

## Middle East Respiratory Syndrome

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October 2013

### Introduction

In 2012, a new coronavirus called, MERS-CoV emerged in Saudi Arabia. Coronavirus is the name for a group of viruses that have crown-like spikes on their surface. There are three main sub-groupings of coronaviruses, known as alpha, beta, and gamma, and a fourth provisionally assigned new group called delta coronaviruses.

Human coronaviruses were first identified in the mid-1960s. Most people will contract a coronavirus during their lifetimes. Human coronavirus usually causes mild to moderate upper-respiratory tract illness. The five coronaviruses that can infect people are alpha coronaviruses 229E and NL63 and beta coronaviruses OC43, HKU1, and SARS-CoV. This last is the coronavirus that causes severe acute respiratory syndrome, or SARS (CDC, 2013). SARS is the coronavirus that is most well-known around the globe. The new coronavirus called MERS (for Middle Eastern Respiratory Syndrome) is causing concern globally, much like SARS did ten years ago.

### What is SARS?

Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus, called SARS-associated coronavirus (SARS-CoV). SARS was first reported in Asia in February 2003. The illness spread to more than two-dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained (CDC, 2013). Since 2004, there have not been any known cases of SARS reported anywhere in the world.

### What is MERS?

Middle east respiratory syndrome (MERS) is a viral respiratory illness first reported in Saudi Arabia in 2012. It is caused by a coronavirus called MERS-CoV. As of September 25, 2013, more than 53 out of 128 people that have MERS-CoV infection developed severe acute respiratory illnesses such as fever, cough, and shortness of breath (CDC, 2013). About 50% of the people infected with MERS have died, most of them from Saudi Arabia. So far the countries that are most affected are Saudi Arabia, United Arab Emirates, Qatar, and Tunisia. As of fall 2013, no cases have been identified in the United States. Although MERS has not spread rapidly throughout the Middle East, research suggests that the virus spreads through physical contact.

## Is MERS the Same as SARS?

Saudi Arabia's deputy health minister Abdullah Abdulaziz M. Al Rabeeah has stated, "MERS is not SARS" because MERS so far has not spread rapidly among humans. MERS typically hits older persons and those already ill much harder than those in good health. Ninety-six percent of people who contracted MERS-CoV already had a chronic condition such as diabetes, high blood pressure, heart disease, or kidney disease, whereas, SARS-CoV was spread among a diverse population throughout the world and was most evident in younger and healthier people. In those it does infect, MERS progresses rapidly, leading to death a week earlier, on average, than SARS did (Memish, 2012). Fifty percent of people with chronic illnesses who contracted MERS have died, compared with just 1% of people with chronic illnesses who contracted SARS. The high death rate associated with MERS may be a result of the method of identifying the disease; thus far, researchers are only discovering very severe cases of illness. Moreover, there may be many people who have already caught MERS, but have not expressed the symptoms yet.

## The Cause?

Researchers have isolated MERS in bat feces from the home site of the first Saudi victim to sequence the MERS viral genome. Dr. Zaki from Saudi Arabia and Dr. Fouchier from the Netherlands together sequenced the MERS virus's genome and after constructing an evolutionary tree, it is evident that it is related to a virus that infects bats (*Economist*, 2013). One of the research samples of bat feces yielded a partial genetic sequence that was a 100% match to the virus isolated from the patient. The bats belong to a class of Egyptian tomb bats called *Taphozous perforates* (Karesh, 2013). It is evident that the virus spreads from infected bats, but it is not clear whether it is transmitted directly through bats to humans. Camels are common in Saudi Arabia, and there is speculation that the bats might first infect camels, which in turn infect humans who come in contact with the camels for transportation and milk. On the other hand, some say bats might contaminate the food that people eat in Saudi Arabia (*Economist*, 2013).

## Safety, Regulation, and the Upcoming Hajj

Hajj is the great pilgrimage to Mecca, Saudi Arabia and is a journey that all Muslims, with the means to, must make before they die. Saudi Arabia expects more than 5.5 million pilgrims from 187 countries to travel to this year's Hajj, which, given that it is the hotspot of the MERS virus, suggests that October 13 – 18, 2013, will be a critical period for public health.

In Saudi Arabia, the government closely influences the news media. Early during the outbreak of MERS, Saudi newspapers reported that the virus did not spread from person to person, even after medical authorities claimed otherwise. The World Health Organization (WHO) issued guidelines recommending health advisories be displayed to the public at sites such as airports and other points of entry into the country in the form of banners, pamphlets, and radio announcements (*Wall Street Journal*, 2013). When compared with the guidelines set by WHO, Saudi Arabia's safety precautions have gaps. During July, travelers at Jeddah and Riyadh airports – the gateways for pilgrims – said they had noticed no such

advisories related to MERS; many people came and left the airports without seeing or hearing any public health advisories (*Wall Street Journal*, 2013).

Furthermore, only recently did Saudi Arabia make a few recommendations with respect to the Hajj. The government of Saudi Arabia recommended but did not order that the children, elderly, and the ill forgo the Hajj this year. It also planned to have 20,000 health care officials on standby for any emergencies during the pilgrimage. Moreover, the Saudi government has asked pilgrims to be vaccinated against meningitis and the seasonal flu two weeks before their trip for Hajj (Bell, 2013). "Individuals will be prone to all sorts of illnesses and people are coming from all parts of the world where different infections are prevalent," said Dr. Fawad Khan at Al Noor Hospital in Abu Dhabi. He also recommends pilgrims to take additional precautions, such as bringing extra supplies of medicine and antibiotics, as well as first-aid kits. Health authorities in Saudi Arabia have stocked up on required vaccines that they will make available to pilgrims for free.

The Saudi government reduced its quotas for Hajj visas, thereby reducing the number of people countries can send on the pilgrimage. For example, Indonesia, the most populous Muslim country, will only be allowed to send a maximum of 180,000 pilgrims this year, which is about 17% lower than usual. Every year, on average, Saudi Arabia earns \$30 billion in revenues from the Hajj. This year, due to MERS, Saudi Arabia expects to lose \$2.6 billion in October due to visa restrictions and increased government expenditures on MERS safety and prevention.

## Lacking data or no data?

During September 10-13, 2013, one of the world's largest infectious disease conferences, Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC) took place in Denver, Colorado, but there were no presentations on MERS-CoV slated on the program. The United States National Library of Medicine has thousands of articles on SARS, but fewer than 50 articles for MERS. During the SARS outbreak in 2003, China was very quick to let the world know about the virus's causes and symptoms, and to publish scholarly information of various characteristics of the virus's genome (Aljazeera, 2013). Medical scientists all over the world are questioning Saudi Arabia for not conducting a case controlled study of MERS patients.

Yet in Saudi Arabia, there may be a cultural conflict that has prevented research on MERS. Examining the remains of infected patients is a common method of gathering scientific data on disease; however, the corpses of those who were infected by MERS have not been autopsied because Islamic cultures, like Saudi Arabia, rarely autopsy their dead. Many researchers are now asking, "When will the data become public through scientific presentations or does the data not exist?" (*Knickmeyer*, 2013).

## Closing Statements

In conclusion, MERS-CoV is a beta coronavirus that was first reported in 2012 in Saudi Arabia. MERS-CoV is not the same coronavirus that caused severe acute respiratory syndrome (SARS) in 2003. However, like the SARS virus, MERS-CoV is most similar to coronaviruses found in bats. It is evident that the CDC is

concerned with MERS because people who have been confirmed to have MERS infection developed severe acute respiratory illness. The current case fatality rate for MERS is about 50% with 53 deaths. As of fall 2013 there are no specific treatments for illnesses caused by MERS-CoV, and no vaccine is available. Even though the cases are not numerous, with the influx of international travelers to the Hajj, there is significant potential for the virus to spread to other parts of the world.

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