

# STANDARD DEVIATIONS: And Now, the Rest of the Story (Again?)

Greetings,

Coronavirus has plagued man for a while. Some members of this family are responsible for mild disease like common colds, some can cause colds with major symptoms, such as fever, and sore throat, and others (like COVID-19) are more aggressive in their abilities to infect, harm, and kill humans.

Last week I pointed out SARS-CoV, MERS-CoV, and SARS-CoV2 as close coronavirus cousins that have lethal consequence for their hosts. COVID-19 has become a pandemic because its viral pathology allows it to propagate whereas the earlier species have struggled to maintain infections in humans due to their high Case Fatality Rate (CFR).

Killing the Golden Goose (us) is not good. Especially if the golden eggs are yours (the virus).

Well, we're not alone. An almost identical scenario is playing out in rabbits.



In 2018 the newsletter discussed Rabbit Hemorrhagic Disease (STANDARD DEVIATIONS: Believe It or Not! Mar 19, 2018); a viral scourge (originating in China!) that killed tens of millions of rabbits around the world – except the U.S. But, now, *a new member of the family has emerged* that has infiltrated the States and is decimating rabbit populations world-wide.

**Rabbit Hemorrhagic Disease Virus (RHDV)** is a highly contagious disease caused by a *calicivirus* that affects rabbits. RHDV was first seen in China in 1984, but was thought to have originated in Europe, and there have now been confirmed cases in 40 countries.



RHDV2, a new virus, emerged in France in 2010, and quickly spread in Europe and the Mediterranean, and has replaced the original strain in many countries. In 2015, RHDV2 was first detected in Australia – *it spread coast-to-coast in the rabbit population in 18 months* and became the dominant strain replacing RHDV1.

In 2020, outbreaks of the disease in domestic rabbits, as well as cottontail rabbits and hares, have been reported in Arizona, New Mexico, Colorado, Texas, Nevada, California **and Utah**. Affected wildlife include mountain cottontail rabbits (*Sylvilagus nutalli*), desert cottontail rabbits (*S. audubonii*), antelope jackrabbits (*L. alleni*), and black-tailed jackrabbits (*L. californicus*). Millions have died, millions more have been culled.

RHDV is a very swift and sudden killer, giving little warning. Rabbits may die without showing any symptoms at all. Symptoms may include:

- Loss of appetite
- Lethargy
- High fever
- Seizures
- Jaundice
- Bleeding from nose, mouth, or rectum
- Difficulty breathing
- Sudden death

RHDV2 has two properties that make it problematic (and eerily similar to our current SARS-CoV2).

#### Incubation Period

- RHDV1: 1-3 days. Rabbits may die within 12-36 hours to a few weeks, after onset of symptoms. (SARS: 2-5 days.)
- RHDV2: 3-5 days. RHDV2 infections incubate 3-9 days until onset of symptoms, then death happens within 3-5 days. (SARS-CoV2: 2-14 days)

#### Death Rate (Mortality)

- RHDV1: 40-100% (SARS: 10%)
- RHDV2: 5-80% (SARS-CoV2: ~1-3%)

Surviving and asymptomatic carriers shed virus for weeks. **Having a longer disease course, and killing fewer, permits the virus to spread more efficiently.**

A virus has mutated in such a way that it becomes a much more effective pathogen. Does any of this sound familiar?

RHVD vaccine is another allegorical signature we should pay attention to. While a vaccine is available, it's not exactly cut and dry.



This virus can't be grown in vitro. The vaccine is "liver-derived"; laboratory rabbits are intentionally infected with RHD and their livers and spleens harvested to make vaccines. Protection is short-lived and rabbits must be vaccinated annually. Production is competitive and regulated and many of the endemic areas do not have access to vaccine. I'd argue that our coronavirus vaccine efforts (production and distribution) should take heed.

Two years ago I made the case that RHDV and another virus (**HIV**) were similar in their timelines, progressions, and threats (STANDARD DEVIATIONS: And now....The Rest of the Story (almost...), Mar 26, 2018). Today I'm saying, "Wait a minute, this is awfully close to what we are witnessing in real-time with SARS-CoV2!"

Here's what the newsletter said back in 2018.

**"HIV was a knock on the door, a wake-up call, a trial by fire for laboratory safety; and it took ten years to establish a bloodborne pathogen standard! But HIV opened the eyes of the world to the concept of biosafety and the value of using of PPE. And if HIV was a knock on the door, Ebola, SARs, MERS-CoV and novel Influenza, etc. are Big, Bad Wolves; and the huff-and-puff is coming in the form of some emergent pathogen, which may blow the house down. Will you be ready?"**

HIV cases in the U.S. number around 40,000 a year. Current national cases of COVID-19 are occurring at ~40,000 cases **a day**.

HIV taught us to wear gloves. TB taught us to wear respiratory protection. Ebola taught us to use PPE, isolation, contact tracing, vaccination, and our noodles. We're back in class and SARS-CoV2 is at the lectern.

And here we are, fighting a pandemic, arguing biosafety strategies, frantic for a vaccine, and reinventing wheels.

Viruses transform and evolve to become more efficient at infecting us. We can be mindful of our biosafety and prevention but risk exists and finds a way. Biosafety is becoming integrated into our lives. Finally?

Have a great week and be safe,

Bryan

