Coronavirus in Saudi Arabia

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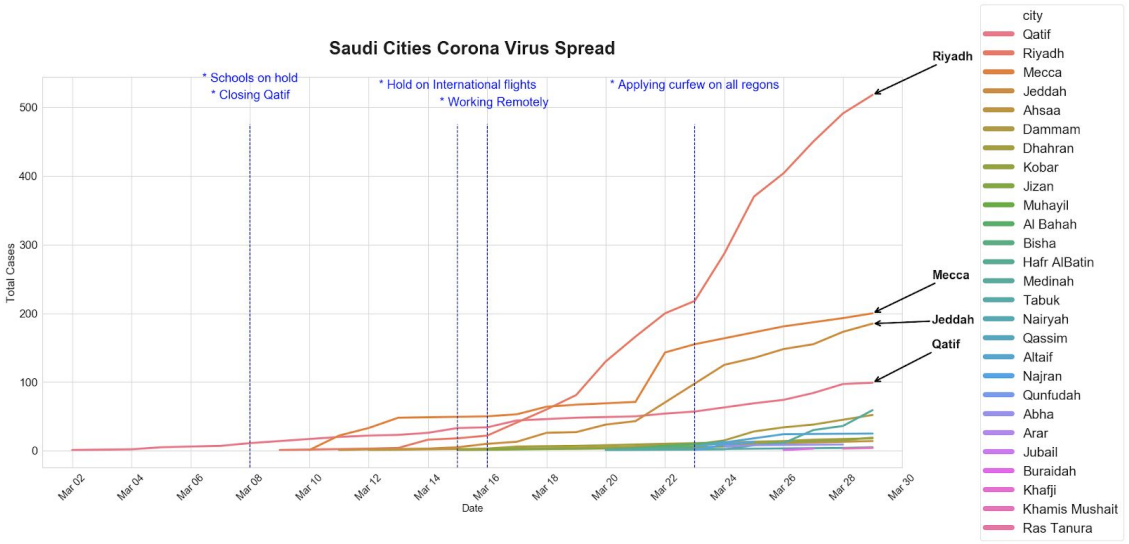
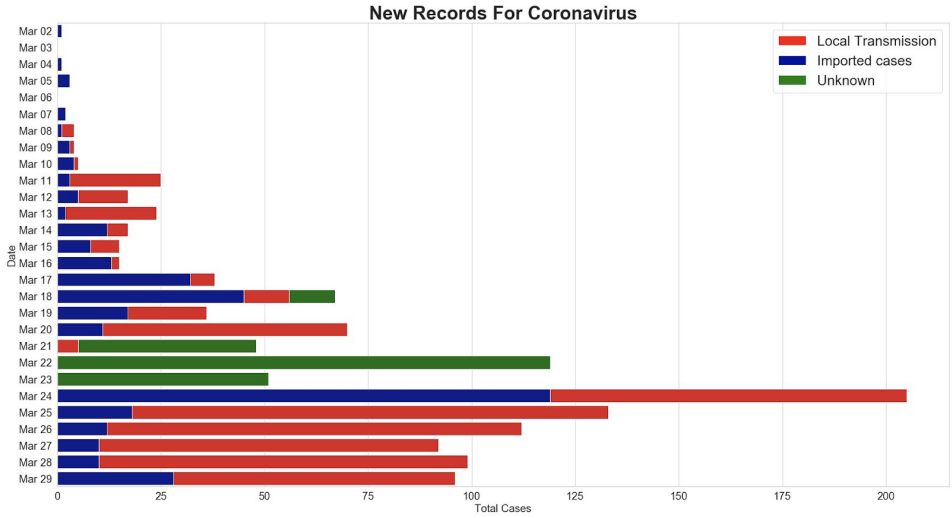
Coronavirus pandemic has presented unprecedented challenges to the global health systems. The Saudi government has taken a number of proactive steps to address this crisis. In this report we assess the current situation and advise on whether more aggressive policies need to be deployed.

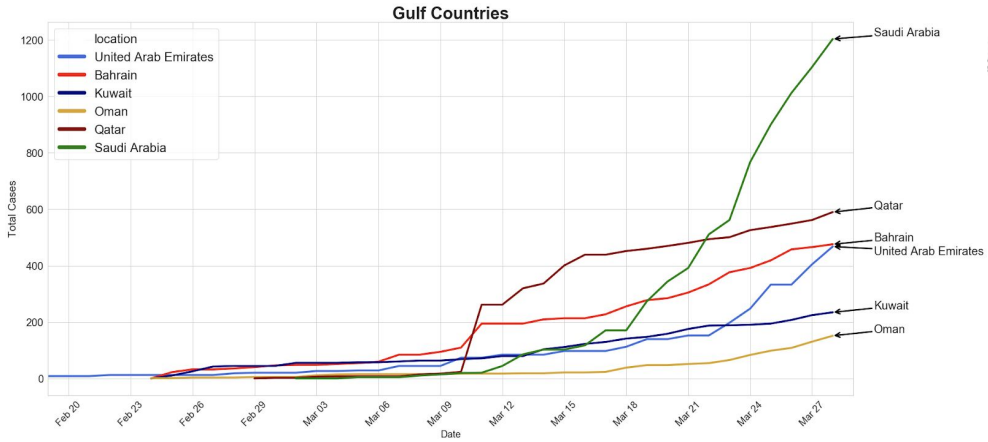


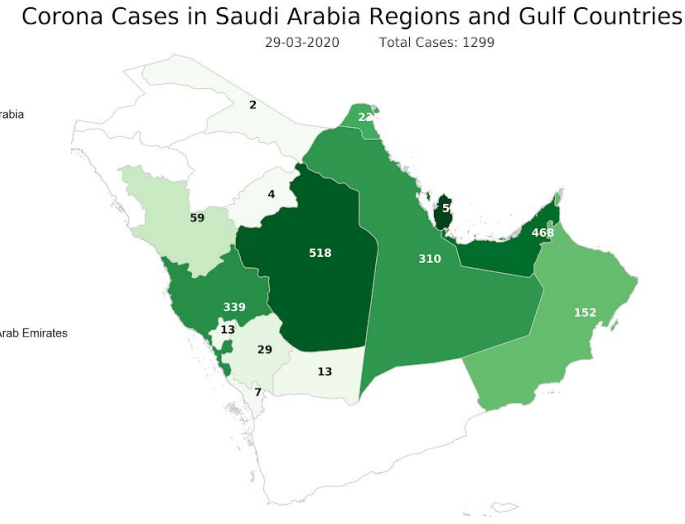
Change in Source of New Cases

At the beginning of the crises, reported cases were by forign travel. However, as the crisis has progressed and with government travel restriction orders and policies, more and more of the new cases are due to virus transmitting within the local population. This can be seen in the plot to the right.

We should continue restricting travel both internally between the different regions and externally to neighboring and other countries as the number of cases are sharply increasing worldwide.

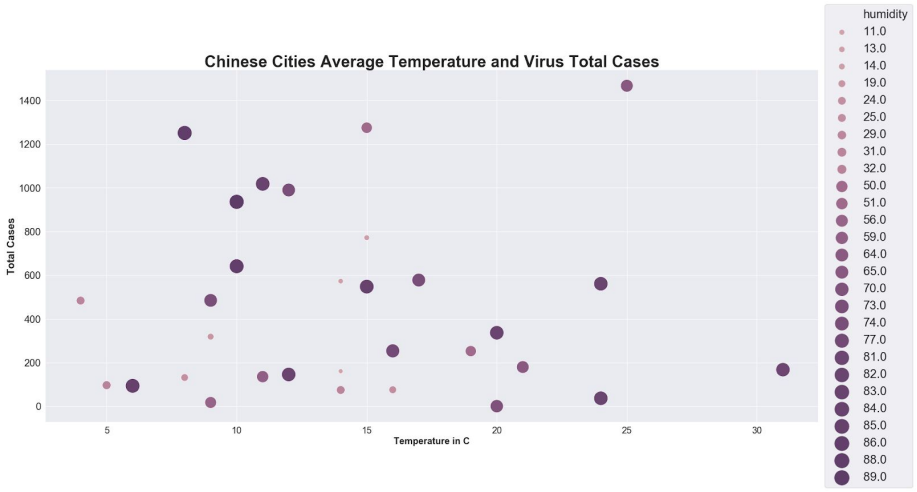






Effect of Weather

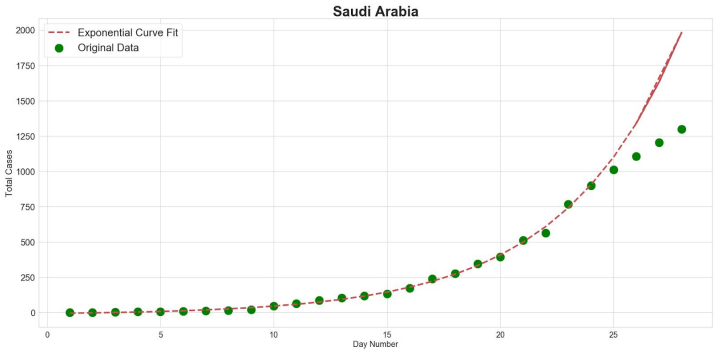
There has been some speculation that the warmer summer months will help in curbing the spread of the Coronavius. To evaluate this possibility we investigated the spread of the virus in different Chinese cities.



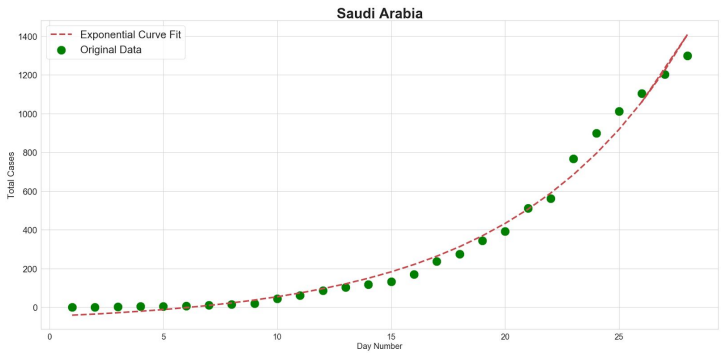
We did not find reliable evidence (as seen on the right) of higher temperature slowing down the virus. Thus this speculation should not be given a lot of weight. Considering that the temperatures in the Kingdom during the summer are overall higher than those found in Chinese cities during the months of January to March, we could expect to see different results in the Kingdom. However, we advise that we take the risk of Coronavirus transmission seriously and continue with social distancing and other precautions until further data confirms otherwise.

Effects of Current Policies

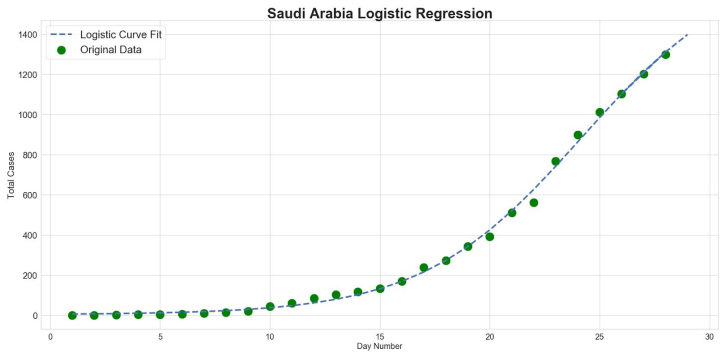
Due to fourteen day quarantine period delay, it is still too early to understand how much of an effect stay-in-home and shelter-in-place orders as well as city lockdown policies may have. Data shows an exponential increase in cases which is in line with what we see in other countries as can be seen in the plot on the right. Having said that there is some evidence that the spread of the virus is slowing down compared to what it would have been without intervention.



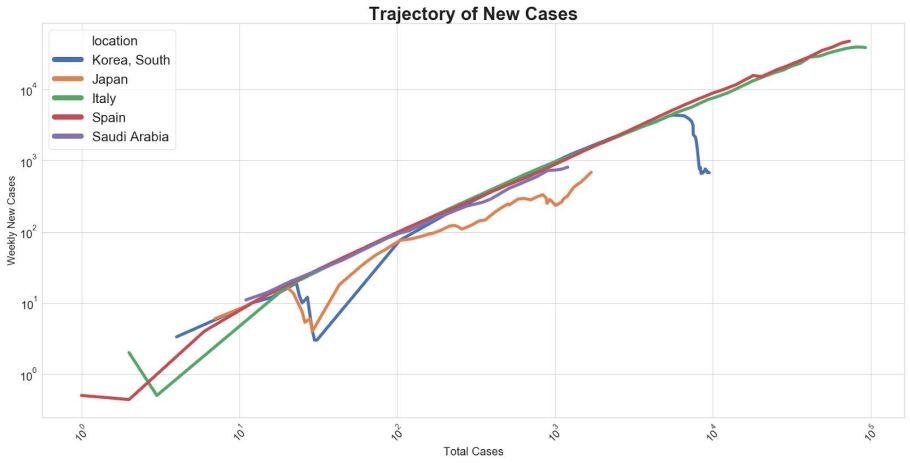
In order to see this we fit an exponential curve on the 22nd of March and use it to predict cases for the following week. Though it predicted cases well for the 23rd and 24th, it then deviated notably (top curve). Furthermore, when fitting an exponential curve through all the data we see a poor fit (middle curve) compared to a logarithmic curve (bottom curve) which flattens. This suggests an improvement in slowing down the virus.



Nonetheless, it is early to be certain and the gains are not large enough to suggest easing up. We recommend continuing to increase the efforts to slow down the virus with policies that encourage public compliance.

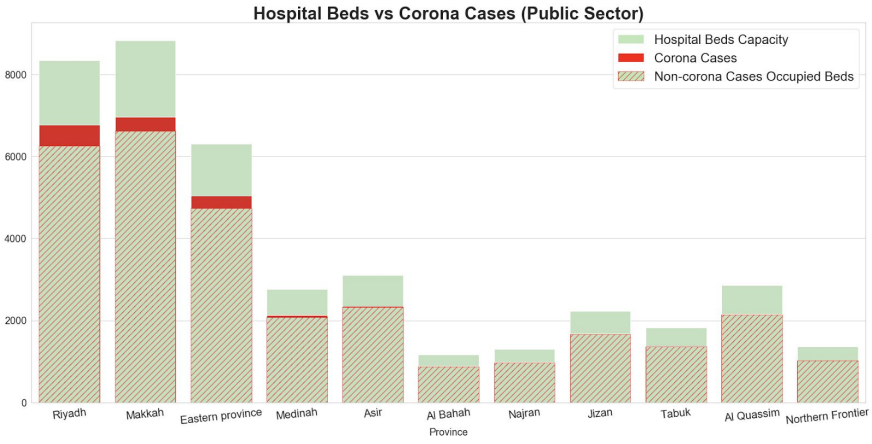


The goal during this pandemic is as emphasized by many is to 'flatten the curve'. This can be seen as a dip in the number of new cases. A look at the weekly new cases by total cases plot shows that we are not there yet (plot below on the next page).



Hospital Capacity

One of the major concerns with the Coronavirus is the large number of cases that can overwhelm the hospital system. We use CDC estimates as well as Saudi census data and health datasets on the number of hospital beds to estimate the number of cases before we reach full hospital capacity. This assumes hospitalization of only cases that need medical attention. The estimates for the proportion or available hospital beds for Corona cases is fourth of the hospital bed. Our estimates indicate that we should expect 1.19% of all Coronavirus cases to require hospitalization. Therefore, we estimate that we'll be at full capacity when we have 6423 to 9176 Corona cases (note this is the number of public and for present cases and not the reported total cases. That is total cases minus the recovered cases and fatalities). Furthermore, we estimate ICU rate of 0.22% to 0.45% and fatality rates of 0.03% to 0.05%. We recommend planning to reduce hospital bed occupancy for low priority cases and delaying non-emergency operations as well as planning for increasing capacity.



Data Sources and References

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- Natural Earth
- Centers for Disease Control and Prevention
- Our World in Data
- World Health Organization (HWO)
- WHO situation reports
- DataPack
- CSSEGIS
- Qlik Community
- Ministry of Health Open Data