Middle East respiratory syndrome coronavirus (MERS-CoV) – worry, but don't panic.

LONDON, UK----2nd September 2013----ExpertREACT. Middle East respiratory syndrome coronavirus (MERS-CoV) is worrying, but according to evidence so far it appears less of a threat than SARS and novel influenza viruses.

Just like severe acute respiratory syndrome (SARS) back in 2002/2003, the world is faced with another new virus which provokes fear and possible panic. As of 30 August 2013 the World Health Organisation has recorded 108 laboratory-confirmed cases of infection with Middle East respiratory syndrome coronavirus (MERS-CoV) including 50 deaths **(1)**. Unlike SARS (which stood at around 9.6%) the case fatality rate of MERS-CoV is of grave concern being much higher at around 50%, similar to avian flu (H5N1). Epidemiologic and phylogenetic analyses support person-to-person transmission of MERS-CoV.

Members of the WHO emergency committee decided not to consider MERS-CoV a Public Health Emergency of International Concern (PHEIC) in July 2013 **(2)** and do not advise special screening at country points of entry with regard to MERS-CoV nor does it currently recommend the application of any travel or trade restrictions. However, the US Obama Administration considers MERS-CoV a public health threat and will allow the Food and Drug Administration (FDA) to quickly approve treatments and tests for the virus **(3).**

MERS-CoV, a novel beta RNA coronavirus, was first reported in Saudi Arabia in 2012 and so far has been linked to 4 countries around the Arabian Peninsula , namely the Kingdom of Saudi Arabia, United Arab Emirates, Qatar, or Jordan. The majority of MERS-CoV related deaths have occurred in Saudi Arabia, although some have occurred in destination countries such as the UK and France. No cases so far have been recorded in the US. Typically cases of MERS-CoV have occurred in older men and people with underlying health conditions. Symptoms include fever, cough and dyspnoea and can include chills, rigor, headache, myalgia and malaise. Respiratory failure is the major complication.

According to the US CDC patients considered under investigation for MERS-CoV infection have fever (≥38°C, 100.4°F) and pneumonia or acute respiratory distress syndrome (based on clinical or radiological evidence) and either a history of travel in the target region within 14 days before onset of symptoms or may have been in close contact with someone symptomatic, who also travelled in the region. Only laboratory investigation is able to confirm a case of MERS-CoV , which requires the use of PCR testing on at least two specific genomic targets or a single positive target with sequencing on a second **(4).** Validated serologic assays are not yet available, and this may have limited the identification of cases.

Currently no specific anti-viral agent has shown to be effective against MERS-CoV with treatment mainly relying on supportive therapy. Past clinical experience from SARS suggests that a number of interventions including ribavirin with and without corticosteroids, interferon alfa with corticosteroids, ribavirin with lopinavir and ritonavir, and convalescent plasma may improve the outcome in patients but the data are not conclusive **(5).**

Although not exactly the same as SARS, MERS-CoV is similar in that it is most closely related to coronaviruses found in bats (HKU4 and HKU5). SARS arose when a coronavirus moved from bats to civet cats to humans. Although so far MERS-CoV has been only found in humans, it is thought a similar pattern of events has occurred where MERS-CoV probably has been transmitted within unknown animal host(s), then after gradual adaptation has suddenly become capable of infecting humans. Indeed, latest research indicating high titres of neutralising antibodies against MERS-CoV in dromedary camels suggest this species might be an intermediate host for MERS-CoV after bats. This which would explain the specific geographical nature of the infections **(6).** Identifying the exact pathway of the MERS-CoV virus to humans is critical as blocking blocking zoonotic and human-to-human transmission could be the most promising and cost-effective method to prevent further human fatalities.

A potential vaccine against MERS-CoV is a plausible option. Indeed, the US CDC has already stated it is in early discussions with an undisclosed developer. Much can be learnt from

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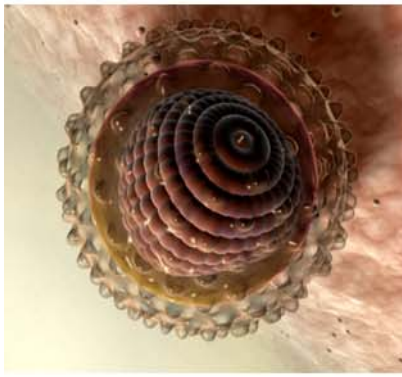

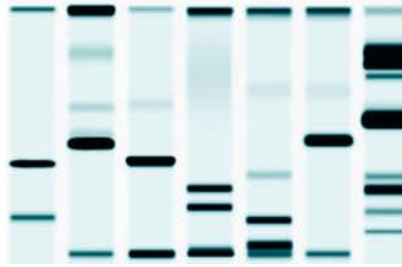

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previous work on the SARS vaccine atlhough no specific product was ever licensed. SARS killed greater than 10 times the amount of people than MERS-CoV and then disappeared. Many public health experts predict that old-fashioned methods of infection control could also be suitable for MERS-CoV , which appears to be much less infectious than SARS. Studies investigating whether MERS-CoV has pandemic potential have shown that so far MERS-CoV has not spread as widely and as rapidly as SARS **(7).** It also appears that adaptation to humans has taken much longer with MERS-CoV , which has been circulating for more than a year.

In the past decade we have seen H3N2, H1N1, SARS, H7N9 and now MERS-CoV. Before that HIV has been the most frightening example of a new virus which still doesn't have a vaccine. As long as man lives in close proximity with animals, and viruses maintain their ability to mutate and adapt we will need to be ever vigilant.

*__Top 5 companies:__ GSK Biologicals, Sanofi Pasteur, Merck & Co, Pfizer (Wyeth) and Novartis Vaccines and Diagnostics

References and Notes:

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2) WHO Statement on the Second Meeting of the IHR Emergency Committee concerning MERS-CoV. 17 July 2013. Available at: http://www.who.int/mediacentre/news/statements/2013/mers_cov_20130717/en/index.html. Accessed September 2013

3) Middle East Respiratory Syndrome Coronavirus (MERS-CoV). etermination of a Significant Potential for a Public Health Emergency and Declaration that Circumstances Exist Justifying an Authorization Pursuant to Section 564 of the Federal Food, Drug and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)

4) Middle East respiratory syndrome. Case definitions. Available at: http://www.cdc.gov/coronavirus/mers/case-def.html. Accessed September 2013

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6) Reusken CBEM, Haagmans BL, Muller MA, et al. Middle East respiratory syndrome coronavirus neutralising serum antibodies in dromedary camels a comparative serological study. *Lancet Infect Dis* 2013; published online Aug 9. http://dx.doi.org/10.1016/S1473-3099(13)70164-6.

7) Bauch CT et al. Assessing the pandemic potential of MERS-CoV. The Lancet, Volume 382, Issue 9893, Pages 662 - 664, 24 August 2013

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