



Science's extensive COVID-19 coverage is free to all readers. To support our nonprofit science journalism, please **make a tax-deductible gift today.**

**Got a tip?**

**How to contact the news team**

Advertisement

**Eyes on the virus.** Growing awareness about MERS will help curb the epidemic in Saudi Arabia, says Christian Drosten. CHRISTIAN DROSTEN

## MERS: A Virologist's View From Saudi Arabia

By Kai Kupferschmidt | May. 6, 2014 , 11:15 AM

**BERLIN**—Christian Drosten, a virologist at the University of Bonn in Germany, is among those leading the effort to understand Middle East respiratory syndrome (MERS) and contain the disease. He is also one of the very few Western scientists who have worked in Saudi Arabia in collaboration with local researchers.

On Friday, Drosten returned to Germany after a week in Saudi Arabia, where he investigated what's behind **a sudden explosion in reported MERS cases.**

*ScienceInsider* caught up with him during a stopover in Berlin.

**Q: There have been almost 400 MERS cases and more than 100 deaths in Saudi Arabia in the last 2 years. What's the situation like at the moment?**

**C.D.:** There's a huge public awareness of the disease. Lots of people are wearing facemasks now. Actually, more when I left than when I arrived. In that 1 week, there was a clear increase. People know there is this virus and they are being careful, and I think that will actually help curb the number of new infections.

**Q: It certainly doesn't feel that way. Saudi Arabia has reported more infections in April than the whole world in the two previous years. The United States announced its first case on Friday, and before that there were imported cases in Greece and Malaysia. Is the disease spiraling out of control?**

**C.D.:** There has been a lot of discussion about whether the virus has mutated to pass more easily from human to human. But we have sequenced three genomes from samples taken early in April in Jeddah, where many of the cases occurred, two more from later in the Jeddah outbreak, and another one from a patient in Mecca. They all look completely normal.

**Q: But can you really tell from the genome whether the virus has adapted to humans?**

**C.D.:** It's almost impossible to tell from the sequence whether there has been a functional change in the virus. But we do know that certain parts of the genome are particularly important, and one of those is the receptor-binding domain of the spike protein.

**Q: The part of the virus that binds to human cells.**

**C.D.:** Exactly. And we do not see any changes there. The rest of the virus genome is also really closely related to previously sequenced MERS genomes. You really have to look quite hard to find any changes at all, and when you do find changes, there are other MERS genomes that had those changes, too. This is not like influenza viruses, which have a way higher mutation rate. Coronaviruses have correction enzymes so in general they are more stable genetically.

Advertisement

**Q: Still, the number of infections is going up.**

**C.D.:** You cannot compare the new numbers to those from a few months ago. Until the 26th of March, 459 tests had been done in all of Saudi Arabia this year. Then in just 1 month, just in the city of Jeddah, 4629 PCR tests were done. Something dramatic changed, and that is the case definition.

Before, tests were done on patients who had pneumonia and required [intensive care]. But now people are being tested not because they are sick, but because they had contact with a patient. Some of these tested positive, but many of them don't really get sick.

**Q: Could the test results be wrong?**

**C.D.:** No, when I was in Jeddah I really tested the central lab where all the PCR for MERS is done. I made them run almost 200 PCRs with water, interspersed with some real samples. The tests were done on all the machines they use, with two different PCR assays and by two different technicians. To my surprise, there were no false positives at all.

We also reran samples from six health care workers who had cared for a patient in Tabuk; they seemed to be positive at a very low level. I can say unequivocally, these results are real. When you look at the PCR data on all the recent tests, they are often very weak signals. These people probably just have a very low concentration of virus in the throat. It's hard to interpret. It's possible that these are infections that are quickly controlled by the immune system. That may happen frequently in health care workers dealing with several really sick patients.

**Q: You're saying these people should not have been tested at all?**

**C.D.:** During the [2003] SARS [severe acute respiratory syndrome] outbreak, there was a strict case definition. People who had had contact with SARS patients but showed no symptoms were not tested with PCR. Instead

## Related Jobs

### Director, Epidemiology Scientist

Pfizer  
New York City, New York

### Open Faculty Recruiting

Texas Biomedical Research Institute  
San Antonio, Texas

### Director ERP Solution Architect, Record to Report

Gilead Sciences, Inc.  
Foster City

[MORE JOBS ►](#)

## Latest News

### Trending

- [1. Martian rover sends back 'overwhelming' video, audio from the Red Planet](#)
- [2. Giant gravitational wave detectors could hear murmurs from across universe](#)
- [3. Abortion opponents protest COVID-19 vaccines' use of fetal cells](#)
- [4. Gene-silencing injection reverses pain in mice](#)
- [5. How big is the average penis?](#)

## Most Read

- [1. Watch the winners of this year's 'Dance Your Ph.D.' contest](#)
- [2. Ancient Earth was a water world](#)
- [3. How tuberculosis reshaped our immune systems](#)

they were tested for antibodies later, to see if an infection had happened. That should happen now in Saudi Arabia, too. Asymptomatic people should not be tested with PCR. At the moment, there is no antibody test available in the country. But you could list all those contacts and take a blood sample from each of them 14 to 21 days later and then have it tested outside the country. Three people from my lab are going to Riyadh to establish an ELISA test for antibodies.

**Q: But isn't it good to know all the cases, even if they are mild?**

**C.D.:** The question of whether there is a mild, short-lived infection in some people is scientifically interesting. But in cities like Jeddah, it is bringing the health system close to collapse. That is the big problem. So many samples are being tested that the lab capacity won't suffice for the real cases. And as more and more samples are tested, mistakes are bound to happen. On top of that, if you identify all these mild cases and put them in isolation beds, then you have no beds left for the real cases.

**Q: What should be done with mild cases then?**

**C.D.:** There is a good option and that is isolation at home. You can have people from the public health agency call every day to make sure people are staying home. You can give them written information on what they are allowed to do, and what not. There are many examples for this. It was used very successfully in Singapore during the SARS epidemic.

**Q: Clearly there are also very serious cases. At least 38 people died of MERS in Saudi Arabia in April.**

**C.D.:** Yes, I have seen results from patients with huge virus concentrations. These patients are highly contagious. Now in some emergency rooms in some Saudi hospitals, patients are kept for a very long time because there are no beds available on the wards. If there are such highly contagious patients amongst them, then clearly you get hospital-acquired infections and that is the

**4. Abortion opponents protest COVID-19 vaccines' use of fetal cells**

**5. Suspicions grow that nanoparticles in Pfizer's COVID-19 vaccine trigger rare allergic reactions**

## Sifter

**Scientists use 'x-ray vision' to read a letter sealed in 1697**

By Sofia Moutinho | Mar. 2, 2021



**This ancient Egyptian pharaoh met a gruesome end, scans reveal**

By Sofia Moutinho | Feb. 23, 2021



**Astronomers spy promising blob around our nearest neighbor star, but is it a planet?**

By Daniel Clery | Feb. 11, 2021



**It is not a flower. It is a fungus!**

By Sofia Moutinho | Feb. 4, 2021



**Watch blue whales try to dodge ships in Patagonia**

By Sofia Moutinho | Feb. 3, 2021



More Sifter

other thing we are seeing at the moment. You have to remember that the absolute number of cases is still low. A few hundred. So just one hospital outbreak can raise the numbers significantly and lead to the impression that the whole epidemic is changing.

**Q: You've also looked at how easily the virus is transmitted at home?**

**C.D.:** We will submit a paper on that soon. We looked at 26 index cases and 280 people that they had close contact with. These were almost all family members, in some cases also maids or drivers. We looked really closely with PCR and antibody tests, and in the end you can say nine of those 280 contacts were infected. And these are people who really had immense exposure. That means the reproductive rate of the virus is 0.3, not close to 1, as others have argued.

**Q: So at the moment MERS's only real chance to spread is in hospitals?**

**C.D.:** Yes, I think those hospitals where there are problems with hygiene are fuelling this small epidemic.

**Q: What about the political situation? Deputy Minister of Health Ziad Memish, who you work with, has received quite a bit of criticism.**

**C.D.:** Some people have charged that he is holding back important information to secure high-ranking publications and things like that. But that is not true. I have been working with him since October and I had a good impression of him from the start. He is a Western-educated epidemiologist who knows what he is talking about.

**Q: Others have charged that he demands to be a publication's first or last author just in return for providing samples.**

**C.D.:** Getting really good samples under controlled conditions is not easy in a country like Saudi Arabia. I

think what Memish is organizing there is a huge contribution that warrants a first or last authorship. I have no problem with that. Memish really pushes people, he is extremely busy and he has built up an incredible network in the last 2 years. It's a big loss that his political position is weakening.

**Q: You mean that the new health minister, Adel Fakieh, is sidelining him?**

**C.D.:** He has formed a new advisory committee and Memish is not part of that. That is a big problem, I think. It means they are starting from scratch. All the knowledge and the network that Memish has established is not being used. My impression was that the committee is dominated by clinicians and clinical microbiologists. They know how to treat patients of course, but not necessarily how to deal with an epidemic. I think Memish has really developed a kind of gut feeling for MERS in the last 2 years and that is not being used any more. I think that is the biggest mistake being made in Saudi Arabia at the moment.

**Q: The ministry has also announced that three hospitals in Jeddah, Riyadh, and Dammam will be dedicated to treating MERS patients. Is that a good idea?**

**C.D.:** Of course it's a good idea to build these facilities so patients can be treated better. But what's needed most right now is a massive campaign for hospital hygiene. Sending teams into the hospitals to retrain the health care workers, who come from all over the globe. Teach them proper infection control. That would change a lot.

**Q: Even when that is done, there have been a lot of studies suggesting that camels are an important source of infections as well.**

**C.D.:** Camels will remain a source. It is interesting by the way, when we are talking about Jeddah: Most of the camels that are imported to the Arabian Peninsula come through the port of Jeddah. So you could think about testing all the young camels that arrive and quarantining

them in the harbor until the virus is gone. But that would be a huge logistical challenge. Who would do those tests? Where should the camels be locked up all that time? A vaccine is more realistic and there are some good candidates.

**Q: But none of those are being tested in camels yet.**

**C.D.:** It is really difficult to get a sufficient number of animals that have not had an infection already. Where are you going to get them? You cannot just buy a circus. And you would want them not to be adult animals, because they are really big and hardly fit into any research lab. It's a real challenge.

Posted in: [People & Events](#), [Health](#), [MERS Virus](#)



### Kai Kupferschmidt

Kai is a contributing correspondent for *Science* magazine based in Berlin, Germany. He is the author of [a book about the color blue](#), published in 2019.

[Twitter](#)

## More from News

[Major coronavirus variant found in pets for first time](#)



[European countries resume use of AstraZeneca's COVID-19 vaccine, hoping pause has not dented confidence](#)



[Researchers hunt for cause of rare, COVID-19-linked immune disease in children](#)

