URBAN & RURAL PATTERNS OF COVID-19 IN AFRICA

Dr. Roland Ngom, Mr. Milse Nzingou, Dr. Impouma Benido

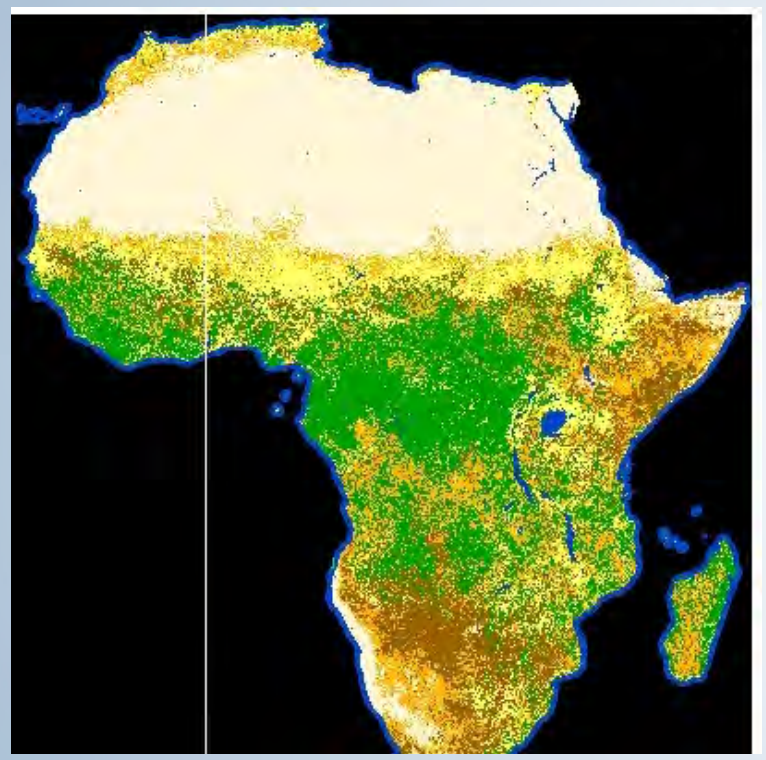
Health Emergencies Information And Risk Assessment
World Health Organization, Regional Office for Africa

Content

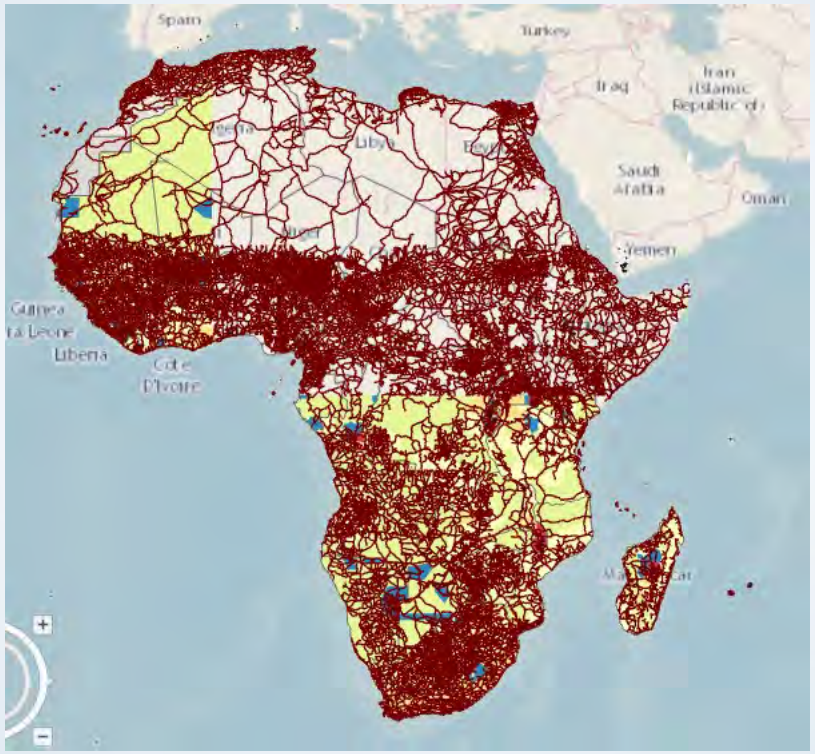
A. Methods
B. Urbanity Index and COVID-19 morbidity
C. Urbanity Index and COVID-19 mortality
D. Urbanity Index and COVID-19 Recoveries
E. Conclusion

Methods

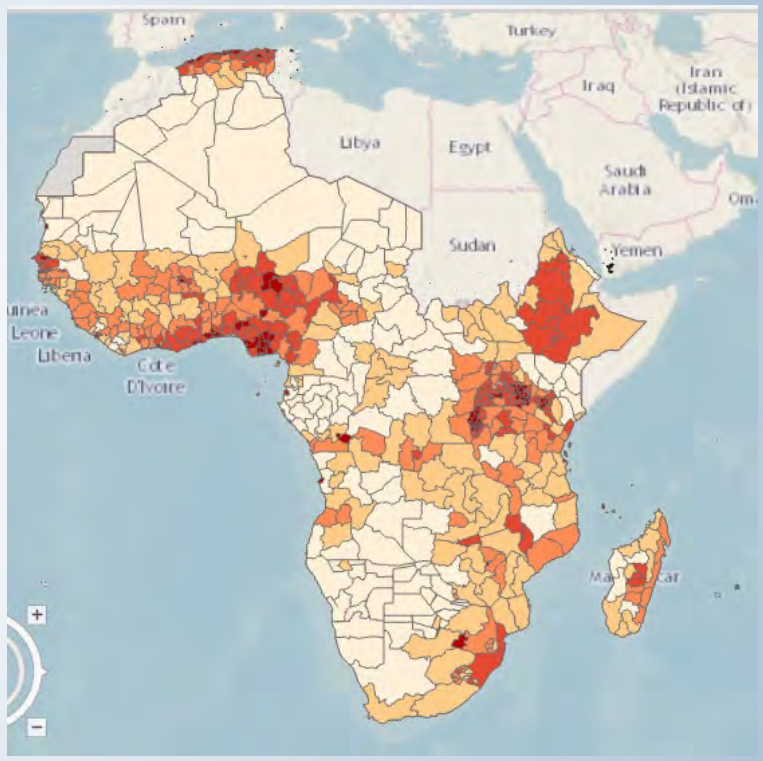
Creating an Urbanity Index (UI)



Urban features (Remote sensing)



Road network



Population density

Methods

Creating an Urbanity Index (UI)

A Urbanity Index (UI) adaptable to various geographies (Provinces, districts, etc.)

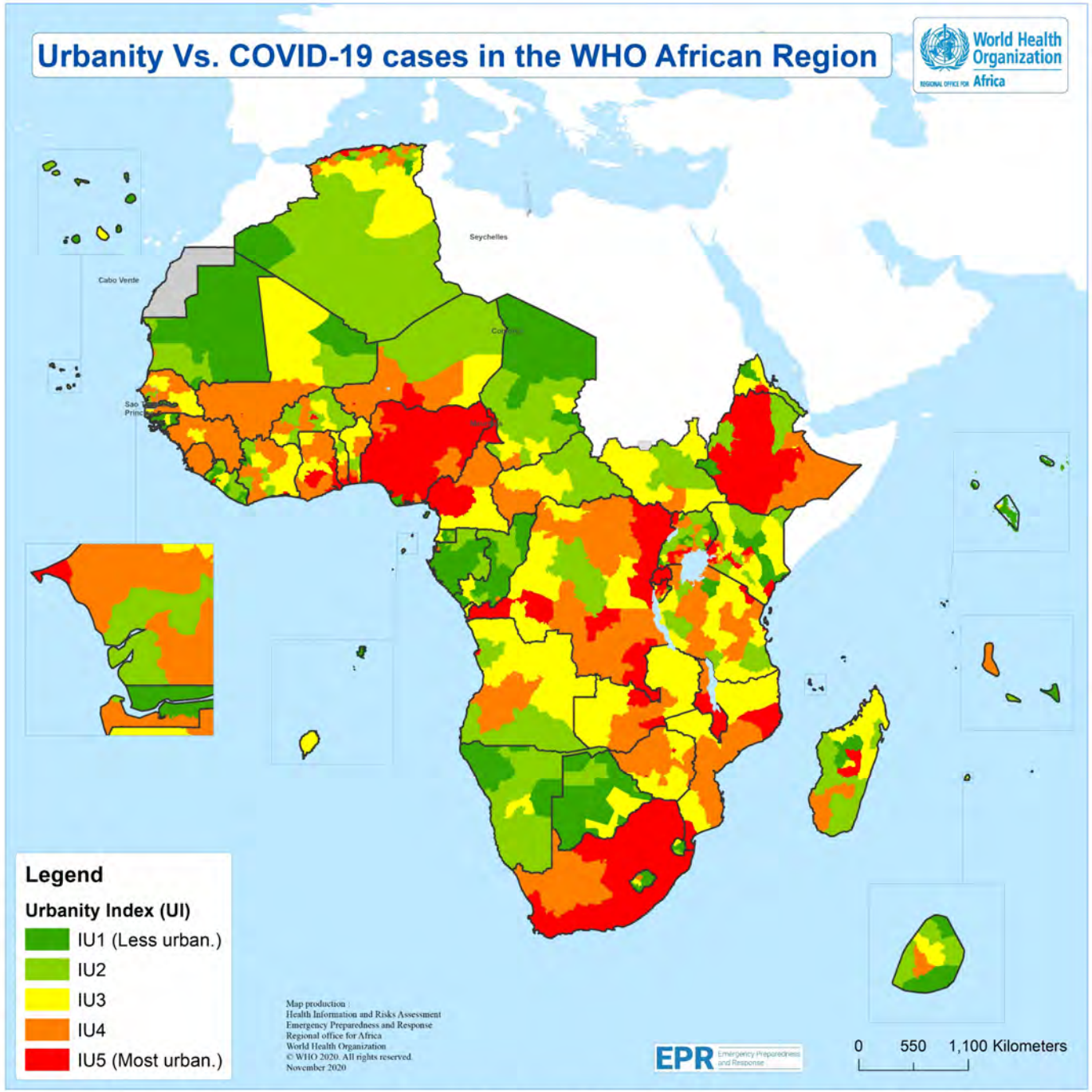


Figure 1: Urbanity index map of provinces

COVID-19 Situation data

Situation as of
11/17/2020, 8:00:00 AM

World Health Organization
Africa

MOBILE VERSION

WHO African Region

1,397,609
Cumulative cases

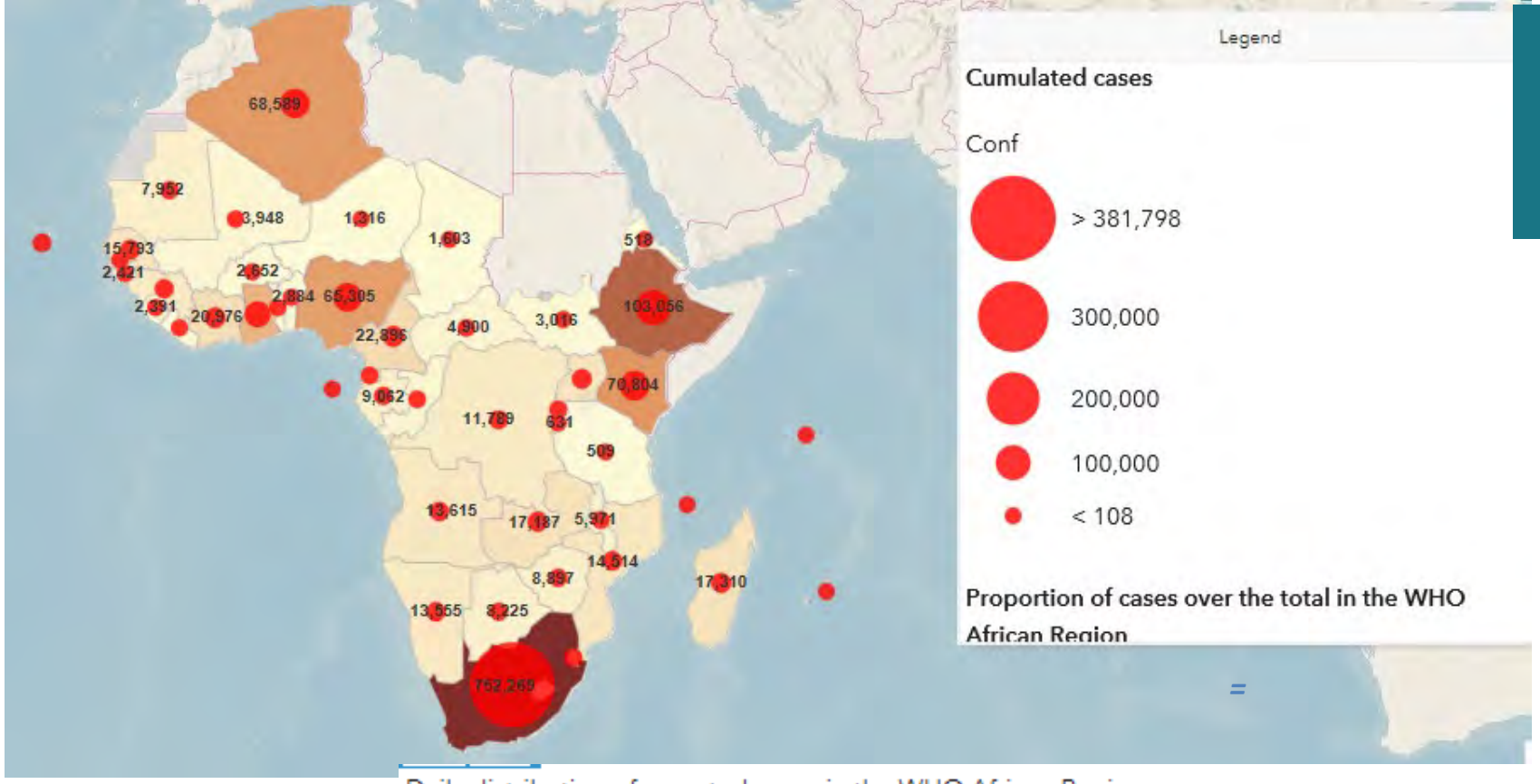
WHO African...

Last 24 hours
4,478
New confirmed case(s)

1,212,645
Recoveries (cumulative)

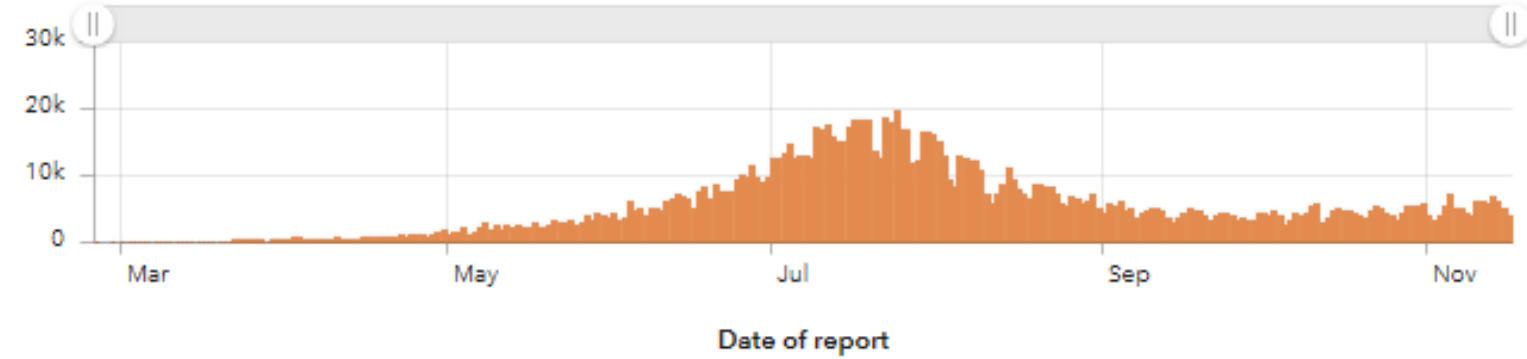
31,610
Cumulative deaths

153,353
Active cases (cumulative)



Daily distribution of reported cases in the WHO African Region

Dashboard access: https://arcg.is/XvuSX



Daily reported cases

Methods

Descriptive analyses and
Multi-level models to assess countries contextual effect and UI contribution

Level 2 = Countries Contextual effect

Level 1 = UI categories

- COVID-19 Cases
- COVID-19 Attack rate
- COVID-19 Case Fatality Ratio (CFR)
- COVID-19 Recovery rates

March to September 2020

Methods

Spatial clustering bivariate analyses (Local Moran I)

Urbanity index

COVID-19 morbidity, mortality and recoveries

Urbanity Index and COVID-19 morbidity

A multiplication of cases in the most urbanized areas and an expansion to the less urbanized (Figure 2)

Cases significantly lower in less urbanized provinces (Statistical model)

Consistently low intra-class correlations (ICC) values over the time

=

Consistent differences between countries with UI not really contributing to the variance

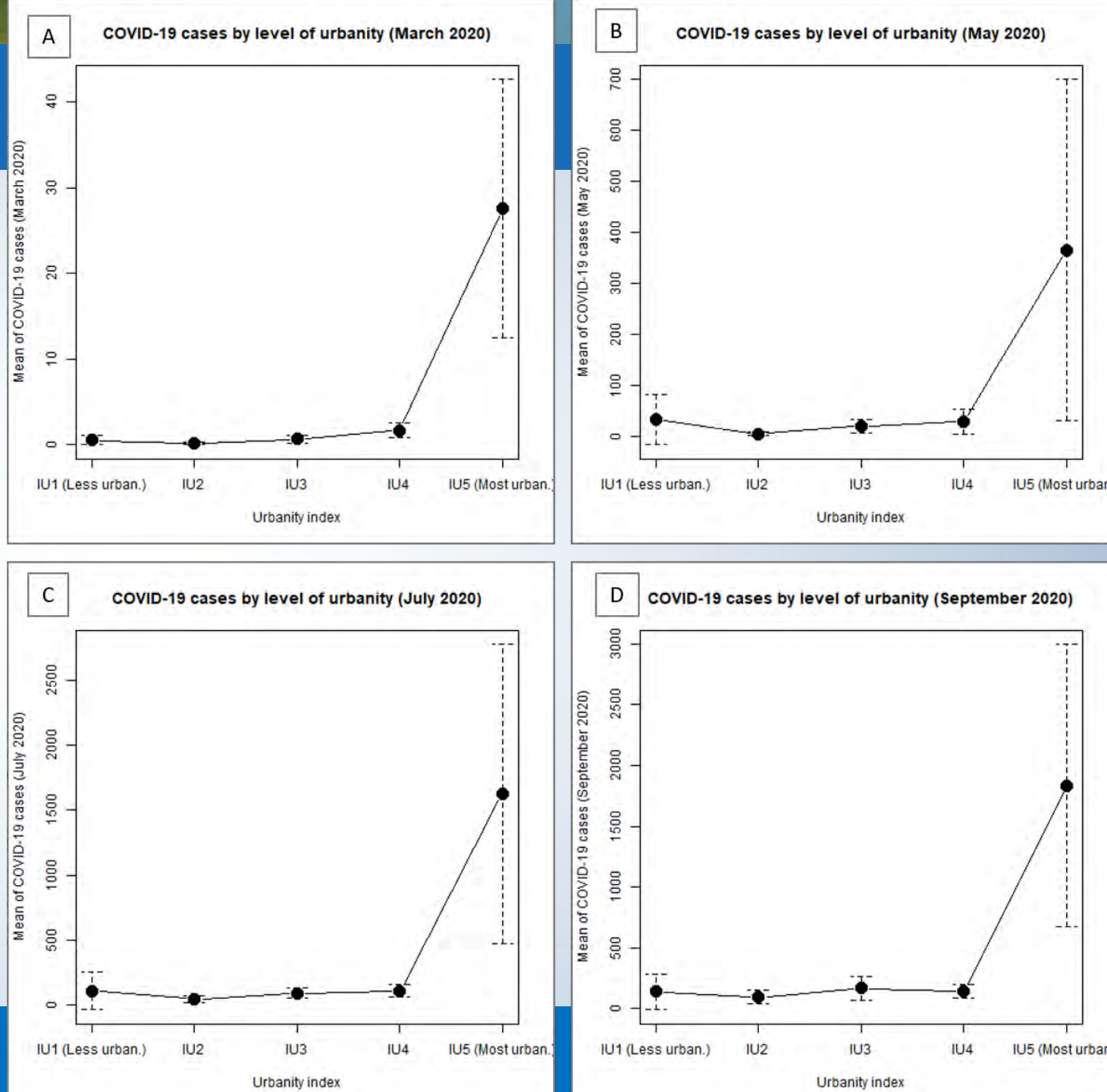


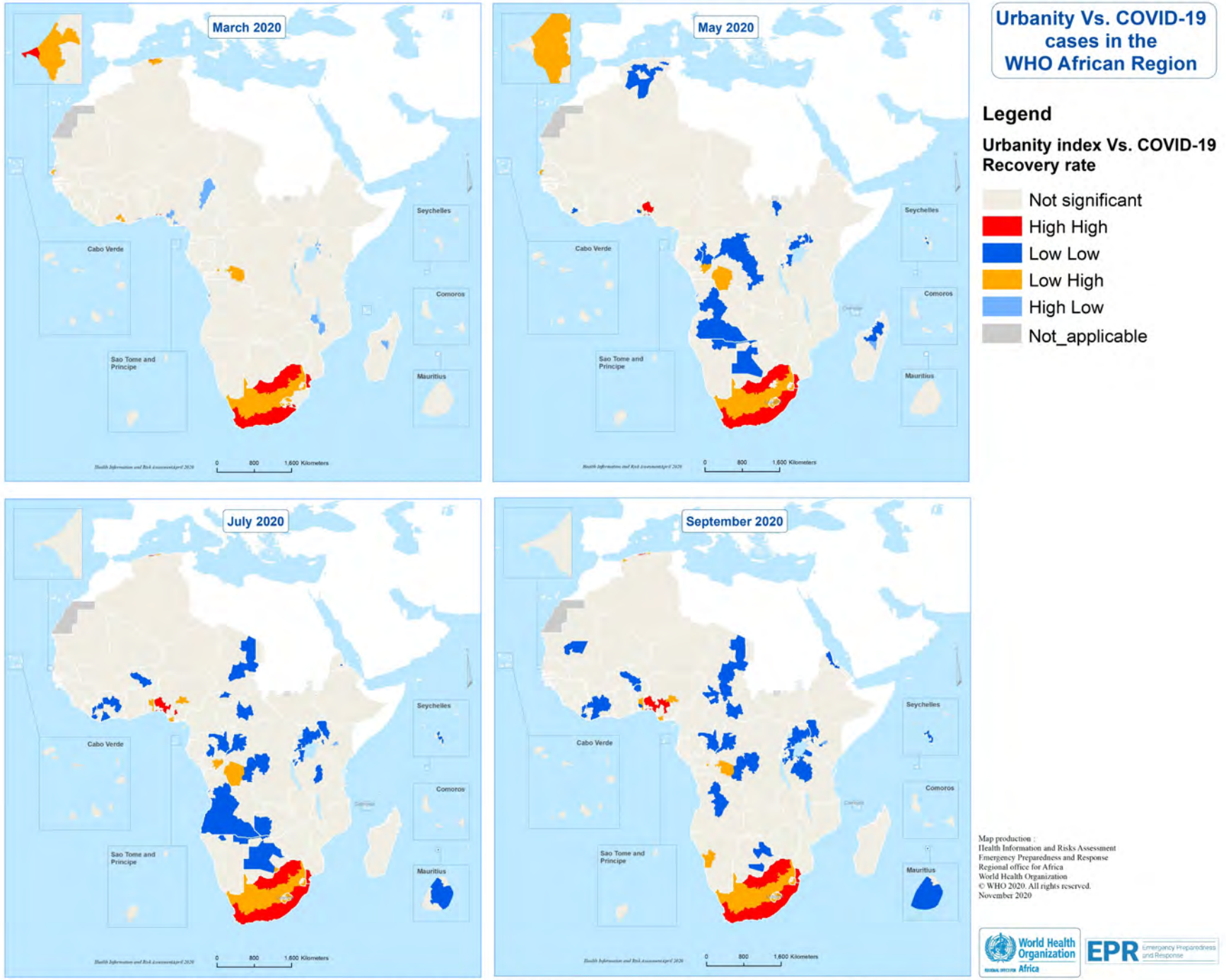
Figure 2: COVID-19 cases trends by Urbanity index

Urbanity Index and COVID-19 morbidity

Consistent clusters of higher urbanity and Higher number of COVID-19 cases in South Africa (Eastern Cape, Gauteng & North West provinces) (Figure 3)

Multiple and disseminated clusters of Low urbanity and Low number of COVID-19 cases (Figure 3)

Figure 3: Urbanity index Vs COVID-19 cases



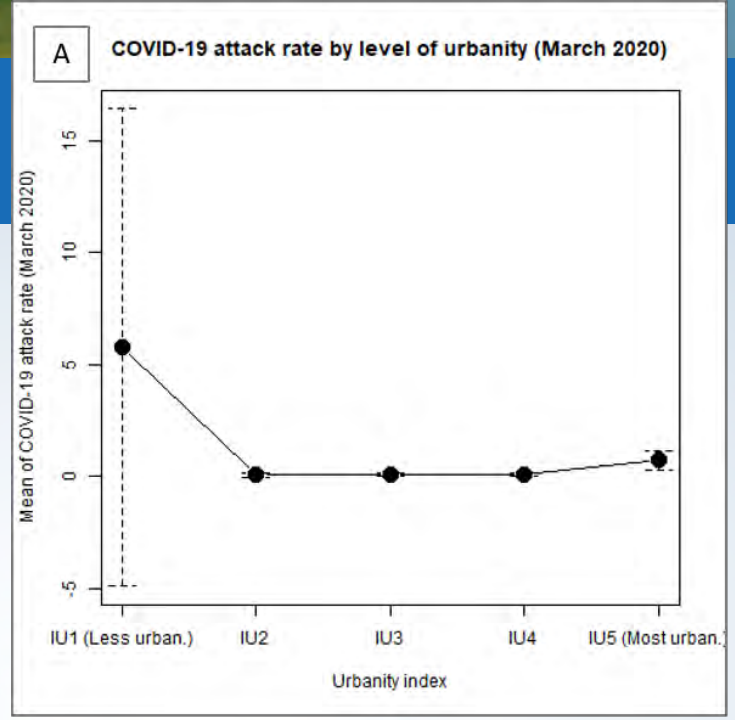
Urbanity Index and COVID-19 morbidity

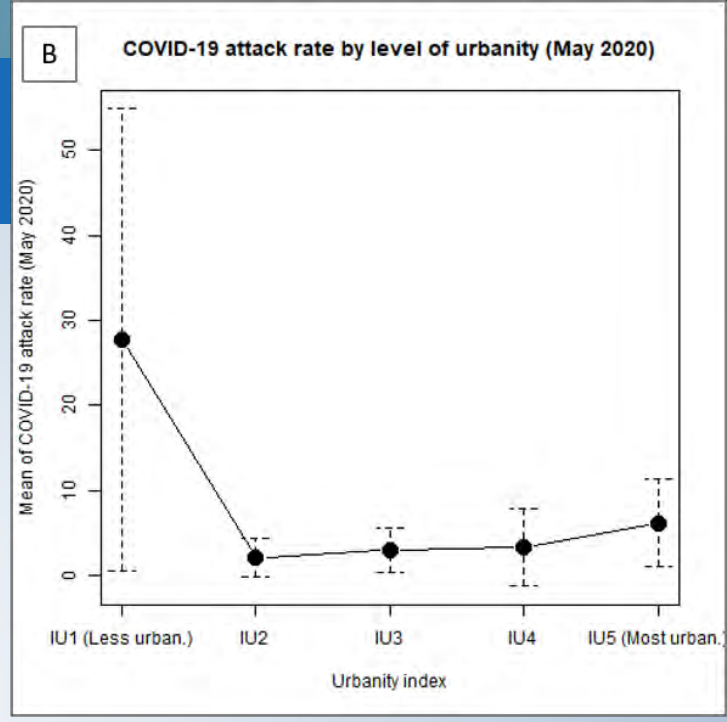
Consistently higher attack rate in rural-like provinces (Figure 4)

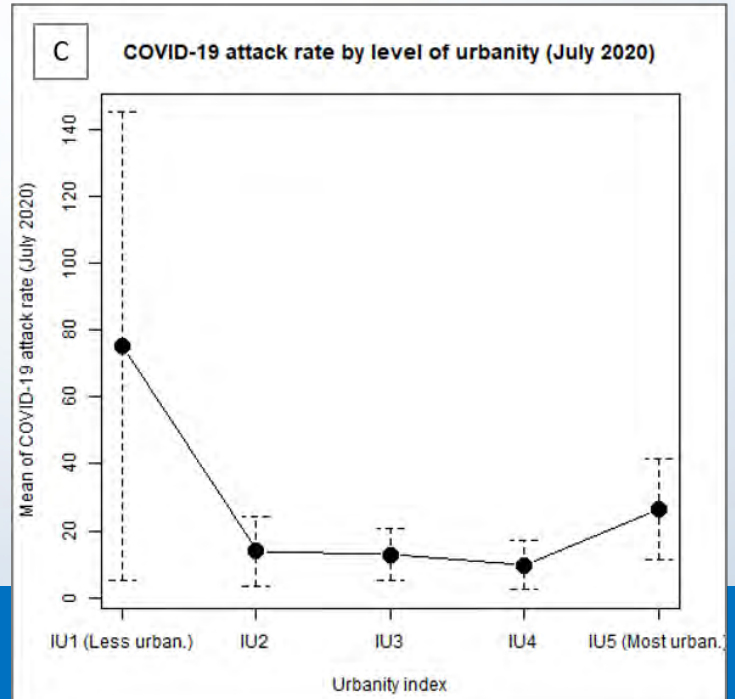
Lower intra-class correlations (ICC) values from July to September 2020

=

IU better explains differences in attack rates after the first two months of COVID-19 presence







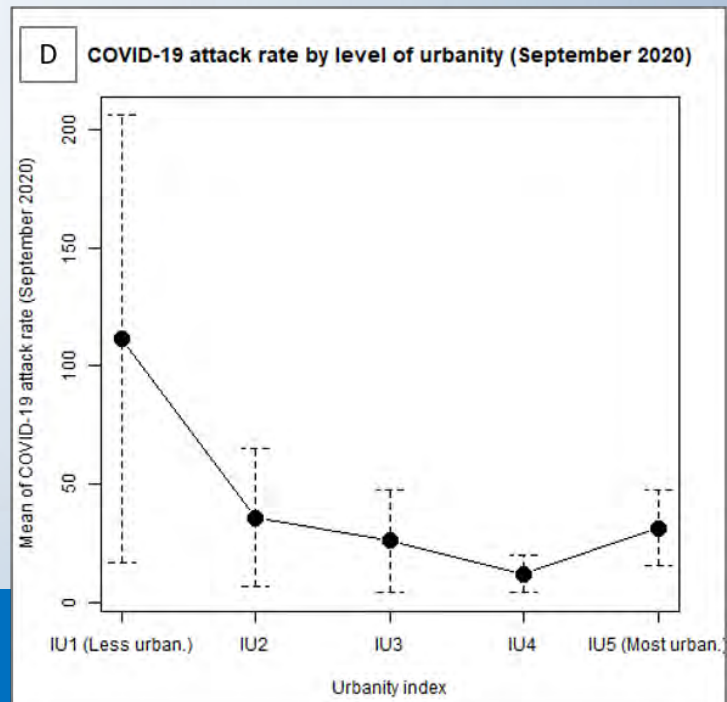


Figure 4: COVID-19 attack rate trends by Urbanity index

Urbanity Index and COVID-19 morbidity

Consistent Clusters of higher urbanity and Higher COVID-19 attack rate in South Africa (Eastern Cape and Western Cape provinces) (Figure 5)

Higher attack rates in less urbanized provinces driven by provinces in South Africa, Namibia and Congo Brazzaville (Figure 5)

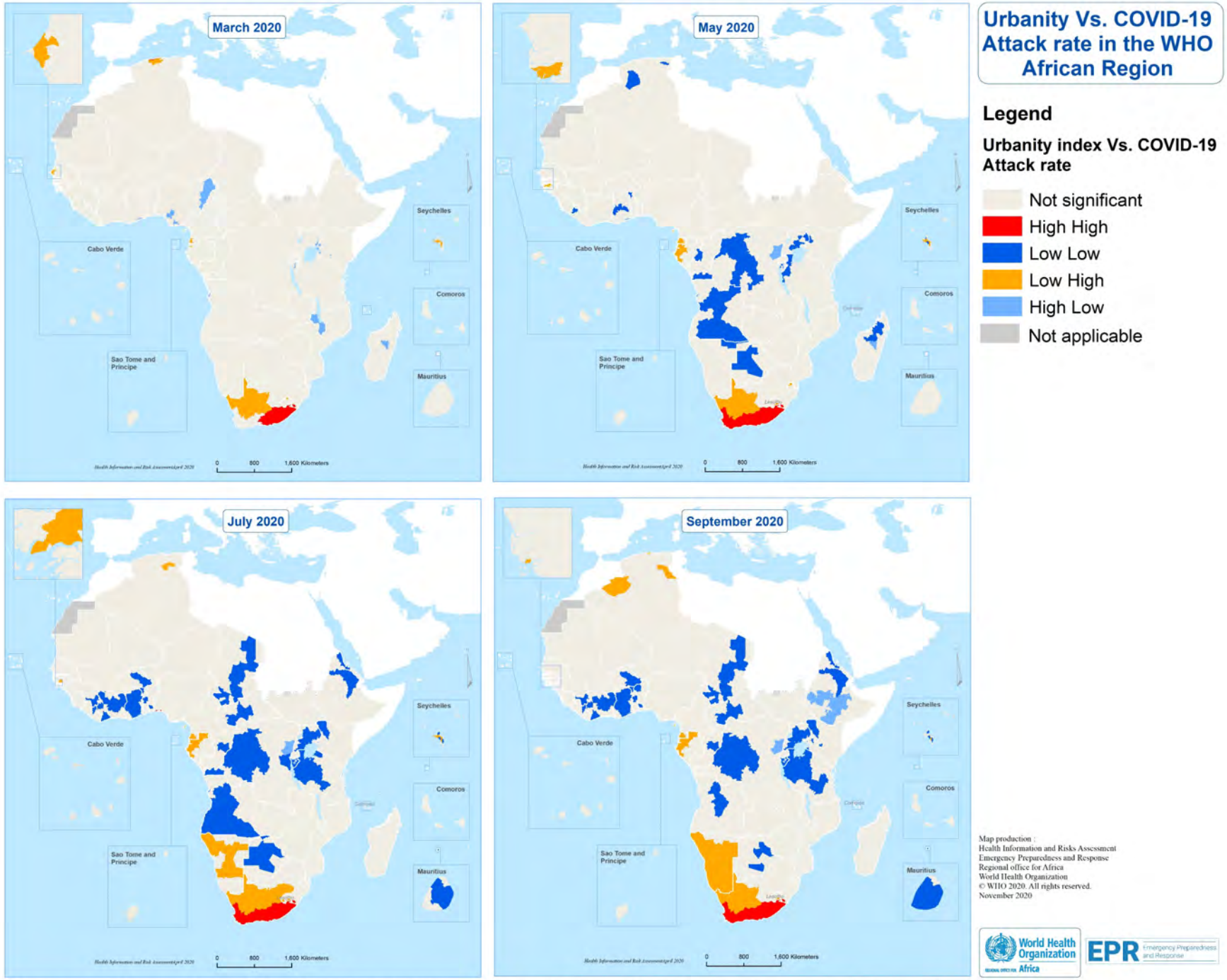


Figure 5: Urbanity index Vs COVID-19 attack rate

Urbanity Index and COVID-19 mortality

A change in CFR with most urbanized not showing the highest CFR value after the first two months of COVID 19 in the region (Figure 6)

Higher intra-class correlations (ICC) values from July to September 2020

=

reduced dissimilarities between rural-like and urban like provinces (Figure 6)

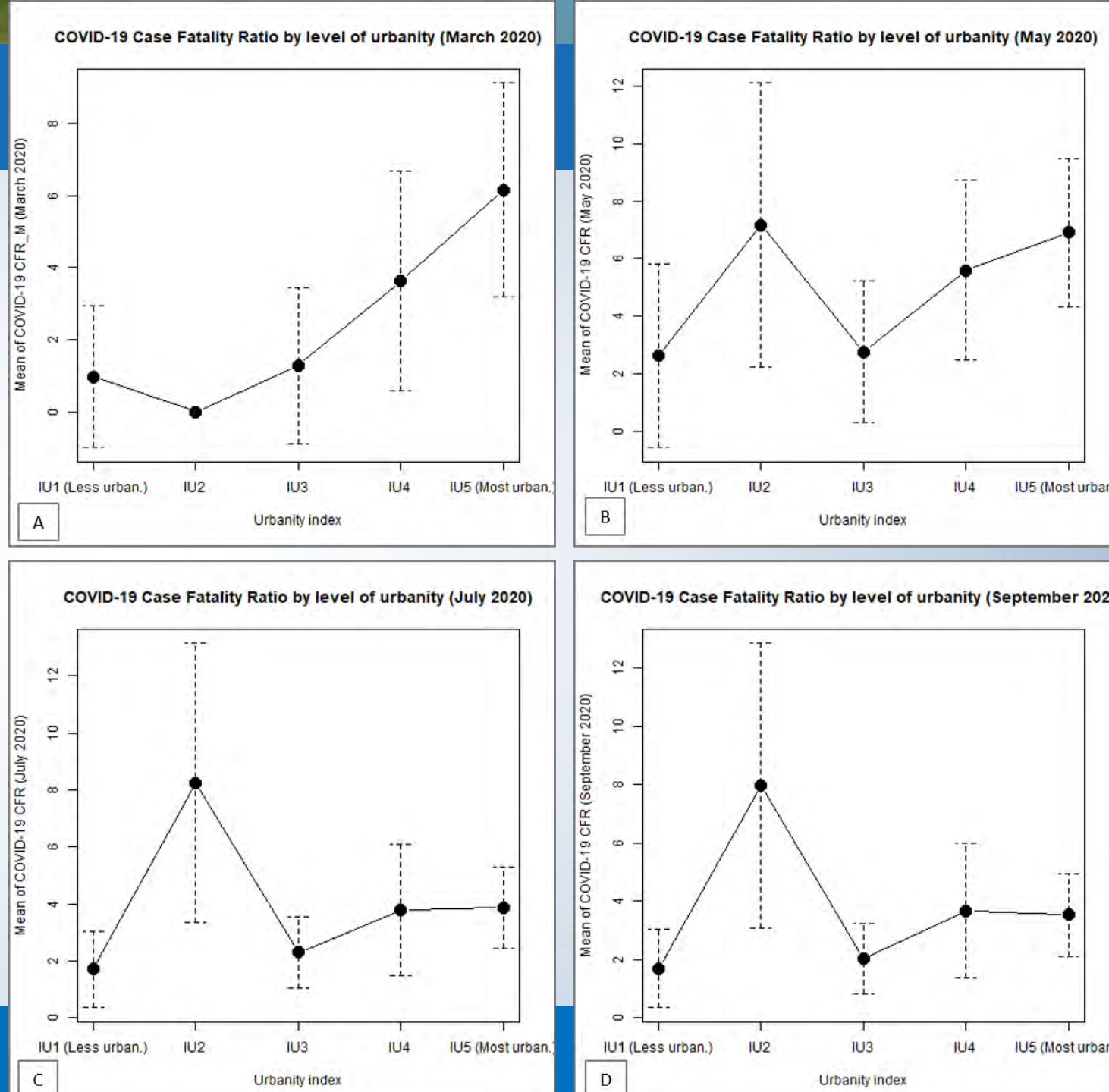


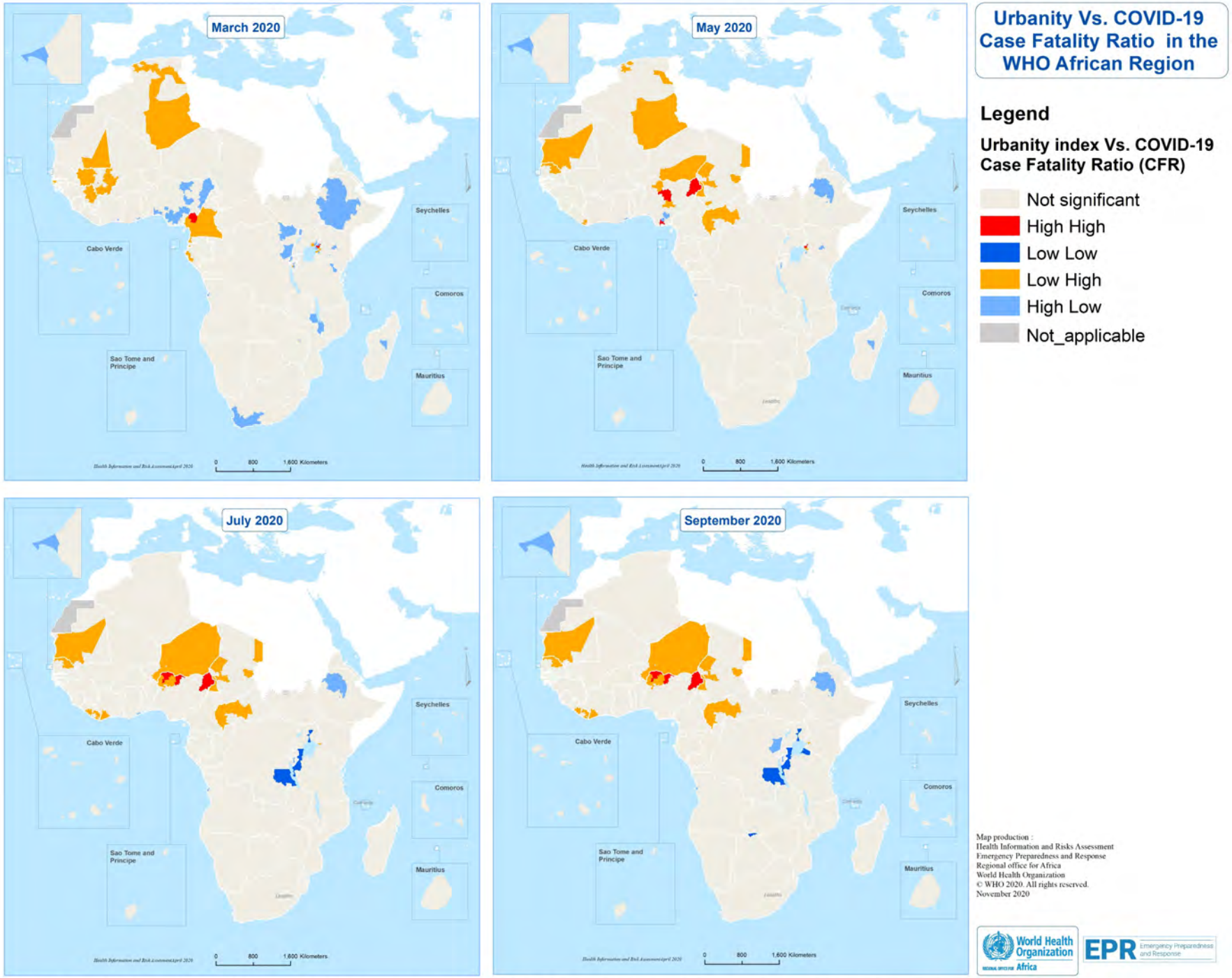
Figure 6: COVID-19 Case Fatality Ratio trends by Urbanity index

Urbanity Index and COVID-19 Mortality

Few varying High High provinces in Nigeria and Cameroon (Figure)

Higher CFR values in less urbanized provinces driven by provinces in Niger and Mauritania

Figure 7: Urbanity index Vs COVID-19 CFR



Urbanity Index and COVID-19 Recoveries

A sudden increase of recovery rate in rural-like provinces (Figure 6)

Higher intra-class correlations (ICC) from July to September 2020

=

Reduced dissimilarities between rural-like and urban like provinces (Figure 6)

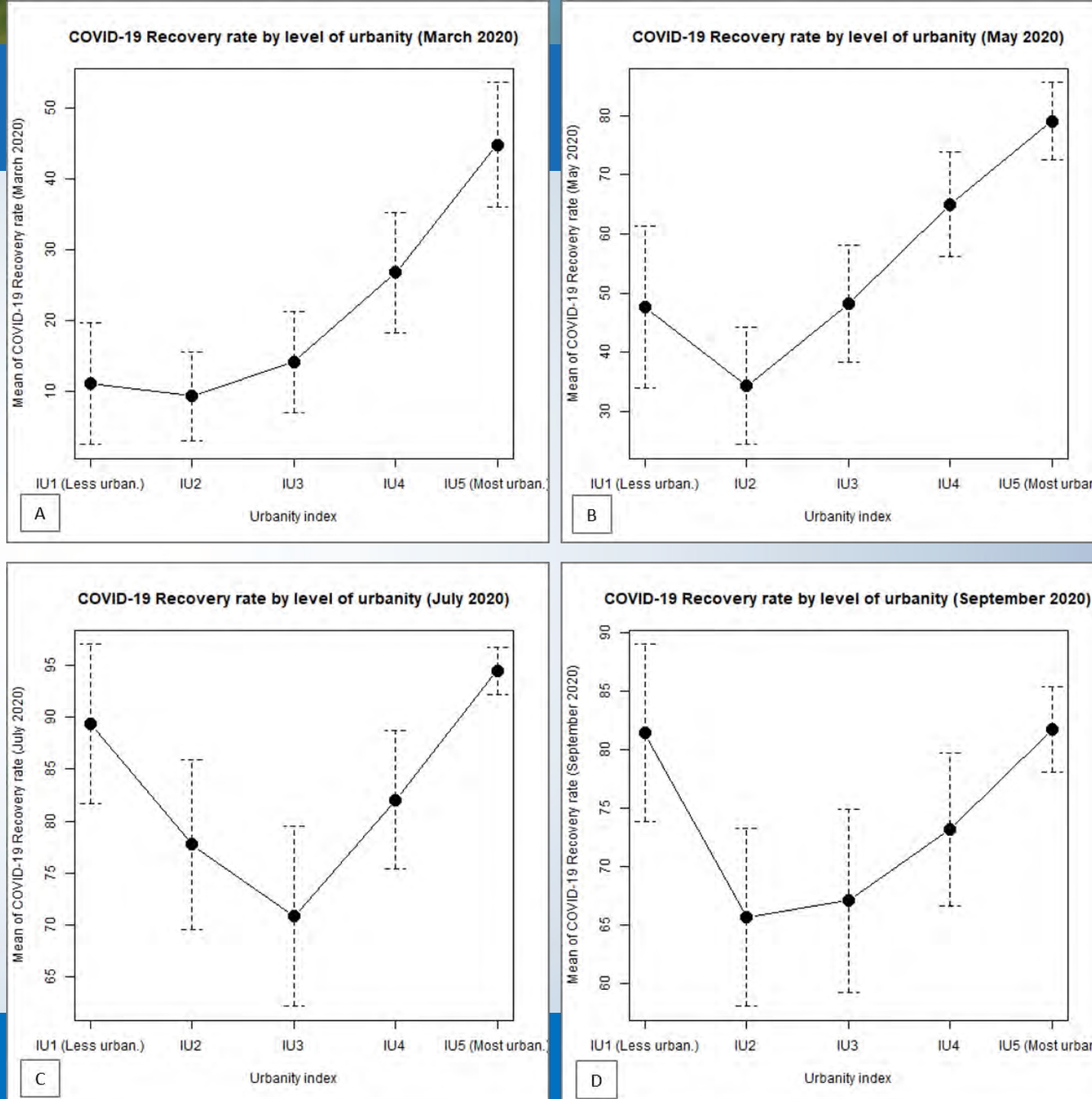


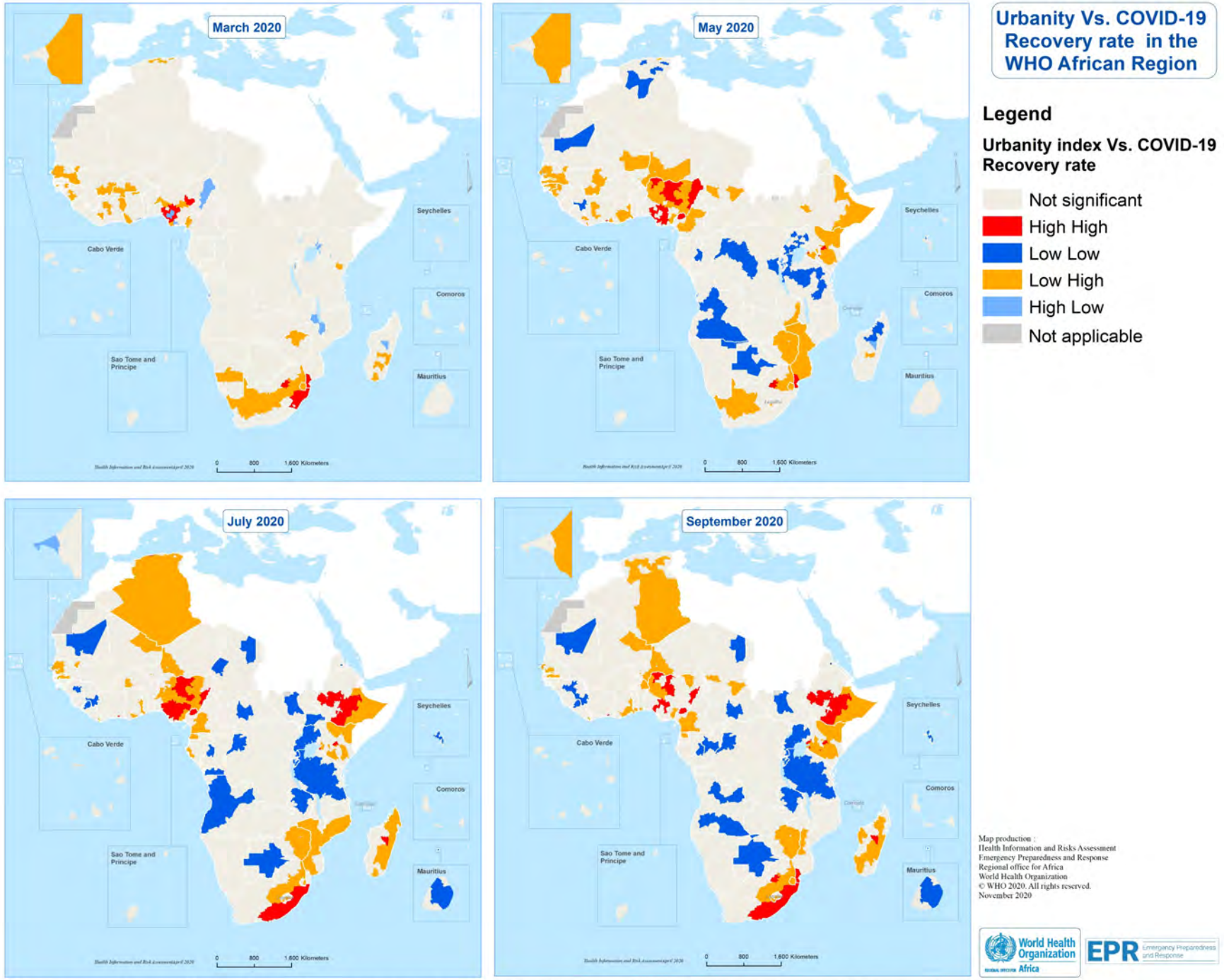
Figure 8: COVID-19 recoveries trends by Urbanity index

Urbanity Index and COVID-19 Recoveries

Clusters of higher urbanity and recovery rates in Nigeria, Kenya and South Africa (Kwa Zulu and Eastern Cape (Figure 9)

Significant presence of clusters of lower urbanity and higher recovery rate driven by provinces in Senegal, Algeria, Nigeria and Mozambique

Figure 9: Urbanity index Vs COVID-19 recoveries



Conclusions

- The UI allows comparisons of COVID-19 trends between rural-like and urban-like areas. Useful for planning and management.
- Number of cases consistently and significantly higher in most urbanized provinces With South African provinces as drivers.
- Consistently higher attack rates in rural-like provinces , with differences better explained by the UI.
- Reduced dissimilarities in CFR throughout the time with highest values in rural-like areas.
- Reduced dissimilarities in recoveries rates throughout the time with highest values in rural-like areas.

Conclusions

Thanks