*Presentation for IUSSP Webinar:*

*"Covid-19 Pandemic and Sexual and Reproductive Health in Africa"*

*Day 4: September 3, 2020*

# COVID-19 pandemic and demographic research questions in Africa


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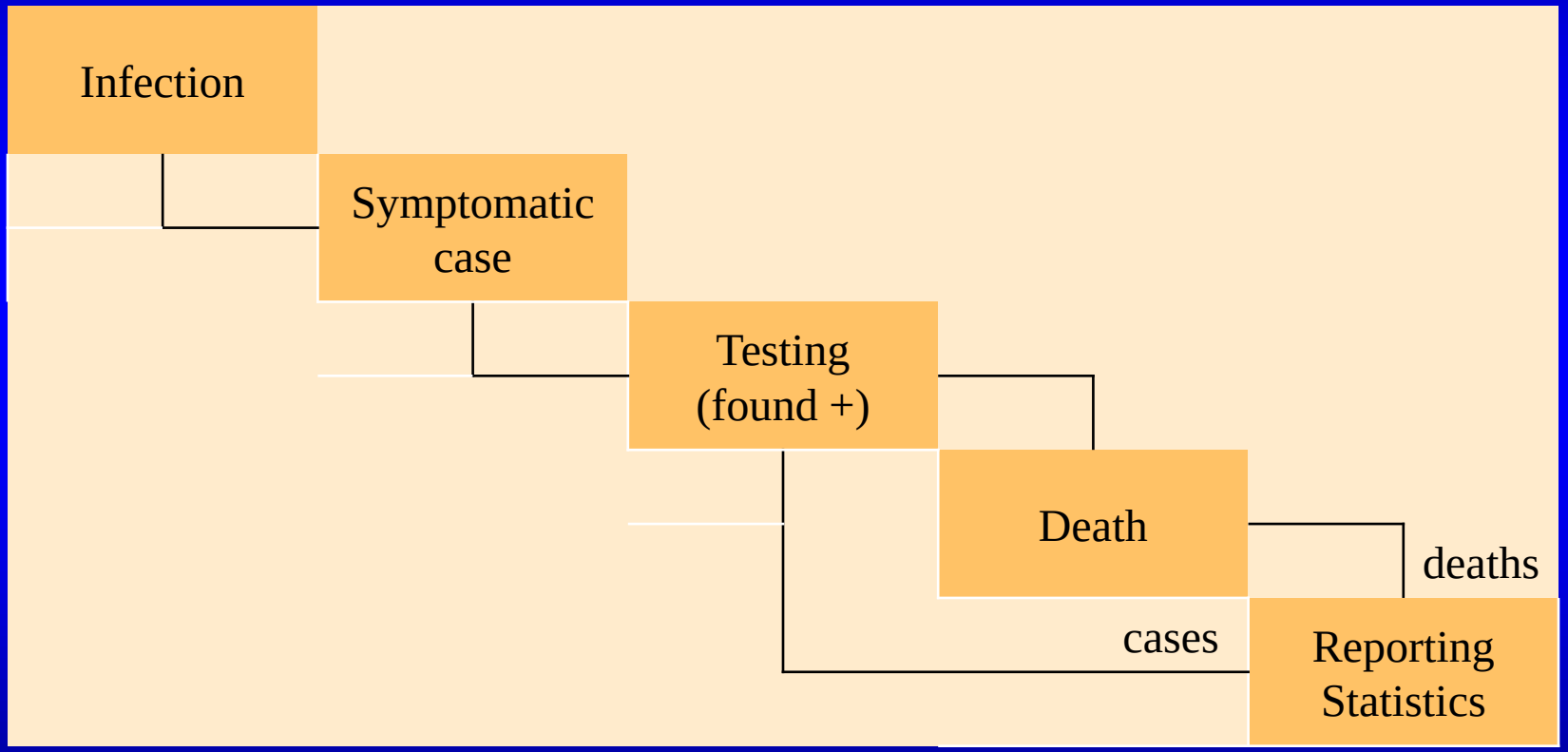
# Aim of the presentation

1. Describe what is known about COVID-19 in Africa, 6 months after onset
2. Describe heterogeneity in incidence (cases/population)
3. Relate heterogeneity with known demographic and economic factors
4. Source of data:
   - WHO, daily reports
   - International databases

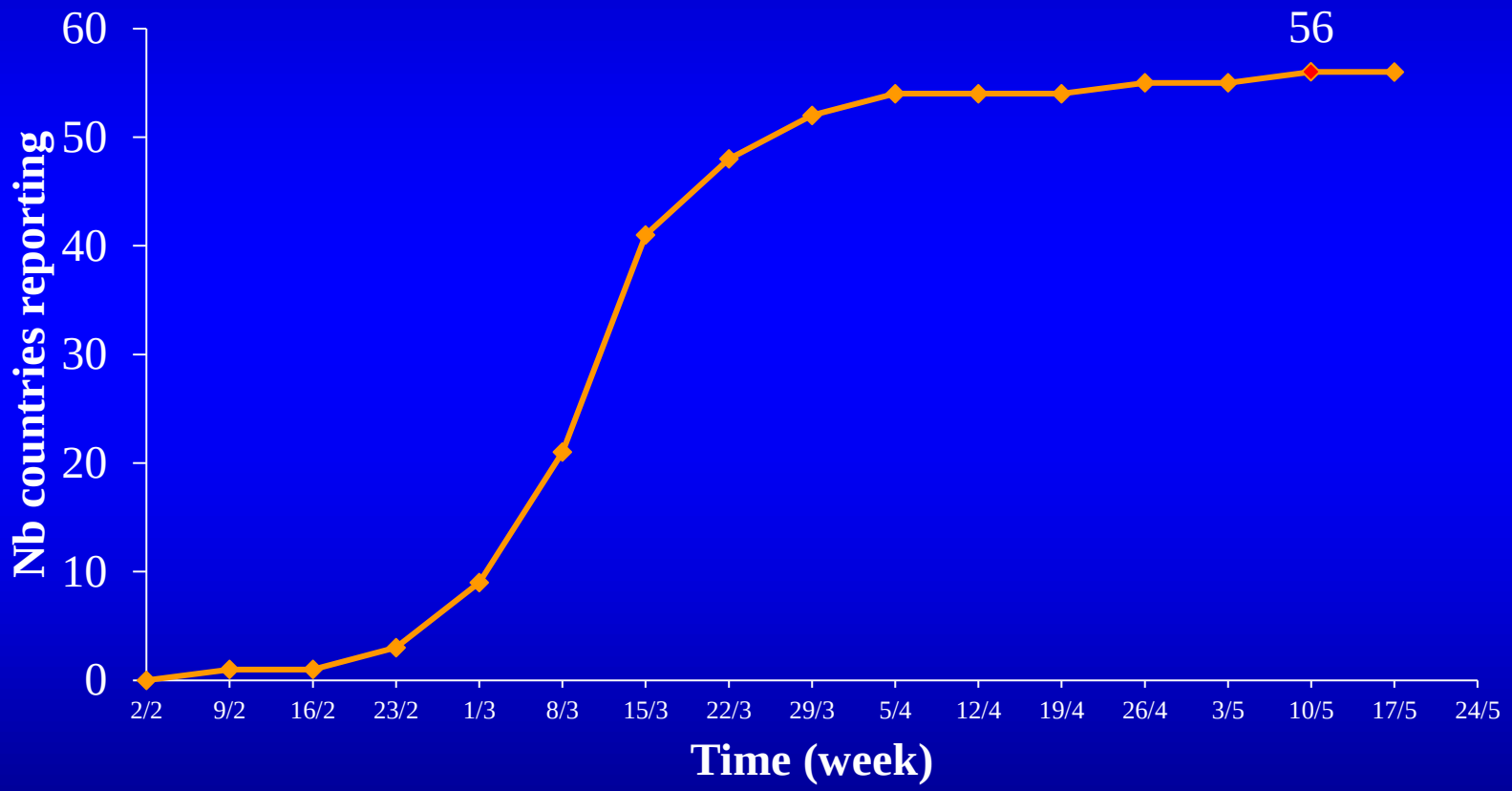
# Uncertainty about data



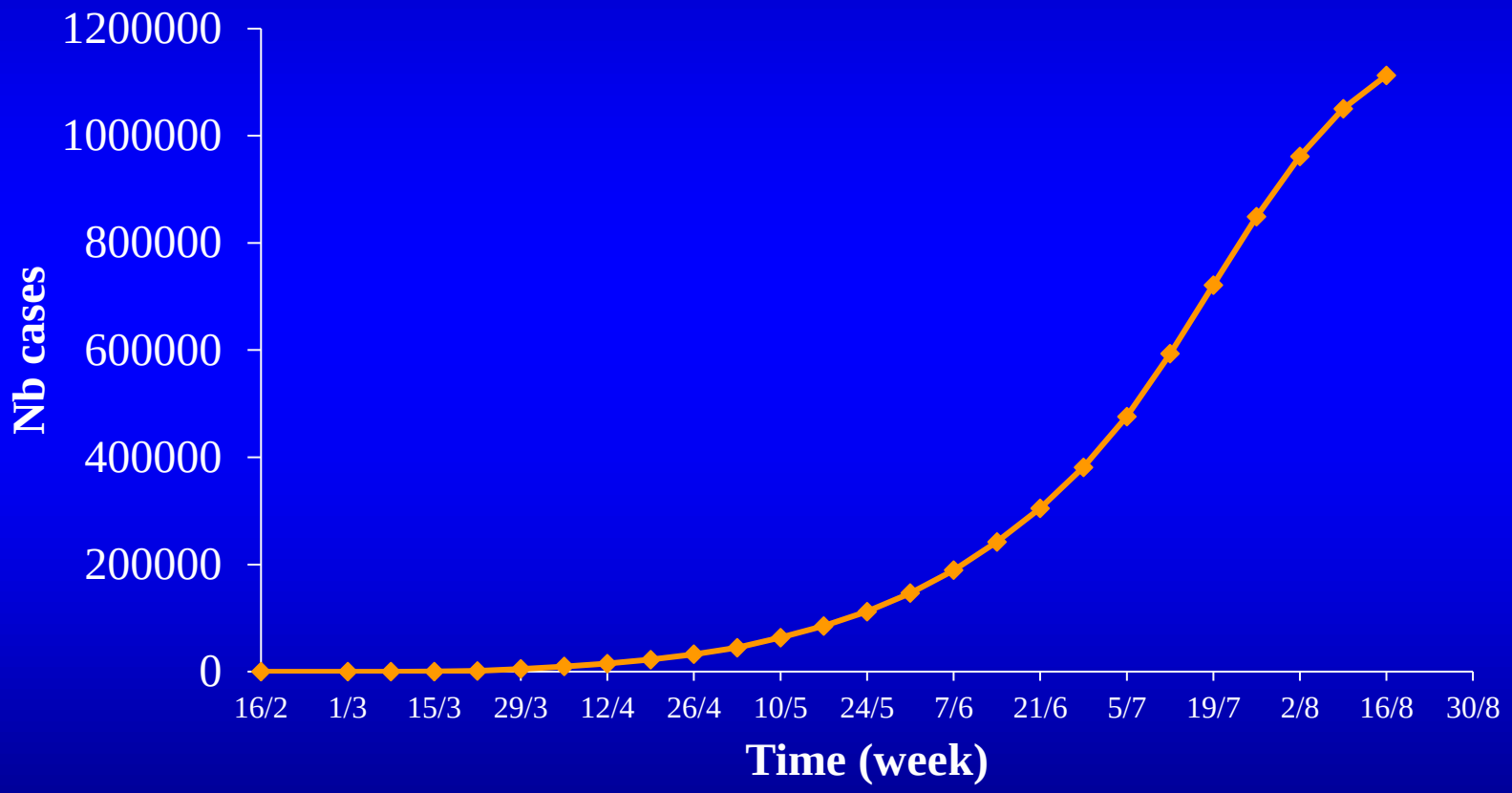

**5 majors steps / Reporting statistics may be far away from true infections**

# African countries reporting cases

(first = Egypt, 15/02; by 17/05= all 56 countries and territories)

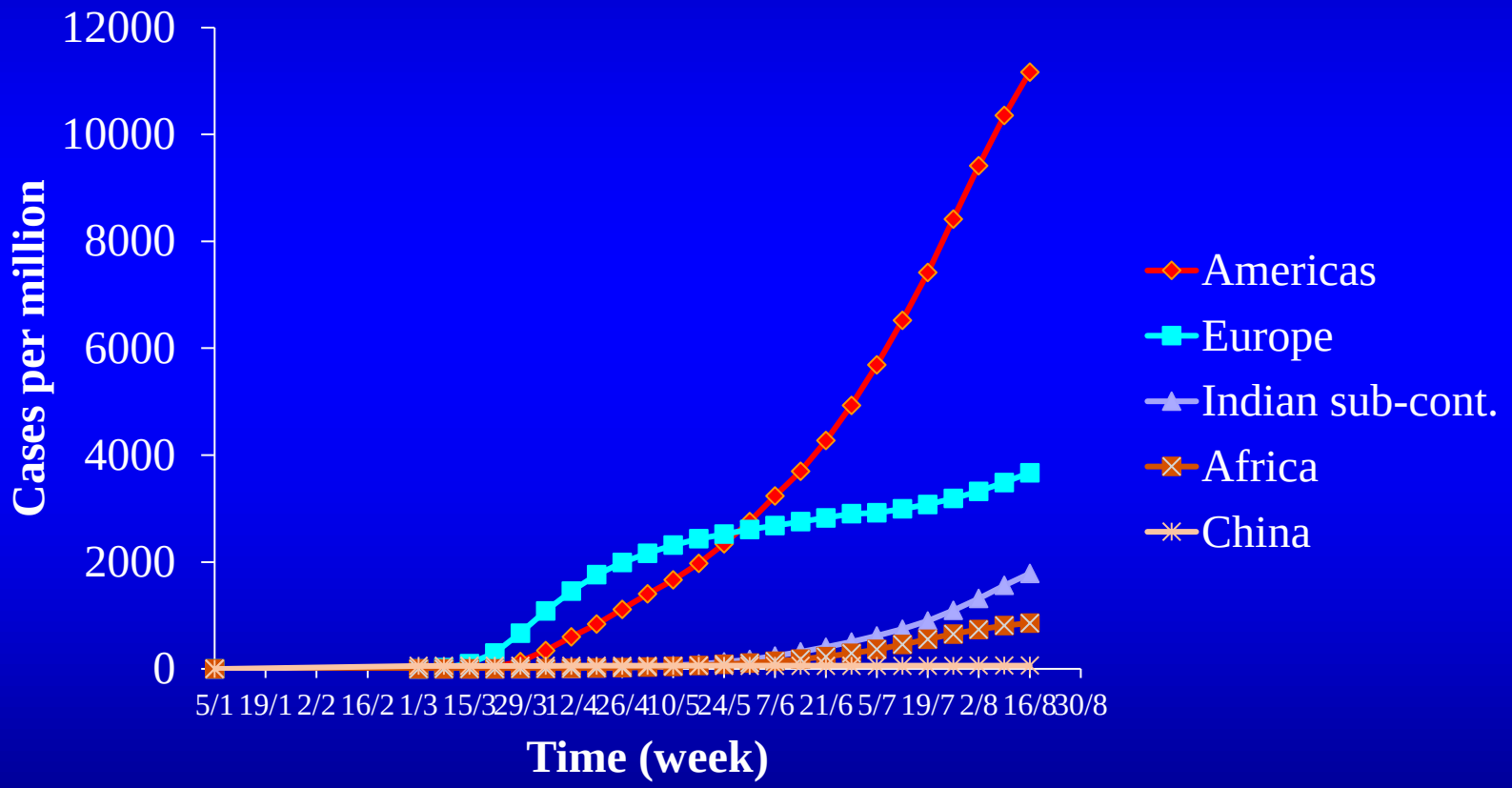


# Dynamics of the epidemic:
## Notified cases in Africa



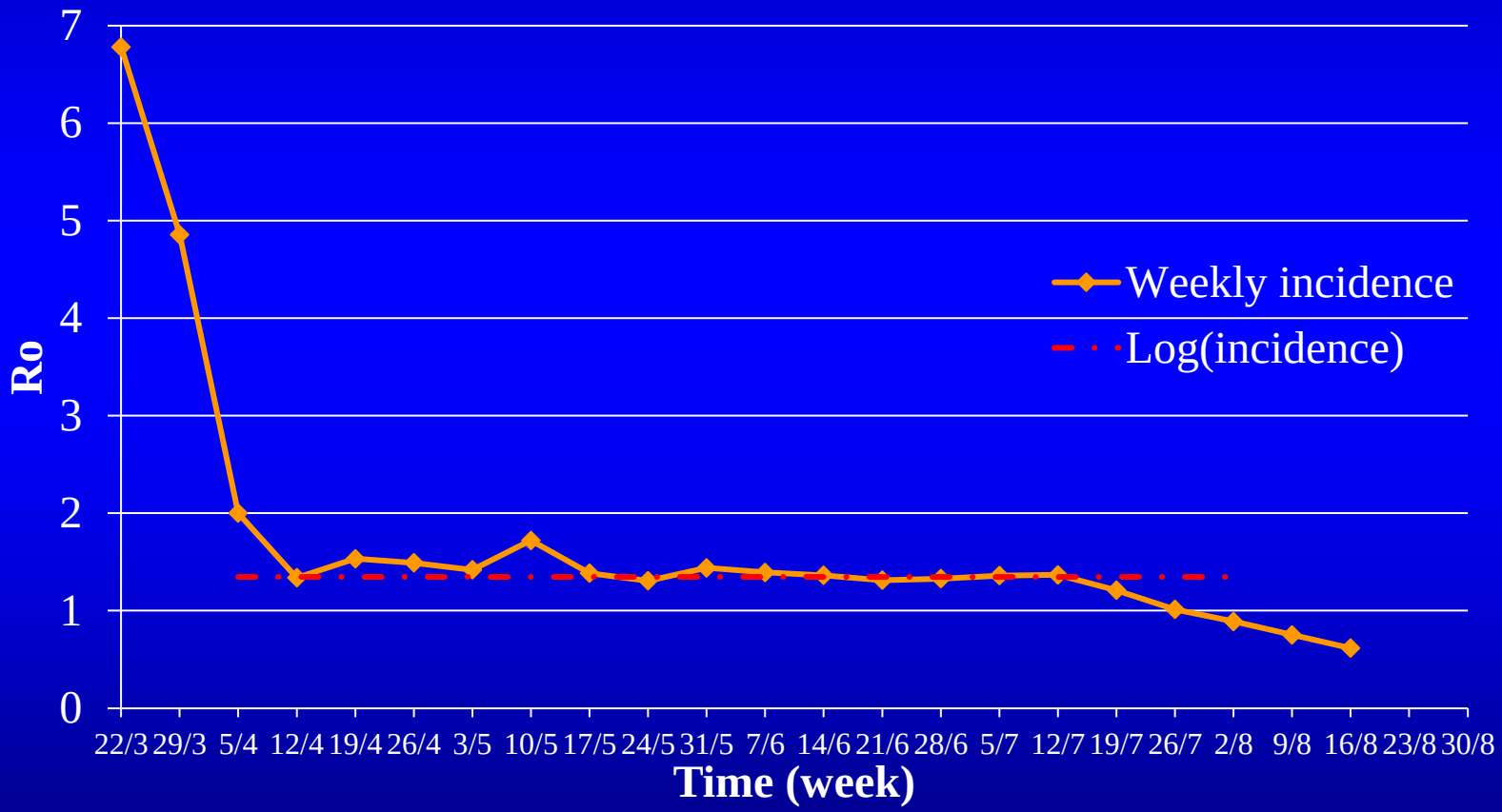

**Exponential increase from April 12 to July 12, slower thereafter**

# Incidence per population in the world



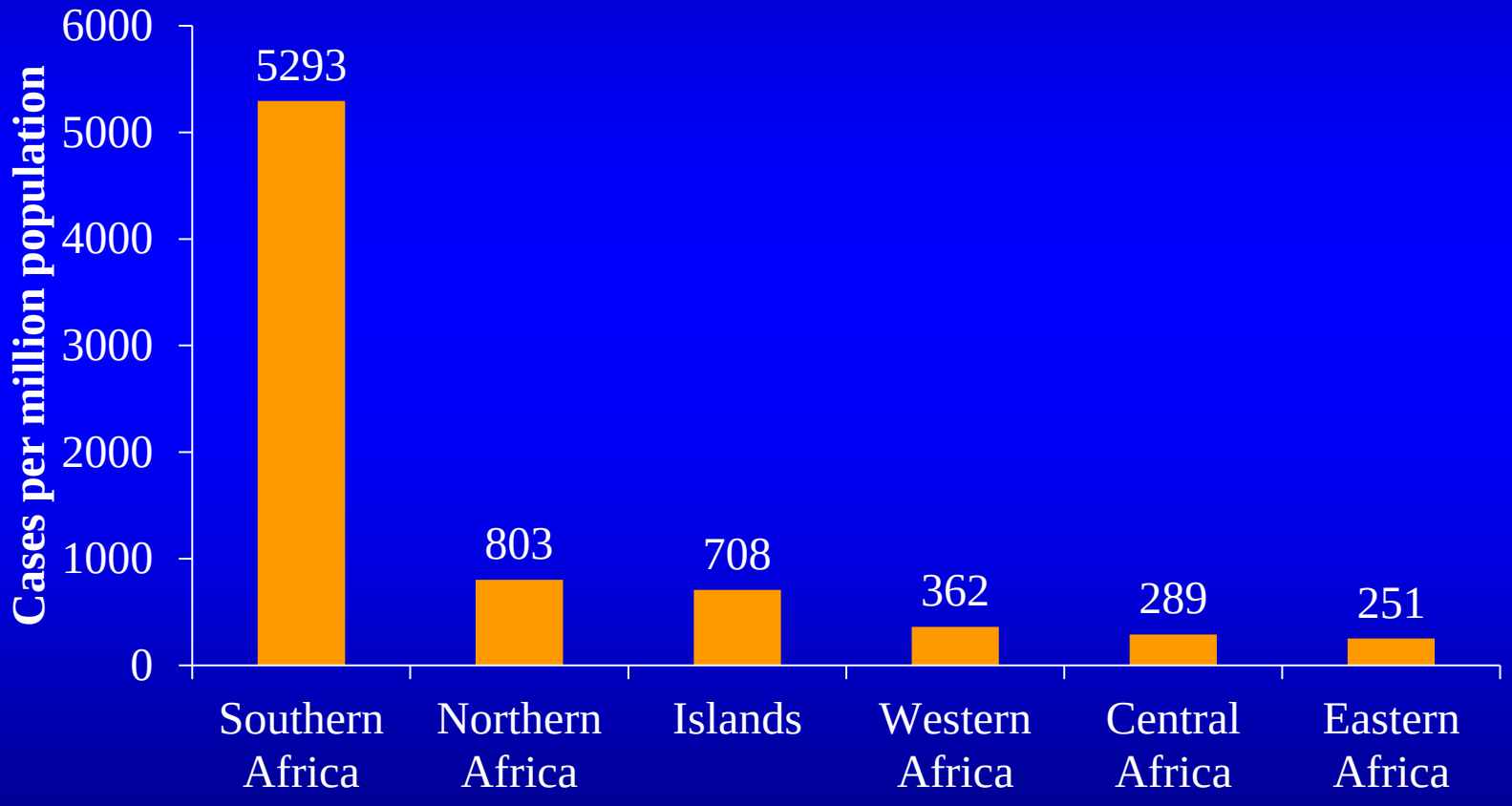

**Huge heterogeneity across continents : 1 to 13 to America; 14 to 1 to China**
**Closest to Africa is the Indian sub-continent**

# Estimates of $R_0$ in Africa
## (net reproduction rate ~ 1.35 before mid-July)



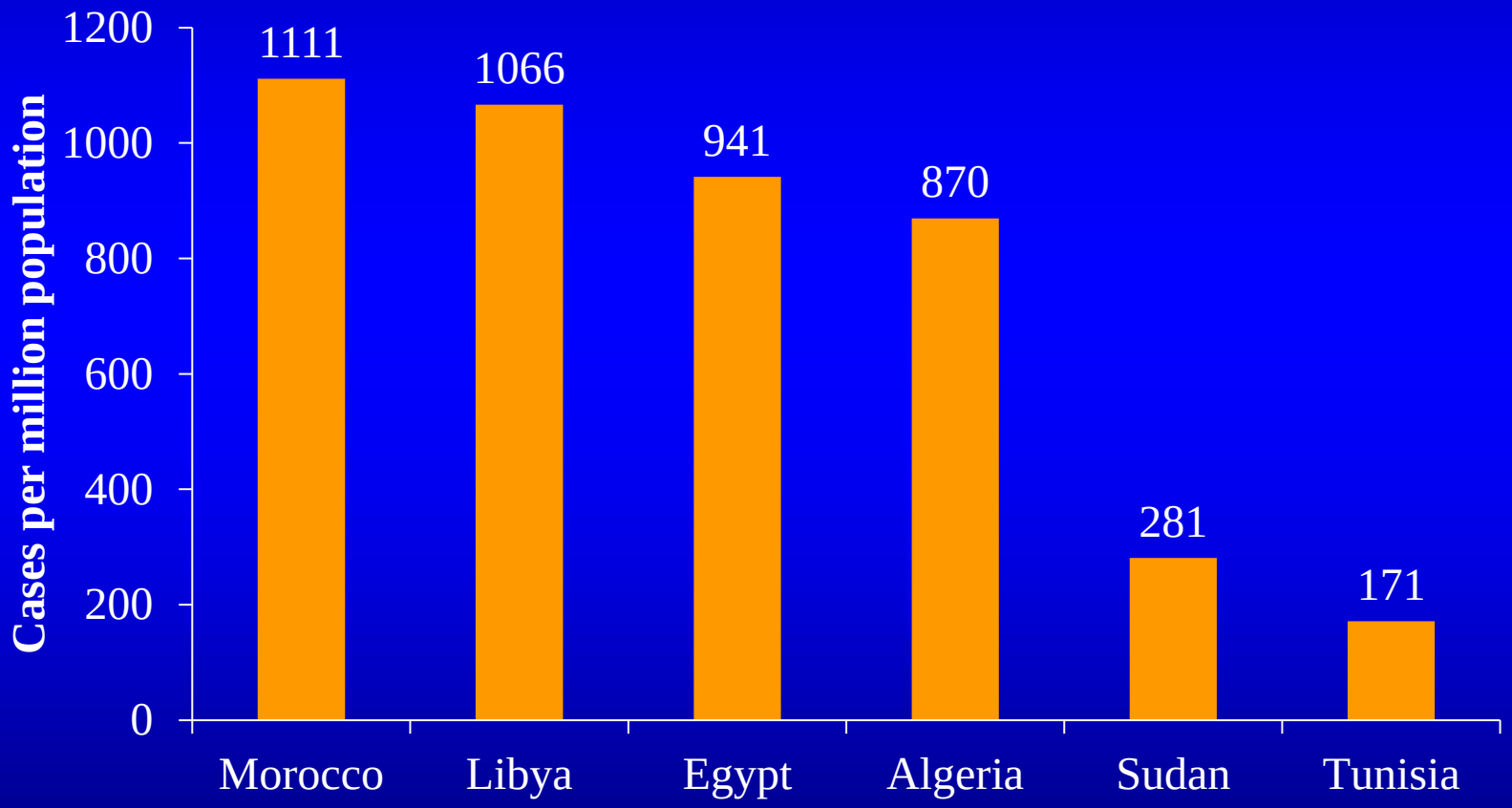

**Ro stable around 1.35 from April 12 to July 12 / marked reduction thereafter**
**Prospects for reduced incidence / end of first phase?**

# Heterogeneity in cumulated incidence: large regions in Africa



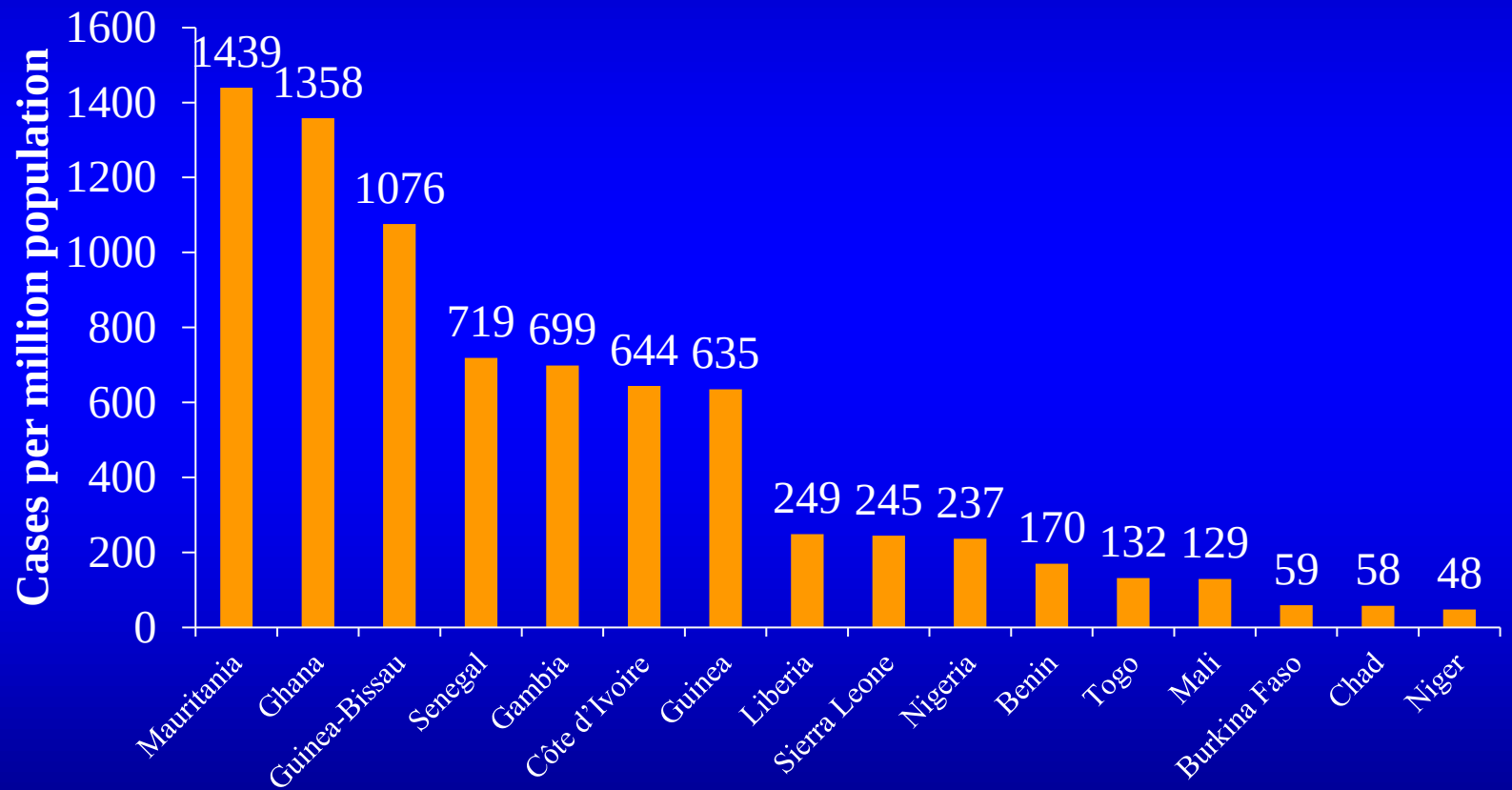

**Range = 1 to 21**

# Heterogeneity in incidence: countries in Northern Africa



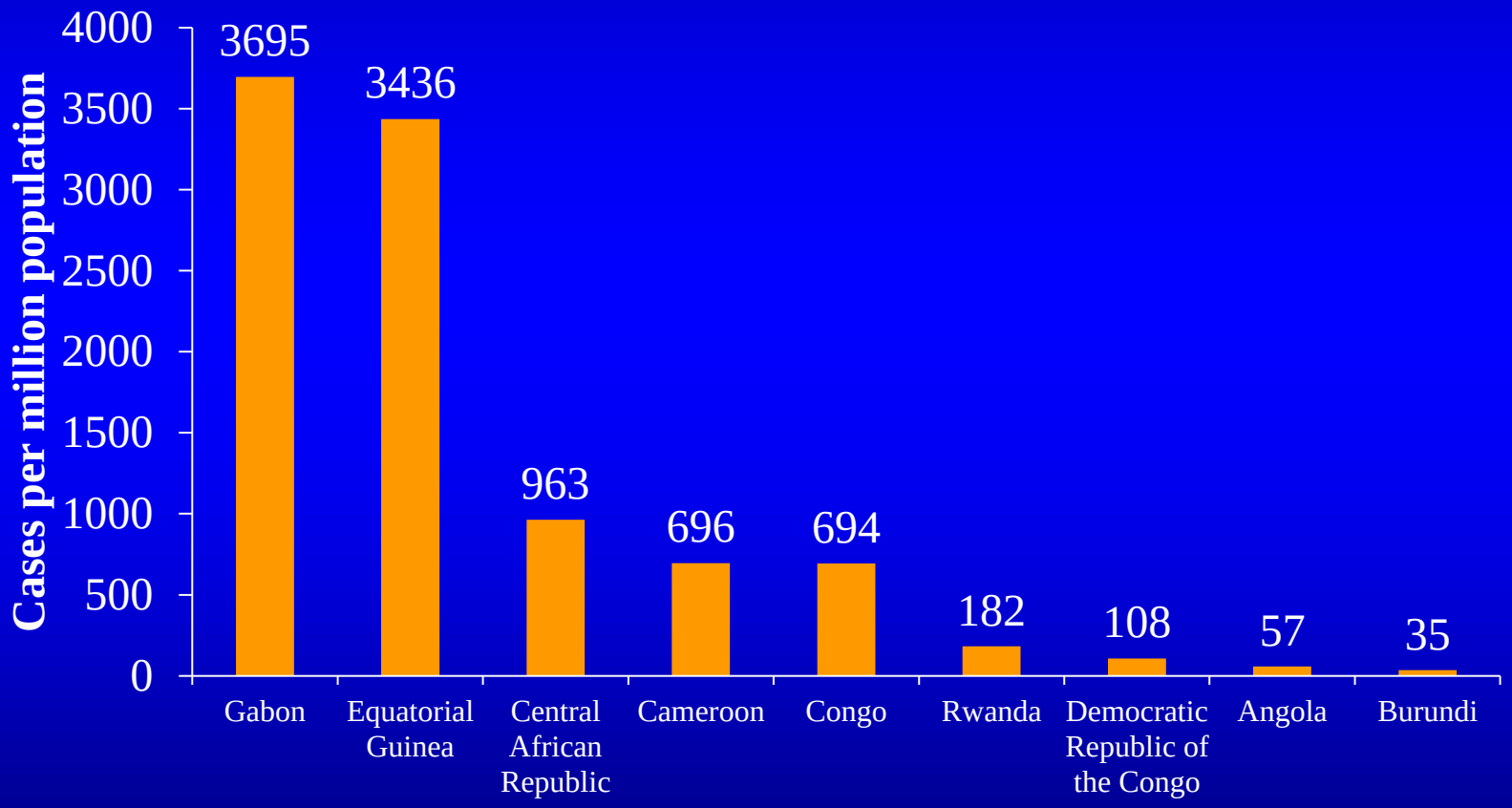

**Range = 1 to 6.5**

# Heterogeneity in incidence: countries in Western Africa



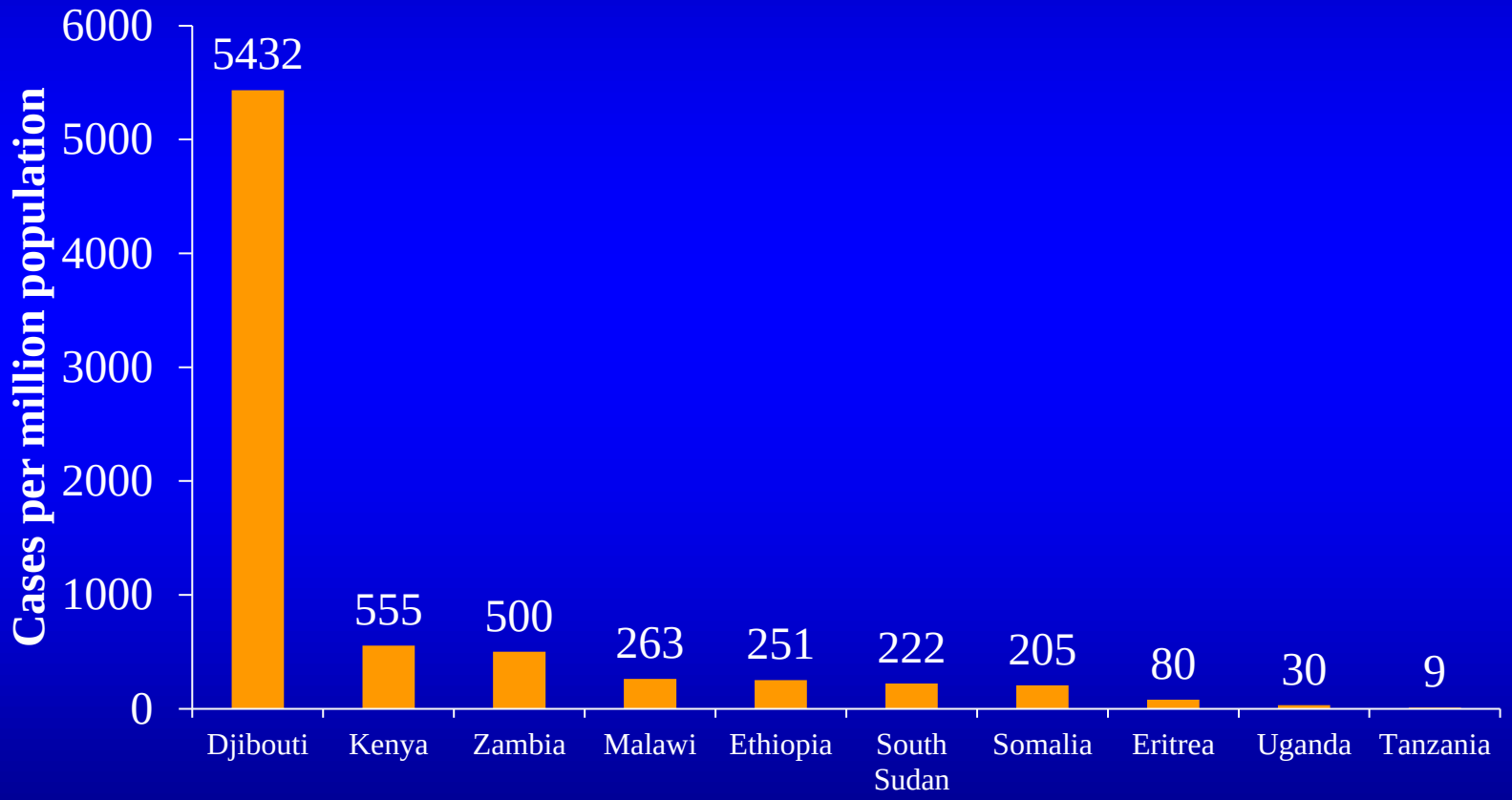

**Range = 1 to 30**

# Heterogeneity in incidence: countries in Central Africa



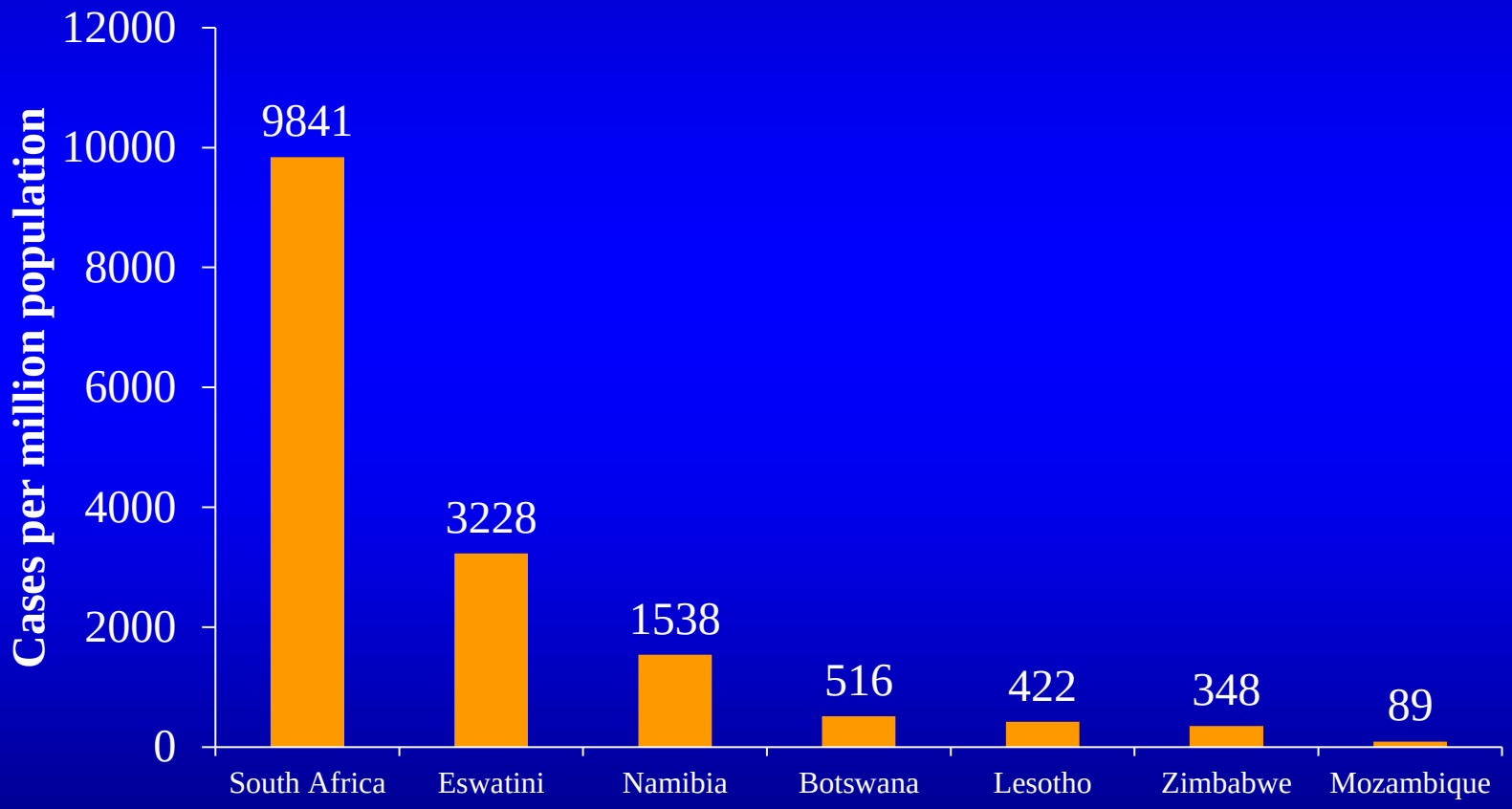

**Range = 1 to 106**

# Heterogeneity in incidence: countries in Eastern Africa



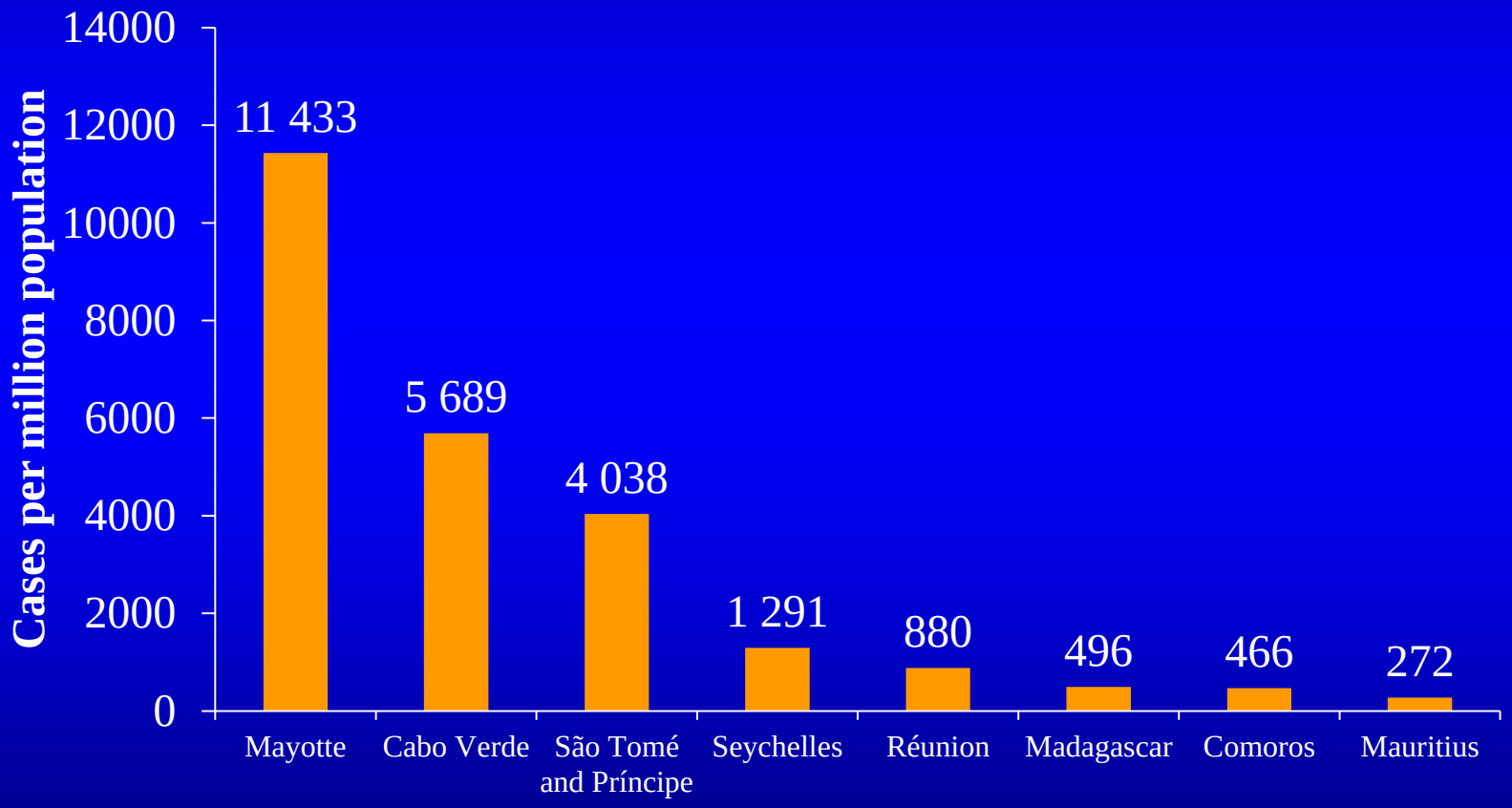

**Range = 1 to 637**

# Heterogeneity in incidence: countries in Southern Africa

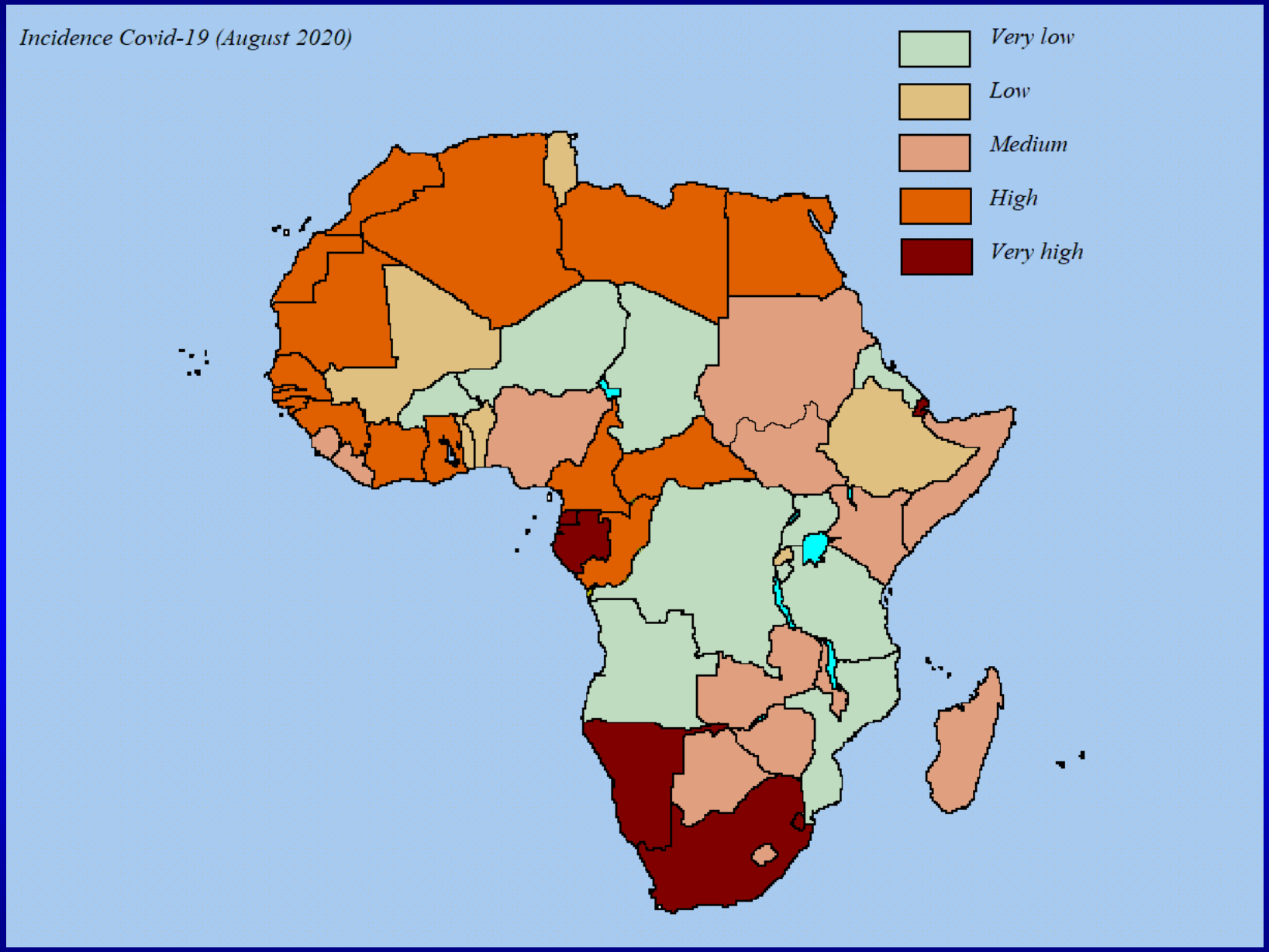



**Range = 1 to 110**

# Heterogeneity in incidence: African islands




**Range = 1 to 42**


Incidence Covid-19 (August 2020)
Very low
Low
Medium
High
Very high

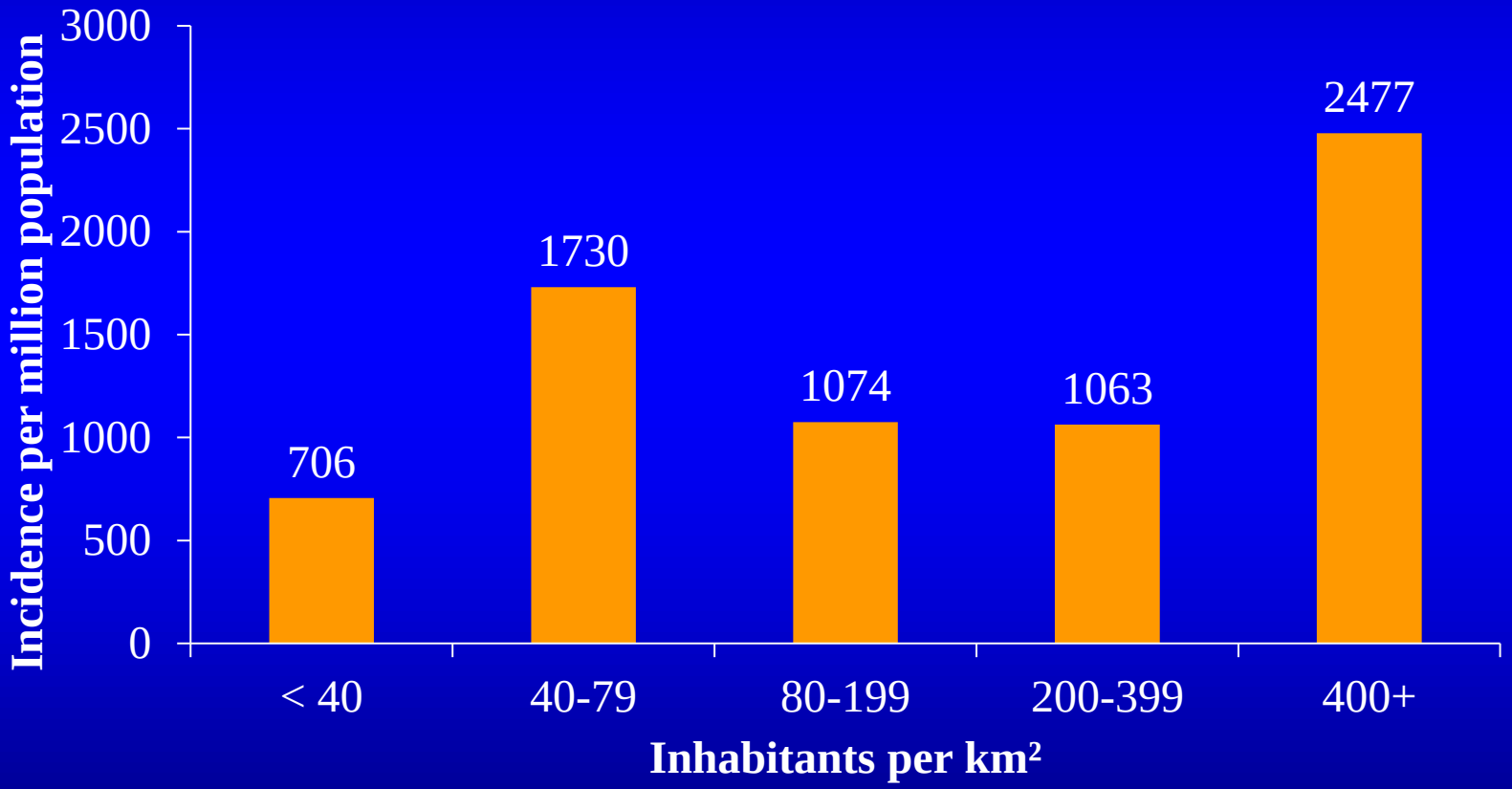
# Conclusions on incidence
## in Africa

- All African countries infected by May 2020
- Huge differences among countries in cumulated incidence by August 2020
- Min = 9 per million (Tanzania)
- Max = 11433 per million (Mayotte)
- Range = 1342 to 1
- Questions:
  - What is due to true dynamics of the infection?
  - What is due to testing and reporting ?

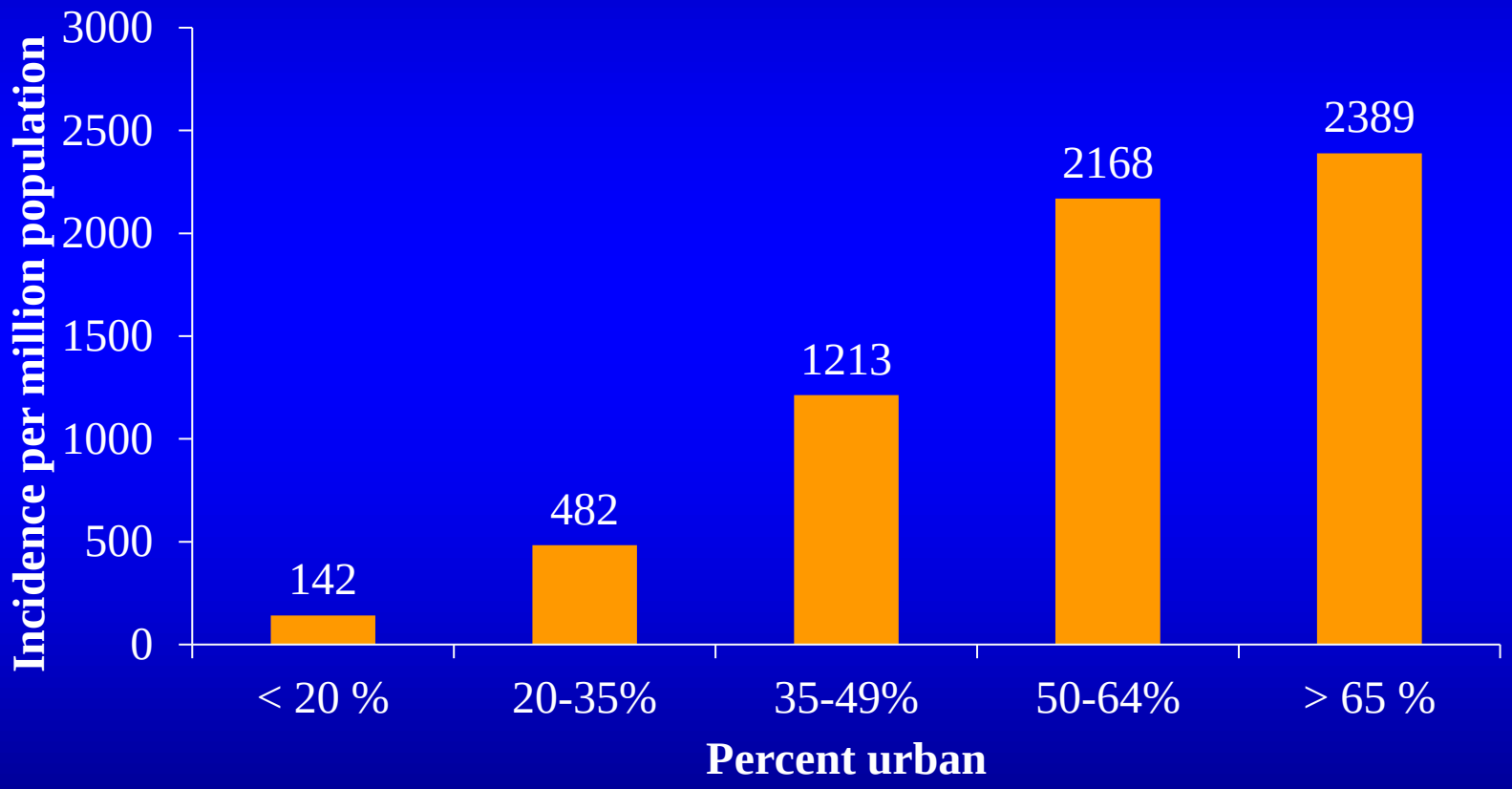
# Correlates of incidence
## in Africa

- If data were reliable, there should be correlations with other variables, as expected:
  - Demographic correlates:
    - population density, urbanization → higher incidence
    - age structure, fertility, mortality ?
  - Economic correlates:
    - higher income → more moves, more interactions, less isolation → higher incidence
  - Public health correlates:
    - health personnel: more physicians → more testing, higher incidence
    - but also lower case-fatality

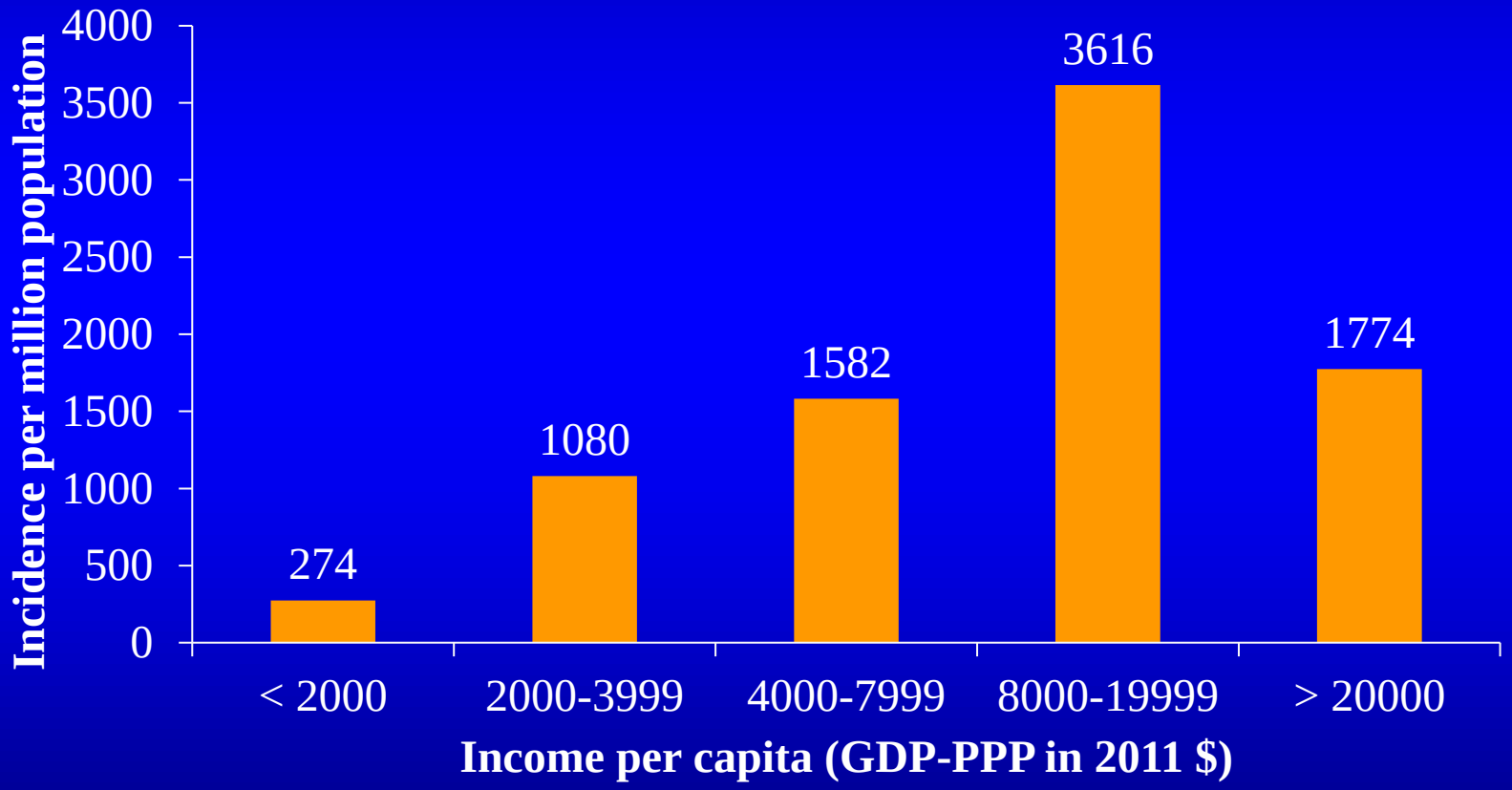
# Correlation of incidence with population density



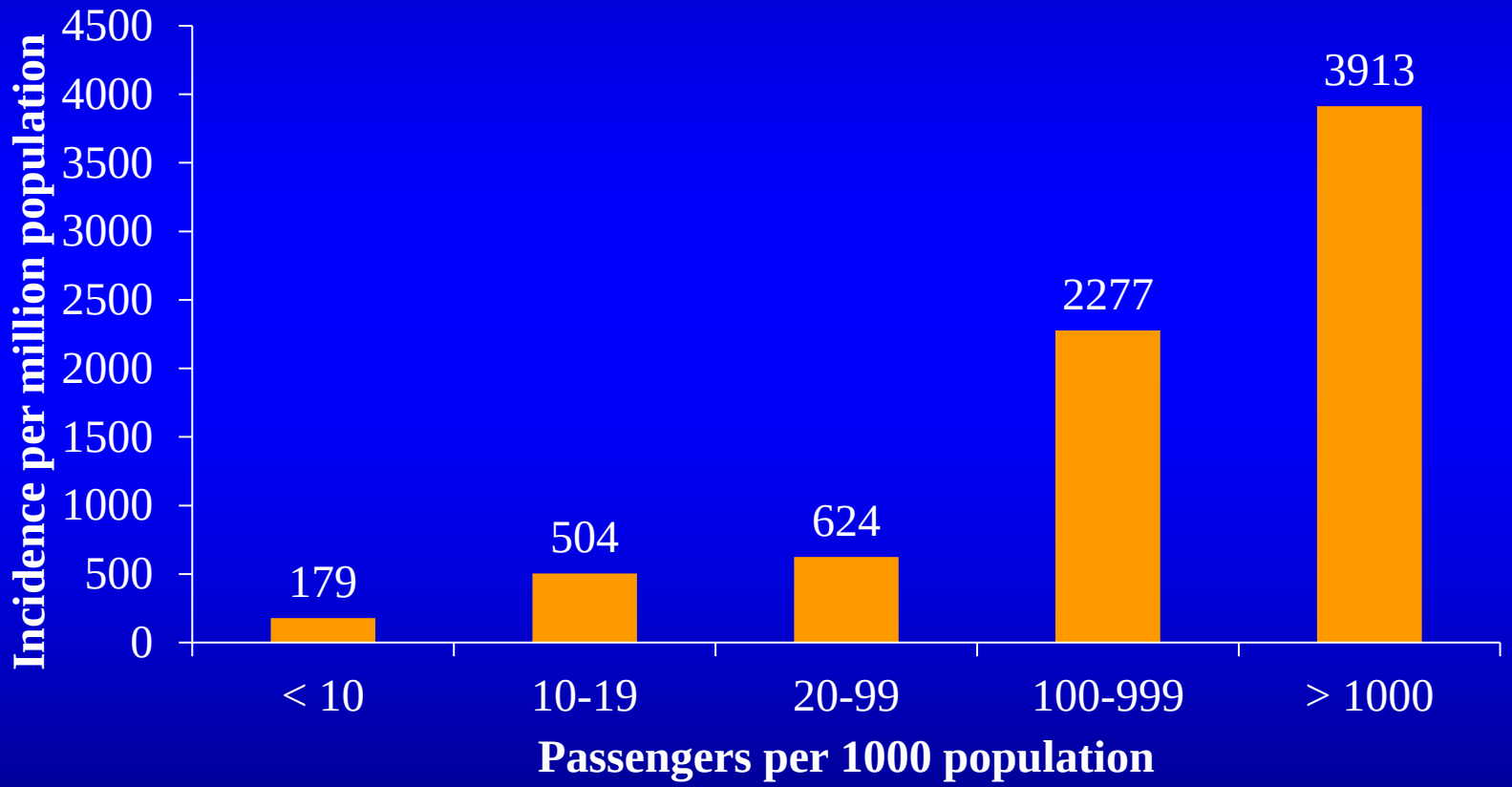
# Correlation of incidence with urbanization



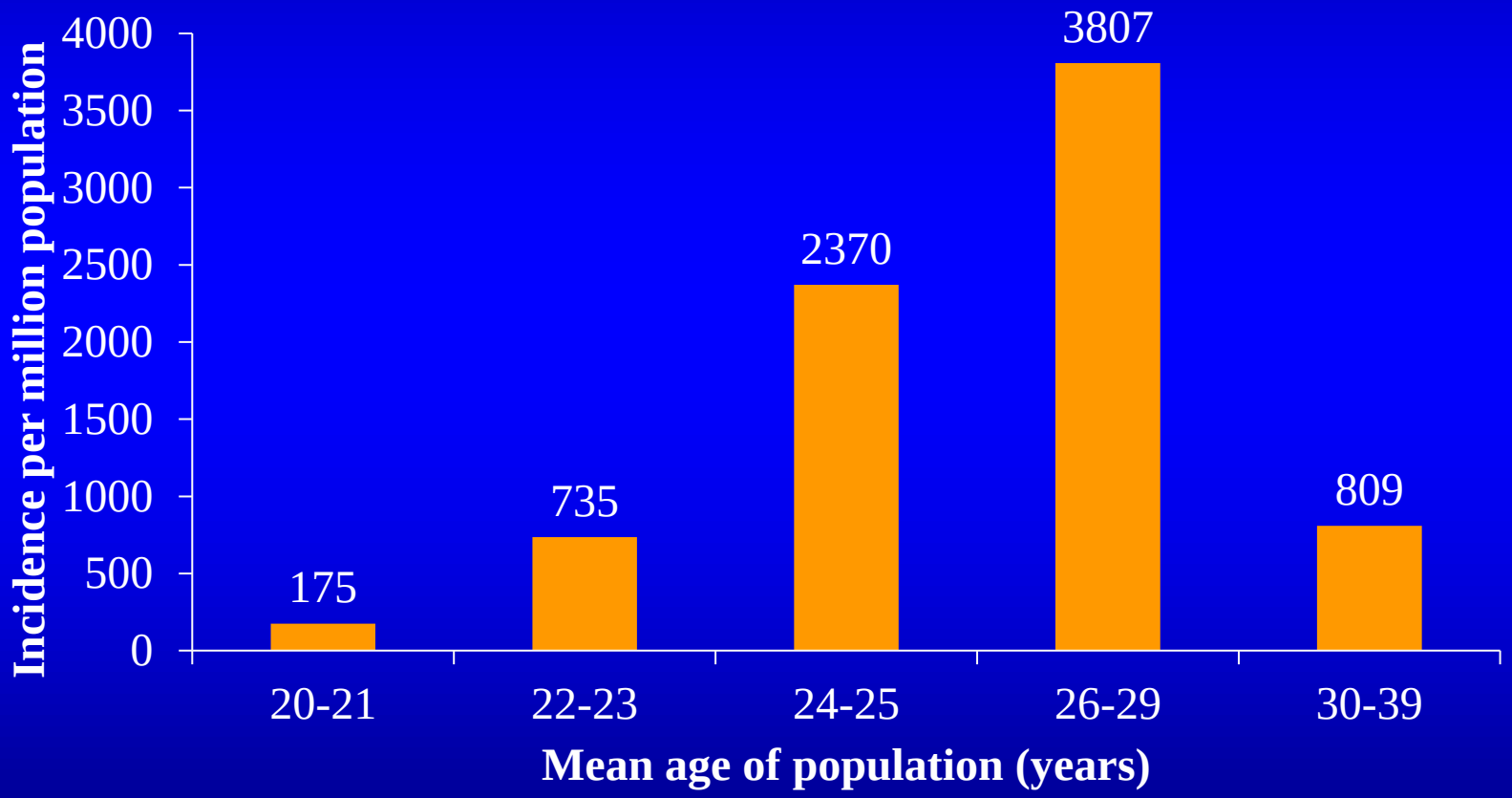
# Correlation of incidence with income per capita (GDP-PPP)



# Correlation of incidence with air traffic



# Correlation of incidence with age structure of population



# Multivariate analysis of incidence

(country differences)

| Variable | B coeff. | St. Error | P-value | Signif |
|---|---|---|---|---|
| Constant | -3035.5 | 2244.0 | 0.182 | |
| Population density | 4.373 | 1.797 | 0.018 | ** |
| Percent urban | 4249.7 | 1904.9 | 0.030 | ** |
| Log(GDP) | 763.3 | 380.4 | 0.050 | * |
| Mean age | **-173.1** | 101.3 | 0.093 | * |

# Conclusion on correlations

- Correlations with demography and development
  - With population density, urbanization
  - With income per capita, air traffic
  - Stable in multivariate analysis, no other factor significant
  - Relation with age structure changes in multivariate analysis: younger populations have higher incidence
- Then, many reasons why incidence may be lower in Africa than elsewhere, and similar to Indian sub-continent

# Towards further research

- Many opportunities for research
  - Biologists / Virologists /
  - Vaccines & Medicines
  - Epidemiologists
  - Economists
  - Social sciences
  - And… Demographers
- Population based research
  - Main determinants of country differences seem to be demographic

# Towards demographic research on Covid-19

- When will the epidemic calm down; trends in $R_0$?
- Why are differences between countries so huge?
- Why is Covid-19 inversely related to the demographic transition (fertility & mortality)?
- Why is Covid-19 inversely related to economic development (GDP)?
- What is the role of the youth (< age 20) in the dynamics of transmission?
- Are sex-differences in Africa the same as in Europe?
- What will be the impact of disease control policies?

# A difficult question

- We have seen many negative impacts of the management of the Covid-19 pandemic on
  - Health: Morbidity, Mortality, Reproductive health, Prevention, Treatments, Health services, Health personnel, Violence, etc.
  - Economics: Growth, Unemployment, Poverty, etc.
  - Other sectors: Education, Nutrition, Households, etc.
- Q: Will policies to control Covid-19, in particular lockdown and travel restrictions, have more deleterious effects than the disease itself?
  - How do we address this difficult question?

# Concluding remarks

- Still at the beginning of the epidemics in August 2020 (3 to 6 months since first cases)
- The huge differences in incidence are due to a variety of factors, many of them are demographic factors
- Case fatality is still low in Africa, but this may change in the future
- We should not forget the problems in testing and reporting cases and deaths in Africa,


**How long will last the new fashion ? …**