

# Influence of Chinese city's hygiene on the SARS-CoV-2 transmission

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## Value and impact

**Theoretical implication:** how does hygiene impact the virus transmission, which will help to understand the transmission dynamics of the virus.

**Practical implication:** to evaluate the effectiveness of national hygienic cities, which will promote city hygiene in China and beyond.

## Background

- Transmission dynamics of this emerging infectious disease haven't been fully understood
- Previous research shows the air quality may influence the virus transmission
- Overall hygiene in the city may be related to the SARS-CoV-2 transmission.

## Methods

### National hygienic city

- Ninety-three reconfirm national hygienic cities in China in 2018, this is the newest list of national hygienic city.

### Total confirmed cases

- nCov2019 packages
- Excluding infected arrivals from abroad

### Move-out data before lockdown

- Baidu Qianxi
- Inspect elements
- 16 days (Jan 10, 2020 - Jan 25, 2020)
- Each city's move-out strength is presented as a percentage
- Total move-out strength was adjusted by each day's move-out strength.

## Results

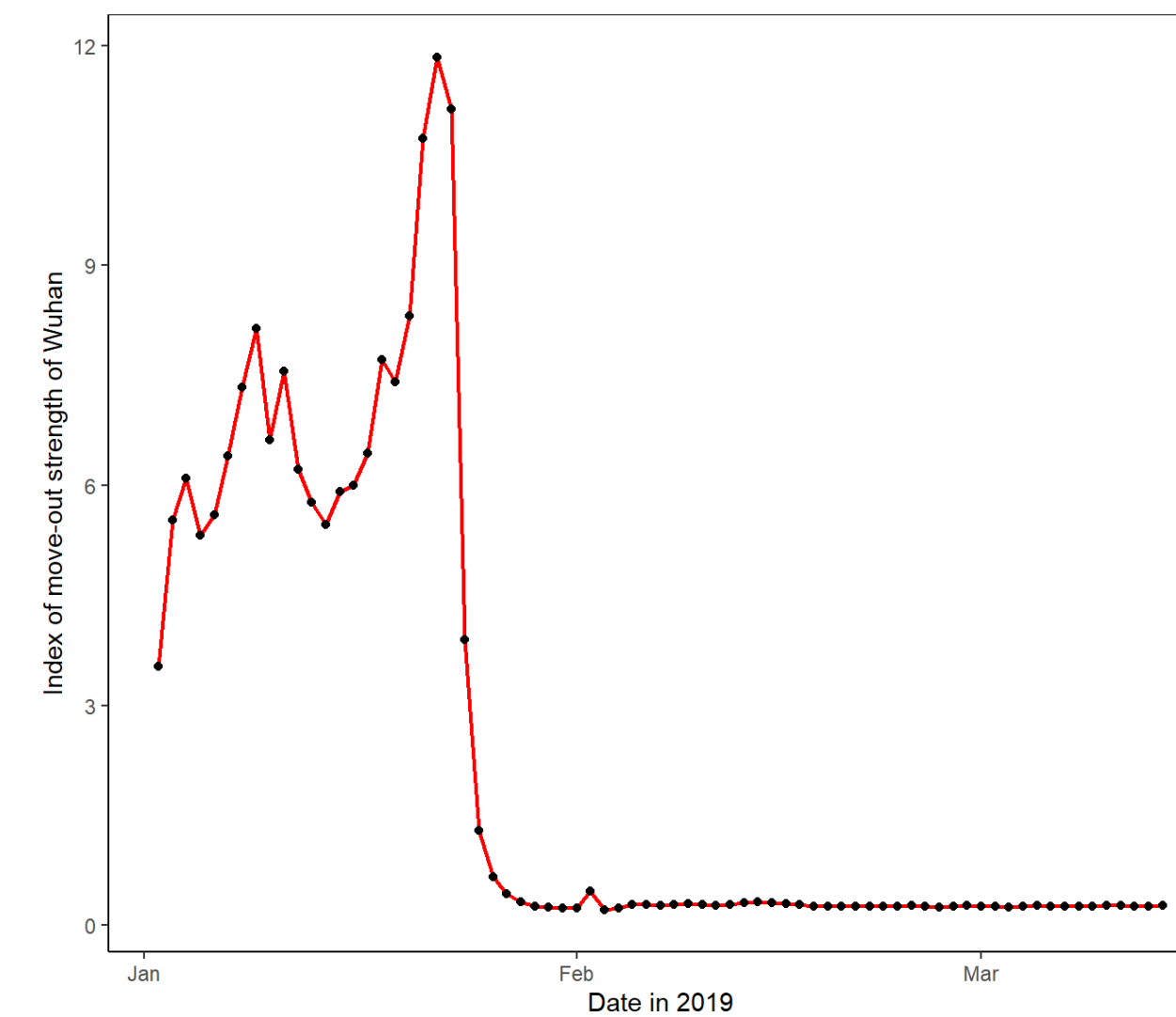


Figure 1. Move out trend from Wuhan

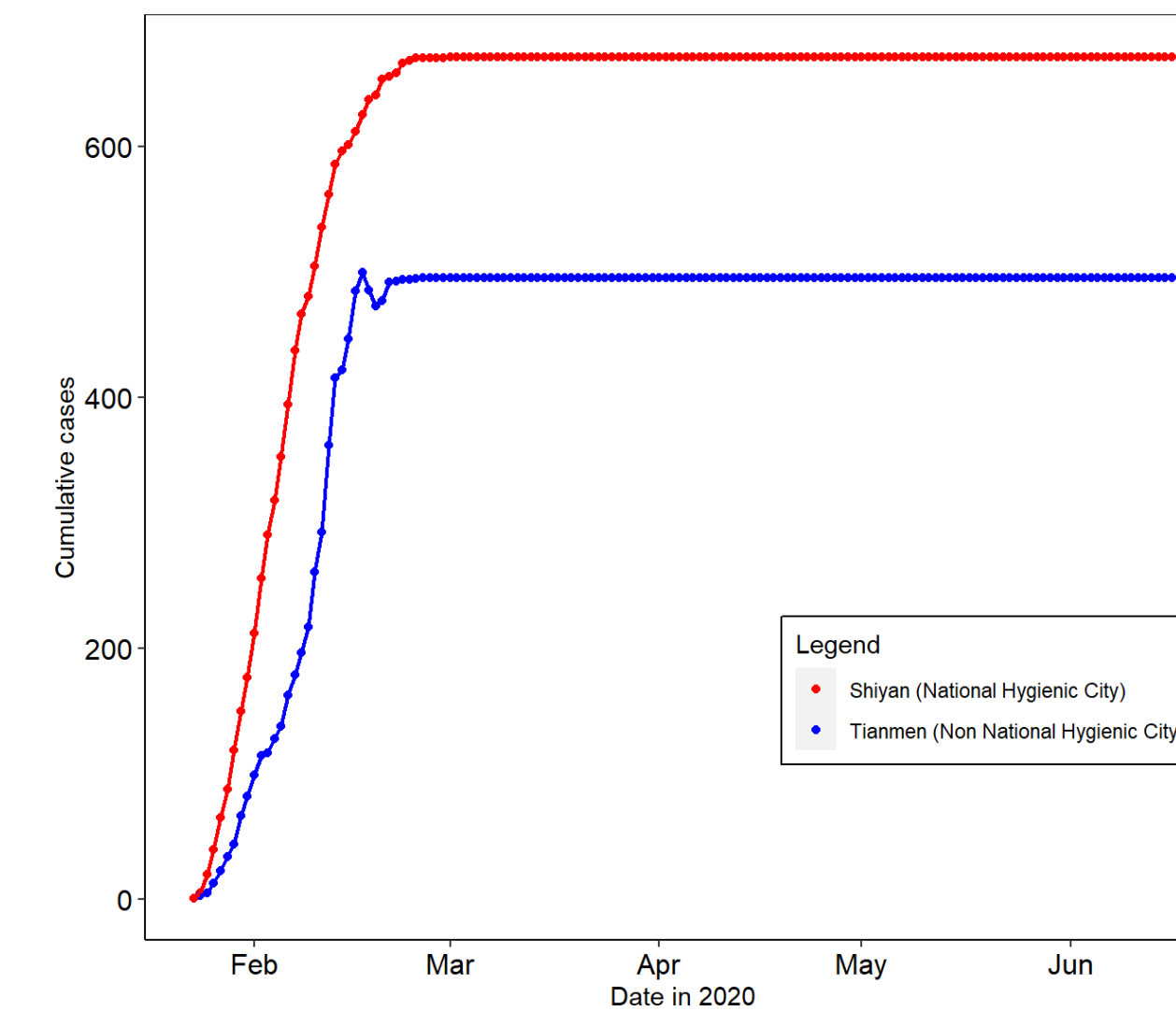


Figure 2. A comparison of Tianmen and Shiyan

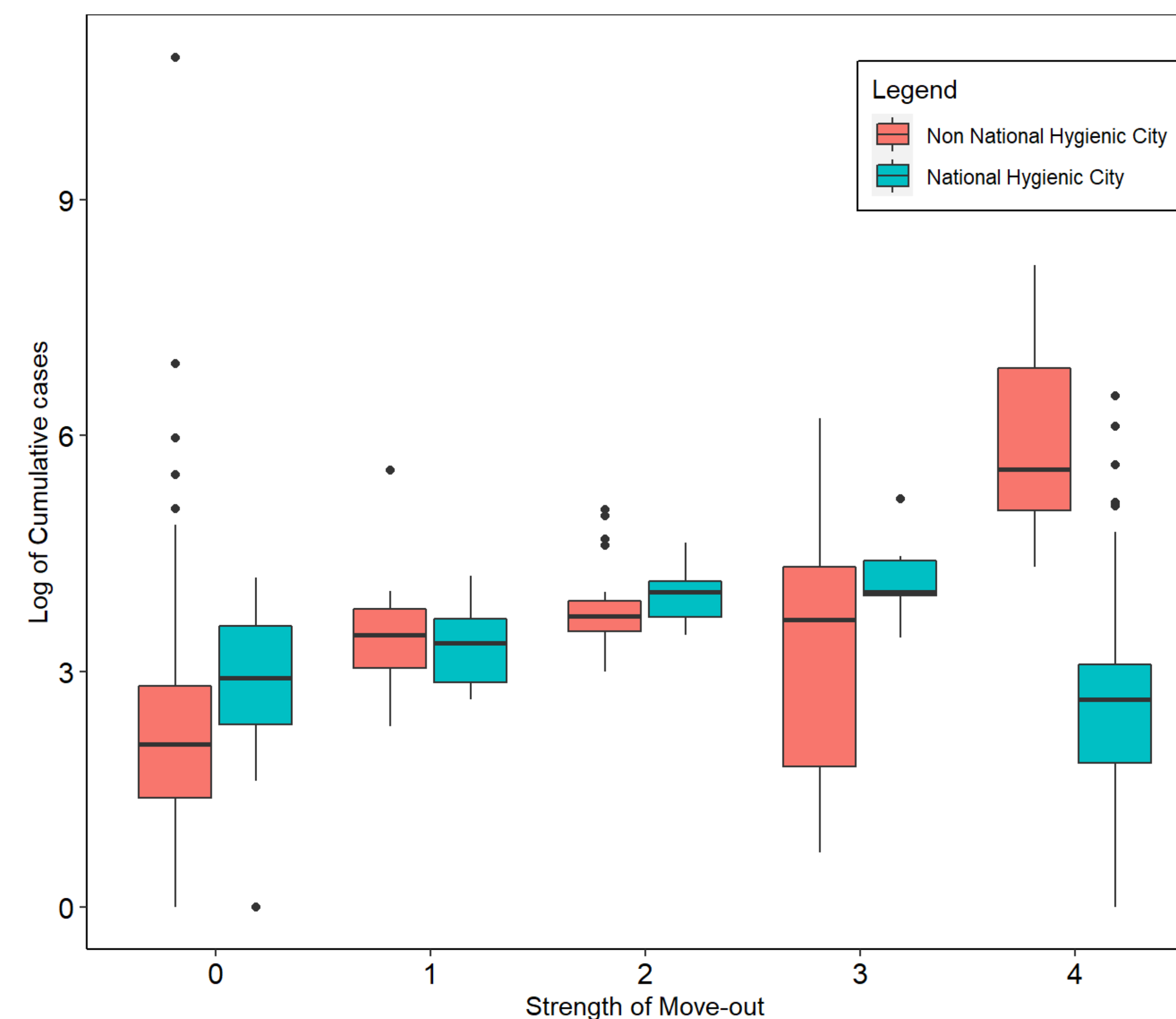


Figure 3. A comparison of all cities outside Wuhan

## Conclusions

- Lockdown of Wuhan effectively cut-down its move-out.
- Top 10% move-out cities are from Jan are all in Hubei province
- The national hygienic city may not have significantly better control of the epidemic
- The outliers with weak epidemic control, are more likely to be non- national hygienic city

## Future work

- Case-control match of hygienic cities and non-hygienic cities
- Multiple linear regression to total confirmed cases
- The difference in mortality & recovery time
- Detailed hygiene condition

## Limitations

- The transmission may start in early January, 2020 or earlier.
- The move-out data from Wuhan does not include transportation means
- The real performance of local government varies in response to this emerging infectious disease

## Contact

- Scan the QR code for this <project's website> to find more information.
- There is a version of interactive poster, click <here> to view the interactive poster and its source code on github.



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## Acknowledgements

Data were from <Baidu Qianxi>, Dr.Guangchuang Yu's <nCov2019 packages>, and <National Health Commission of the People's Republic of China.>

Packages of <tidyverse>, <leafletCN>, <plotly>, <knitr> were used in data analysis and visualization.

The poster template was from Dr.Peng Zhao's <xjtlu package>.

## References

1. Li H, Xu X-L, Dai D-W, Huang Z-Y, Ma Z, Guan Y-J. Air Pollution and temperature are associated with increased COVID-19 incidence: a time series study. International Journal of Infectious Diseases. Published online 2020. <doi:10.1016/j.ijid.2020.05.076>
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