

The Brazillian Amazon & COVID-19

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Background and Overview

What happened in the Amazon and São Paulo during COVID-19?

This exploratory analysis of tabular and genetic data shows that the city of Manaus, and its state, Amazonas, were hit harder per capita than São Paulo during the summer of 2020. Deaths especially affected adult male patients, and elderly patients. From summer into fall, this intense period of infection correlated with the emergence of an antibody prevalence among Manaus blood donors that was approximately threefold greater than antibody prevalence among São Paulo blood donors (Buss *et al.*, 2020). This is an indication of good news and herd immunity for Manaus, heading into winter.

Additionally, a genetic analysis of 33 SARS-CoV-2 samples showed that **TODO: sequencing and bash finding**.

Methods

Tabular data analysis

TODO: tabular paragraphs: .

Genetic data analysis

- vcfR package website.
- <https://kjhealy.github.io/covdata/>
- <https://github.com/como-ph/oxcovid19>
- <https://ropensci.org/blog/2020/10/20/searching-medrxiv-and-biorxiv-preprint-data/>
- <https://covidtracking.com/data/api>
 - `readr::read_csv("https://api.covidtracking.com/v1/states/daily.csv")`
- <https://rt.live/>
 - `readr::read_csv("https://d14wlfuexuxgcm.cloudfront.net/covid/rt.csv")`

Results and Discussion

66% of Manaus blood donors versus 22% of São Paulo blood donors

Figures

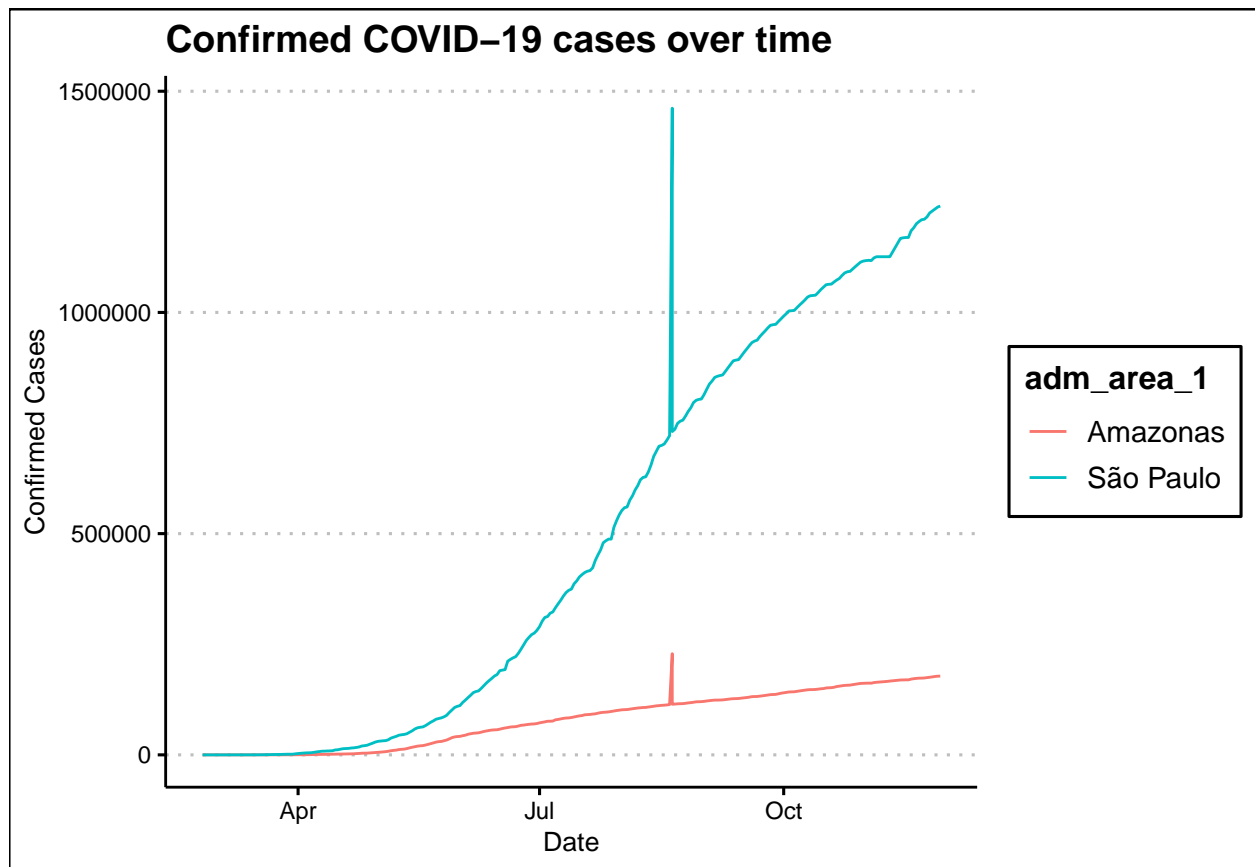


Figure : The state of São Paulo saw more total confirmed cases than the state of Amazonas.

Population of Brazil

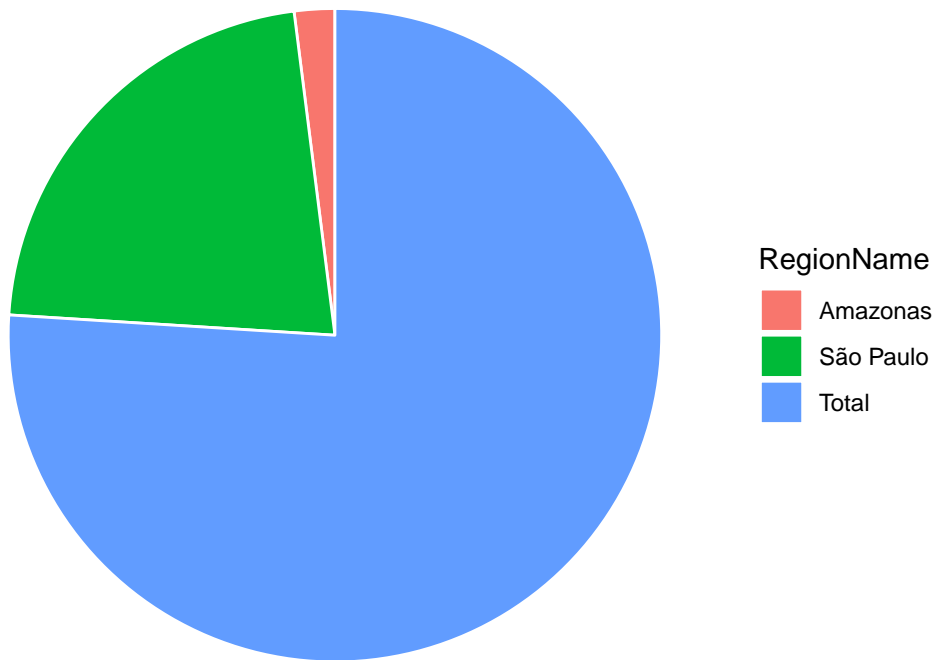


Figure: The state of São Paulo is much larger than Amazonas by population at 46 million versus 4 million.

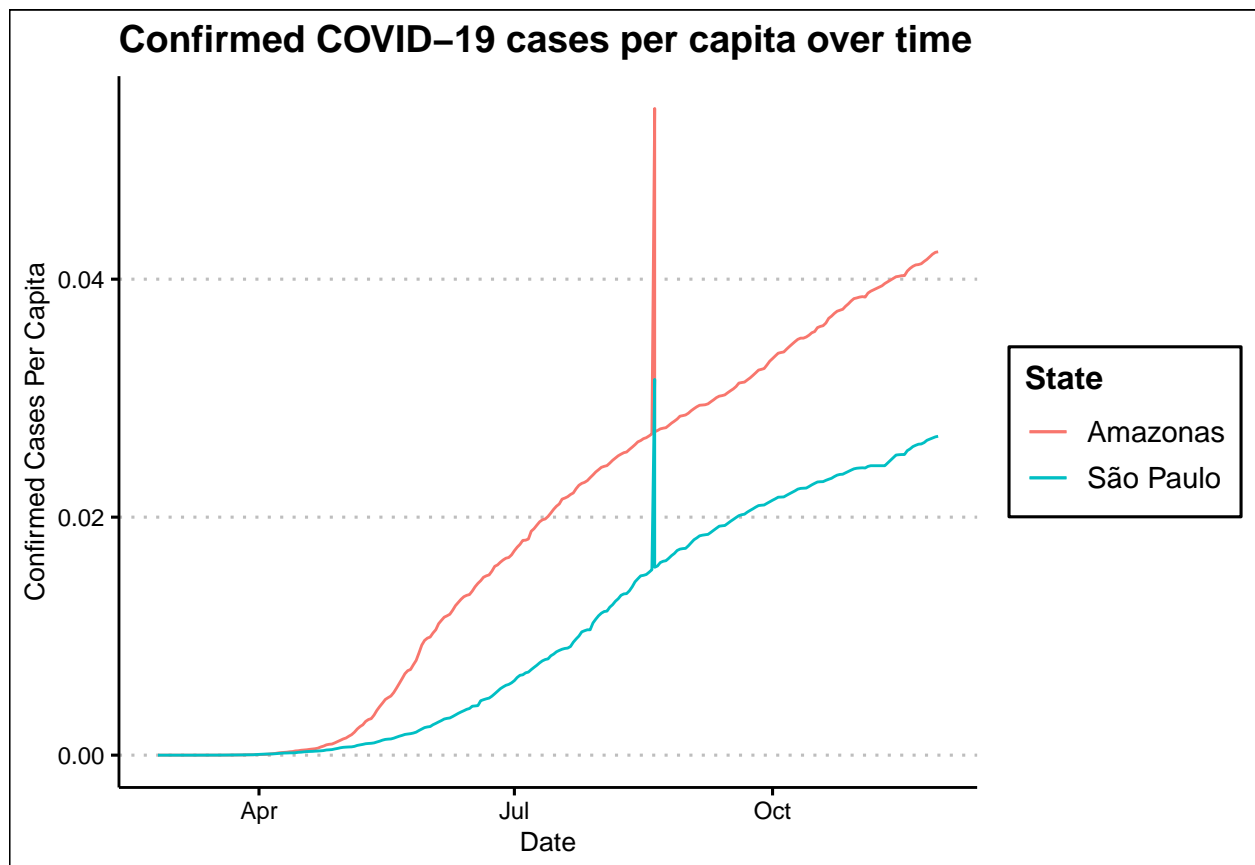


Figure: Amazonas saw greater confirmed cases per capita than São Paulo.

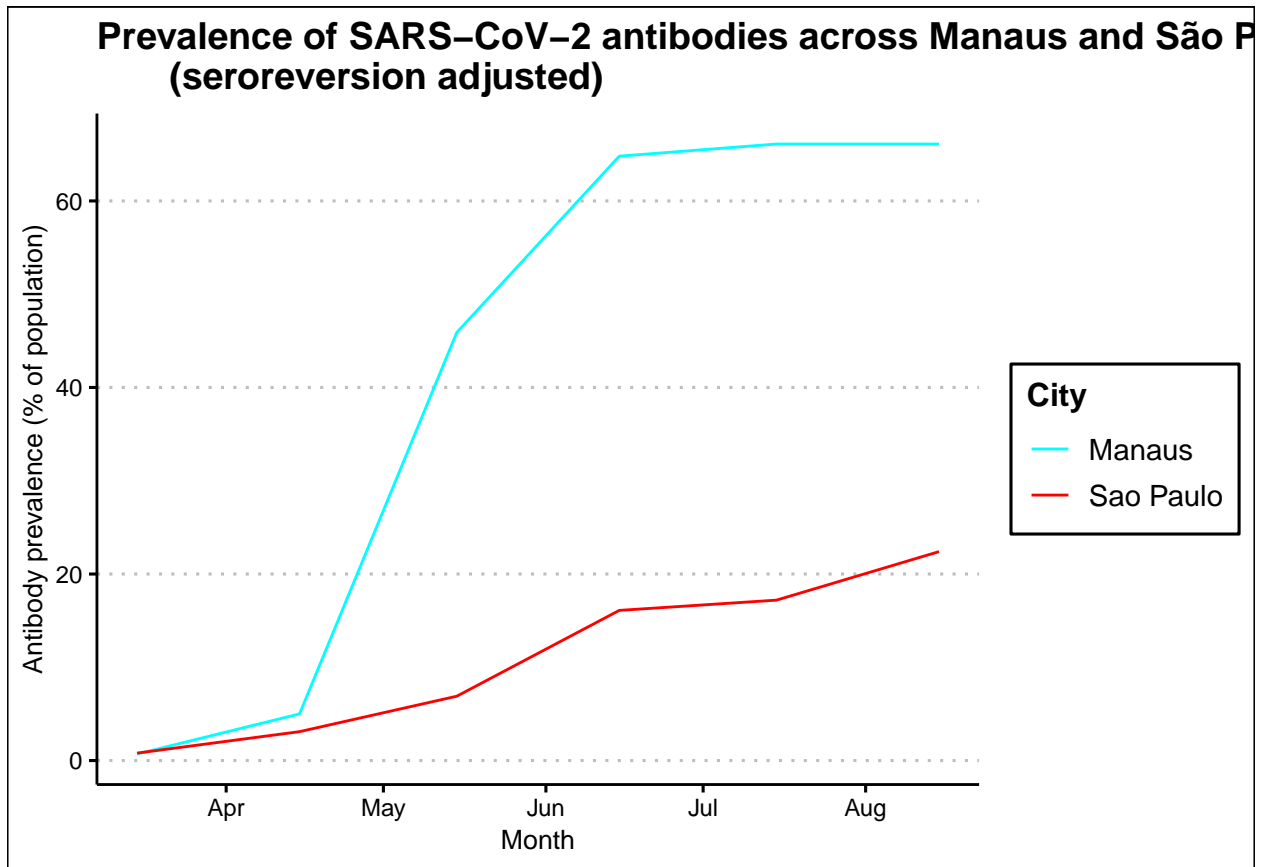


Figure: Manaus saw more widespread prevalence of SARS-CoV-2 antibodies vs. São Paulo, up to 66% vs. 22% of the population respectively.

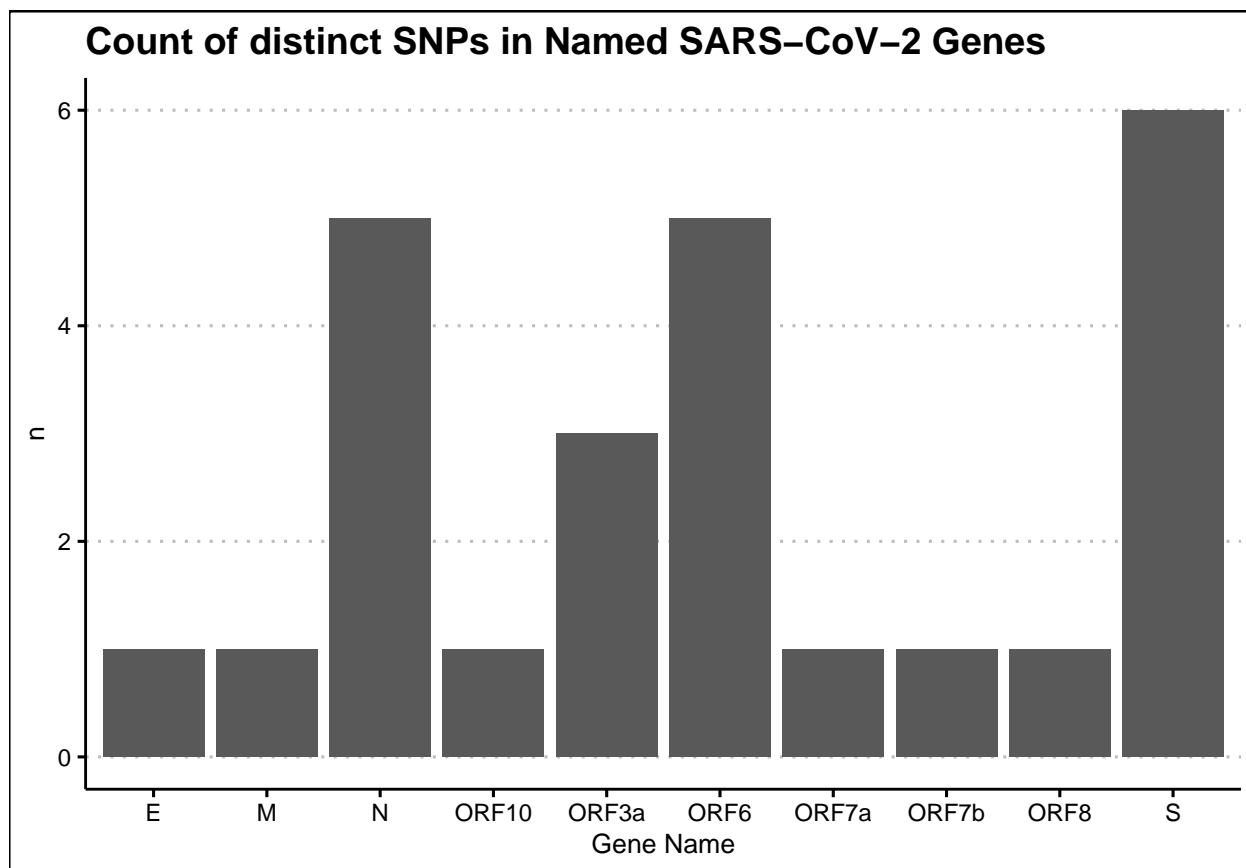


Figure: N and S genes have more unique SNPs in the set of samples analyzed.

NULL

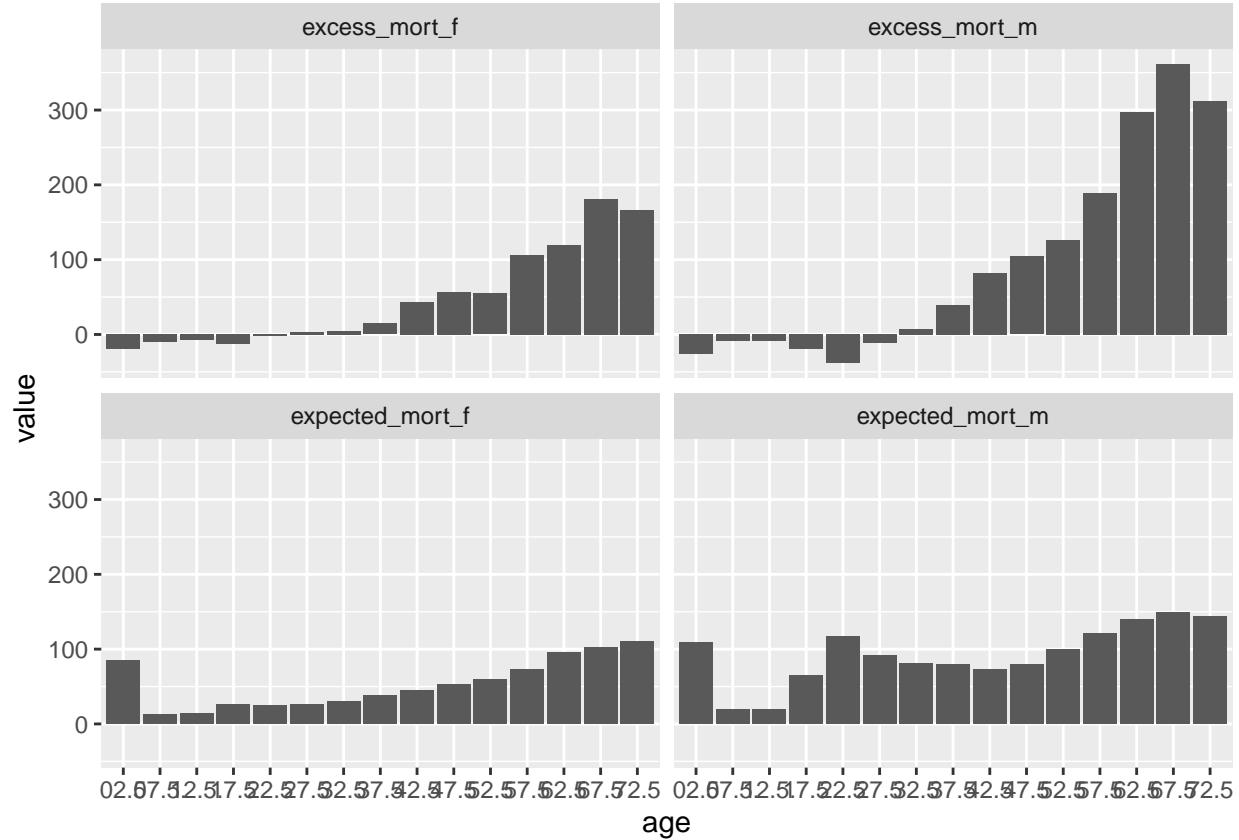


Figure: Excess mortality, the number of unusual deaths, was highest in Manaus males and older patients, March 2020 through June 2020.

Tables

Gene Name	Start	End	Length
S	21563	25384	3821
ORF3a	25393	26220	827
E	26245	26472	227
M	26523	27191	668
ORF6	27202	27387	185
ORF7a	27394	27759	365
ORF7b	27756	27887	131
ORF8	27894	28259	365
N	28274	29533	1259
ORF10	29558	29674	116

Table 1: Gene names, locations, and lengths in the SARS-CoV-2 genome. Higher SNP counts in the S and N genes may be related to the larger size of these genes.

Sources Cited

Buss,L.F. *et al.* (2020) COVID-19 herd immunity in the brazilian amazon. *medRxiv*.