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How 'Professor Lockdown' helped save tens of thousands of lives worldwide — and carried COVID-19 into Downing Street

Bill Bostock Apr 25, 2020, 7:21 AM



Professor Neil Ferguson, head of the department of infectious disease epidemiology at Imperial College London. J-IDEA; Ruobing Su/Business Insider

- Professor Neil Ferguson, of Imperial College London, authored a paper that prompted the UK to scrap its coronavirus strategy.
- Ferguson's team warned Boris Johnson that the quest for "herd immunity" could cost 510,000 lives, prompting an abrupt U-turn.
- His simulations have been influential in other countries as well, cited by authorities in the US, Germany, and France.
- During the pandemic, Ferguson caught COVID-19 himself. Around the same time, a wave of infections swept 10 Downing Street, hospitalizing Johnson.
- A competing model from the University of Oxford, and some criticism from contemporaries, is casting a shadow on his work and the government's reliance on modelling.
- Here's what we know about "Professor Lockdown" and the gold standard in science that is Imperial College.
- *Editor's note: This article was updated on May 11 to include news of Ferguson's May 5 resignation after he was caught breaking lockdown to meet his lover.*
- Visit Business Insider's homepage for more stories.

There has never been better time to be an epidemiologist.

The last 20 years have played host to a flurry of pathogen outbreaks; Foot and Mouth in 2001, SARS in 2003, Swine Flu in 2011, MERS in 2012, and Ebola and Zika in 2014.

Before that, there hadn't been a major influenza epidemic for 40 years.

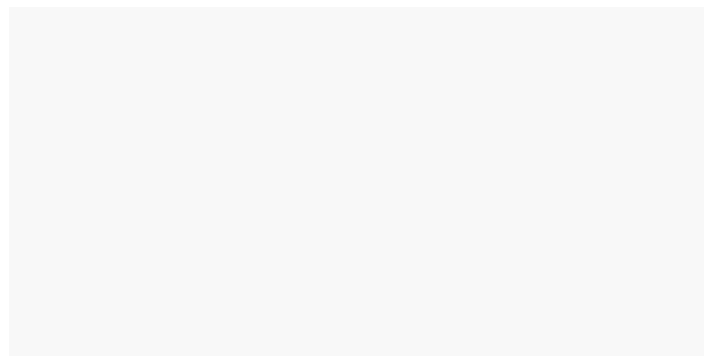
So as head of the department of infectious disease epidemiology at Imperial College London since 2012, Professor Neil Ferguson has not been short of work.

He modeled the spread of all those outbreaks, advising five UK prime ministers in the process. But all that seems like a practice run for 2020.

In February of this year, coherent data began emerging from northern Italy, the first place in Europe to feel the force of the novel coronavirus outbreak that began in Wuhan, China, in November. Cometh the hour, cometh the man.

"This virus is probably the one that concerns me the most of everything I've worked on," Ferguson [said in](#) an early TV interview on February 14.

Nine UK coronavirus tests had come back positive at the time. No one knew how bad the outbreak would become.



Professor Neil Ferguson appearing by video link on the BBC's "The Andrew Marr Show" on April 5, 2020. BBC

Ferguson, a slim, bespectacled 51-year-old typically seen in jeans, t-shirt, and suit jacket, formed Imperial's COVID-19 Response Team, dusted off a mathematical model he made 15 years ago, and set to

work.

On March 16, around a month after the earlier interview, Ferguson delivered a bombshell 20-page paper to UK Prime Minister Boris Johnson.

The message was clear: 510,000 people could die if the government didn't abandon its current strategy of allowing the disease to spread.

"We were expecting herd immunity to build. We now realize it's not possible to cope with that," Professor Azra Ghani, who worked on the paper, said that evening.

On March 23, the UK scrapped "herd immunity" in favor of a suppression strategy, and the country made preparations for weeks of lockdown. [Ferguson's study was responsible.](#)

His work has also informed the strategies pursued by the White House and the governments of France and Germany.

And it was successful. At the time of writing, "only" 18,000 people deaths have been recorded in Britain's hospitals — 28 times fewer than predicted under the old strategy.

Overshadowing his professional contribution, however, is the revelation that Ferguson resigned from his role as government advisor on May 5 after [it was reported that he was meeting up with his lover in secret](#) — a violation of the lockdown that he had in his own way helped to create.

"Professor Lockdown"

In the world of mathematical epidemiology, Ferguson is renowned for his accomplishments, temperament, and work ethic. Ferguson did not respond to interview requests for this story.

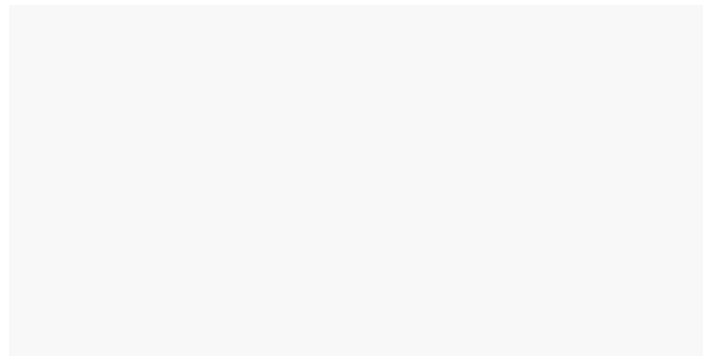
Professor Christl Donnelly, who worked on the paper with Ferguson, told Business Insider: "Neil works incredibly hard. He has been writing computer code himself in addition to attending many high-level advisory meetings and simultaneously leading our Imperial College London COVID-19 Response Team."

"Neil got a treadmill desk for his Imperial office, but he was disappointed that the speed was limited to walking speed," Donnelly, who has also been Ferguson's colleague for 20 years, said.

"He exercises with as much commitment as he works."

Ferguson co-founded the MRC Centre for Global Infectious Disease Analysis, based at Imperial, in 2008. It is the leading body advising national governments on pathogen outbreaks.

It gets tens of millions of dollars in annual funding from the Bill & Melinda Gates Foundation, and works with the UK National Health Service, the US Centres for Disease Prevention and Control (CDC), and is [tasked with supplying](#) the World Health Organization with "rapid analysis of urgent infectious disease problems."



Imperial College in South Kensington, London. Getty Images

Not long after Ferguson founded the centre came its first real test: the H1N1 epidemic, also known as Swine Flu.

"Conspiracy theorists feel this is not a coincidence," he joked to his Imperial students during a September 2016 lecture.

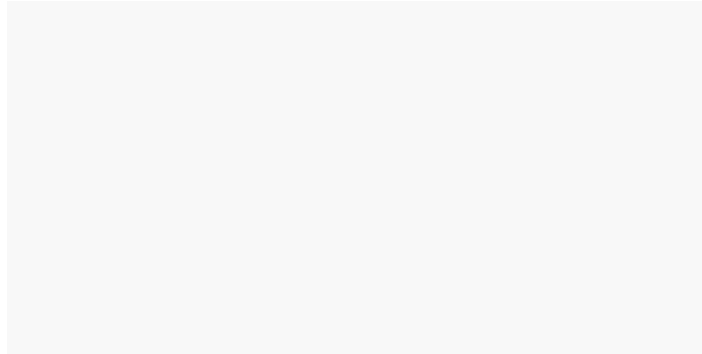
James Hay, a postdoctoral student at the Harvard Chan School of Public Health, who spent years studying in Ferguson's department, also praised him.

He told Business Insider: "I think what sets Neil apart is just how sharp his technical skills are and how clearly he thinks."

"In academia, as you become more senior, the responsibilities shift away from writing code and solving maths problems towards big picture tasks. It's pretty exceptional that Neil is still so proficient at

the technical side."

"The general feeling from junior researchers that work with him is that he is fantastic at solving complex technical problems on the spot and is clear in communicating their solutions," Hay said.



Professor Neil Ferguson. Imperial College London

Ferguson completed his PhD in theoretical physics at the University of Oxford in 1994, under the supervision of Professor John Wheeler, a member of the Oxford Faculty of Physics.

Wheater told Business Insider: "Neil was a pleasure to supervise. He was one of my best graduate students. He's a very smart guy, and he worked very hard, and I have nothing but good memories about that time."

But Ferguson did not stick to physics, switching disciplines to mathematical biology, specifically epidemiology.

"Neil has very good judgement about what are the important problems to which he personally can make an important contribution to society," Wheeler told Business Insider.

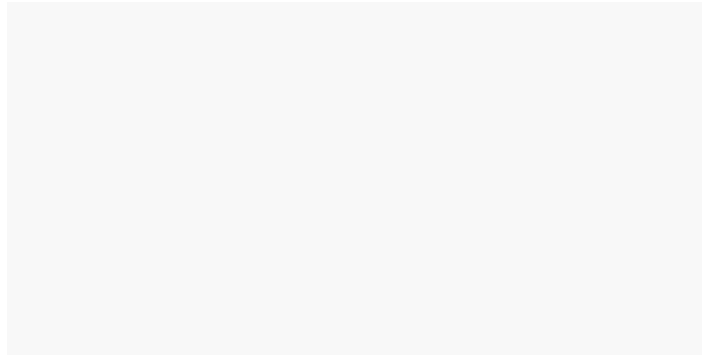
"Patient zero"

It is no exaggeration that Ferguson's paper saved hundreds of lives.

But in the story, there is an irony that he may have helped infect the highest levels of government with the virus.

On March 17, Ferguson strolled under the architrave of 10 Downing Street ahead of a 5 p.m. press conference where he would outline his findings. He greeted senior members of Johnson's cabinet, gave his speech, and left.

Ferguson woke at 4 a.m. the next morning with a high fever, interspersed with a dry cough. On March 19 he tested positive for the coronavirus.



10 Downing Street. Ministry of Defence via Wikimedia Commons

"Which is a strange experience — to be infected by the virus one is modelling," he tweeted to his 108,000 followers. At 9 a.m., the next day, Ferguson dialed into his daily online meeting with colleagues.

In the days that followed, Johnson, his chief adviser Dominic Cummings, health secretary Matt Hancock, and chief medical officer Chris Whitty reported symptoms of the virus.

It is impossible to say with any confidence where these infections had come from. But, inevitably, the question was asked: was Ferguson "patient zero" for infecting Britain's elite?

A spokeswoman for the Prime Minister declined to comment on who had infected him.

Ferguson himself says he could have got it anywhere.

"I've been in so many meetings in the last few weeks, and a number of my colleagues from other universities who've been advising government in those meetings have also developed symptoms," he told the BBC's "Today" program on March 18.

Johnson, Whitty, and Hancock tested positive on March 26. Cummings followed suit on March 30. Johnson spent three nights in intensive care, and has retreated from day-to-day government to recuperate.

"Families are going to lose loved ones before their time."

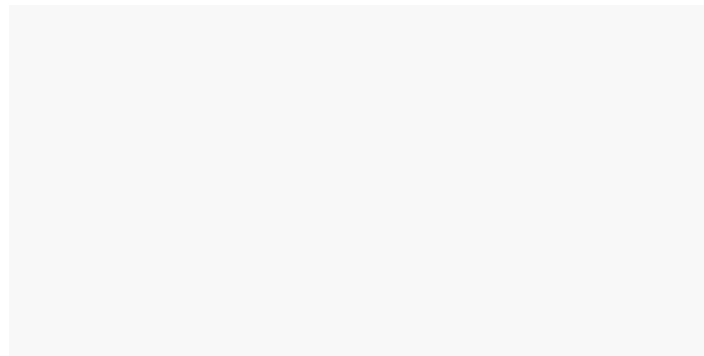
Earlier, on March 12, as the UK's coronavirus outbreak was gaining speed, Johnson announced that the UK would pursue "[herd immunity](#)."

This involved eschewing the social distancing tactics advocated by the World Health Organization and letting the virus infect as many people as possible so they could develop immunity.

It was earlier research from Ferguson and Imperial — before the prediction of 510,000 deaths — which helped underpin the strategy. Few other countries chose the same path.

"This is the guy who screwed up the original model," Fox News host Laura Ingraham [put it in a tweet](#) after the government scrapped the herd immunity approach.

The UK characterized its approach as the sure way to counter a deeply troubling situation. With no trace of his usual optimism, [Johnson said](#): "Many families are going to lose loved ones before their time."



Boris Johnson in London on March 27, 2020. Getty

500 scientists, most experts on infectious diseases, [signed a letter on March 14](#), calling for Johnson to abandon the plan and [enforce social distancing](#).

Professor John Ashton, a leading public health expert, [accused the government](#) of dragging its feet, "behaving like 19th-century colonialists playing a five-day game of cricket."

There was no news from 10 Downing Street.

On March 16, Ferguson went back to Johnson with the new, game-

changing paper. It said the UK death toll would peak on May 15, and reach staggering levels.

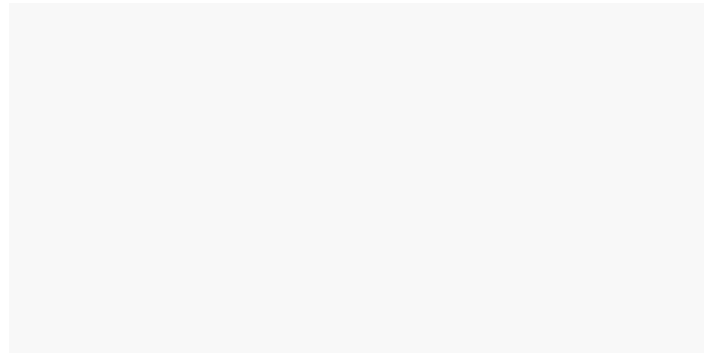
"Suppression is the only viable strategy," it concluded.

However, doubt has been cast on the government's reliance on models to direct their response to virus outbreaks.

"I am an epidemiologist, and I worry that the response is based too much on epidemiology alone," Mark Woolhouse, professor of infectious disease epidemiology at Edinburgh University, [told the Financial Times](#).

In 2009, one of Ferguson's models predicted 65,000 people could die from the Swine Flu outbreak in the UK — the final figure was below 500.

"That prediction wasn't just nonsense, was it?" BBC presenter Nick Robinson [asked health secretary Matt Hancock](#) on the "Today" program on April 16.



Work at the ExCel centre in London to build a 4,000 bed temporary hospital - the NHS Nightingale hospital, comprising of two wards, each of 2,000 people, to help tackle coronavirus. Stefan Rousseau/PA Images via Getty Images

"He does have, to be fair, a lot of critics"

Scientists have piled in to criticize Ferguson's paper in less uncertain terms.

"Some of the major assumptions and estimates that are built in the calculations seem to be substantially inflated," John Ioannidis, a professor of disease prevention from Stanford University, [told The Telegraph](#).

Michael Thrusfield, a professor of veterinary epidemiology at

Edinburgh University, told the paper he had "déjà vu" after reading

the Imperial paper, saying Ferguson was responsible for excessive animal culling during the 2001 Foot and Mouth outbreak.

Ferguson warned the government that 150,000 people could die. Six million animals were slaughtered as a precaution, costing [the country billions in farming revenue](#). In the end, 200 people died.

Similarly, he was accused of creating panic by overestimating the potential death toll during the 2005 Bird Flu outbreak. Ferguson estimated 200 million could die. The [real number](#) was in the low hundreds.

"I much prefer to be accused of overreacting than under-reacting," Ferguson said in February. On April 16, [he told an IMF meeting](#), "We don't have a crystal ball."

One contemporary noted that it is inherent to Ferguson's work that his predictions will not always materialize.

Professor Paul Hunter, a member of the Epidemiology and Public Health group at the University of East Anglia who appeared on the same panel as Ferguson on March 17, told Business Insider: "The modelling area is particularly dangerous area because it's so uncertain, and because there is a big risk with all models and all modelers that they overstate, or run the risk of overstating, their own ... importance."

Hunter said: "He does have, to be fair, a lot of critics around in the UK modelling world."

However, Ferguson's role in the Foot and Mouth outbreak is remembered as overwhelmingly positive. Queen Elizabeth II awarded him the Order of the British Empire in 2002 in 2002 for advising Tony Blair's government.

His paper also received as many endorsements.

Professor Tim Colbourn, at the UCL Institute for Global Health, said: "This is an excellent piece of work from some of the world's best infectious disease modelers and presents the models and policy options clearly."

Professor Stephen Griffin, from the Leeds Institute of Medical Research (LIMR) called it an "excellent read."

Research (LIMK) called it an "excellent study."

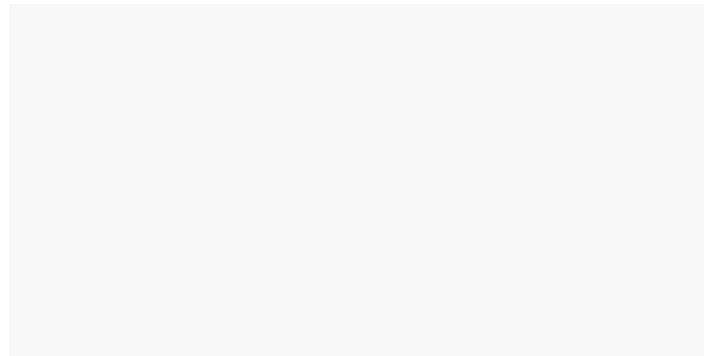
A household name

Imperial, based in South Kensington, has a shining reputation.

Governments around the world use Imperial research to underpin policy decisions, and their staff are among the world's most influential scientists.

Dr Deborah Birx, coronavirus response coordinator to the Trump administration, [told journalists at a March 16 press briefing](#) that the Imperial paper prompted the CDC's new advice to work from home and avoid gatherings of 10 or more.

Ferguson's report was also used to inform this graph displayed behind Trump at a March 31 press briefing:



Donald Trump seen on March 31 looking at a graph made with data from a paper by Ferguson's team at Imperial College London. C-SPAN

"We had new information coming out from a model, and what had the biggest impact in the model is social distancing, small groups, not going in public in large groups," Birx said.

The White House received the paper two days before it was made public.

Meanwhile, in Germany, the paper was [cited in a March 20 report by the Robert Koch Institute](#), a federal agency that supplies the government there with public health advice.

And on April 7, France's health minister Olivier Véran used [a separate paper from Ferguson's team at Imperial](#), which estimated that 2,500 French lives were saved by confinement, [to justify the government's measures](#).

Keys to the castle

Some scientists have taken issue with Ferguson over the workings of his model, because Ferguson alone holds the only key to analyze his research.

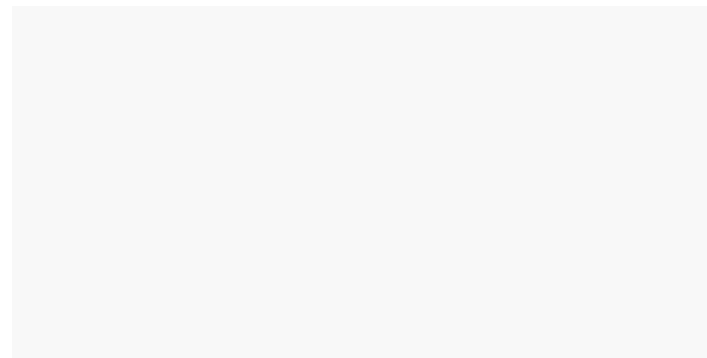
The micro-simulation model used to map the coronavirus was built in 2005, when Ferguson predicted how Thailand would react to a mutated avian flu outbreak.

"One must ask: Why we are still using models developed 15–20 years ago?" [said the authors of a critique of the paper](#) published in the Bulletin of Mathematical Biology.

Mike Cates, who in 2015 took over from Stephen Hawking as Lucasian Professor of Mathematics at the University of Cambridge, leads a rival coronavirus modelling effort at The Royal Society and says there is great risk in relying on Ferguson's model alone.

"We need some alternative models because very big decisions are being made based on the [Imperial] models. That doesn't mean there's anything wrong with the Imperial model. It's just that you can't have one model, which has in it every possible different set of assumptions," [Cates told The Times of London](#).

Another expert, Professor Søren Brage, from the MRC Epidemiology Unit at the University of Cambridge, told Business Insider that it is essential that the workings of models like Ferguson's are scrutinized.



The University of Oxford. [Facebook / University of Oxford](#)

"Modelling is an important sub-discipline of epidemiology which effectively attempts to predict possible future scenarios under different assumptions, and it is only right that those assumptions are scrutinized as they are very influential in the models," Brage

said.

However, code sharing and documentation are often at the bottom of a scientist's to-do list, according to Hay, the Harvard expert and former colleague of Ferguson.

"The pressure is on doing science and publishing results, which means that these sorts of peripheral tasks often get left by the wayside," he said. "Neil is an excellent scientist with a lot of experience in this area."

Ferguson said [on March 22](#) that he was working with GitHub and Microsoft to make his model widely available for use, but that he couldn't spare "multiple days" to train people to use it.

An old Oxford scandal which still has echoes today

While all this was going on, a spat was emerging between Ferguson's team at Imperial, and the evolutionary ecology of infectious disease unit at the University of Oxford, led by Professor of Theoretical Epidemiology Sunetra Gupta.

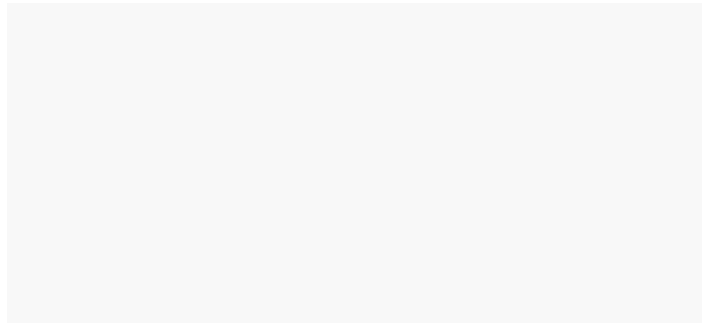
On March 24, Gupta's team [published a paper](#) that said the UK death rate suggested that 50% of the population may already have the coronavirus.

The suggestion was covered widely in the press, and seemed to imply the virus had been badly misunderstood.

The authors said their results, "suggest the ongoing epidemics in the UK and Italy started at least a month before the first reported death and have already led to the accumulation of significant levels of herd immunity in both countries."

Speaking to [the Financial Times](#), Gupta said she supported social distancing and lockdown measures taken by the government, but was "surprised that there has been such unqualified acceptance of the Imperial model."

She later told The Times of London that "it's tricky to use them [Imperial's model] to forecast what's going to happen. We need to also consider alternatives."



Professor Neil Ferguson. [JIDEA/YouTube](#)

Ferguson said on March 27 that there was no bad blood between the two. "Sunetra and I have always got on. I never fell out with her, and actually she will give you the same view," he told *The Telegraph*.

However, he did cast doubt on her team's findings.

"We don't think [Gupta's model] is consistent with the observed data," he [told the Science and Technology Committee of the UK Parliament](#).

"Those data all point to the fact that we are nowhere near the [Oxford] scenario in terms of the extent of the infection."

However, it could have been Ferguson authoring an Oxford study, if it weren't for a gossipy scandal that rocked the tiny world of epidemiology 20 years ago.

Ferguson is an Oxford alumnus, who completed his masters and DPhil there between 1987 and 1994, whereupon he joined a 70-strong team of scientists working under Professor Sir Roy Anderson.

At the same time, Gupta was embarking on a five-year fellowship with the university's zoology department. By 1999 she was applying for a permanent position and was voted in — six-votes-to-two — by a panel from Oxford's zoology department.

But one of those who opposed her appointment was Anderson, who accused her of having an affair with a panel member, whose vote would, therefore, be called into question.

Gupta sued Anderson and won damages (subsequently donated to charity).

Anderson was suspended from his position as Linacre Professor of Zoology and later apologized profusely in a letter. He returned to work, but was later ousted by his department.

Upon leaving Anderson moved to [St Mary's Hospital](#), run by Imperial College. He took his team with him — including Ferguson.

A spokeswoman for Anderson told Business Insider he was unable to comment, as he too was recovering from COVID-19.

A spokesperson for Professor Gupta told Business Insider she was unable to comment due to research commitments.

"No exit strategy"

Ferguson revised his death toll estimate to 20,000 on March 25 after the UK government's lockdown, citing evidence suggesting that the plan was working. Nonetheless, he was not optimistic about the future.

"We will have to maintain some level of social distancing, a significant level of social distancing, probably indefinitely until we have a vaccine available," Ferguson told BBC radio.

Ferguson, who said the government has "no exit strategy," has heaped pressure on the government in recent days to develop a clear action plan.

In response, Health Secretary Matt Hancock said: "He advises government. He is not in the government."

It is not a stretch to say that Ferguson has earned his moniker of "Professor Lockdown."

The impact of his team's paper is felt every day by the 66 million people living in the UK, and other nations which have embraced lockdowns.

During significant outbreaks, models are often relied upon by governments, and their authors placed under tremendous scrutiny. It is tough work.

"In outbreaks things are different," Bill Hanage, associate professor

of epidemiology at the Harvard TH Chan School of Public Health

who worked in Ferguson's department before leaving for the US, told Business Insider.

"The responsibilities are a burden (in the case of a pandemic like this extraordinarily so), the days are long. Some people do better than others at handling what can be severe stress."

"Some people have accused epidemiologists of enjoying the attention, or feeling relevant. The truth is that epidemiology is always relevant, and we would much rather that this was not happening."

"But since it is happening it's our job to confront it, and to try to explain to the public what is happening. I'm looking forward to the day in the future when the pandemic is behind us, and we can be anonymous again."



Do you have a personal experience with the coronavirus you'd like to share? Or a tip on how your town or community is handling the pandemic? Please email covidthips@businessinsider.com and tell us your story.

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