The Daily COVID-19 Literature Surveillance Summary

September 18, 2020

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COVID-19 LST

COVID-19 Daily Literature Surveillance

COVID19LST

Bringing you real time, distilled information for guiding best practices during the COVID-19 pandemic

LEVEL OF EVIDENCE

Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence

Question	Step 1 (Level 1*)	Step 2 (Level 2*)	Step 3 (Level 3*)	Step 4 (Level 4*)	Step 5 (Level 5)
How common is the problem?	Local and current random sample surveys (or censuses)	Systematic review of surveys that allow matching to local circumstances**	Local non-random sample**	Case-series**	n/a
Is this diagnostic or monitoring test accurate? (Diagnosis)	Systematic review of cross sectional studies with consistently applied reference standard and blinding	Individual cross sectional studies with consistently applied reference standard and blinding	Non-consecutive studies, or studies without consistently applied reference standards**	Case-control studies, or "poor or non-independent reference standard**	Mechanism-based reasoning
What will happen if we do not add a therapy? (Prognosis)	Systematic review of inception cohort studies	Inception cohort studies	Cohort study or control arm of randomized trial*	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
Does this intervention help? (Treatment Benefits)	Systematic review of randomized trials or *n*-of-1 trials	Randomized trial or observational study with dramatic effect	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based reasoning
What are the COMMON harms? (Treatment Harms)	Systematic review of randomized trials, systematic review of nested case-control studies, *n*-of-1 trial with the patient you are raising the question about, or observational study with dramatic effect	Individual randomized trial or (exceptionally) observational study with dramatic effect	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning
What are the RARE harms? (Treatment Harms)	Systematic review of randomized trials or *n*-of-1 trial	Randomized trial or (exceptionally) observational study with dramatic effect			
Is this (early detection) test worthwhile? (Screening)	Systematic review of randomized trials	Randomized trial	Non -randomized controlled cohort/follow-up study**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning

*** Level may be graded down on the basis of study quality, imprecision, indirectness (study PICO does not match questions PICO), because of inconsistency between studies, or because the absolute effect size is very small; Level may be graded up if there is a large or very large effect size.**

**** As always, a systematic review is generally better than an individual study.**

How to cite the Levels of Evidence Table
OCEBM Levels of Evidence Working Group*. "The Oxford 2011 Levels of Evidence".
Oxford Centre for Evidence-Based Medicine. http://www.cebm.net/index.aspx?o=5653
** OCEBM Table of Evidence Working Group = Jeremy Howick, Iain Chalmers (James Lind Library), Paul Glasziou, Trish Greenhalgh, Carl Heneghan, Alessandro Liberati, Ivan Moschetti, Bob Phillips, Hazel Thornton, Olive Goddard and Mary Hodgkinson*

EXECUTIVE SUMMARY

Climate

- Vaccine experts discuss concerns regarding historical disparities in vaccine/healthcare access in disadvantaged and minority groups. They propose a SARS-CoV-2 vaccine distribution plan with special emphasis on the ethical principles, utilitarianism, and egalitarianism, employing a tier system beginning with healthcare providers/front-line workers, adults > 65, and those with high comorbidities, followed by random chance selection weighted so that disadvantaged areas have higher access to vaccine.

- Health policy experts argue that the multifaceted impacts that young people are facing as a result of the COVID-19 pandemic are being ignored due to their reduced infection rates and improved outcomes following infection. The authors call for more research on the impact the pandemic is having on young people, involving young people in pandemic policy planning at institutional and governmental levels, more governmental resource allocation to young people, and prioritization of young voices in the media, organizations and government.

Transmission & Prevention

- A retrospective study in Thailand of 211 asymptomatic contacts of COVID-19 patients who later tested positive and 839 asymptomatic contacts of COVID-19 patients who never tested positive evaluated factors that contributed to whether an individual with close contact to a person with COVID-19 contracted the virus. Factors independently associated with a lower likelihood of contracting SARS-CoV-2 included wearing a mask during all contact with the infected individual, maintaining greater than 1 meter of distance from the infected individual, having close contact for less than or equal to 15 minutes with the infected individual, and frequent hand washing.

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CLIMATE

DISPARITIES

RATIONING OF CIVILIAN COVID-19 VACCINES WHILE SUPPLIES ARE LIMITED

Zimmerman RK, South-Paul JE, Poland GA.. J Infect Dis. 2020 Sep 7:jiaa569. doi: 10.1093/infdis/jiaa569. Online ahead of print.
Level of Evidence: Other - Expert Opinion

BLUF

An expert opinion by vaccine experts from the University of Pittsburgh School of Medicine and Mayo Vaccine Research Group addresses concerns regarding historical disparities in vaccine/healthcare access in disadvantaged and minority groups. They propose a SARS-CoV-2 vaccine distribution plan with special emphasis on the ethical principles, utilitarianism, and egalitarianism, employing a tier system beginning with healthcare providers/front-line workers, adults > 65 and those with high comorbidities, followed by random chance selection weighted so that disadvantaged areas have higher access to vaccine (See attached figure).

FIGURES

Priority groups for pandemic rationing of a COVID vaccine when supplies are limited, by rationale and ethical basis

Priority	Priority Group	Rationale	Comment	Ethical Theory Support	
				Utilitarianism	Egalitarianism
1	Health care providers (HCP), therapeutics and vaccine makers, military	Critical need in pandemic	HCP needed to treat disease and support the ill. These groups help and protect others, valuing lives beyond their own.	X	X
2	Groups at highest benefit	Medical benefit	Medical benefit incorporates both ability to respond well to a particular vaccine and medical need (i.e., underlying health conditions or age).	X	X
3	Persons selected by lottery	Random chance	Values each person equally but even chance may not overcome historic inequities given problems with follow-through on opportunities. Weight by Area Deprivation Index.		X
Potentially high if identified	Persons highly involved in transmitting SARS-CoV2 (e.g., super-spreaders)	Reducing transmission	Key to reducing transmission by the asymptomatic or mildly symptomatic. Historically, live vaccines often have the most potential for this (e.g., the community benefits of live attenuated influenza vaccine).	X	X

Priority groups for pandemic rationing of a COVID vaccine when supplies are limited, by rationale and ethical basis

INJUSTICES FACED BY CHILDREN DURING THE COVID-19 PANDEMIC AND CRUCIAL NEXT STEPS

Campbell S, Carnevale FA.. Can J Public Health. 2020 Sep 3. doi: 10.17269/s41997-020-00410-6. Online ahead of print.
Level of Evidence: Other - Expert Opinion

BLUF

A letter to the editor from health policy experts from the University of Toronto and McGill University, Montreal argues that the multifaceted impacts that young people are facing as a result of the COVID-19 pandemic are being ignored due to their reduced infection rates and improved outcomes following infection. The authors call for ethical analysis of reported evidence through the lens of justice as well as policy and practice changes that include more research on the impact the pandemic is having on young people, involving young people in pandemic policy planning at institutional and governmental levels, more governmental resource allocation to young people, and prioritization of young voices in the media, organizations and government.

SARS-COV-2 (COVID-19) HAS NEUROTROPIC AND NEUROINVASIVE PROPERTIES

Flores G.. Int J Clin Pract. 2020 Sep 15:e13708. doi: 10.1111/ijcp.13708. Online ahead of print.
Level of Evidence: Other - Review / Literature Review

BLUF

A literature review by Gonzalo Flores at Benemérita Universidad Autónoma de Puebla, Mexico found that there is far less information known about the effects of neuroinvasive and neurotropism of COVID-19 compared to other coronaviruses. However, the literature describes several potential mechanisms through which coronaviruses may be able to penetrate into the CNS (through olfactory or peripheral neurons, an infected monocyte, or by directly binding ACE2 receptors on blood brain barrier endothelial cells) and discusses other coronaviruses such as SARS-CoV, with which a case report exhibited generalized tonic-clonic seizures. The author concludes that further research is needed to understand potential neuroinvasion and neural injuries following SARS-CoV-2 infection.

ABSTRACT

Now, we know that the first report of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) was in December 2019 in Wuhan, China. In January, the existence of a disease caused by a virus with respiratory tropism for humans was announced, and in February it was already named SARS-Cov-2. The World Health Organization (WHO) 1 gave it the name of COVID-19, on February 11. One month later, WHO declared that the disease caused by this virus was already a pandemic (WHO, 2020) 1 . The virus started in China, then affected other Asian countries such as Japan, South Korea, etc., and later spread to Europe, then America.

CASE-CONTROL STUDY OF USE OF PERSONAL PROTECTIVE MEASURES AND RISK FOR SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2 INFECTION, THAILAND

Doung-Ngern P, Suphanchaimat R, Panjangampatthana A, Janekrongtham C, Ruampoom D, Daochaeng N, Eungkanit N, Pisitpayat N, Srisong N, Yasopa O, Plernprom P, Promduangsi P, Kumphon P, Suangtho P, Watakulsin P, Chaiya S, Kripattanapong S, Chantian T, Bloss E, Namwat C, Limmathurotsakul D.. Emerg Infect Dis. 2020 Sep 15;26(11). doi: 10.3201/eid2611.203003. Online ahead of print.

Level of Evidence: 4 - Case-series, case-control studies, or historically controlled studies

BLUF

A retrospective case control study conducted using 211 cases (asymptomatic contacts of COVID-19 patients who later tested positive) and 839 controls (asymptomatic contacts of COVID-19 patients who never tested positive) (Figure 1) from Thailand between 1 March 2020 and 30 March 2020 evaluated factors that contributed to whether an individual with close contact to a person with COVID-19 also contracted SARS-CoV-2. Factors independently associated with a lower likelihood of contracting SARS-CoV-2 included wearing a mask during all contact with the infected individual, maintaining greater than 1 meter of distance from the infected individual, having close contact for less than or equal to 15 minutes with the infected individual, and frequent hand washing (Table 1). This study supports the physical distancing guidelines practiced by most societies in order to limit the spread of SARS-CoV-2.

ABSTRACT

We evaluated effectiveness of personal protective measures against severe acute respiratory disease coronavirus 2 (SARS-CoV-2) infection. Our case-control study included 211 cases of coronavirus disease (COVID-19) and 839 controls in Thailand. Cases were defined as asymptomatic contacts of COVID-19 patients who later tested positive for SARS-CoV-2; controls were asymptomatic contacts who never tested positive. Wearing masks all the time during contact was independently associated with lower risk for SARS-CoV-2 infection compared with not wearing masks; wearing a mask sometimes during contact did not lower infection risk. We found the type of mask worn was not independently associated with infection and that contacts who always wore masks were more likely to practice social distancing. Maintaining >1 m distance from a person with COVID-19, having close contact for <15 minutes, and frequent handwashing were independently associated with lower risk for infection. Our findings support consistent wearing of masks, handwashing, and social distancing to protect against COVID-19.

FIGURES

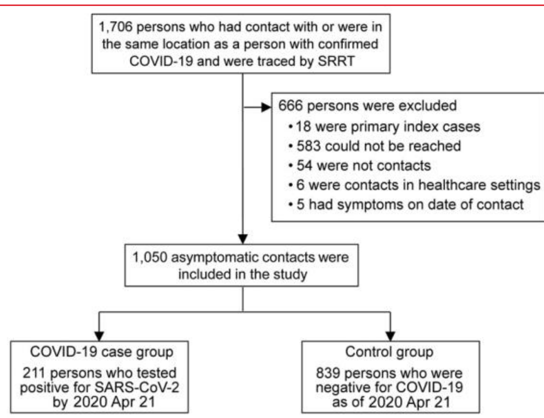

Figure 1. Flow diagram in case-control study of severe acute respiratory syndrome coronavirus 2 infections and contacts, Thailand, March–April 2020. COVID-19, coronavirus disease; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; SRRT, Surveillance and Rapid Response Team of Ministry of Public Health.

Factors	COVID-19 cases, no. (%), N = 211†	Controls, no. (%), N = 839†	Crude odds ratio (95% CI)‡	p value	Adjusted odds ratio (95% CI)‡	p value
Sex	n = 211	n = 838				
F	65 (30.8)	404 (48.2)	Referent	0.52	Referent	0.37
M	146 (69.2)	434 (51.8)	0.83 (0.47–1.46)		0.76 (0.41–1.41)	
Age group, y	n =211	n = 829				
≤15	6 (2.8)	49 (5.9)	0.65 (0.17–2.48)	0.29	0.57 (0.15–2.21)	0.21
>15–40	94 (44.5)	435 (52.5)	Referent		Referent	
>40–65	98 (46.4)	302 (36.4)	1.65 (0.91–2.97)		1.77 (0.94–3.32)	
>65	13 (6.2)	43 (5.0)	1.29 (0.33–5.07)		0.97 (0.22–4.24)	
Contact place§	n = 211	n = 839				
Nightclub	35 (16.6)	193 (23.0)	NA	NA	NA	NA
Boxing stadium	125 (59.2)	19 (2.3)				
Workplace	11 (5.2)	286 (34.0)				
Household	38 (18.0)	192 (22.9)				
Others	2 (0.9)	149 (17.8)				
Shortest distance of contact	n = 197	n = 809				
Physical contact	132 (67.0)	292 (36.1)	Referent	0.001	Referent	0.02
≤1 m without physical contact	61 (30.9)	335 (41.4)	0.76 (0.43–1.35)		1.09 (0.58–2.07)	
>1 m	4 (2.0)	182 (22.5)	0.08 (0.02–0.31)		0.15 (0.04–0.63)	
Duration of contact within 1 m	n = 199	n = 801				
>60 min	180 (90.4)	487 (60.8)	Referent	0.003	Referent	0.09
>15–60 min	14 (7.0)	162 (20.2)	0.53 (0.24–1.17)		0.67 (0.29–1.55)	
≤15 min	5 (2.5)	152 (19.0)	0.13 (0.04–0.46)		0.24 (0.07–0.90)	
Sharing dishes or cups¶	n = 210	n = 837				
N	125 (59.5)	576 (68.8)	Referent	0.001	Referent	0.39
Y	85 (40.5)	261 (31.2)	2.71 (1.48–4.94)		1.33 (0.70–2.54)	
Sharing cigarettes#	n = 209	n = 836				
N	196 (93.8)	824 (98.6)	Referent	0.001	Referent	0.03
Y	13 (6.2)	12 (1.4)	6.12 (2.12–17.72)		3.47 (1.09–11.02)	
Handwashing**	n = 210	n = 826				
None	44 (20.9)	121 (14.6)	Referent	<0.001	Referent	0.045
Sometimes	114 (54.3)	333 (40.3)	0.41 (0.18–0.91)		0.34 (0.14–0.81)	
Often	52 (24.8)	372 (45.0)	0.19 (0.08–0.46)		0.33 (0.13–0.87)	
Type of mask††	n = 211	n = 834				
None	102 (48.3)	500 (60.0)	Referent	0.003	–	–
Nonmedical masks only	25 (11.8)	77 (9.2)	0.78 (0.32–1.90)			
Nonmedical and medical	12 (5.7)	48 (5.8)	0.46 (0.13–1.64)			
Medical mask only	72 (34.1)	209 (25.0)	0.25 (0.12–0.53)			
Compliance with mask-wearing††	n = 210	n = 823				
Not wearing a mask	102 (48.6)	500 (60.7)	Referent	<0.001	Referent	0.006
Wearing a mask sometimes	79 (37.6)	125 (15.2)	0.75 (0.37–1.52)		0.87 (0.41–1.84)	
Always wearing a mask	29 (13.8)	198 (24.1)	0.16 (0.07–0.36)		0.23 (0.09–0.60)	

Table 1: Factors associated with coronavirus disease among persons followed through contract tracing, Thailand, March–April 2020*

*NA, not applicable; COVID-19, coronavirus disease. †Data not available for all cases and controls for all factors. ‡Crude and adjusted odds ratios were estimated using logistic regression with random effects for location and for index patient nested within the same location. §The state enterprise office was included as a workplace. Others included restaurants, markets, malls, religious places, and households of index patients or other persons but not living together. Location was included in the model as a random effect variable. ¶Sharing multiserving dishes and using communal serving utensils to portion food individually was not categorized as sharing dishes. #Included sharing electronic cigarettes and any vaping devices. **Included washing with soap and water, and by using alcohol-based solutions. ††Wearing masks incorrectly, such as not covering both nose and mouth, was considered the same as not wearing a mask for analyses. Crude odds ratios of wearing mask and of each factor evaluated were estimated using logistic regression with random effects for location and for index patient nested within the same location to take into account clustering; therefore, the crude odds ratios are not equal to dividing of the odds in the case group by the odds in the control group.

A DRONE-BASED NETWORKED SYSTEM AND METHODS FOR COMBATING CORONAVIRUS DISEASE (COVID-19) PANDEMIC

Kumar A, Sharma K, Singh H, Naugriya SG, Gill SS, Buyya R.. Future Gener Comput Syst. 2021 Feb;115:1-19. doi: 10.1016/j.future.2020.08.046. Epub 2020 Sep 3.
Level of Evidence: Other - Modeling

BLUF

Engineers and computer scientists from India, United Kingdom, and Australia present an in-depth proposal of their drone based healthcare system for use during the COVID-19 pandemic by describing its architecture (Figure 3), outlining the collision avoidance algorithms, and providing real-time drone based simulations. They argue that this system could help monitor patients, sanitize, provide thermal imaging (Figure 1), enforce social distancing (Figure 2), as well as collect and analyze data to better combat and manage the pandemic on a large scale, even in areas with insufficient medical infrastructure.

ABSTRACT

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. It is similar to influenza viruses and raises concerns through alarming levels of spread and severity resulting in an ongoing pandemic worldwide. Within eight months (by August 2020), it infected 24.0 million persons worldwide and over 824 thousand have died. Drones or Unmanned Aerial Vehicles (UAVs) are very helpful in handling the COVID-19 pandemic. This work investigates the drone-based systems, COVID-19 pandemic situations, and proposes an architecture for handling pandemic situations in different scenarios using real-time and simulation-based scenarios. The proposed architecture uses wearable sensors to record the observations in Body Area Networks (BANs) in a push-pull data fetching mechanism. The proposed architecture is found to be useful in remote and highly congested pandemic areas where either the wireless or Internet connectivity is a major issue or chances of COVID-19 spreading are high. It collects and stores the substantial amount of data in a stipulated period and helps to take appropriate action as and when required. In real-time drone-based healthcare system implementation for COVID-19 operations, it is observed that a large area can be covered for sanitization, thermal image collection, and patient identification within a short period (2 KMs within 10 min approx.) through aerial route. In the simulation, the same statistics are observed with an addition of collision-resistant strategies working successfully for indoor and outdoor healthcare operations. Further, open challenges are identified and promising research directions are highlighted.

FIGURES

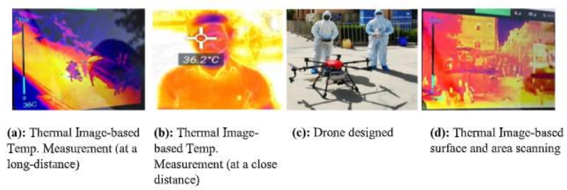

Figure 1. Real-time drone-based COVID-19 temperature reading, thermal scanning and medication system.

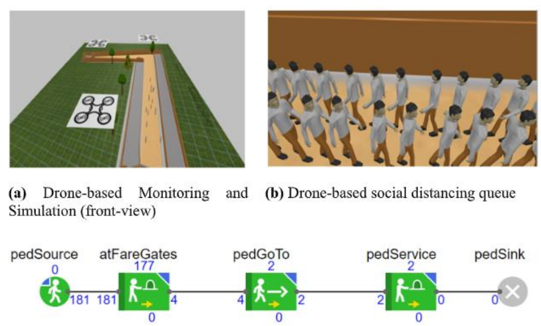

Figure 2. Drone/UAV-based simulation model for social distancing in hospitals, banks, supermarket etc.

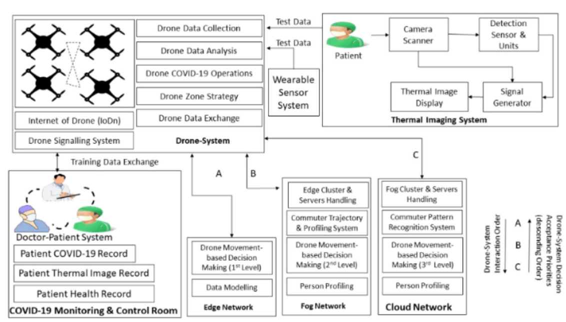

Figure 3. Architecture for drone-based COVID-19 monitoring, control, and analytics in smart healthcare system.

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