SARS-CoV-2 seroprevalence studies: the Portuguese experience in last 2 years and next steps

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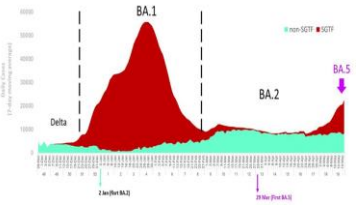
National background



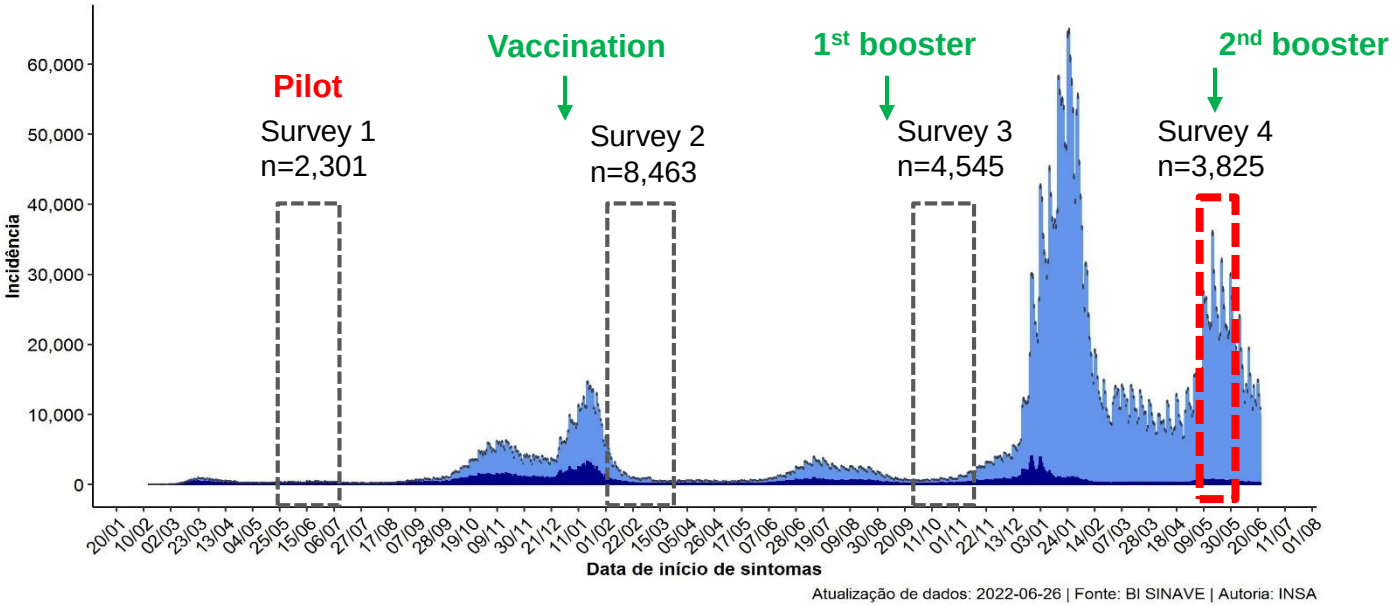


Figure 1. COVID-19 epidemic curve and periods of the national serosurveys, Portugal, mar 2020-jun 2022.

First COVID-19 case in Portugal: 2nd March 2020
Portuguese population: 10,344,802

By 3rd June 2022 (end of 4th phase):

- 4,822,682 infections (around 47 % population)
- 23,319 deaths (225 per 100,000)
- Primary vaccination coverage: 86.4 %
- 1st booster coverage: 63.7 %

Methods

Study design: cross-sectional study

Study population: residents in Portugal of any age

Sampling: Two-stage non-probability quota sampling design stratified by age group

Recruitment: Residual serum from the users of community laboratories (~350 lab) and public hospitals (~40 hosp)

Data collection: serum sample [1st - 3rd surveys: self-reported questionnaire and blood sample]

Laboratorial methods:

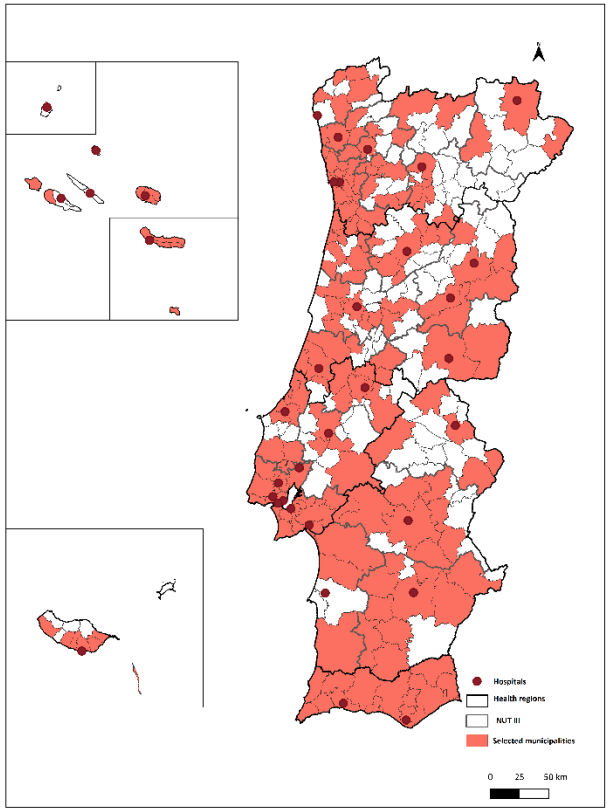


Figure 2. Geographical distribution of the data collection points (4th survey).

Table 1. Antibody tests used 2nd to 4th serosurveys

Method	Antibody	Antigenic-target	Result	
Chemiluminescence	IgG	Nucleoprotein	qualitative	all participants
Chemiluminescence	IgG	*Spike* glycoprotein (S1)	quantitative + > 50 AU/ml	all participants
ELISA	Neutralizing Ab	Receptor-Binding Domain (RBD)	quantitative + > 20 IU/ml	random sample of positive IgG(anti-S)

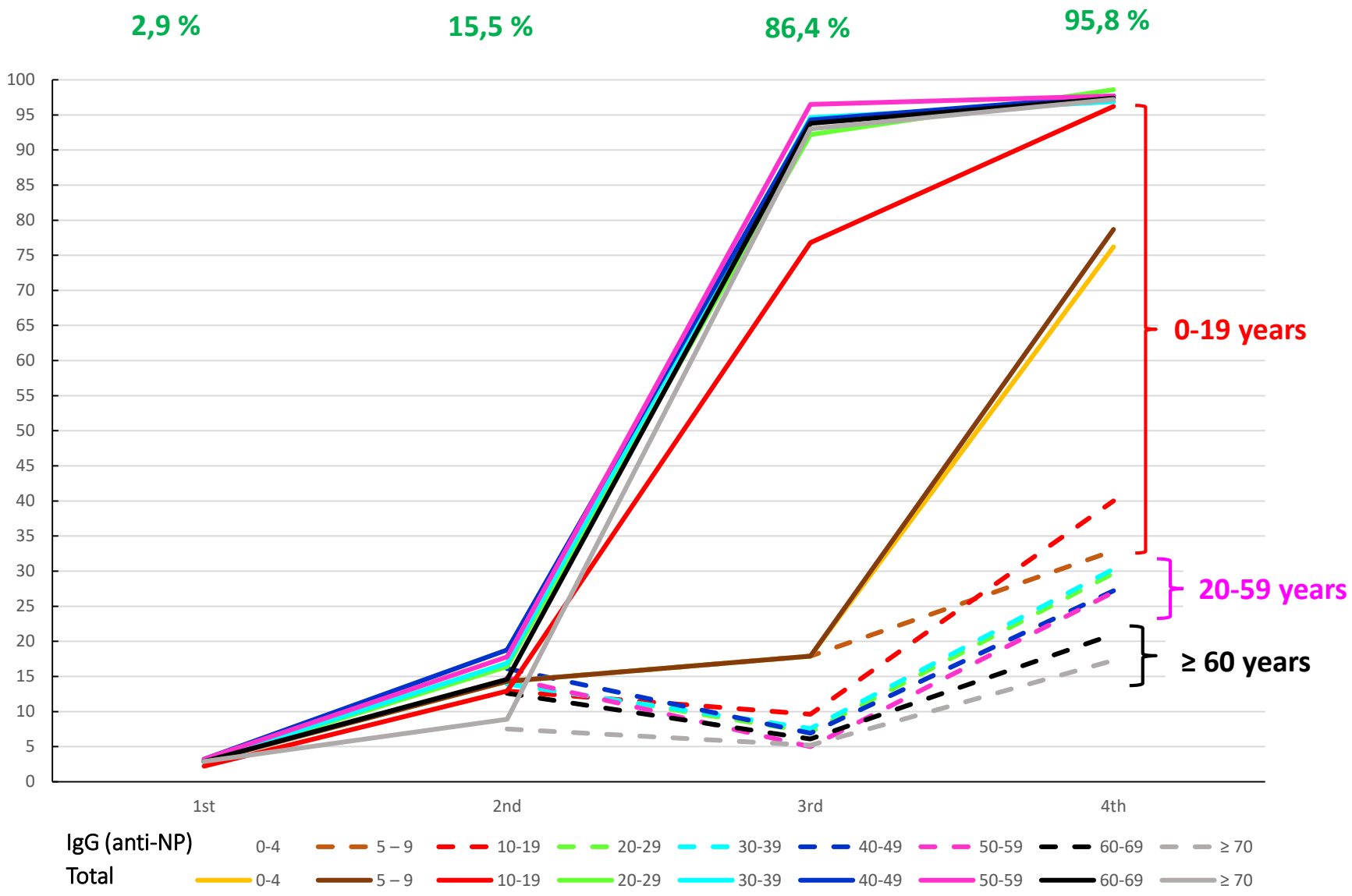
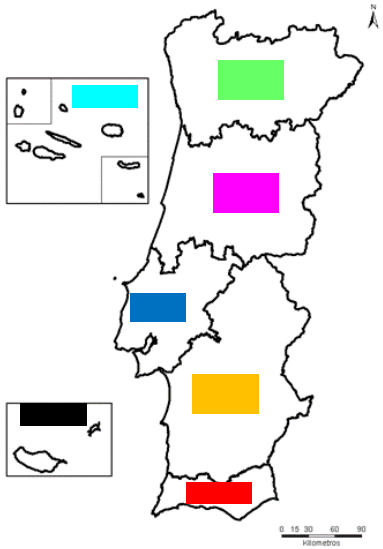


Figure 3. Seroprevalence by age group, Portugal, may 2020-jun 2022.



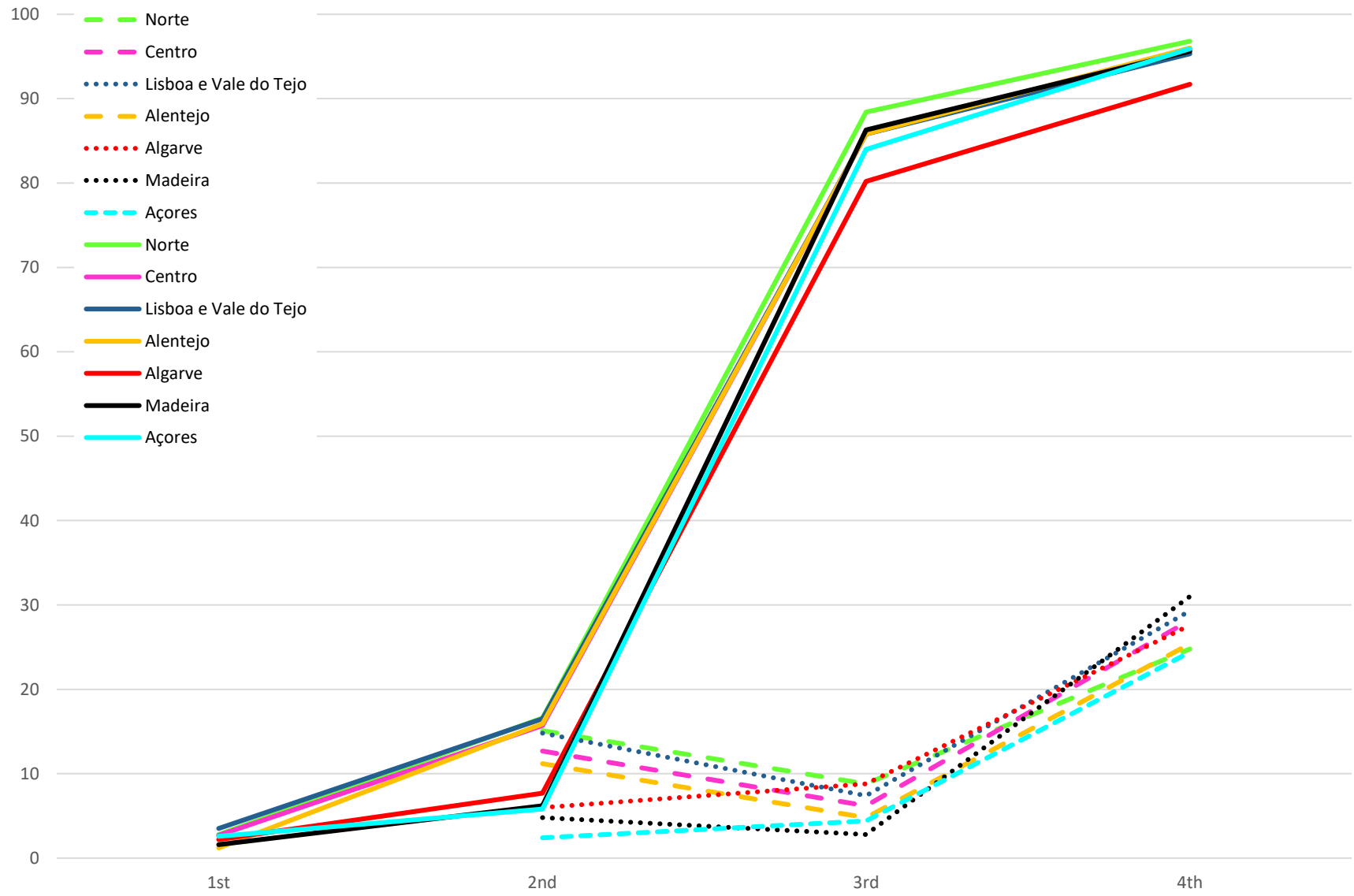


Figure 4. Seroprevalence by region, Portugal, may 2020-jun 2022.

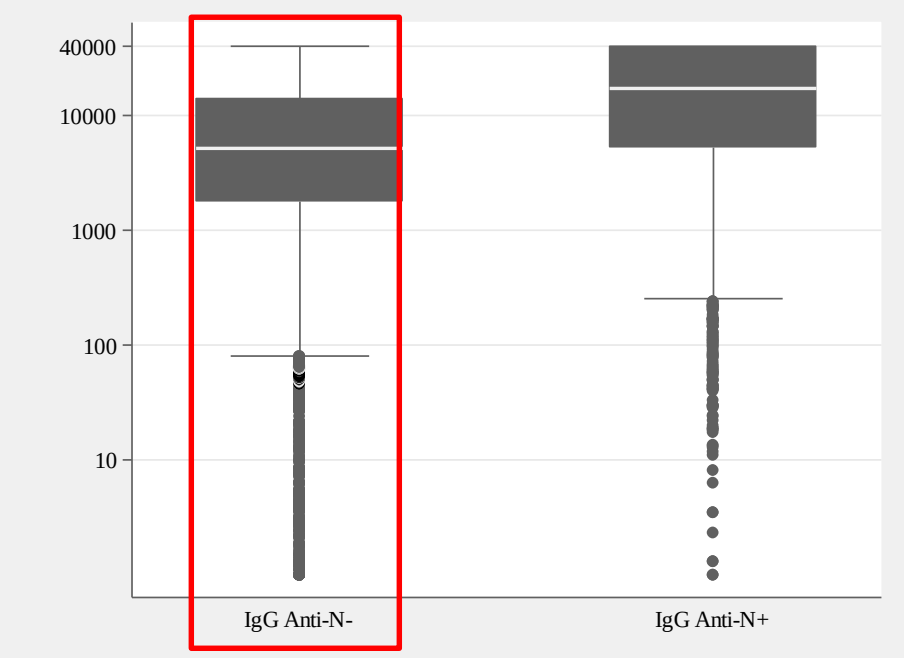


Figure 5. IgG(anti-S) titres by IgG(anti-NP) reactivity, Portugal, apr-jun 2022.

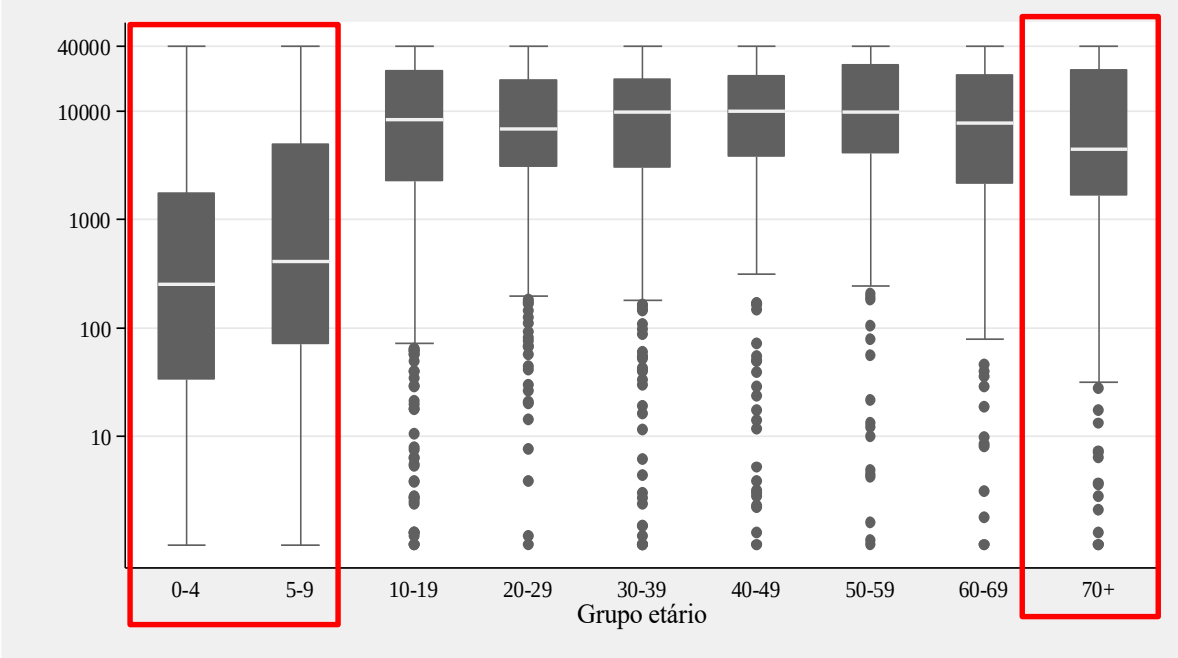


Figure 6. IgG(anti-S) titres by age groups, apr-jun 2022.

Lower IgG (anti-S) titers in IgG(anti-NP) negative group, in children < 10 years and adults ≥ 70 years.

Strong correlation (ρ=0.9) between IgG(anti-S) and neutralizing antibodies.

Key messages

- Suitable methodology to monitor COVID-19 epidemic
- Lower total seroprevalence [but higher IgG(anti-NP)] in non vaccinated groups or groups with lower vaccination coverage
- Lower IgG(anti-S) and nAb in children, older and those IgG(anti-NP) negative
- Integration of influenza and COVID-19
- Periodic serosurvey accordingly COVID-19 seasonality (preparing the season):
  - Identifying risk groups
  - Monitoring COVID-19 and Influenza activity
  - Data for modelling studies
- This experience allowed us to have a platform easily activated if needed for monthly surveys

ISN COVID-19 group

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