

# Using models to understand Coronavirus transmission patterns

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*Editor's note: The authors of this article are insurance mathematicians (actuaries); experts in creating mathematical projection models for insurance companies and pension funds.*

As the Coronavirus spread across the world from the start of this year, the authors came together to discuss how they could contribute to a better understanding of its spread, even though there was limited available data at the time. As actuaries, they focused on mathematical and modelling skills, which can provide insight by helping to guide predictions.

The results of their efforts over the past months have been two models, as described below. These models are used to illustrate the concepts and make a point (not to be seen as an absolute truth) – giving insight into the behaviour of the virus' spread.

Articles shared with the media by the authors are meant as an introduction to their research, more of which can be found at [www.crownactuaries.eu](http://www.crownactuaries.eu).

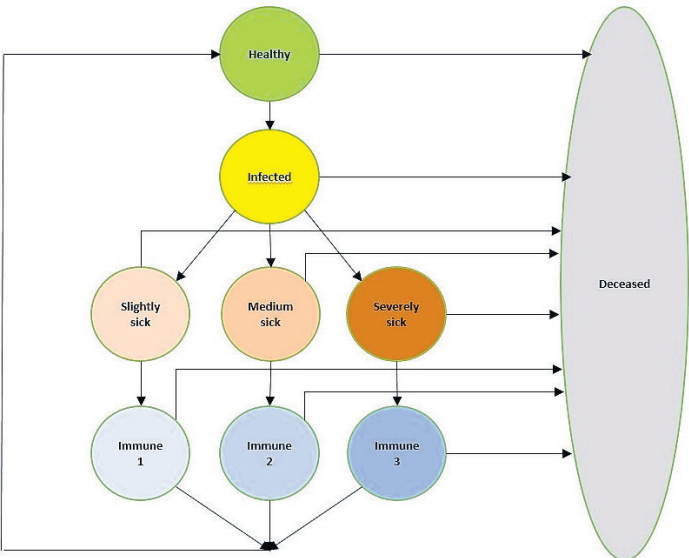
*The models assume different health circumstances for individuals. People start as healthy, become infected, become ill, and then recover and become (temporarily) immune to the virus. Not everyone will recover, and older people in particular are more likely to die.*

**The first model provides insight into how the virus develops without any intervention.** For St. Maarten, with 41,500 inhabitants, and 176 infected people (as per August 15, 2020), it turns out that the number of infected people would increase to 20,000 of which 2,200 would be severely sick people. This would exceed the hospital's capacity.

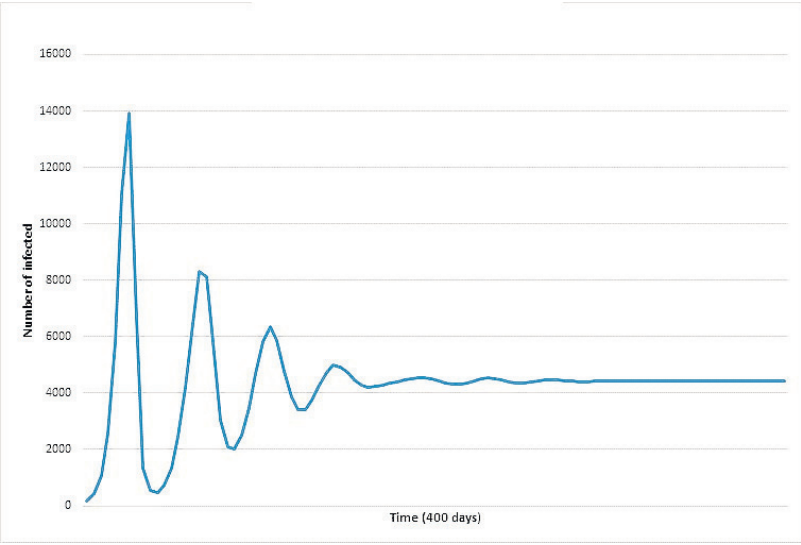
Within this model, after the first wave, a second smaller wave would occur, and the following waves decrease in size. In the long term, 40 per cent of the population remains healthy and 2,000 people are severely sick.

The model is an approximation of reality. We don't take into account modifications of the virus, and seasonal effects. The model does show that in the long run there will be a steady state in the number of people who are healthy, sick and immune, which gives an indication to how to control the virus.

The first model shows the reasons behind government intervention: if the virus would be able to



The progression of the state of COVID-19 infected people.



The first model, which shows the projected number of infections, without any intervention.

spread without restrictions, then almost one third of St. Maarten would become infected and hospital capacity would be insufficient. Through early intervention, the number of infections have been limited.

However, the coronavirus behaves very irregularly: some infected people don't infect others, while other infected people infect many other healthy people. As a result, regional outbreaks occur, instead of national virus spreading.

**Our second model includes this irregular behaviour.** By using several projections, it turns out you can be caught off guard by the virus, and more infections occur than expected. Therefore, the government needs to take into account these unexpected jumps in infections. Even an early intervention can't prevent a situation where there is insufficient hospital capacity.

The results from this second model show that the jumps in the number of infected people can be significant: therefore, cooperation between islands on hospital and intensive care (IC) capacity can help with these unexpected jumps.

Especially since St. Maarten is an island, a virus outbreak can easily become a national issue. Preventive measures and identifica-

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## Staycation CONTINUED FROM PG. 1

to prolong the memories). Let's pause here to log the first night's sleep in the king-sized bed.

The next morning was perfect for a room service breakfast feast. Yes, there was journey (or johnny) cakes on the menu. With absolutely no need to plan anything or go anywhere in particular I ensconced myself in the deep sofa, put my feet up and thought: no to-do list, so much do-nothing time.

The call to do some yoga came and I managed to get some stretches in. There's also the Serenity Point Gazebo overlooking Maho Bay, tranquil for solo, or couples, massages or indoor spa indoor treatments.

After a sumptuous lunch at Azul (menus change daily), we claimed a hammock. The weather was very cooperative with the right amount of sunshine

and cool breeze wafting off Maho Bay. Feeling safe and completely at home, a nap swiftly came. More explorations (chased Lady Luck to Casino Royale in Maho Village) and relaxation followed the nap, including pool time in one of their three pools (The Edge Pool with its man-made beach perched cliff-side, the Point Pool with perfect plane-spotting views, and the swim-out suite guests have their semi-private pool), cocktails atop the Sunset Lounge + Bar and another five-course dinner at Azul.

The evening was capped with wine sent up by the front desk, even though a well-stocked bar was included with the suite, and a warm bath in the huge bathtub.

The following day brought none of the usual stress of flight times and possible overweight baggage. There was sufficient opportunity to mull over breakfast at Azul, lounge by The Edge

Pool, and take one last soak in the tub before heading back to reality.

If there was ever a time I clearly understood the Italian phrase "dolce far niente" (sweet idleness), this staycation was it. The transition from still being at home to pure relaxation

was seamless and complete. And it continues to linger until the next (hopefully soon) staycation.

Now back to remembering my wallet. There was no need for that at Sonesta Ocean Point Resort – the all-inclusive element had it all covered!

Craving your own bit of dolce far niente? Sonesta Ocean Point Resort\* has a special offer for island residents. Call 546-6222 to make a reservation and make sure to use promo code "RESIDENT" and mention this article.

\*The adjacent family-

focused Sonesta Maho Beach Resort, Casino & Spa will reopen on October 29, 2020, and will also offer the Staycation special. Guests of Sonesta Ocean Point Resort will also have access to the family resort with the Stay at One, Play at Two program.



Swim out suites.



Yoga in the zen garden.