police

Coronavirus: Taiwan says infected couple likely picked up infection on Hong Kong flight to Italy









Coronavirus – cruise ships

CORONAVIRUS CRUISE SHIPS



3,600 PASSENGERS AND CREW THREE PASSENGERS FROM EARLIER VOYAGE DIAGNOSED 30 CREW MEMBERS WITH FLU LIKE SYMPTOMS TAKEN OFF

CRUISE SHIP WESTERDAM (Holland America)

- No coronavirus cases but made a stop over to Hong Kong
- Countries in the area **forbidden** docking in their ports







The economic impact from the Mexican outbreak of **H1N1 influenza** in 2009 is said to have lost the country's tourism industry approximately US\$5 billion, contributing to a global loss of **\$55 billion**.

Similarly the **SARS** outbreak in 2003 is estimated to have lost the tourism industry between **\$30 and \$50 billion***.

2019-nCoV: yet unknown

Recovery time for visitor numbers to a destination following an epidemic scare is **19 months**, though this could be lessened to 10 months if the right responses were introduced.

* <u>https://www.ncbi.nlm.nih.gov/books/NBK92473/#ch2.s8</u>



• In recent years, scientists have linked most emerging infectious diseases to animals, especially wildlife. Much of that

wildlife is being displaced by global infection in closer contact with huma microbes in animals that could spell of **PREDICT Program** funded by the l nearly 1,000 new animal-borne viruse \$\overline{\backsim 92}\$ ocronaviruses, the fa
♥ Program dis



In the 1998-1999 **Nipah virus** outbreak in **Malaysia** that killed more than 100 people, researchers concluded that **fruit bats** dislodged by forest fires and an El Niño-related drought began feeding on fruit trees grown on the same farms as pigs. The close proximity allowed the virus to jump from **bats to pigs to farmers.**

 Global warming can accelerate displacement by thawing, burning, flooding, or drying out habitats in response to hotter temperatures and stronger storms.

- **Stressed animals**, whether due to displacement or confinement in live animal markets, are more susceptible to disease.
- Researchers recently announced finding 33 viruses—28 of which were new to science—that had been entombed for 15,000 years in ice cores within a melting glacier in Tibet*.
- Southern Florida: Mixing native animals and abandoned exotic pets in an increasingly steamy subtropical swamp.
- Some pathogens normally seen only at lower temperatures are adapting to warmer conditions e.g. fungus Candida auris.



"Where we fail universally is in the aftermath. So, once we've put it back in its box, we rarely do the appropriate amount of soul-searching and autopsy on this to say, How do we stop this from happening again?"

Christopher Mores, Professor of Global Health George Washington University in Washington, D.C.

