ANALYSIS OF MASS TEST RESULTS IN THE AUTONOMOUS PROVINCE OF BOLZANO

Considerations and initiatives to fight the spread of SARS-CoV-2

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Snapshot: Autonomous Province of Bolzano

- The **healthcare** is provided by one health authority (**Azienda Sanitaria dell'Alto Adige**) organized in 4 health districts.

- **7 hospitals** with a total of **1,641 beds** are operated by the local healthcare authority

Country:
Italy
Province Capital:
Bolzano
Population:
534,624 People
Density:
72,2 km²
Municipalities:
116

Distribution of the population:
Bolzano: 44,00%
Merano: 26,00%
Bressanone: 14,60%
Brunico: 15,00%

Degree of urbanization:
High: 21,10%
Intermediate: 23,90%
Low: 55,00%

Mass testing initiatives at international level

What is "mass testing"?

- "**Mass testing**" consists in performing a **high volume of tests**, regardless of whether people show symptoms or not, in order to **identify** suspected cases with **SARS-CoV-2 infection**. As the virus **detection techniques become easier to perform** and read, more population testing initiatives are performed by countries worldwide.

- There are great differences between countries in the way these initiatives are carried out, reflecting **differences** in the **organisational models** adopted, in the **human resources and means employed**, but also in the **different cultures** in dealing with sensitive issues such as public health protection.

Mass testing initiatives at international level

Studies from European Centre for Disease Prevention and Control

- The European Centre for Disease Prevention and Control (**ECDC**) has recently issued a paper on population-wide testing, considering **rapid antigenic swabs** to be **ideal** for this purpose, provided that the following **five objectives** for their use **are met**:
  - to control transmission
  - monitoring the transmission rates of the SARS-CoV-2 virus and its severity
  - to mitigate the impact of COVID-19 in health and care facilities
  - detect clusters or outbreaks in specific situations;
  - maintain the elimination status of COVID-19 once achieved

Mass testing initiatives at international level

The steps of the European Commission

- **The European Commission** has presented on October 28th 2020 a Communication to the European Parliament and the European Council on the steps to be taken to **stem the epidemic** and has **mobilised €100 million** to directly **purchase rapid antigenic tests** and deliver them to **Member States**, in the belief that they may be useful for population screening.

The screening in the AP of Bolzano

Aim of the initiative

1 To get a picture of the population in that specific moment

2 To test and isolate most of the cases of COVID-19

3 To gather data and information to cross with other data sources and for subsequent strategies

The screening in the AP of Bolzano

Details of the initiative

The initiative was realized between **20 to 22 November 2020.** All test executed **72 hours before and after** the testing period were included into the sample.

The **normal prevention and care activities** (increase in the capacities in the hospitals, organization of intensive care, monitoring in the residences for the elderly, etc.) **were not stopped** in the testing period and took place contemporarily.

The situation before the screening

Main indicators

RT-Value

1,92 from 19.10 - 25.10
1,72 from 26.10 - 01.11
1,16 from 09.11 - 15.11

NEW

Creation of **113** new hotspots

Increased occupancy rate of ICU, IMCU and NS beds

The ordinance of the Provincial Governor

Measures taken in case of positive tests (1/2)

Due to the **exceptional nature of the situation**, in order to identify and isolate the largest possible number of infected people, special measures have been taken:

1. **the positivity to SARS-CoV-2** infection by means of a rapid antigenic test is followed by **home isolation measures without carrying out a confirmative PCR test**

2. **strict contacts** were not traced

The ordinance of the Provincial Governor

Measures taken in case of positive tests (2/2)

In order to leave the isolation, there was a differentiation to be made:

- Persons who did **not develop symptoms** during the period of isolation: after **10 days of home isolation** from the detection of a positivity to SARS-CoV-2 the person could return to the community **without** the **need** for **further testing**.

- Persons who did **develop symptoms** during the period of isolation at home: in this case the person should immediately **contact** their **General Practitioner or Pediatrician** to take appropriate action.

The screening in the AP of Bolzano

Key figures and Data

Cost estimation:
4.500.000 €

Key figures:
Total number of tests: 361.781
Total positive cases: 3.615

Test locations:
Total municipalities: 116
Test locations: 204

Key Partner:

Südtiroler Gemeindenverband Genossenschaft

Weisses Kreuz / Croce Bianca

Croce Rossa Italiana
Comitato Provinciale di Bolzano

LFV LANDESVERBAND DER FREIWILLIGEN FEUERWEHREN SÜDTIROLS

UNIVERSITÀ DEGLI STUDI DI TRENTO
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The screening in the AP of Bolzano

Health professionals employed for the screening

The total number of health professionals employed was **1.937.** These were divided in:

- **SABES personnel:** 1.289 people
  - 142 doctors
  - 1.048 nurses and midwives
  - 99 prevention, technical health and rehabilitation professionals

- **external health personnel:** 327 people
  - 196 private doctors
  - 65 GPs
  - 50 nurses, pediatric nurses, midwives
  - 16 prevention, technical health and rehabilitation professionals)

- **White Cross and Red Cross personnel:** 321

The screening in the AP of Bolzano

The role of the municipalities

The **116 municipalities** of South Tyrol supported the local Health Authority in carrying out the screening of the population:

The key activities were:

a. **selecting and preparing the location** owned by the municipality or, if necessary, by other Authorities (e.g., school buildings, gyms, association offices) according the provided guidelines.

b. **providing its own staff** for administrative tasks and finding volunteers.

The screening in the AP of Bolzano
AG Tests used in the screening

Ag commercial kits

World Health Organization

WHO Emergency Use Listing for in vitro diagnostics [IVDs] Detecting SARS-CoV-2

Last update: 2 October 2020

Rapid Antigen Tests

Date Listed	Product name	Product codes	Manufacturer
02 October 2020	Panbio COVID-19 Ag Rapid Test Device (NASOPHARYNGEAL)	41FK10	Abbott Rapid Diagnostics Jena GmbH
11 September 2020	STANDARD Q COVID-19 Ag Test	09COV30D	SD Biosensor, Inc

EN   REF Q-NCOV-016
STANDARD Q
COVID-19 Ag
STANDARD Q COVID-19 Ag Test
PLEASE READ INSTRUCTIONS CARD (LD) BEFORE YOU PERFORM THE TEST
® SD BIOSENSOR

Sensitivity = 96,5%
Specificity = 99,7%

Abbott   REF 41FK10   CE
Panbio
COVID-19 Ag Rapid Test Device

Sensitivity = 93,3%
Specificity = 99,4%

pre-test probability for a positive/negative result
- context (prevalence, incidence),
- enrolled categories (asyptomatic/symptomatic, days from hypotetical contact, …),
- viral load,
- standardization of sample collection,
- transport and storage,
- execution and interpretation,
- molecular reference method used …

LOW CIRCULATION PERIOD
Sensitivity 73%: calculated for 76 PCR positive samples (Ct cut-off values <40) collected from symptomatic and asymptomatic patients in August (high virus.
Sensitivity 85%: calculated for the same samples using Ct cut-off values <28.

HIGH CIRCULATION PERIOD
Sensitivity 80%: calculated for 56 PCR positive samples (Ct cut-off values <40) collected from symptomatic and asymptomatic patients in November.
Sensitivity 90%: calculated for the same samples using Ct cut-off values <28.

Moreover, for two further sample sets, one collected during a high prevalence period (69 subjects) and the other during a low prevalence period (633 subjects), 99-100% of antigen positive samples were confirmed by PCR (positive predictive value)

The screening in the AP of Bolzano

Participation rate

Covid Screening 20-21-22 November 2020

Südtirol insgesamt Provincia nel suo complesso	Tests Test	Positiv/ Getestete[1] Positivi/ Testati[1]	Positiv/ Getestete Ansässige[2] Residenti positivi/Testati residenti[2]	Positive Ansässige/ Ansässige[3] Residenti positivi/ residenti[3]	Getestete/ Ansässige[4] Testati/ Residenti[4]
Ansässige – Residenti: 536.667	364.039	3.795 1,0%	3.619 1,0%	0,7%	350.848 65,4%

	Tests Test	Positiv Positivi	Negativ Negativi
Teststationen in den Gemeinden – Postazioni di test nei comuni	259.025	1.872 0,7 %	257.153 99,3 %
Apotheken – Farmacie	20.433	323 1,6 %	20.110 98,4 %
Ärzte / Private Einrichtungen – Medici/strutture privati	66.577	716 1,1 %	65.861 98,9 %
Ärzte/Ärztinnen für Allgemeinmedizin und Kinderärzte/ärztinnen freier Wahl Medici di medicina generale e Pediatri di libera scelta	17.962	884 4,9 %	17.078 95,1 %

The screening in the AP of Bolzano

All 116 municipalities are represented: example given
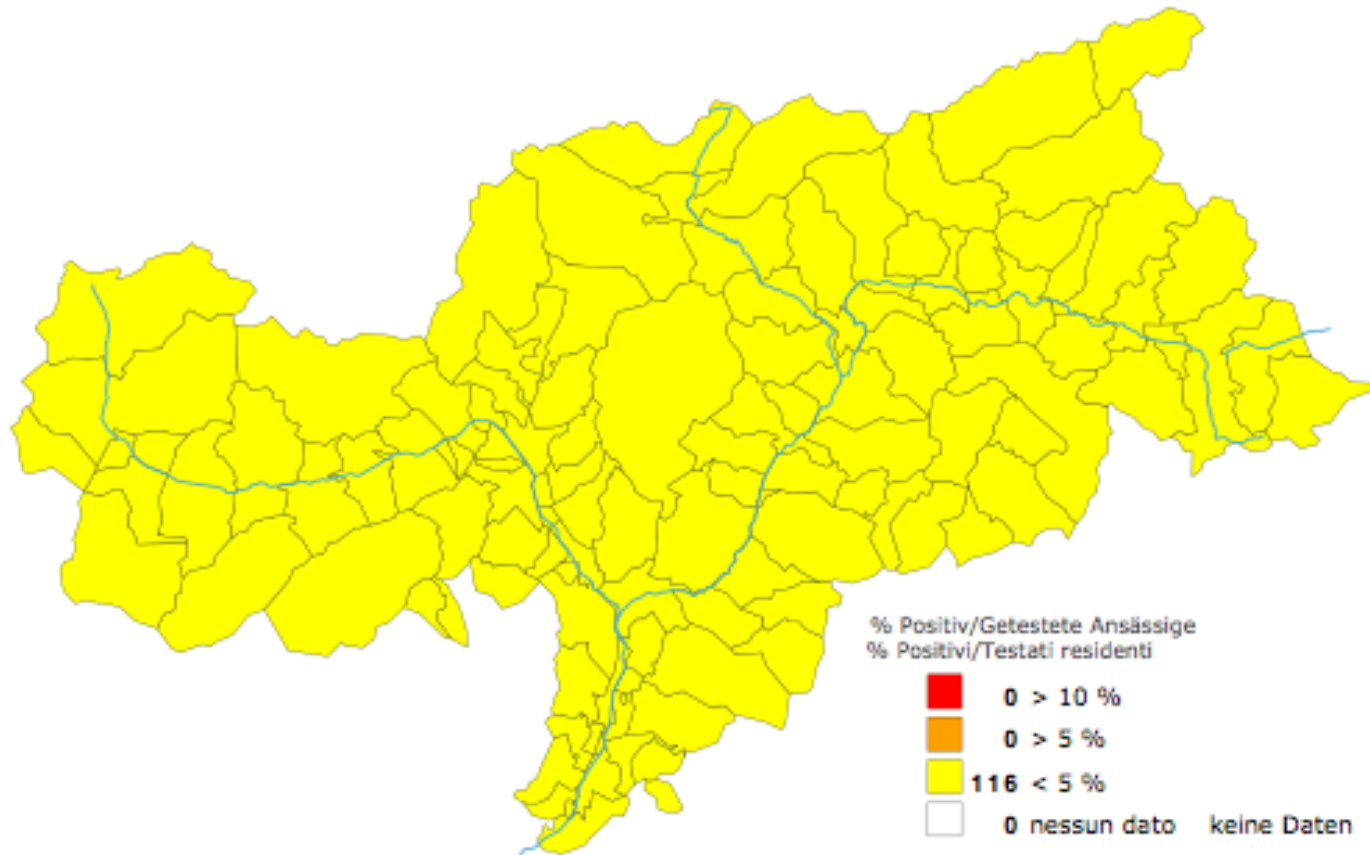
Gemeinde AHRNTAL
Comune di VALLE AURINA

Ansässige – Residenti: 5.990

Tests Test	Positiv/ Getestete[1] Positivi/Testati[1]	Positiv/ Getestete Ansässige[2] Residenti positivi/Testati residenti[2]	Positive Ansässige/ Ansässige[3] Residenti positivi/ residenti[3]	Getestete/ Ansässige[4] Testati/ Residenti[4]
3.419	62 1,8%	78 2,1%	1,3%	3.794 63,3%

	Tests Test	Positiv Positivi
Ahrntal Valle Aurina	3.243	52 1,6 %
MMG_PLS: AHRNTAL MMG_PLS: VALLE AURINA	53	9 17,0 %
Seniorenheim Georgianum Seniorenheim Georgianum	123	1 0,8 %

The screening in the AP of Bolzano

Ratio: positive tests / performed tests

% Positiv/Getestete Ansässige
% Positivi/Testati residenti

0   > 10 %
0   > 5 %
116   < 5 %
0   nessun dato   keine Daten

The screening in the AP of Bolzano

Data analyzed

Following data was analysed after the screening:

- Age and gender
- Family groups
- Workers categories
- Distribution of positive cases in Municipalities
- **Correspondence of the positive emerged cases to the previous epidemiological insights and tests**
- Cross these data with PCR test in the same people who attended antigenic test

The screening in the AP of Bolzano

Screening participants divided per age and sex

Persone inserite in anagrafica BDPA						Persone NON inserite in anagrafica		
	Totale	Positivi	Totale	Positivi			Totale	Positivi	
Maschi	177.029	1.742	51%	53%			4963	89
Femmine	170.286	1.546	49%	47%				
Totale	347.315	3.288	100%	100%				

	Totale		Positivi		Totale		Positivi	
Età	M	F	M	F	M	F	M	F
0 - 6 anni	2.340	2.249	14	13	1%	1%	1%	1%
7 - 18 anni	23.581	21.720	191	166	13%	13%	11%	11%
19 - 65 anni	123.933	115.737	1.318	1.108	70%	68%	76%	72%
66 - anni	27.173	30.580	219	259	15%	18%	13%	17%
Totale	177.027	170.286	1.742	1.546	100%	100%	100%	100%

The screening in the AP of Bolzano

Comparison of age groups of all subjects and Ag positive subjects
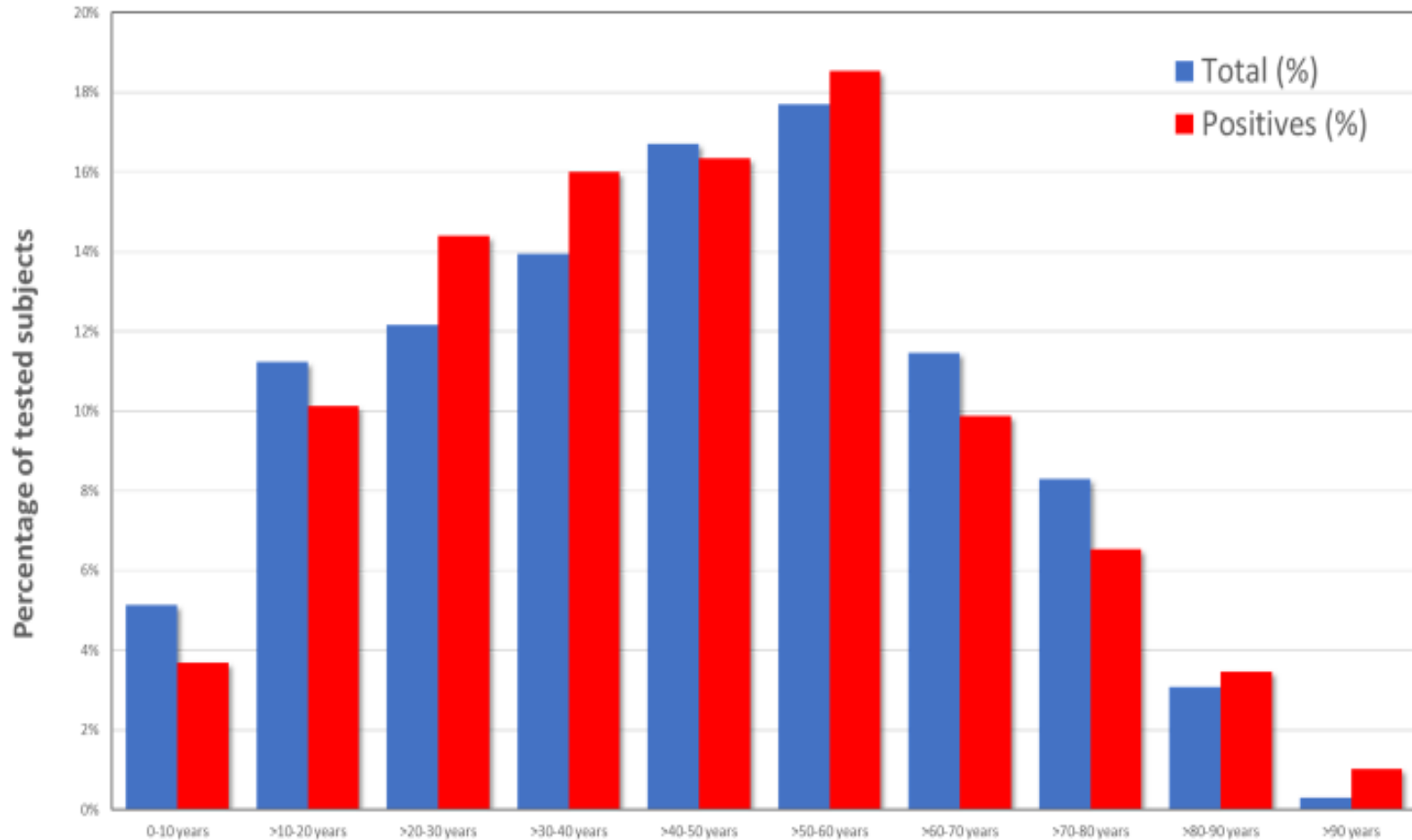
The screening in the AP of Bolzano

Performance of SARS-CoV-2 antigen test

(PCR performed between -2 and +3 days from Ag test)

Real Time-PCR

		RNA detected	RNA not detected	Total
Ag test	Ag positive	459	20	479
	Ag negative	169	821	990
	Total	628	841	1469

Sensitivity = 73,1% (459/(459+169))
Specificity = 97,6% (821/(821+20))

Positive predictive value= 95,8% (459/(459+20))
Negative predictive value= 82,3% (821/(821+169))

Accuracy = 87,1% (459+821)/(459+821+20+169)

BIAS:
- Selection of subjects tested with RT-PCR was not random and therefore does not reflect local epidemiology
- Ag and PCR test were not performed simultaneously, collecting two different biological samples
- Two different kits used for Ag testing and RT-PCR

The screening in the AP of Bolzano

Repercussion on main indicators
(comparison between Ministry reports 25-26-27)

1. **RT calculation based on data from Civil Protection Department:**
   Medical area beds from 98 to 65%, ICU decreasing.

   (Dec. 11th, 2020: 41,8% Med. Area beds occupation)

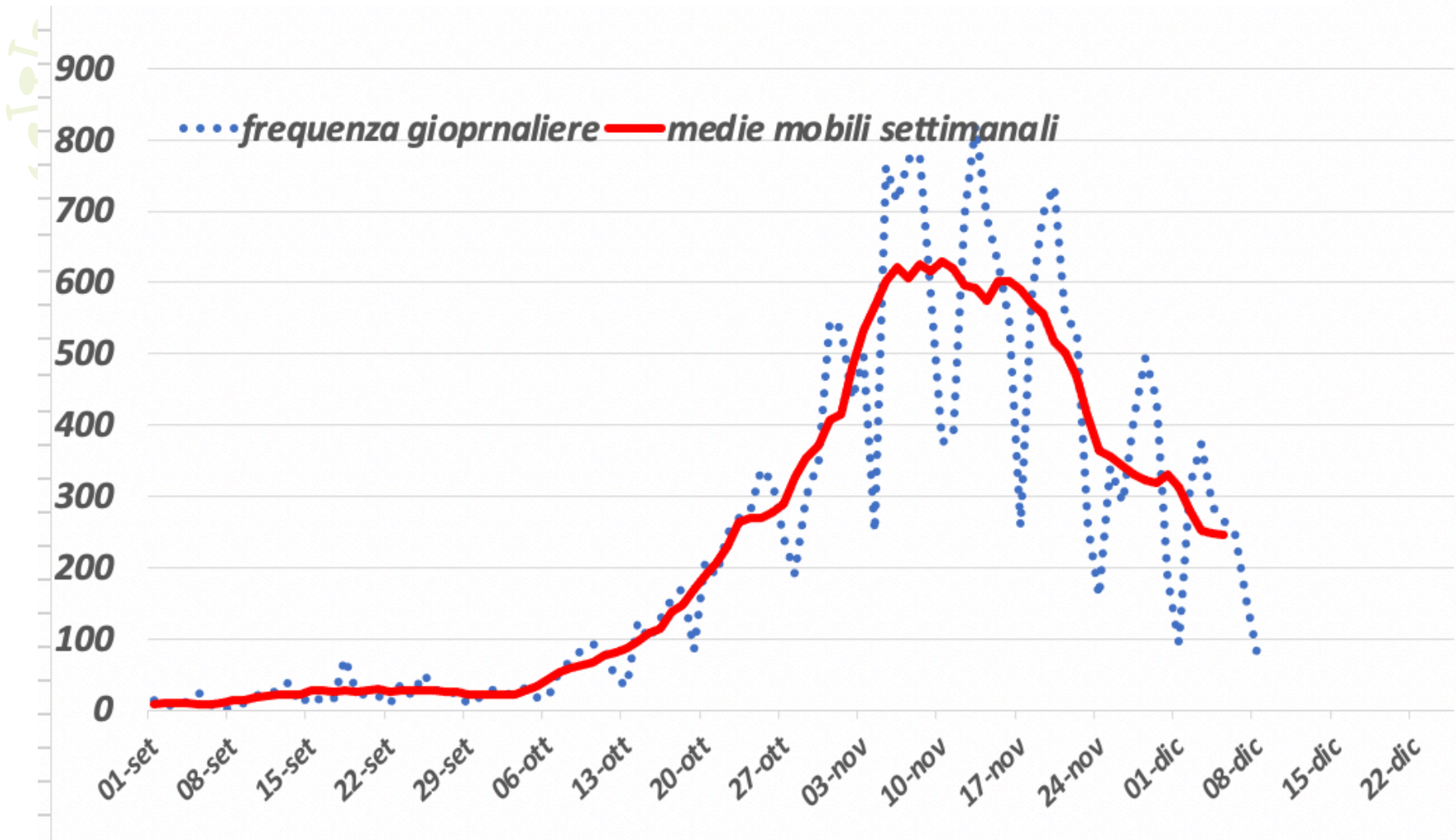1. **Deaths and hospitalization presumably avoided.**
- Total Deaths ,Dec.11th, 2020 : 612
-In Patients 7 Regional Hospitals :

Total in patients	Nov 24th 2020	Dec 11th 2020
Medical Area	323	239
ICU	38	31
other	148	138

The screening in the AP of Bolzano

New daily positive cases in AP of Bolzano

The screening in the AP of Bolzano

RDT Values

Date	Value
01-nov	1,544
02-nov	1,743
03-nov	1,853
04-nov	1,733
05-nov	1,696
06-nov	1,677
07-nov	1,486
08-nov	1,503
09-nov	1,276
10-nov	1,181
11-nov	1,092
12-nov	0,992
13-nov	0,950
14-nov	0,949
15-nov	0,964
16-nov	0,980
17-nov	0,937
18-nov	0,922
19-nov	0,933
20-nov	0,874
21-nov	0,875
22-nov	0,777
23-nov	0,681
24-nov	0,616
25-nov	0,624
26-nov	0,614
27-nov	0,641
28-nov	0,640
29-nov	0,680
30-nov	0,804
01-dic	0,858
02-dic	0,785
03-dic	0,738
04-dic	0,751
05-dic	0,766
06-dic	
07-dic	
08-dic	

RDT a lag 7 dcal 1° novembre
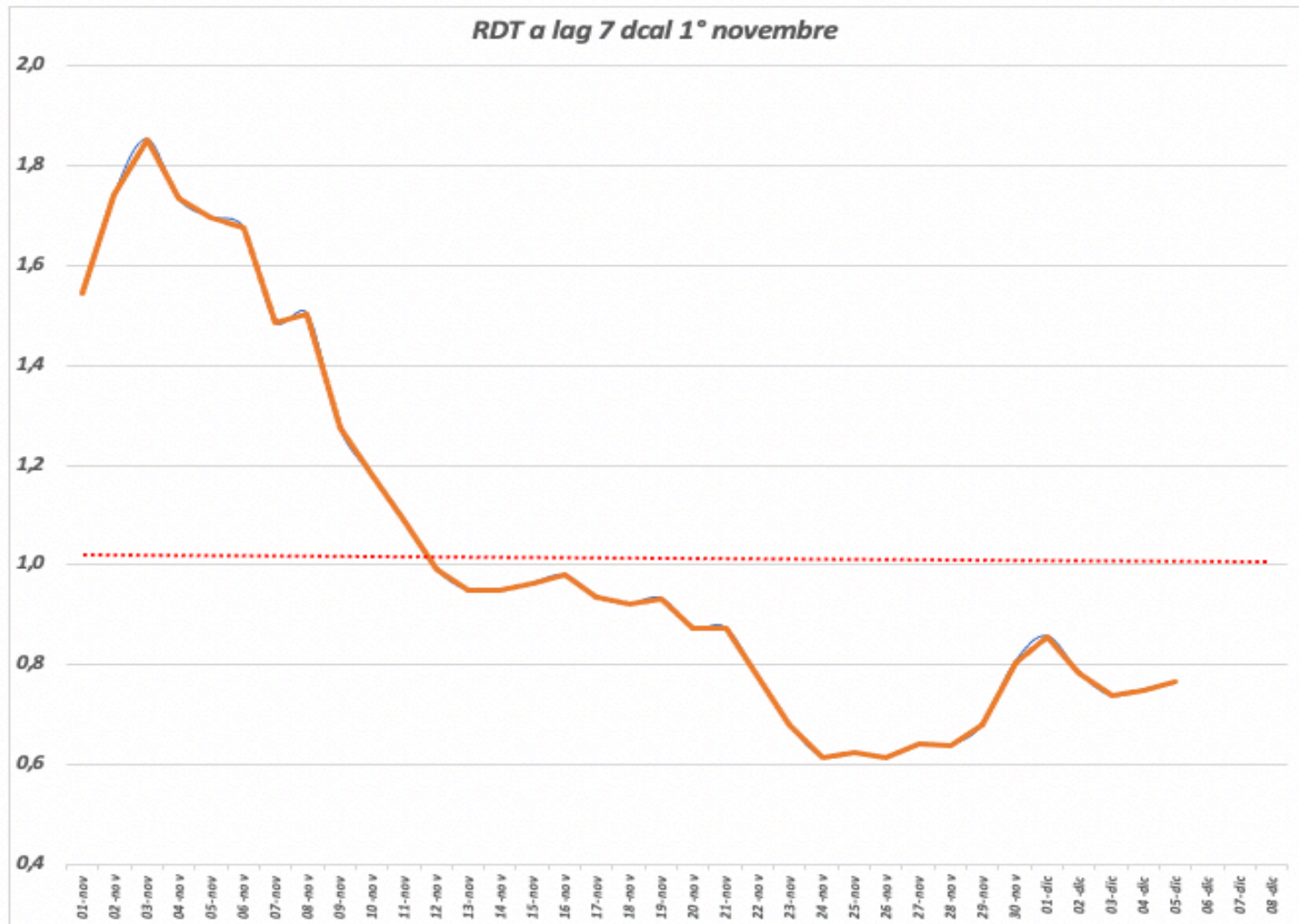
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Comparison: RDT Values & new daily positive cases

frequenze giornaliere e medie mobili settimanali
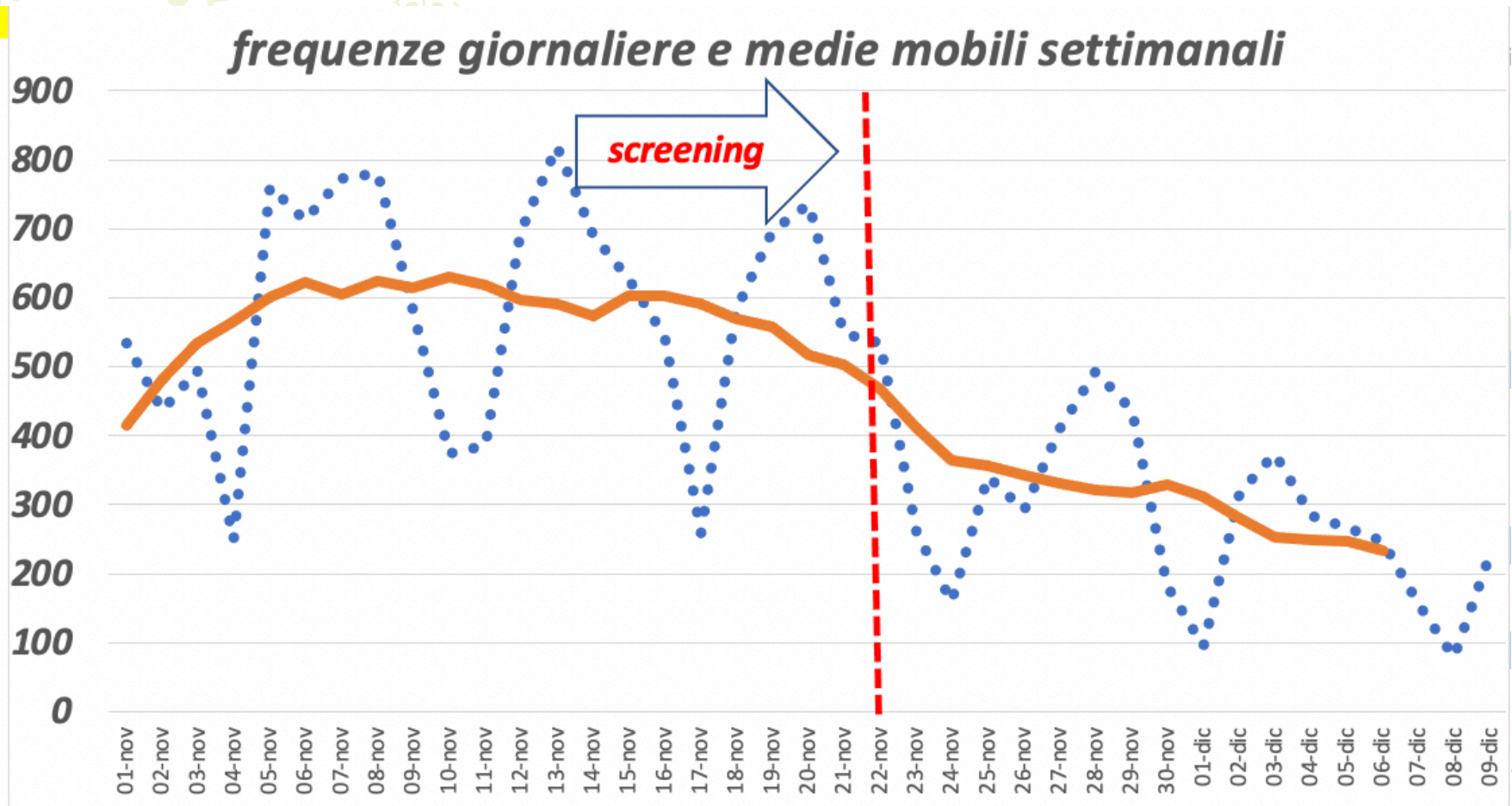
screening

AP of Bolzano
Predictive model of impact of screening-partecipation on Rt-Value

RDT Values (Italy)
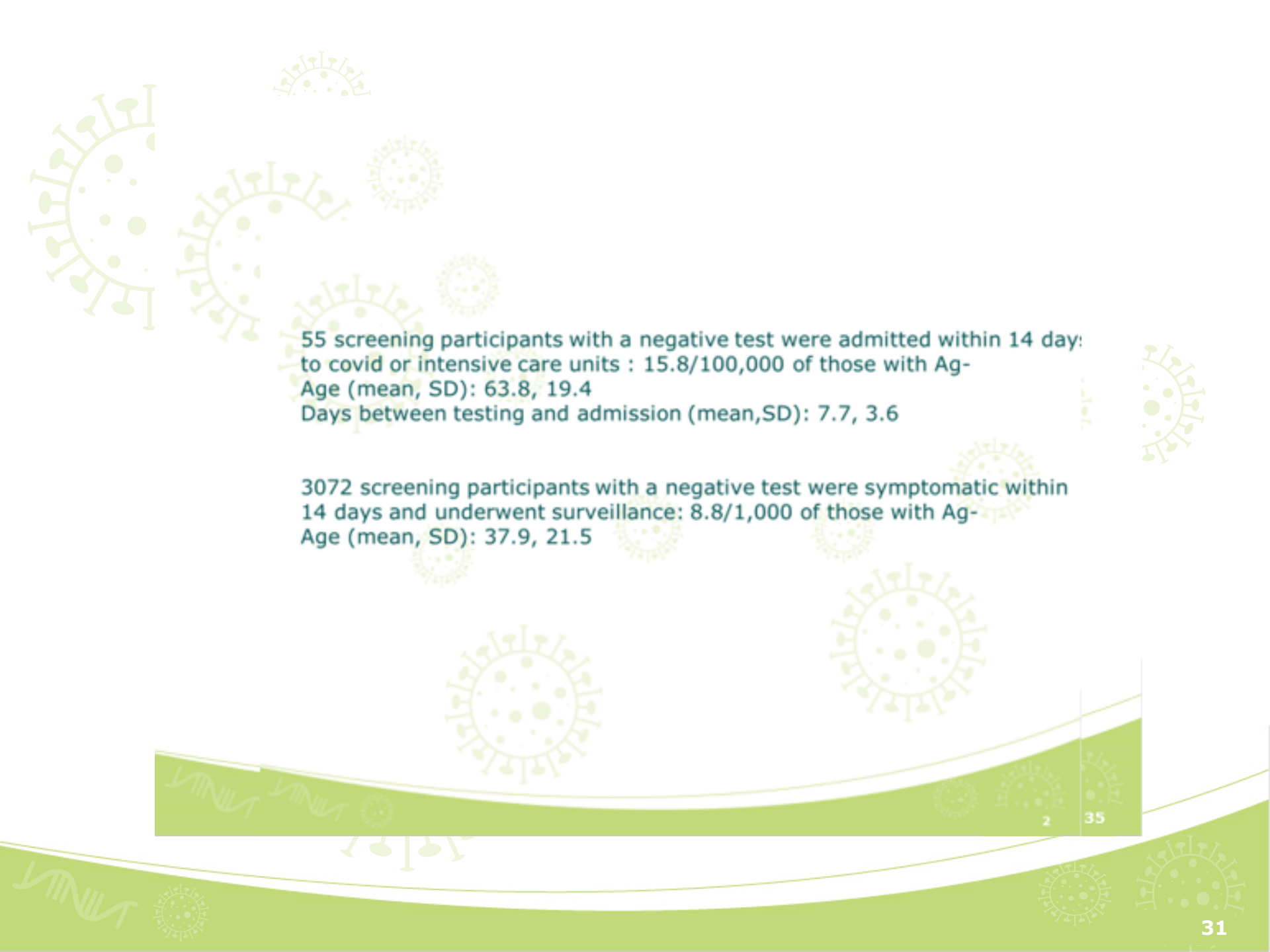

RDt nei giorni dell'ultima settimana

Next steps

Monitoring the epidemiologic situation

- **Monitoring South Tyrol** is a initiative with a sample of **20.000 citizens** throughout the province with the aim of control the epidemiologic situation (weekly sample: 4.000 people). Furthermore, 900 school employees and 300 high school students will participate to the monitoring. The tests will be carried out on a **voluntary basis** every month - from December to March. The first tests are scheduled to take place next week. In order to gather as much information possible, the project-partner are ASTAT (provincial institute of statistics) and EURAC (Institute of Research).

Next steps

Monitoring the epidemiologic situation

- **Sectorial tests**, such as those carried out during the summer months on tourism workers, will also be repeated.
- **Monitoring** various **work environments**
- **Monitoring Social facilities** (not only for the elderly)
- **Wastewater monitoring** in collaboration with the Agency for the Environment and Climate Protection (Appa): a pilot project on wastewater analysis to detect the presence of the virus.
- **High school students** (98,000) and teachers on a monthly basis until the end of the emergency where it seems that it is the teachers who are most affected.
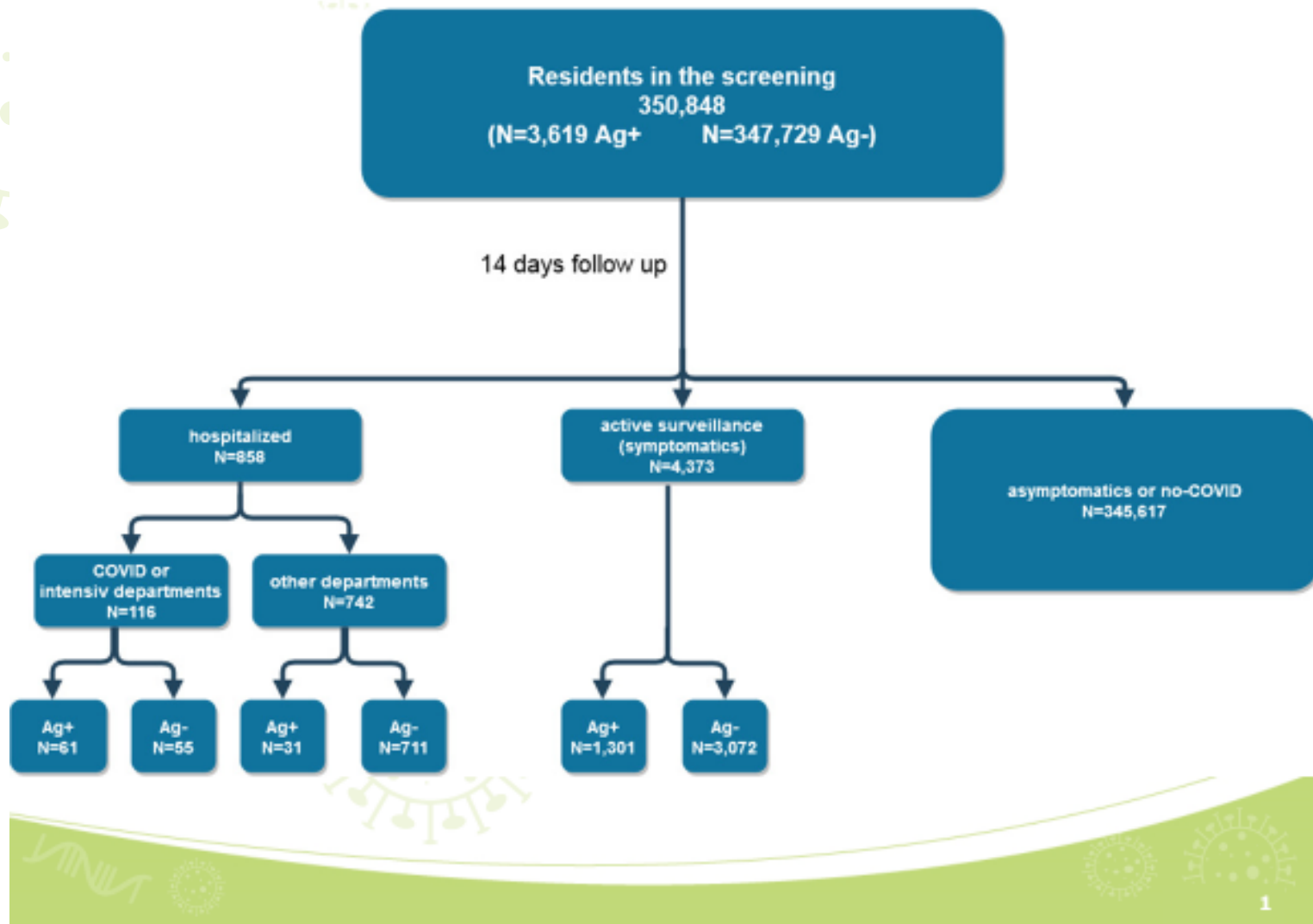
55 screening participants with a negative test were admitted within 14 day:
to covid or intensive care units : 15.8/100,000 of those with Ag-
Age (mean, SD): 63.8, 19.4
Days between testing and admission (mean,SD): 7.7, 3.6

3072 screening participants with a negative test were symptomatic within
14 days and underwent surveillance: 8.8/1,000 of those with Ag-
Age (mean, SD): 37.9, 21.5

Thanks for your attention