GIS DATA TO SUPPORT RESPONSE TO COVID-19: THE ITALIAN CASE

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Data sources (Italy and World)

Civil Protection
https://github.com/pcm-dpc/COVID-19

ISTAT Spatial database and census data
https://www.istat.it/it/archivio/104317

Ministry of Health
http://www.dati.salute.gov.it/dati/

Istituto Superiore di Sanità
https://www.epicentro.iss.it/coronavirus/sars-cov-2-sorveglianza-dati

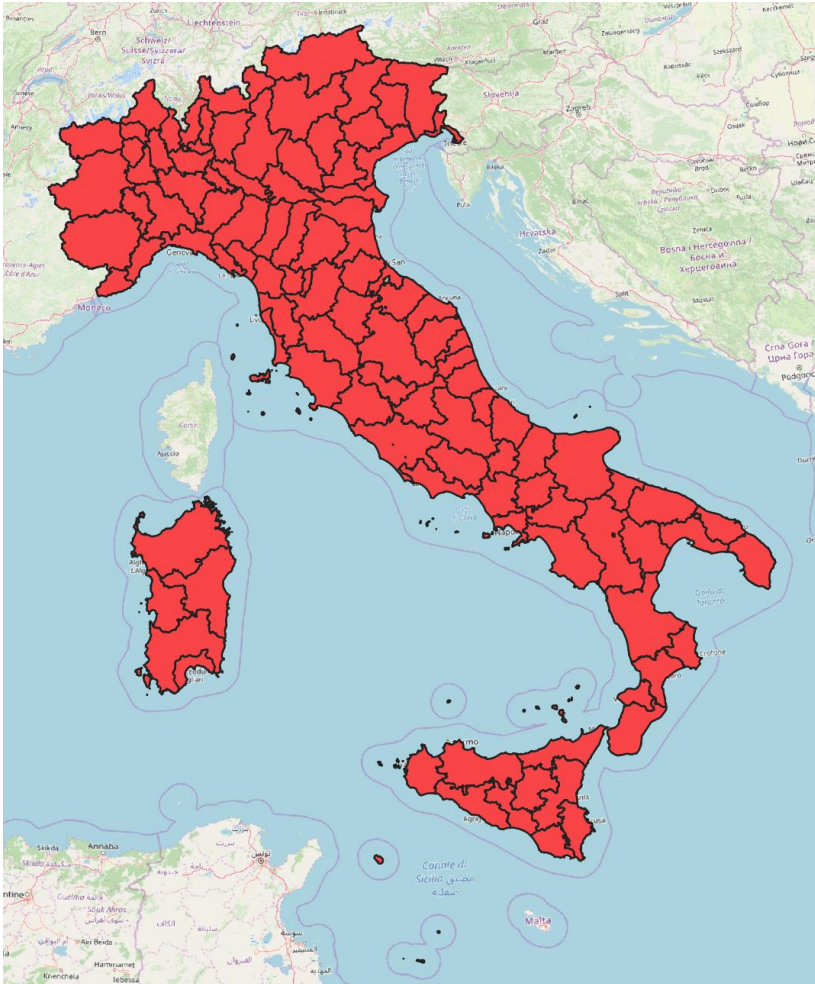Johns Hopkins University
https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data

Timeline of the pandemic in Italy

31/1/2020
- 2 tourists from Wuhan positive for the virus
- suspended all flights to and from China.

21/2/2020
16 confirmed cases in Lombardy

21/2/2020
Probable some not diagnosed cases in Bergamo province
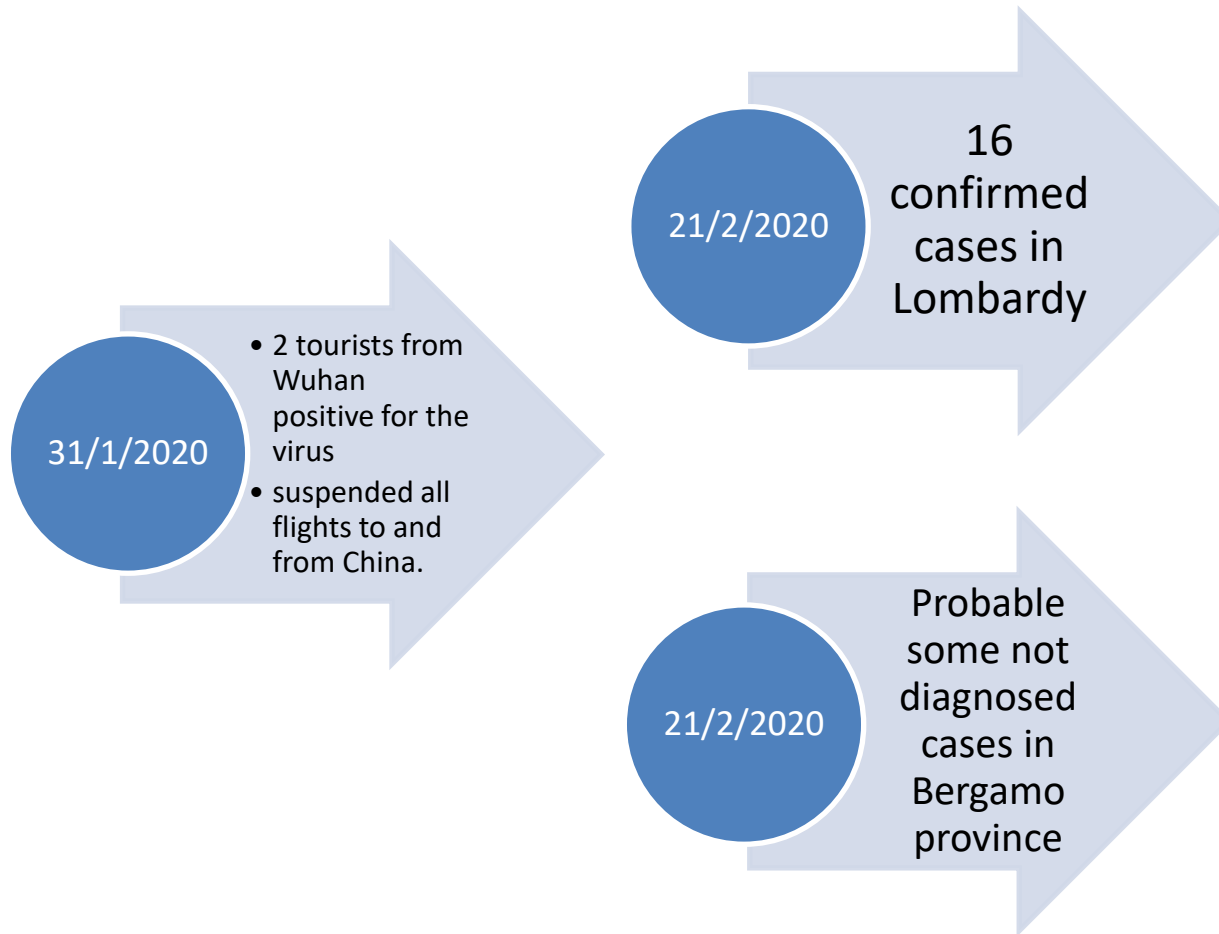
Timeline of the pandemic in Italy

Feb 22 — Lockdown for eleven municipalities (micro lockdown)

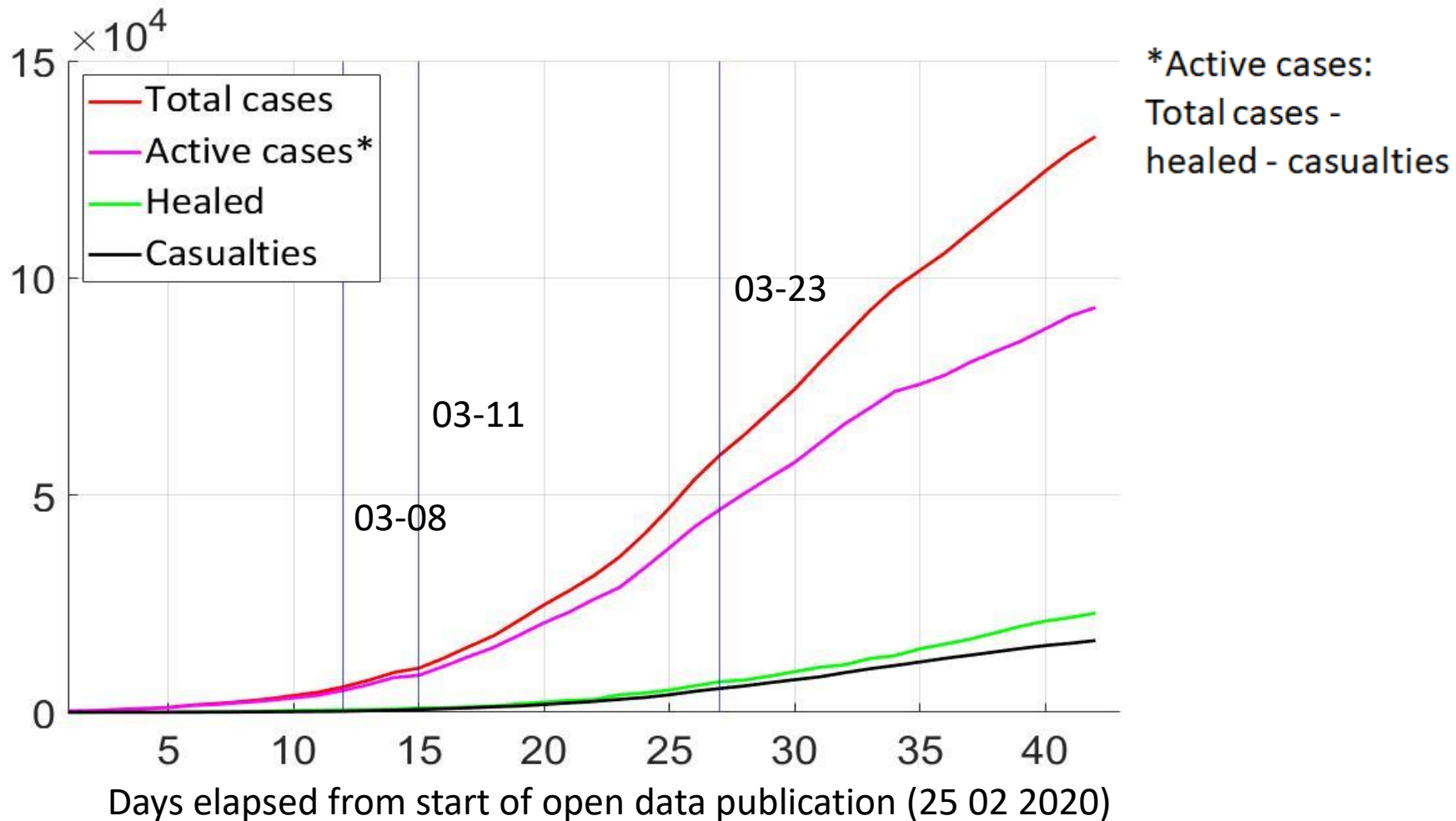**March 8** — Lockdown of Lombardy and 14 other Northern provinces

March 11 — Lockdown of the whole country

March 23 — "Complete" lockdown of the whole country

Timeline of the pandemic in Italy

Days elapsed from start of open data publication (25 02 2020)

*Active cases: Total cases - healed - casualties

Is the lockdown being effective?

A parameter to evaluate epidemic 'velocity':

Ratio of total cases at 6 days (average time of virus incubation*):
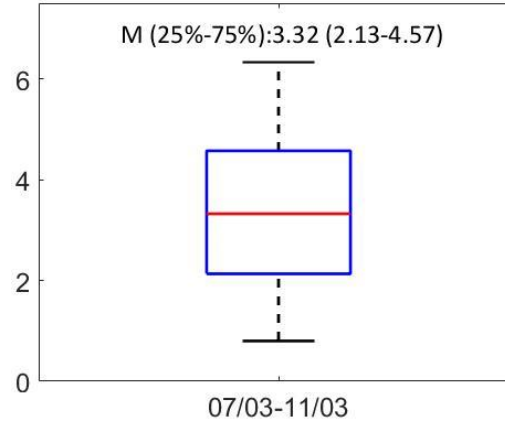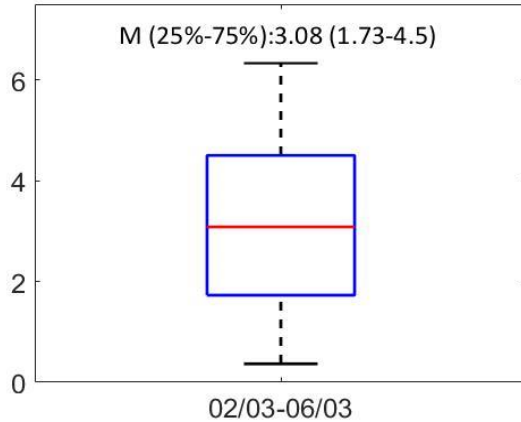R_{6d} = N° total cases at day(x) / N° total cases at day(x-6)

Increase of R_{6d}: epidemic accelerating (exp increase with power > 1)
Decrease of R_{6d}: epidemic decelerating (exp increase with power < 1)

Analysis: values computed for every 10k residents, according to data of the province they live in and represented in boxplots (aggregated for 5 days time spans from 25/02 to 07/04).

* https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf
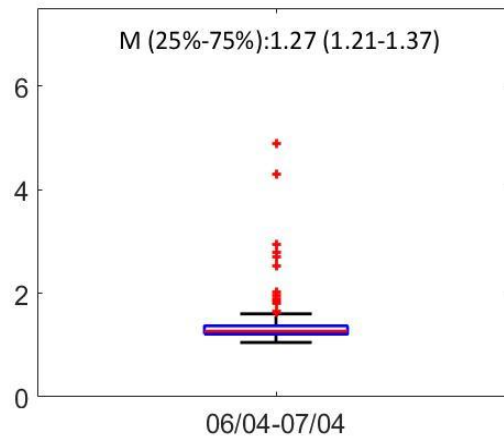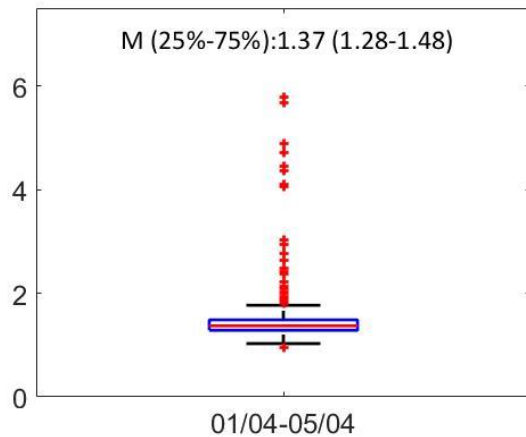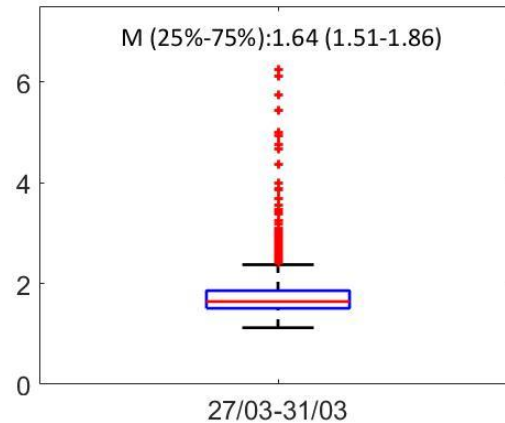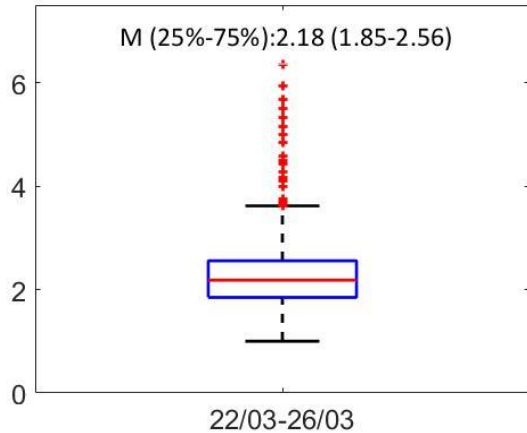
Is the lockdown being effective?

02/03 to 11/03: values are consistently increasing, revealing an acceleration phase in the epidemic.
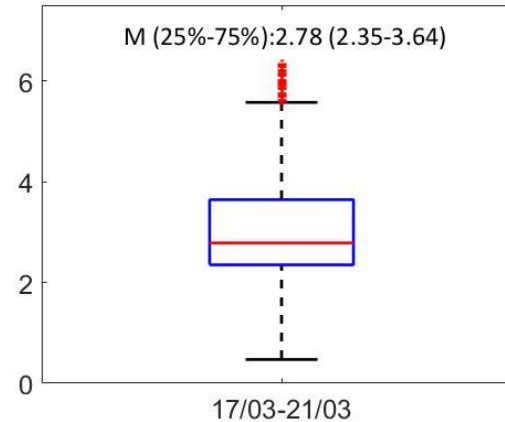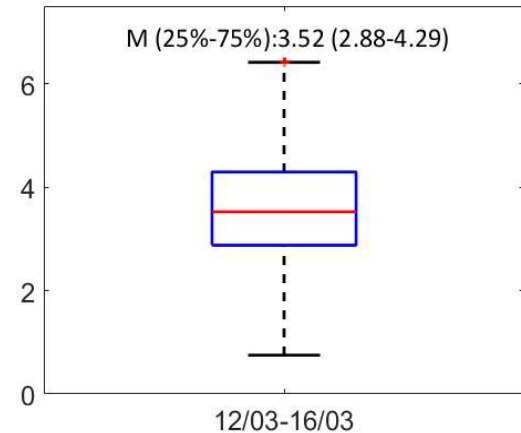
12/03 to 16/03: the effect of the lockdown is not visible yet (values still increasing).

17/03 to 21/03: values start to decrease (acceleration is negative, epidemic is slowing)

Is the lockdown being effective?

M (25%-75%):2.18 (1.85-2.56)

22/03-26/03

M (25%-75%):1.64 (1.51-1.86)

27/03-31/03

M (25%-75%):1.37 (1.28-1.48)

01/04-05/04

M (25%-75%):1.27 (1.21-1.37)

06/04-07/04

Consistent decreasing over time: epidemic is continuously slowing.

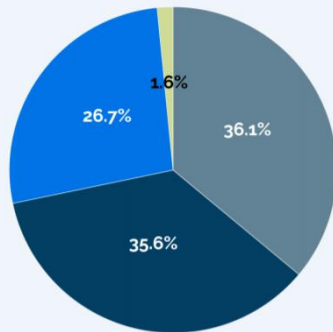Current median value is 1.27: epidemic ends when all values fall to 1.

The current situation (7 April 2020)

127,790 cases of COVID-19[*]
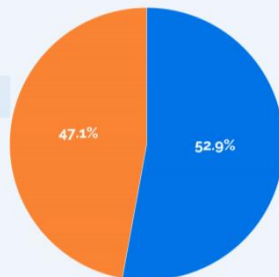
13,121 health-care workers [$]

15,751 associated deaths

Age

1.6%	
26.7%	36.1%
35.6%	

Legend: 0-18 | 19-50 | 51-70 | >70

Median age of cases; **62 years**

Sex

47.1% | 52.9%

Female
Male

Age (years)	Deaths [n (%)]	CFR[§]
0-9	1 (0%)	0.1%
10-19	0 (0%)	0%
20-29	7 (0%)	0.1%
30-39	35 (0.2%)	0.4%
40-49	141 (0.9%)	0.8%
50-59	591 (3.8%)	2.4%
60-69	1821 (11.7%)	8.8%
70-79	5103 (32.8%)	23.2%
80-89	6254 (40.2%)	31.2%
>=90	1616 (10.4%)	27%
Not reported	2 (0%)	1.2%
Total	15571 (100%)	12.2%

Infection and Case Fatality Rate: a matter of policies

- **INFECTION FATALITY RATE (IFR)** = DEATHS/TOTAL INFECTED POPULATION (ASYNTHOMATICS AND SYNTHOMATICS NOT DIAGNOSED INCLUDED) [1.14%]

- **CASE FATALITY RATE (CFR)** = DEATHS/ TOTAL CONFIRMED (DIAGNOSED) CASES

- CFR = **18.1% Lombardy vs 5.8% Veneto:** strongly depends on testing policy
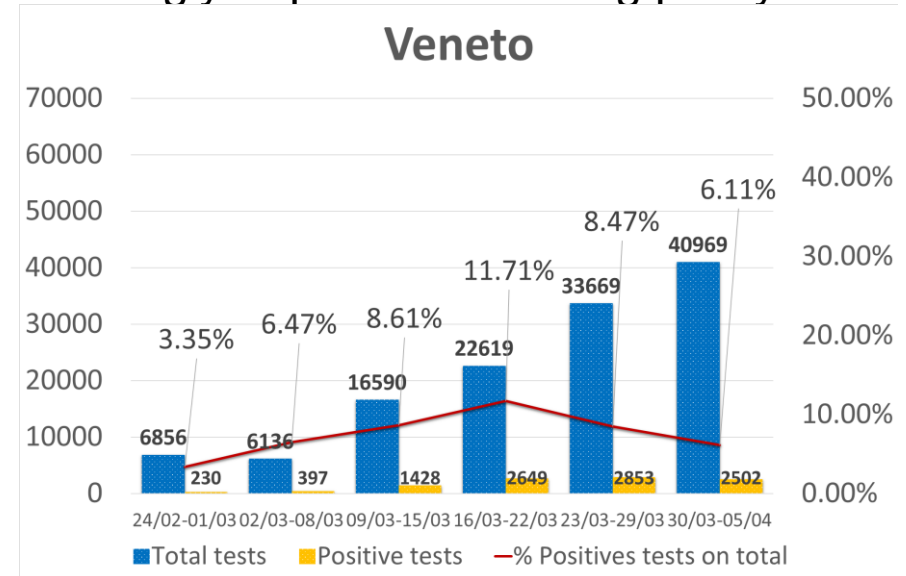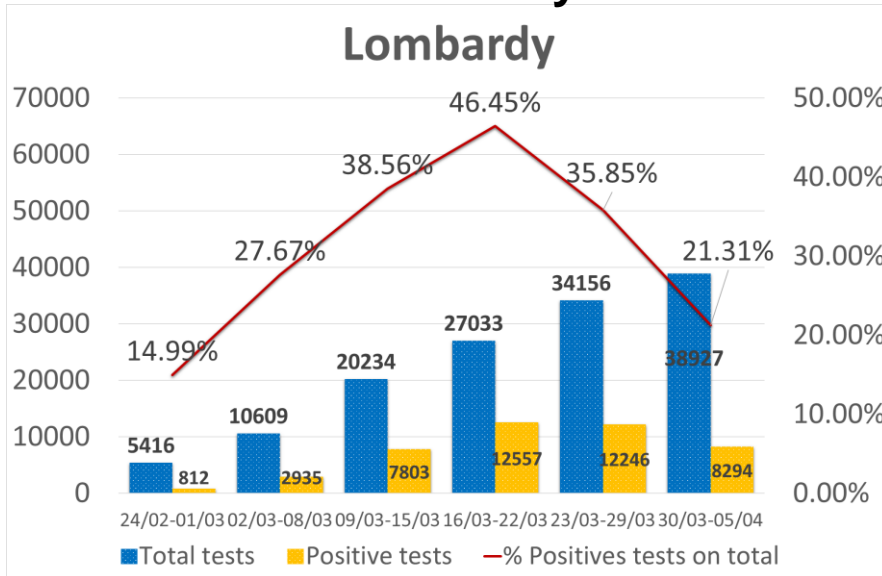
Total number of tests per week, with number and percentage of positive results
Comparison between Lombardy and Veneto

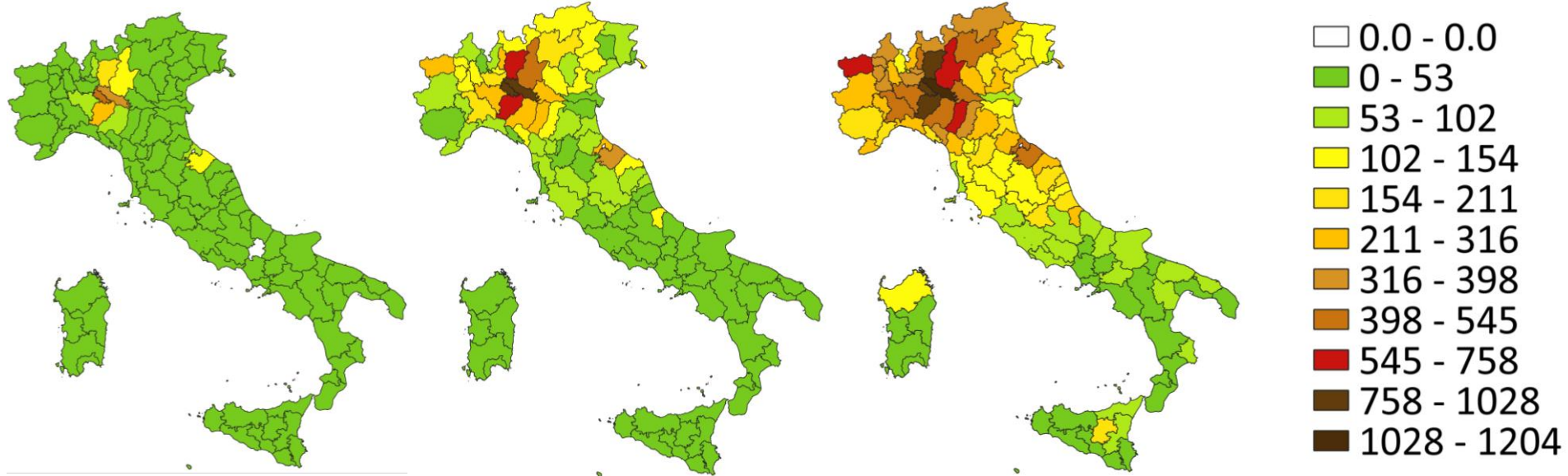# Incidence on resident population
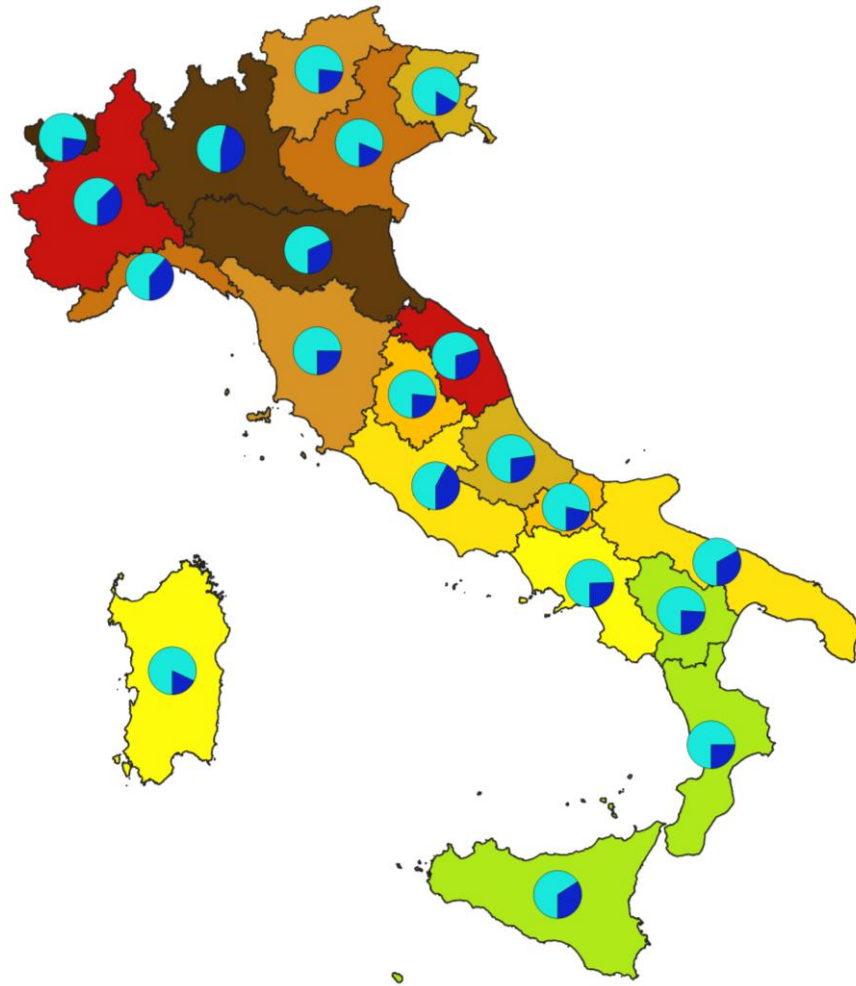
Incidence* at:
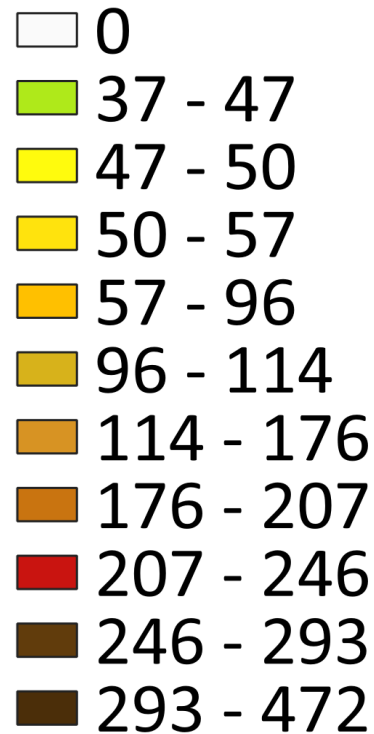
03-12   03-24   04-07   Legend

Legend:
- 0.0 - 0.0
- 0 - 53
- 53 - 102
- 102 - 154
- 154 - 211
- 211 - 316
- 316 - 398
- 398 - 545
- 545 - 758
- 758 - 1028
- 1028 - 1204

* total cases for 100k residents

Hospitalized rates

Active cases / 100k residents

- ☐ 0
- ☐ 37 - 47
- ☐ 47 - 50
- ☐ 50 - 57
- ☐ 57 - 96
- ☐ 96 - 114
- ☐ 114 - 176
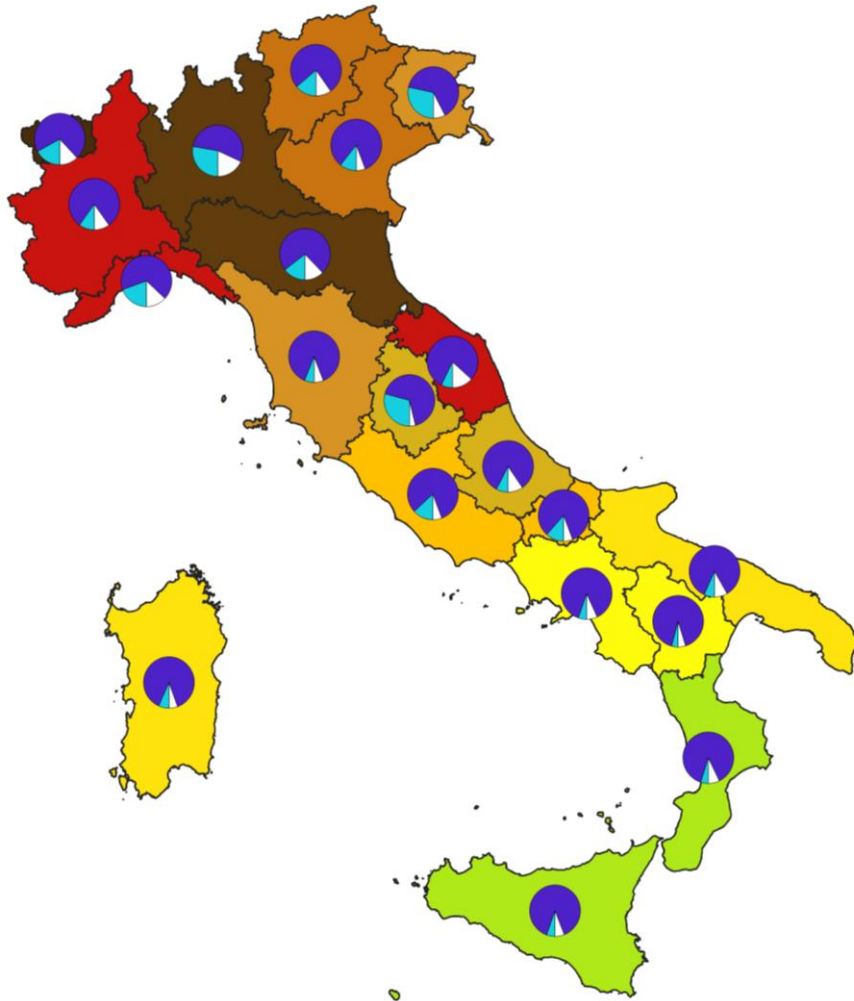- ☐ 176 - 207
- ☐ 207 - 246
- ☐ 246 - 293
- ☐ 293 - 472

Home isolation
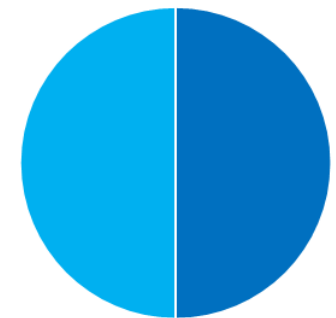
Hospitalized

CFR per region

Total cases / 100k residents

- ☐ 0
- 🟩 42 - 43
- 🟨 43 - 54
- 🟨 54 - 62
- 🟧 62 - 73
- 🟫 73 - 143
- 🟫 143 - 177
- 🟫 177 - 243
- 🟥 243 - 309
- 🟫 309 - 520
- 🟫 520 - 664
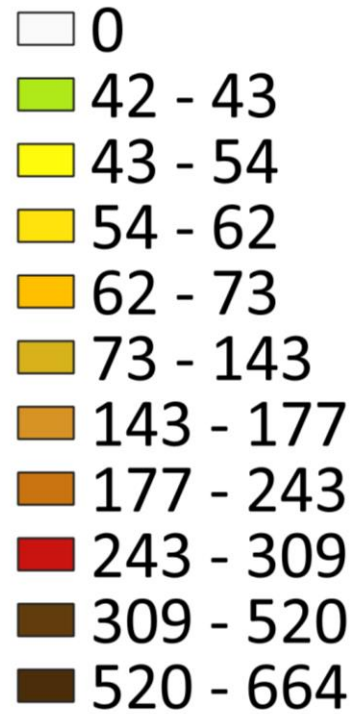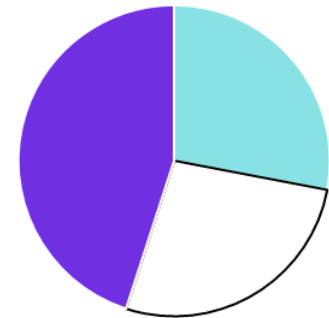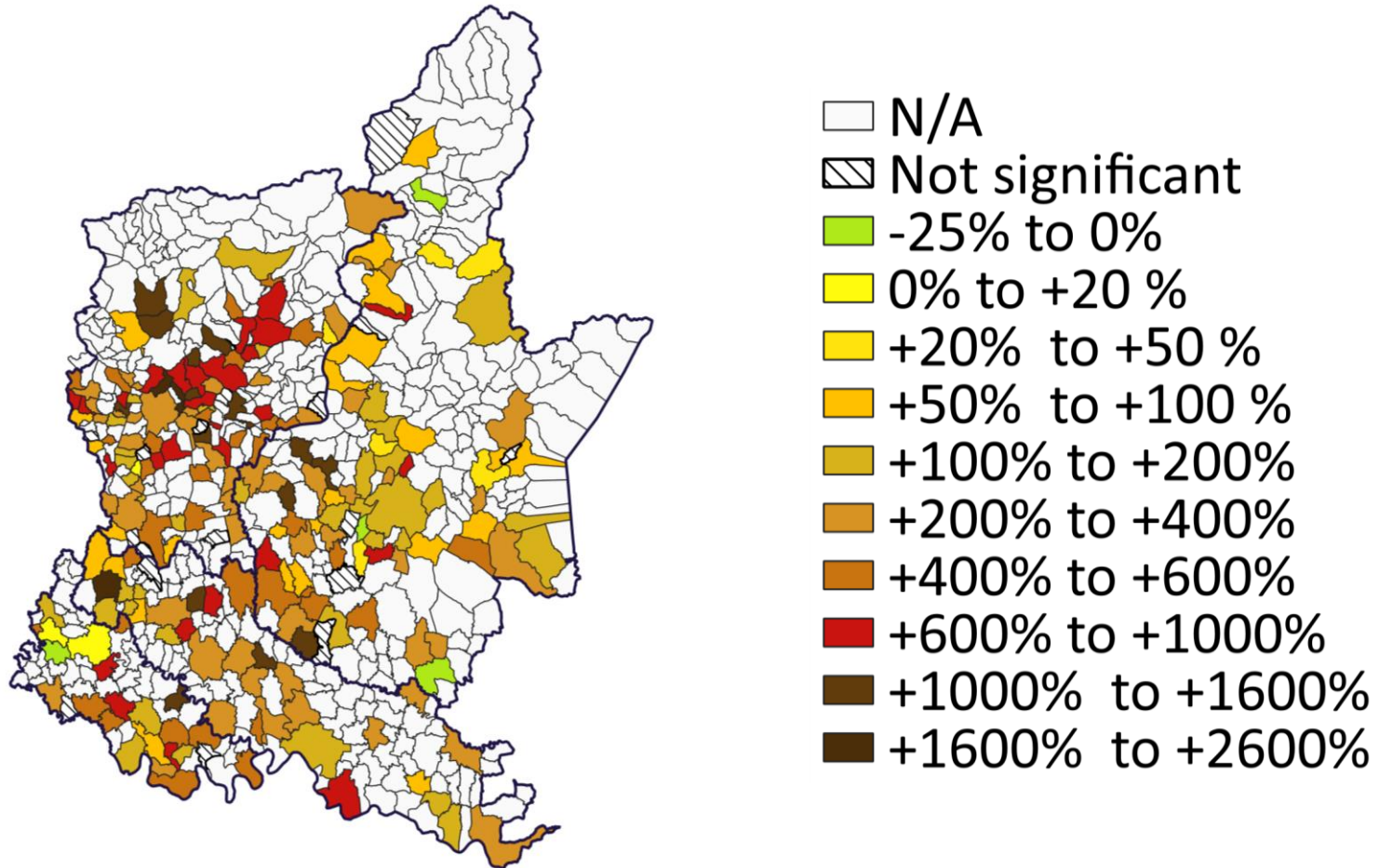
Active cases

Healed
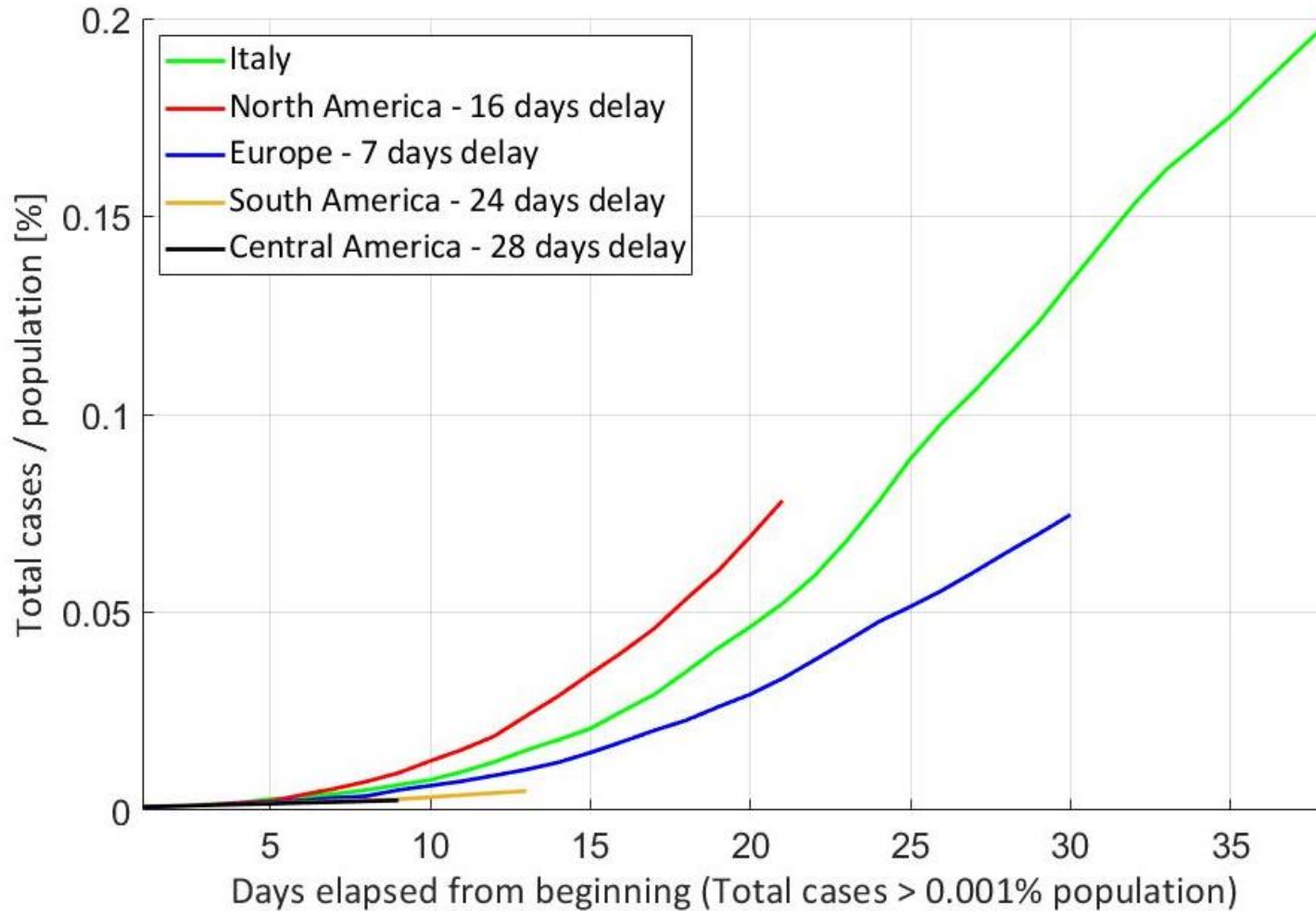
Casualties

Increase of deaths compared to 2019 (%)

Provinces of Bergamo, Brescia, Cremona and Lodi (Lombardy) - January to March

N/A
Not significant
-25% to 0%
0% to +20 %
+20% to +50 %
+50% to +100 %
+100% to +200%
+200% to +400%
+400% to +600%
+600% to +1000%
+1000% to +1600%
+1600% to +2600%

Comparison with Americas

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