



COVID19 briefs for DB Schenker

Importance of prevention and hygiene practices

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COVID19 (SARS-CoV2) – facts of the danger

In cases requiring ICU admission, COVID19 can kill or cause permanent damages to lungs, brain, kidneys, heart, or liver*

- *ICU admission rate by age group: Age 20-44 (2-4.2%), Age 45-54 (5.4-10.4%), Age 55-64 (4.7-11.2%), Age 65-74 (8.1-18.8%)



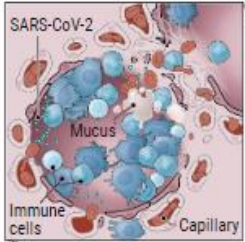
The coronavirus wreaked extensive damage (yellow) on the lungs of a 59-year-old man who died at George Washington University Hospital, as seen in a 3D model based on computerized tomography scans. GEORGE WASHINGTON HOSPITAL AND SURGICAL THEATER



How does coronavirus kill? Clinicians trace a ferocious rampage through the body, from brain to toes

By Meredith Wadman, Jennifer Couzin-Frankel, Jocelyn Kaiser, Catherine Maticic | Apr. 17, 2020, 6:45 PM

On rounds in a 20-bed intensive care unit one recent day, physician Joshua Denson assessed two patients with seizures, many with respiratory failure and others whose kidneys were on a dangerous downhill slide. Days earlier, his rounds had been interrupted as his team tried, and failed, to resuscitate a young woman whose heart had stopped. All shared one thing, says Denson, a pulmonary and critical care physician at the Tulane University School of Medicine. "They are all COVID positive."



1 Lungs

A cross section shows immune cells crowding an inflamed alveolus, whose walls break down during attack by the virus, diminishing oxygen uptake. Patients cough, fevers rise, and it takes more and more effort to breathe.

2 Liver

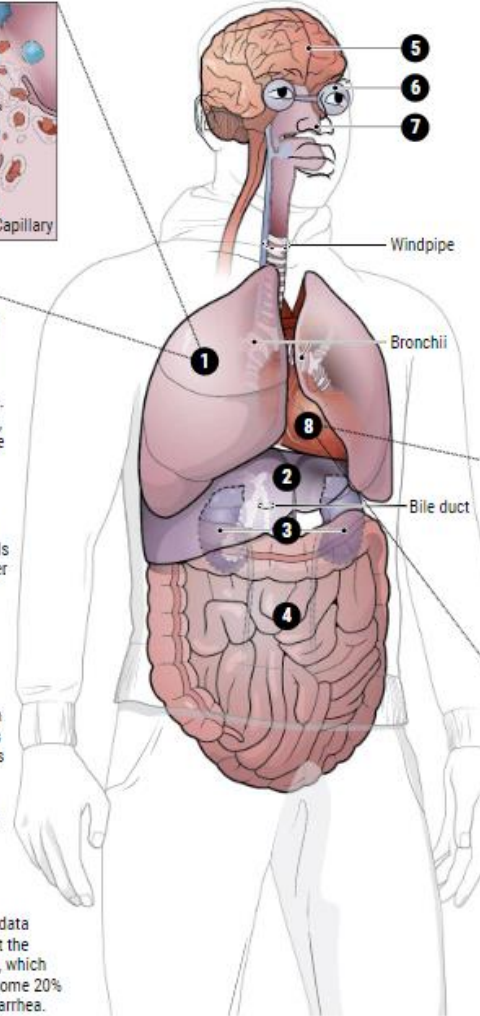
Up to half of hospitalized patients have enzyme levels that signal a struggling liver. An immune system in overdrive and drugs given to fight the virus may be causing the damage.

3 Kidneys

Kidney damage is common in severe cases and makes death more likely. The virus may attack the kidneys directly, or kidney failure may be part of whole-body events like plummeting blood pressure.

4 Intestines

Patient reports and biopsy data suggest the virus can infect the lower gastrointestinal tract, which is rich in ACE2 receptors. Some 20% or more of patients have diarrhea.



5 Brain

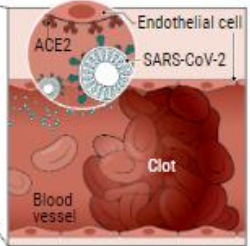
Some COVID-19 patients have strokes, seizures, mental confusion, and brain inflammation. Doctors are trying to understand which are directly caused by the virus.

6 Eyes

Conjunctivitis, inflammation of the membrane that lines the front of the eye and inner eyelid, is more common in the sickest patients.

7 Nose

Some patients lose their sense of smell. Scientists speculate that the virus may move up the nose's nerve endings and damage cells.



8 Heart and blood vessels

The virus (green) enters cells, likely including those lining blood vessels, by binding to ACE2 receptors on the cell surface. Infection can also promote blood clots, heart attacks, and cardiac inflammation.

COVID19 (SARS-CoV2) – where we are today



The Coronavirus in America: The Year Ahead

There will be no quick return to our previous lives, according to nearly two dozen experts. But there is hope for managing the scourge now and in the long term.



By Donald G. McNeil Jr.

Published April 18, 2020 Updated April 20, 2020, 5:35 p.m. ET



[The coronavirus](#) is spreading from America's biggest cities to its suburbs, and has begun encroaching on the nation's rural regions. The virus is believed to have infected millions of citizens and has killed more than 34,000.

Reputable longer-term projections for how many Americans will die vary, but they are all grim. Various experts [consulted by the Centers for Disease Control and Prevention in March](#) predicted that the virus eventually could reach 48 percent to 65 percent of all Americans, with a fatality rate just under 1 percent, and would kill up to 1.7 million of them if nothing were done to stop the spread.

A model by researchers at Imperial College London [cited by the president](#) on March 30 [predicted 2.2 million deaths](#) in the United States by September under the same circumstances.

By comparison, about 420,000 Americans died in World War II.

COVID19 pandemic facts - global

- #1 cause of death in the US – 1,800 death/day (NY Times)
- US model estimate: 65% Americans infected with 240,000 death by mid summer (White House)
- Italy reporting 43% of COVID19 cases being asymptomatic (<https://doi.org/10.1101/2020.04.17.20053157doi>)
- Worst mortality outcomes (Italy: 12.8%), (UK: 12.7%), (France: 10.9%) (Johns Hopkins, as of 14 Apr 2020)
- Lowest mortality outcomes (Germany: 2.5%), (US: 4.1%)
- Global mortality expected to plateau at 4~6%

When will the global lock-down end?

- Vaccine or treatment discoveries are needed to end the lockdown
- While US is targeting 12-18 months for first vaccine, previous record for the fastest new vaccine development is 4 years (mumps vaccine)
- Also there is a risk that the vaccine development may fail. For example, SARS-CoV vaccine failed, the closest virus to COVID19 (SARS-CoV2).

There is no foreseeable exit from COVID19, at least not for another 18 months. Next waves of pandemics from mutating/shifting COVID19 also possible.

COVID19 (SARS-CoV2) – updates on treatment & vaccine research

Current COVID19 treatment expectations

TABLE. Hospitalization, intensive care unit (ICU) admission, and case-fatality percentages for reported COVID-19 cases, by age group — United States, February 12–March 16, 2020

Age group (yrs) (no. of cases)	%*			ICU-to-fatality
	Hospitalization	ICU admission	Case-fatality	
0–19 (123)	1.6–2.5	0	0	NA
20–44 (705)	14.3–20.8	2.0–4.2	0.1–0.2	5%
45–54 (429)	21.2–28.3	5.4–10.4	0.5–0.8	8%
55–64 (429)	20.5–30.1	4.7–11.2	1.4–2.6	25%
65–74 (409)	28.6–43.5	8.1–18.8	2.7–4.9	33%
75–84 (210)	30.5–58.7	10.5–31.0	4.3–10.5	41%
≥85 (144)	31.3–70.3	6.3–29.0	10.4–27.3	94%
Total (2,449)	20.7–31.4	4.9–11.5	1.8–3.4	

* Lower bound of range = number of persons hospitalized, admitted to ICU, or who died among total in age group; upper bound of range = number of persons hospitalized, admitted to ICU, or who died among total in age group with known hospitalization status, ICU admission status, or death.

Source: US-CDC

At this rate, we cannot assume successful treatment or vaccine development

Updates and results on the leading treatments and vaccines

- Hydroxychloroquine + Azithromycin (anti-malaria)
- Lopinavir + Ritonavir (anti-HIV) (DOI: 10.1056/NEJMoa2001282)
 - “no benefit was observed with lopinavir-ritonavir treatment beyond standard care”
- Remdesivir (anti-Ebola) (DOI: 10.1056/NEJMoa2007016)
 - “Among 64 patients receiving oxygen support between age 48-71, 68% of them showed improvements and 13% died”
 - “Likely an incremental improvement, not a panacea” - RBC
- Research suggesting lowering chances of vaccine success

Coronavirus mutation could threaten the race to develop vaccine

- A strain found in India showed changes in the mechanism used to bind the virus to human cells which could render current research futile
- Researchers are targeting the same process that allowed Sars to infect people, but the mutation could upend their assumptions

Coronavirus’s ability to mutate has been vastly underestimated, and mutations affect deadliness of strains, Chinese study finds

- The most aggressive strains of Sars-CoV-2 could generate 270 times as much viral load as the least potent type
- New York may have a deadlier strain imported from Europe, compared to less deadly viruses elsewhere in the United States

Breaking news on remdesivir – it doesn't work either...

Gilead antiviral drug remdesivir flops in first trial

Exclusive: Disappointing results revealed in draft documents published accidentally by WHO



Chinese trial showed remdesivir — developed by California-based Gilead Sciences — did not improve patients' condition © AFP via Getty Images

Donato Paolo Mancini in London and **Hannah Kuchler** in New York 10 HOURS AGO

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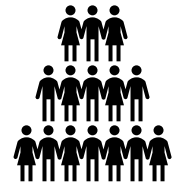
COVID19 (SARS-CoV2) – possible door opener to future pandemics

COVID19 possesses worst possible features for opening doors to a series of future pandemics



Asymptomatic transmission

COVID19 sheds without causing visible health symptoms, making it hard to contain and easy to spread



Highly infectious

It is spreading at record-speed, expected to infect over **70% of global population**



Inter-species crossover

It can infect animals as well, drastically increasing the host count for its **spread and evolution**

Bats, Cats, Rodents, etc.



Rapid mutation “Antigenic drift”

It is also mutating rapidly, making **future detection and treatments steps behind**

With billions soon to be infected, COVID will evolve at 4x faster rate than now



Co-infection and viral evolution “Antigenic shift”

Left unchecked, it can pass its deadly capabilities to other viruses, making it hard to develop vaccines.

Called “shift”, this is the reason why there is no vaccine for common flu.

“Three separate studies suggest the unprecedented mass quarantine measures taken to limit the spread of the deadly coronavirus in China may have changed its genetic course, potentially making it more “insidious” and harder to detect.”

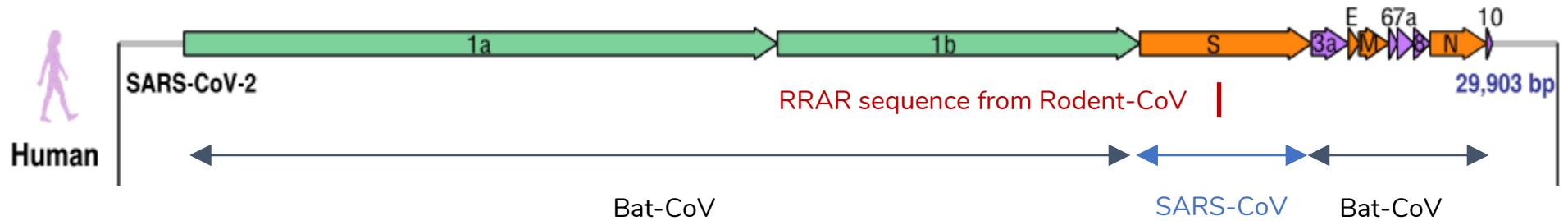
“As the virus spreads around the world, scientists believe it will continue to evolve”

- Stephen Chen, *South China Morning Post*, 12 March 2020

Prevention and hygienic practices are the only current tools in fighting COVID19 and future pandemics

COVID19 (SARS-CoV2) – infection host & transmission routes

Knowing the scientific facts of COVID19 is vital in devising prevention and hygienic strategies for fight it and subsequent pandemics



- Confirmed COVID19 infection target: humans, cats, hamster, etc (<https://doi.org/10.1093/cid/ciaa325>)
- **Saliva** and **feces** are the main medium of viral transmission
- **Oral** and **respiratory** sites are the main viral entry for infection

COVID19 can be transmitted by **mere speech at 8m** – and infecting air and surfaces up to 48 hours ([DOI:10.1056/NEJMc2004973](https://doi.org/10.1056/NEJMc2004973))

- COVID19 viability in air (from speech aerosols): 3 hours+
- COVID19 viability on Cardboard surface: 8 hours+
- COVID19 viability on Stainless Steel surface: 8 hours+
- COVID19 viability on Plastic surface: 24 hours+
- COVID19 viability inside soil or fecal matters: likely longer

- **AVOID any lawn (animal feces i.e. stray cats)**
 - **Remove carpets (contaminated soil)**
 - **ALWAYS wear masks - even in toilet**
- **ALWAYS wash hands, face, and clothes WITH SOAP!**
- **DESIGNATE safe surfaces and keep them clean**

Recommended policies for stopping COVID19 and future pandemics

Current WHO / govt / pharma approaches



- Washing hands
- Wearing masks
- Crowd control



- COVID19 lab tests (RT-PCR)
- On-spot tests (IgG/IgM)
- Quarantine on suspicion



- Antiviral drug development
- COVID19 vaccines
- COVID19 biological drugs

- Passive control & currently failing
- Socio-economically non-sustainable

- Evolving viruses pose difficulties
- Requires constant updates on R&D

- Steps behind - flu scenario unavoidable
- Slow dev & deployment 1.5~3 yrs

Xylonix recommendations for workplace policies in addition



- Strictly prohibit smoking
- Medical leave & mandated clinic visit for any self-diagnosed naso-pharyngeal, dental, or respiratory infection symptoms
- Contact tracing of all self-reported cases of above
- Removal of carpeting
- Require workplace mask-use, even in toilets
- Use of toilet cleansing tablets
- Blocking the entry of any personnel with any suspected naso-respiratory infection symptoms (runny nose, coughs, etc)
- Routine sanitization of shared working surfaces and tools (60 min cycles)
- Permanent installation of sanitization mats at every checkpoint

Limitations of current pandemic control philosophy

Current technology cannot support the philosophy of pandemic control – breaking the transmission chain

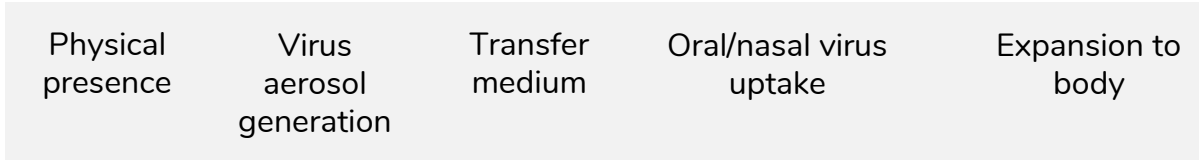
Infector

Transmission event chain

Infectee

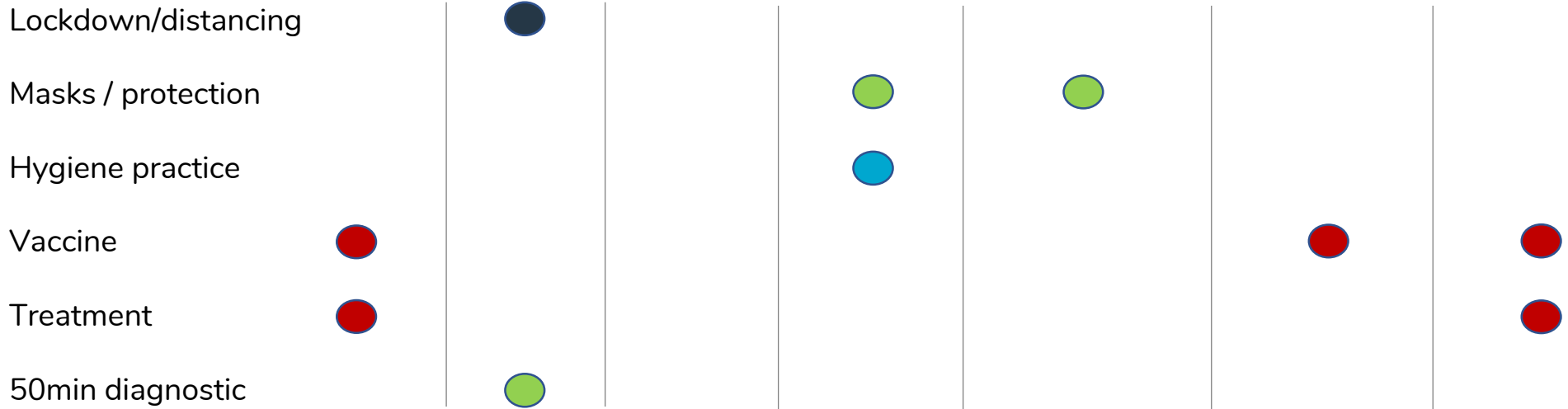


Symptoms
Virus production



Symptoms
Virus production

Current practice



● Effective & Sustainable
 ● Non-sustainable & Disruptive
 ● Disruptive
 ● Poor outlook

Xylonix COVID19 containment strategies and pipelines

Xylonix to launch and initiate a series of pipelines (all patent-pending) for immediate deployment to break the transmission chain

Respiratory antiviral sanitization

-launched by a JV with an undisclosed

Air sanitizer
Nasal barrier gel

Systemic antiviral for clinical treatment featuring Zinc (RNA polymerase inhibitor)

-direct launch by Xylonix

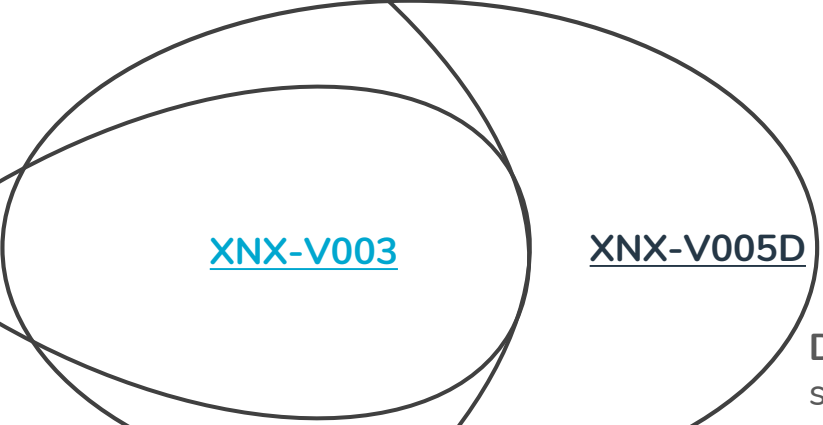
Product categories

- Consumer goods
- Supplements
- Diagnostics
- Pharmaceuticals

Oral-pharyngeal antiviral for prophylactic/palliative use featuring RWE (resveratrol+TF3)

-launched by the JV The Sqix Company

sqix[®] chewable
sqix[®] x3 resveratrol



Diagnosis service & kits supply for private access using Kr-sourced kits

5min PCR diagnostic kit (no machine needed)

- Xylonix subsidiary and a partnership in R&D

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