SoroEpi MSP
PHASE 7 – Collected between September 9 and 20, 2021

Fifty-two point eight percent (52.8 %) of the adult population in the city of São Paulo already has antibodies against SARS-CoV-2.

Neutralizing antibodies are present in 81.8% of the city's adult population.

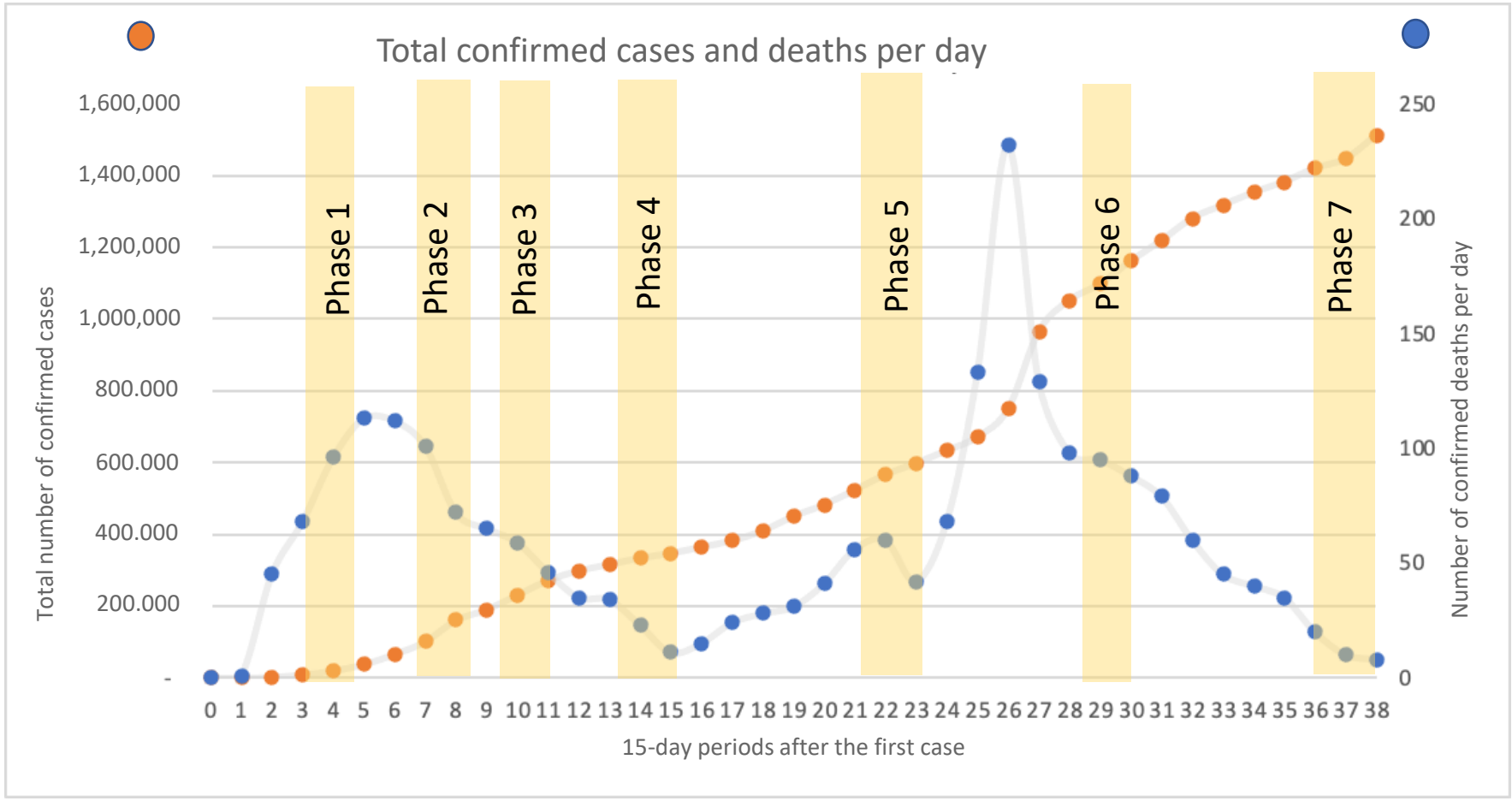
This data suggests that the numbers of severe cases and deaths are likely to continue to decline.

A household survey to monitor the seroprevalence of SARS-CoV-2 infection in adults: a cross-sectional study with probabilistic sampling, carried out in the city of São Paulo between September 9 to September 20, 2021

Financiers: SEMEIA, GrupoFleury, ipec Inteligência em Pesquisa e Consultoria, todos pela saúde uma aliança contra a Covid-19

Approved by the CEP/CONEP system under Brazilian Ethics Certification of Human Studies number: 31032620.0.0000.5474
https://www.monitoramentocovid19.org/

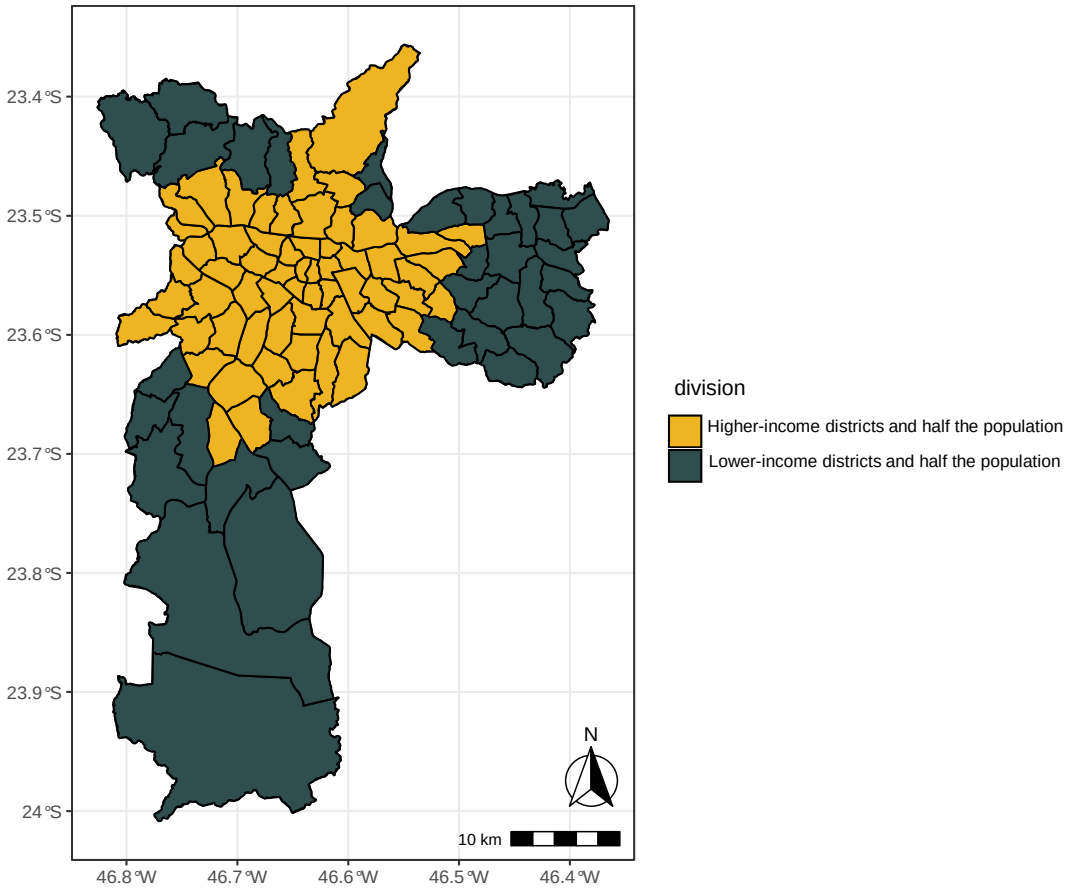
The collection ended on September 20th, when the municipality had a total of 1,452,567 confirmed cases of infection (red dots) and a total of 37,688 deaths from COVID-19. There were approximately 10 deaths per day (blue dots).



São Paulo Municipal Department of Health's Daily Register 543

There were 1,055 blood samples collected from 160 census sectors analyzed to measure seroprevalence in the city of São Paulo. 8 households were drawn in each census sector

District Map



Methodology Summary: The city of São Paulo has a population of 9,256,157 inhabitants 18 years old or over. Two strata were created in the city: districts with the highest income and districts with the lowest income, each of which corresponds to about half of the adult population in the city.

The sample was obtained by probabilistic sampling as described in previous reports.

The levels of anti-SARS-CoV-2 antibodies (IgG and IgM) were measured using chemiluminescence (Abbott Architect) and a second test using electrochemiluminescence (Ig total - Roche).

Neutralizing antibody levels were measured using the cPass™ SARS-CoV-2 Neutralization Antibody Kit (Genzyme Inc) test.

Project details can be found at:
https://www.monitoramentocovid19.org/

The seroprevalence anti-nucleoprotein antibodies was estimated at 52.8%, which corresponds to 4,887,251 inhabitants, 3.3 times the number reported by the municipality. This number is lower in the wealthier districts (43.1%) and higher in the poorer districts (62.2%). There is a statistically significant difference between the sample strata

Anti-nucleoprotein Antibodies

Strata	N= 1050 %	Prevalence %	CI 95%	p Value
Total	100	52.8	48.0–57.6	
Wealthier districts	51	43.1	34.3–52.0	
Poorer districts	49	62.2	57.8–66.6	0.0002

•Rao-Scott chi-square test

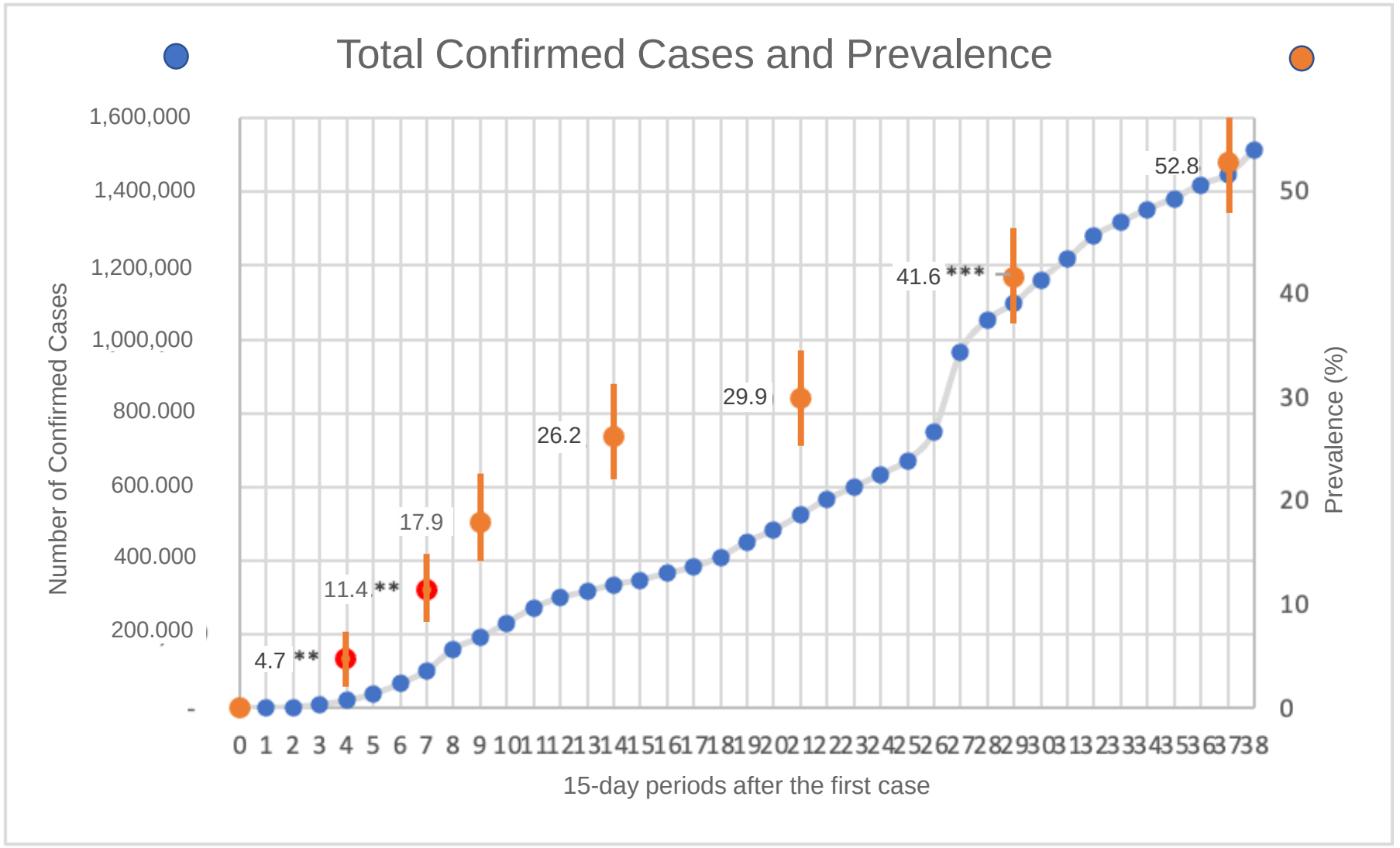
Seroprevalence of antibodies in the city of São Paulo is estimated at 81.8%, 81.3% in the wealthier districts and 82.3% in the poorer districts. The difference between the sample strata is not statistically significant

Neutralizing antibodies

Strata	N= 1050 %	Prevalence %	CI 95%	p Value
Total	100	81.8	78.5–85.1	
Wealthier districts	51	81.3	75.7–86.9	
Poorer districts	49	82.3	78.7–85.9	0.7752

•Rao-Scott chi-square test

The seroprevalence (orange) measured in our study increases with the number of confirmed cases of infection (blue). Vertical bars indicate the 95% confidence interval (CI).



**Phase 1 (pilot) and Phase 2 data was obtained with only one test (MAGLUMI).

***In Phase 6, an Abbott test was used instead of the MAGLUMI test. Retesting the Phase 5 samples demonstrated that the substitution does not significantly alter the seroprevalence measurement.

Between the end of the PHASE 6 collection (May 1st) and the end of the PHASE 7 collection (September 20th), the percentage of the population with neutralizing antibodies increased from 33.3% to 81.8%.

PHASE 6 – May 1, 2021

Vaccinated	Neutralizing Antibodies				Total	
	Yes		No			
	n	%	n	%	n	%
Not vaccinated	310	29.9	692	70.1	1002	100
Partially vaccinated	30	32.7	56	67.3	86	100
Fully vaccinated	67	66.6	31	33.4	98	100
Total	407	33.3	779	66.7	1186*	100

PHASE 7 – September 20, 2021

Vaccinated	Neutralizing Antibodies				Total	
	Yes		No			
	n	%	n	%	n	%
Not vaccinated	16	30.2	19	69.8	35	100
Partially vaccinated	254	78.8	65	21.1	319	100
Fully vaccinated	578	86.7	103	13.3	681	100
Total	848	81.8	187	18.2	1035	100

During this period, the weighted percentage of the adult population vaccinated with two or more doses increased from 8.6% to 63.2% and the fraction of the adult population not vaccinated decreased from 83.6% to 4.1%

Conclusions

In the 140 days that separate Phase 6 (April 22nd to May 1st) from Phase 7 (September 9th to 20th), it was possible to verify changes in the seroprevalence of anti-nucleoprotein antibodies and neutralizing antibodies in the the city of São Paulo's adult population.

The seroprevalence of anti-nucleoprotein antibodies increased from 41.6% to 52.8%. The fraction of the population with neutralizing antibodies increased from 33.3% to 81.8%. While we still observed a higher frequency of anti-nucleoprotein antibodies in the poorest stratum of the city when compared to the richest stratum, this difference was not observed in the seroprevalence of neutralizing antibodies.

As during this period the population not vaccinated (whether with one or two doses) decreased from 83.6% to 4.1%, this large increase in the frequency of adults with neutralizing antibodies is probably due to the increase in the number of individuals who received one or two doses of the vaccine, added to the number of those not vaccinated who had already been infected with SARS-CoV-2.

We believe that with 81.8% of the adult population having neutralizing antibodies, and as long as vaccination continues at its current pace (including booster shots), it is likely that the pandemic in the city of São Paulo will continue on its downward trajectory. That's if no new variants emerge.

SARS-CoV-2 Mapping Group

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