Study on the prevalence of Covid-19 in the Val Gardena - June 2020

Over a quarter of residents of the Val Gardena have antibodies

In the period between the 26th of May and the 8th of June a sample of the population of Val Gardena[1] was involved in a multiple survey linked to the health emergency, consisting of a serological test, a statistical questionnaire as well as a nose-pharyngeal swab test. The sample was extracted from the population registers excluding cohabitations as this data has already been collected. 21 people tested positive in the nursing home, five of whom died.

Serological tests showed that 26.3% of the population had antibodies to covid-19. No swabs were positive: the disease seems to have disappeared or almost disappeared from the territory of Val Gardena in June. Taking into account the specificity and sensitivity values[2] of the test performed, the correct prevalence of antibodies is 26.9%. At a confidence level of 95%, the percentage of the population affected is between 25.0% and 28.9%. Applying these values to the population, we can estimate the number of people who have been infected with the disease and recovered from it at 2,900.

Tab 1

People tested positive for Covid-19 antibodies by venous blood sampling - Val Gardena - June 2020
Percentage values

	Point estimation	Interval estimation (Clopper-Pearson)	
		MIN	MAX
Apparent prevalence	26.3%	24.4%	28.2%
True prevalence	26.9%	25.0%	28.9%

Considering the number of deaths from this disease in 17 people, the death rate is estimated at 0.7%. However, it should be considered that the difference in deaths compared to the average of the previous five years is 33 deaths in March and 18 in April. The death rates could therefore be higher.
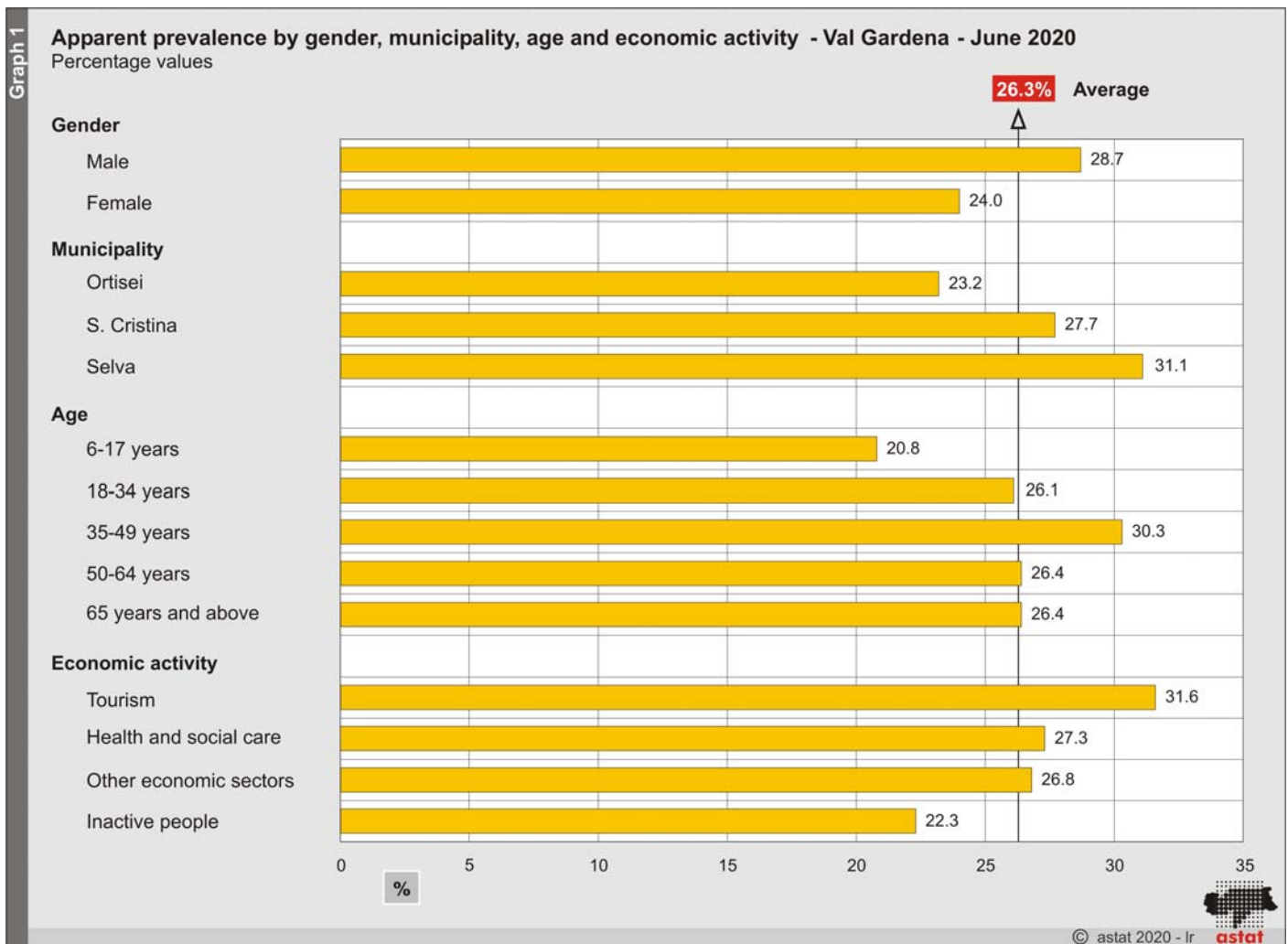
(1) The population of reference is that of the municipalities of Ortisei, S. Cristina, Selva and the Ladin localities of Castelrotto, i.e. Bulla, Oltretorrente and Roncadizza.

(2) The **sensitivity** of a test is the ability of the test to identify individuals with a specific disease. The **specificity** of a test is the ability of the test to identify individuals who do not suffer from the disease.

Positive antibody tests are less common in people who are not working

Significant differences in seroprevalence were found by gender (women 24%[3], men 28.7%), municipalities (Ortisei 23.2%, S. Cristina 27.7%, Selva 31.1%), and economic activity (health and social services 27.3%, tourism 31.6%, other activities 26.8%, not employed 22.3%). In all age groups no statistically significant differences were found, even if middle-aged people show higher values than minors. School education, citizenship (Italian or foreign), and household size do not seem to play a role.

Using statistical analysis techniques, however, you may note that gender has no direct impact on the probability of infection while having a job remains the most significant cause. Alternative models have been tested by including the age variable in various forms, but without this ever being significant. The incidence of the territorial variable remains (here simplified by the dichotomy "living in Selva YES/NO"), but most of all we notice the very low level of explained variance (around 1%). This would indicate a "comprehensive" spread of the phenomenon, which does not vary by population group[4].

Graph 1

Apparent prevalence by gender, municipality, age and economic activity - Val Gardena - June 2020
Percentage values

26.3% Average

Category	Value
Gender	
Male	28.7
Female	24.0
Municipality	
Ortisei	23.2
S. Cristina	27.7
Selva	31.1
Age	
6-17 years	20.8
18-34 years	26.1
35-49 years	30.3
50-64 years	26.4
65 years and above	26.4
Economic activity	
Tourism	31.6
Health and social care	27.3
Other economic sectors	26.8
Inactive people	22.3

© astat 2020 - lr

---

(3) From now on all values refer to the apparent prevalence.

(4) Tab 2

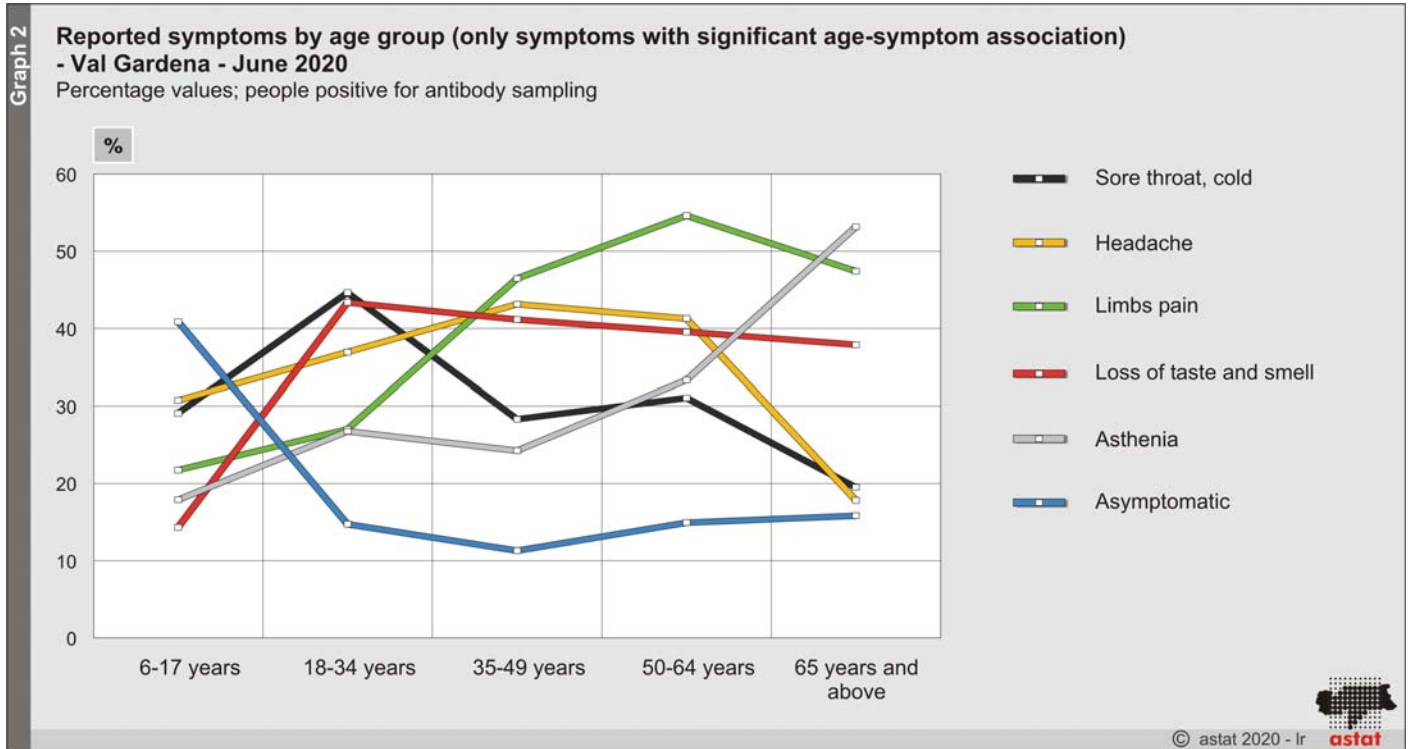**Determinants of the probability of being positive to the venous blood sampling, logit model**

VARIABLES	Odds Ratio	Pr> ChiSq
Sex (male)	1.175	0.142
Living in Selva	1.337	0.013
Being employed	1.372	0.005
Citizenship (Italian)	1.096	0.704
Number of household members	1.008	0.851

Pseudo R-Square 0,0098
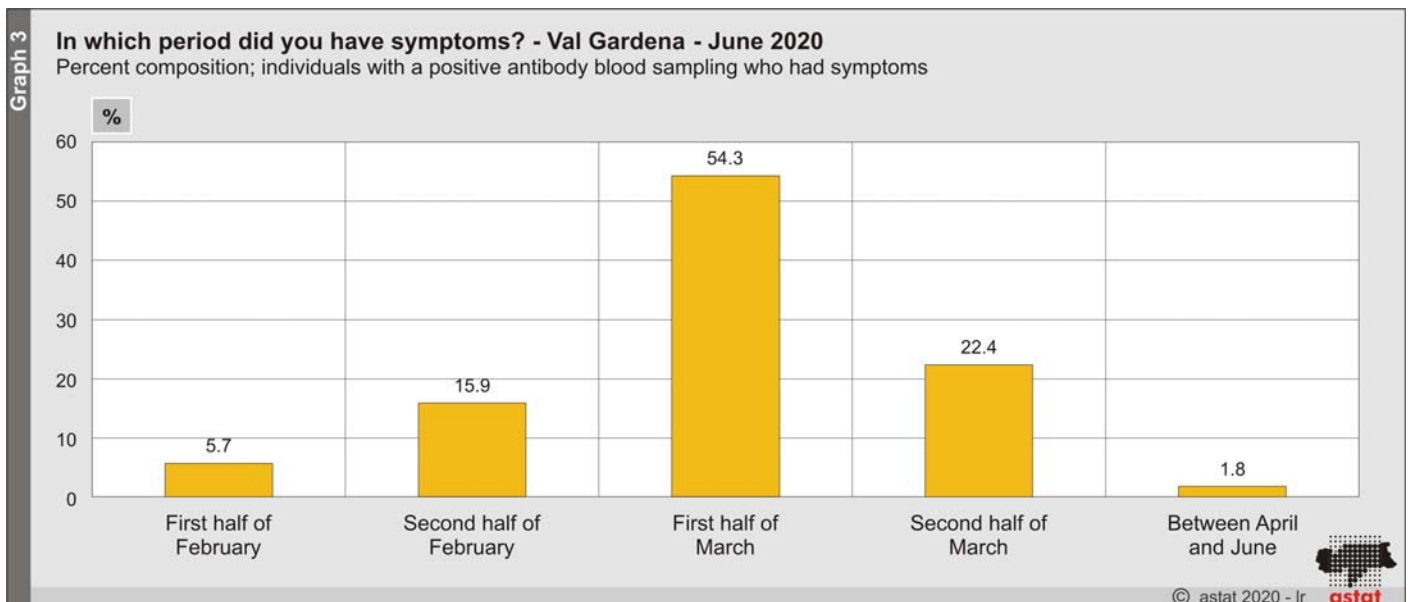*Max-rescaled R-Square 0,0146*

People with a positive serology test reported to have had the following symptoms in the last few months: sore limbs (41.4%), loss of sense of taste and smell (37.2%), headache (34.5%), cough (33.3%), fatigue (32.1%), sore throat (30.8%), fever >37,5°C for at least three consecutive days (29.1%), gastrointestinal disorders (21.1%), chest pain (11.3%), breathing difficulties (11.3%), conjunctivitis (7.9%) and increased pulse (3.7%). All these symptoms occurred much more frequently than in individuals with negative serological tests.

The average duration of these symptoms was seven days, but in one in four cases they lasted for two weeks or longer.

Graph 2

Reported symptoms by age group (only symptoms with significant age-symptom association) - Val Gardena - June 2020
Percentage values; people positive for antibody sampling

Legend:
- Sore throat, cold
- Headache
- Limbs pain
- Loss of taste and smell
- Asthenia
- Asymptomatic

© astat 2020 - lr

17.3% of those who tested positive were fully asymptomatic. Among minors, 40.9% were asymptomatic.

Sore throat occurred more often at a younger age. Pain in the limbs and especially asthenia occurred more frequently with increasing age.

Graph 3

In which period did you have symptoms? - Val Gardena - June 2020
Percent composition; individuals with a positive antibody blood sampling who had symptoms

Period	%
First half of February	5.7
Second half of February	15.9
First half of March	54.3
Second half of March	22.4
Between April and June	1.8

© astat 2020 - lr

Most people said they had symptoms in the first half of March (54.3%). Of those with symptoms and with a positive blood sampling, 62.1% did not contact the health service at all, although several options were available (general practitioner, national emergency centre, toll-free number, and hospital emergency room). Almost everyone who has contacted the health service has contacted the general practitioner.

The infection rate is 20 times higher than previously determined

Tab 3

Did you do the swab-test? - Val Gardena - June 2020
Percentage values; only people with positive antibody result

	%
Yes, with a positive result on the first swab	4.0
Yes, with a negative result on the first swab	7.0
Yes, I did, but I don't know the result	***
No	88.3
Total	**100,0**

***   The accuracy level of the estimate is not sufficient (the data can be published if the relative standard error is lower than 25%).

Of the people who developed antibodies, about 5% have already had a swab taken with a positive or at least an unknown result. According to this, one in 20 people was already detected during the disease.

Tab 4

Between 9 March and 3 May 2020, with whom did you come into contact, apart from close family members? - Val Gardena - June 2020
Percentage values

	Of those: antibody positive	Total
Other relatives	3.9	3.5
Colleagues	11.6	12.1
People I take care of	***	***
Friends	9.4	9.3

***   The accuracy level of the estimate is not sufficient (the data can be published if the relative standard error is lower than 25%).

Infected people who are not identified may represent a danger if they adopt certain social behaviour.

In fact, during the lockdown, people with a positive venous sampling result had the same frequency and type of interpersonal contact as the overall population: between three and four per cent had contact with close relatives, about 12% had contact to colleagues, about one in 100 had to take care of non-self-sufficient people and just over nine per cent also met with friends.

Notes on the "Study on the prevalence and epidemiology of Covid-19 in the Val Gardena - June 2020"

The clinical part of the study was coordinated and lead by Prof. Michael Mian and the tests were performed by operators of the South Tyrolian Health Care System. The statistical questionnaire was proposed to ASTAT by the Institute of General Medicine Claudiana, Dr. Angelika Mahlknecht and Dr. Adolf Engl.

SAMPLING AND CALIBRATION

A probability sample was drawn since the extraction was made with a known probability from the population register. The sampling design is a one stage stratified sampling plan (but please refer to the description below) with stratification of individuals by municipality, gender and age group. There were no a priori domains of study. The universe consists of the resident population, including immigrants, in the three municipalities of Ortisei, S. Cristina, and Selva which were extended to include the Ladin localities of the municipality of Castelrotto (Roncadizza, Oltretorrente, and Bulla) with a total of about 10,700 residents. Cohabitations in residential facilities (nursing homes) are excluded, as they have already been recorded on a universal basis. Without reliable information on the different variances, the various strata have been allocated on a proportional basis. The estimates resulting from the survey are obtained using a calibration estimator and are frequency estimations, both absolute and relative. For this purpose, poststratification was applied with the known totals of the variables: age group, gender, municipality, nationality (dichotomous).

THE QUESTIONNAIRE

The questionnaire was submitted to Astat by the Claudiana Institute of General Medicine and underwent a quick pre-test to assess the social acceptability and understanding. The questions, in addition to the socio-demographic questions necessary for poststratification, are focused on the analysis of symptoms, comorbidity, and people' behaviour due to possible symptoms.

THE PROGRESS OF THE COLLECTION AND THE ACCURACY OF ESTIMATES

In the last few years, in the context of the increase in statistical culture, Astat has been committed to informing the population that a sample based on the spontaneous initiative of respondents has never been able to represent the universe (self selection bias, ASTAT (2019) - Press release 04/2019). In this case, this is even more important than usual because it is essential that the selection and willingness to participate of individuals is not linked to their state of health (symptomatology) and that of the people close to them. A significant nuisance factor was the fear of the selected individuals to be placed in quarantine in case of a positive outcome (fear increased by the imminence of the summer holidays). The response rate (considering that not all selected individuals were eligible)[5] was over 75% for venous blood sampling and about 67% for completing the questionnaire. Most of the data were collected by online auto-completion and partly by telephone interview.

We remind that a response rate of 70% is recommended by many research institutes (e.g. ESS ERIC) to have high-quality surveys.

This high sampling rate (more than one in five residents of Val Gardena) allows, thanks to the so-called "finite population correction", an improvement in the accuracy of the estimates and thus a narrowing of the confidence intervals. However, this improvement is still around 0.2 percentage points and has therefore not been taken into account in this publication.

Information for editors:
For further information please contact: Stefano Lombardo (Tel. 0039 0471 41 84 46), e-mail: stefano.lombardo@provincia.bz.it

Reprint, use of tables and graphics, photomechanical reproduction - also in extracts - is only permitted with indication of the source (publisher and title).

---

(5) An exact quantification of the results could not be carried out, but many shortfalls will certainly be due to the fact that the people drawn could not participate (not present in the valley).