Middle East and North Africa SARS-CoV-2 Surveillance System: Policy, Persistence & Transmission

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Background

- The COVID-19 global pandemic has disrupted the lives of millions and forced countries to devise public health policies to reduce the pace of transmission
- In the Middle East and North Africa (MENA), falling oil prices, disparities in wealth and public health infrastructure, and large refugee populations have significantly increased the COVID-19 disease burden.
- Insufficient testing, asymptomatic infections, and poor reporting reveal a need for better and more accurate surveillance metrics to reduce Sars-CoV-2 persistence and transmission.

Research Objectives

- Measure the dynamics of COVID-19 transmission and persistence with advanced surveillance metrics that complement traditional surveillance methods and overcome data limitations and contamination
- To better understand each country's risk for explosive growth and better inform those who are managing the pandemic

Methods

- We delineate COVID transmission in terms of speed (new daily cases), acceleration or deceleration, jerk (change in acceleration or deceleration), and 7-day persistence
- We extracted 30 days of COVID data in the Middle East and North Africa and used an empirical difference equation to measure daily case numbers as a function of the prior number of cases, the level of testing, and weekly shift variables

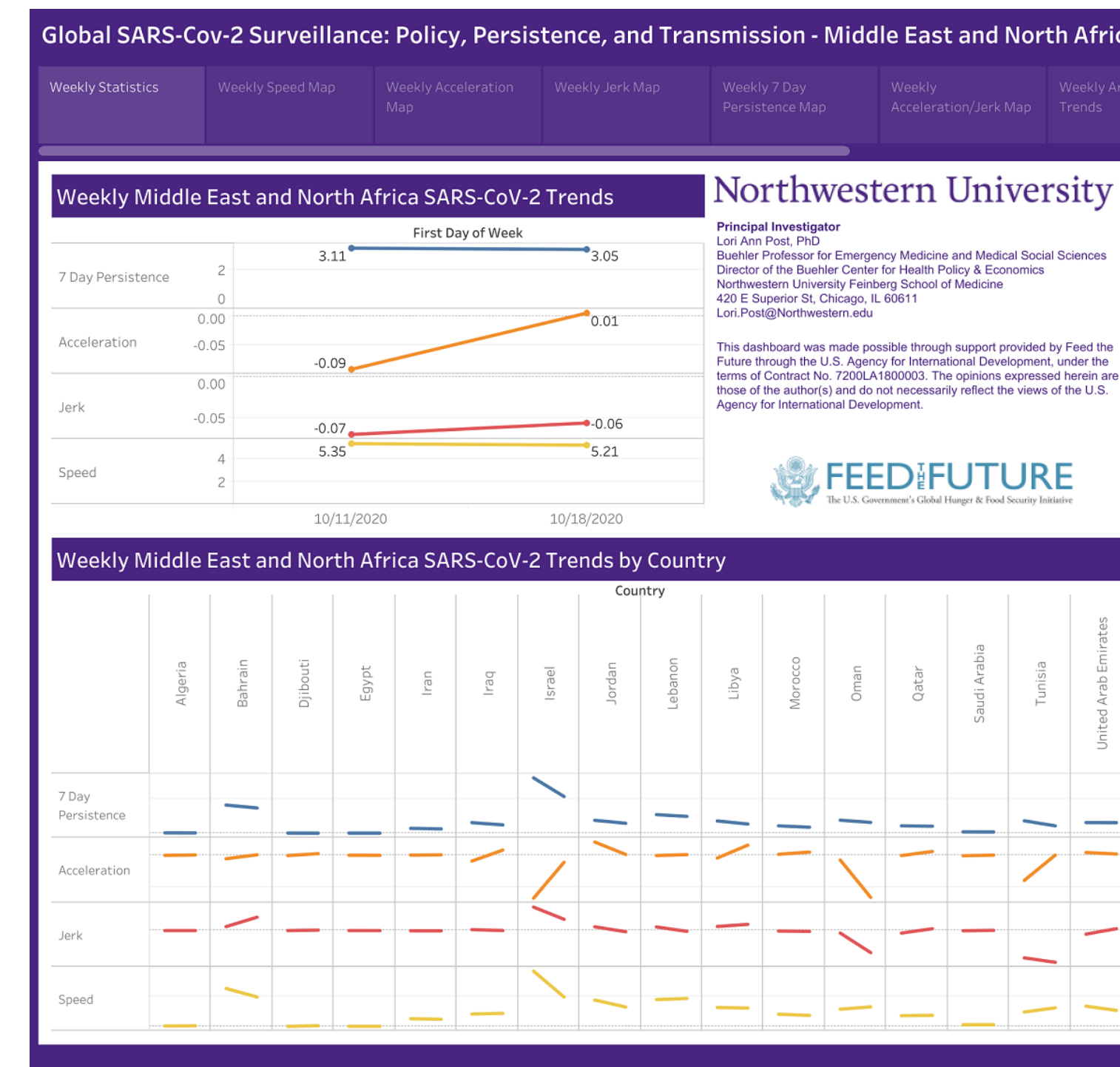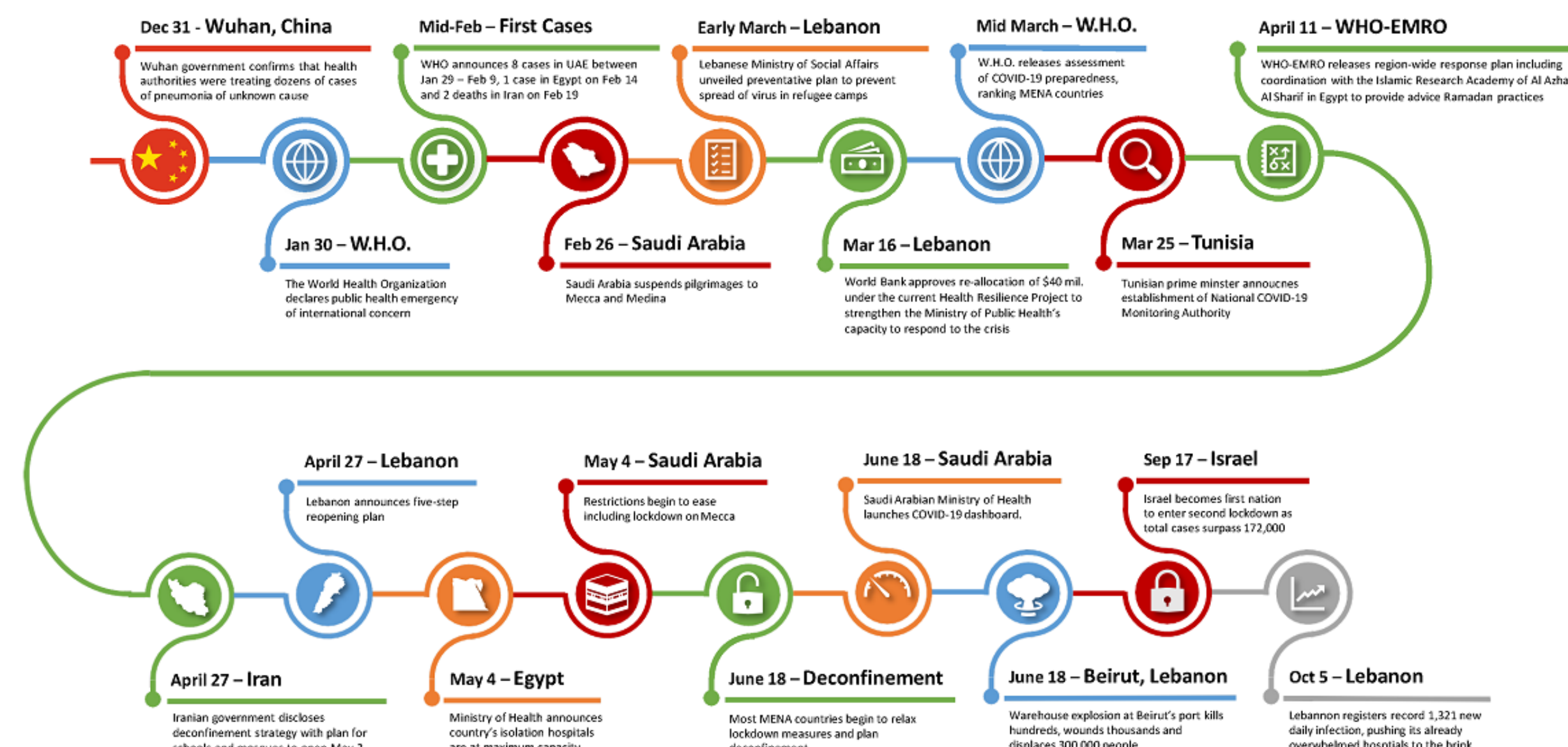## The Global Surveillance Project Dashboard

Figure 1: Timeline of COVID-19 Events in MENA

Results

- Dynamic COVID-19 public health surveillance including speed, acceleration, jerk, and 7-day persistence rates differ from static surveillance of observed daily cases
- Iran, Iraq, Saudi Arabia, and Israel have the highest cumulative COVID-19 caseload
- Many of the smaller countries in MENA have higher infection rates than those countries with the highest caseloads.
- Israel, Bahrain, Lebanon, and Oman had the highest rates of COVID-19 persistence
- Bahrain had positive speed, acceleration and jerk signaling the potential for explosive growth.
- In order from most to least number of cumulative deaths since January 2020: Iran, Iraq, Egypt, and Saudi Arabia

Limitations

- Data are collected at the country level which may preclude local analysis of surveillance trends
- Within MENA, data collection mechanism differs by country and even by region within a given country leading to weekend effects, missing data points and other potential avenues for data contamination

Conclusions

- The combination of dynamic and static public health surveillance metrics allows a more complete picture of pandemic progression across countries in MENA
- Static measures capture data at a given point in time such as infection rates and death rates. By including speed, acceleration, jerk, and 7-day persistence, public health officials may design policy with an eye to the future.
- Iran, Iraq, Saudi Arabia, and Israel all demonstrated the highest rate of infections, acceleration, jerk, and 7-day persistence rates prompting public health leaders to increase prevention efforts.