Analisi COVID-19 - Federico

March 20, 2020

1 Analisi Covid_19

Analisi a livello regionale:

- Ogni regione grafico singolo
- Todo: aggiungere mortalità per regione ##### Analisi a livello nazionale
- Casi totali Italia
- Aggiungere proporzione guariti/terapia intensiva

TODO:

- Generazione giornalieria automatica
- Devo aggiustare il codice che è disordinato e senza commenti
- Scrivere un Readme.md come si deve

[16]:
```
# Importo librerie e apro primo .csv (livello regionale)

import pandas as pd
import matplotlib.pyplot as plt
import pylab
df = pd.read_csv('COVID-19/dati-regioni/dpc-covid19-ita-regioni.csv')
```

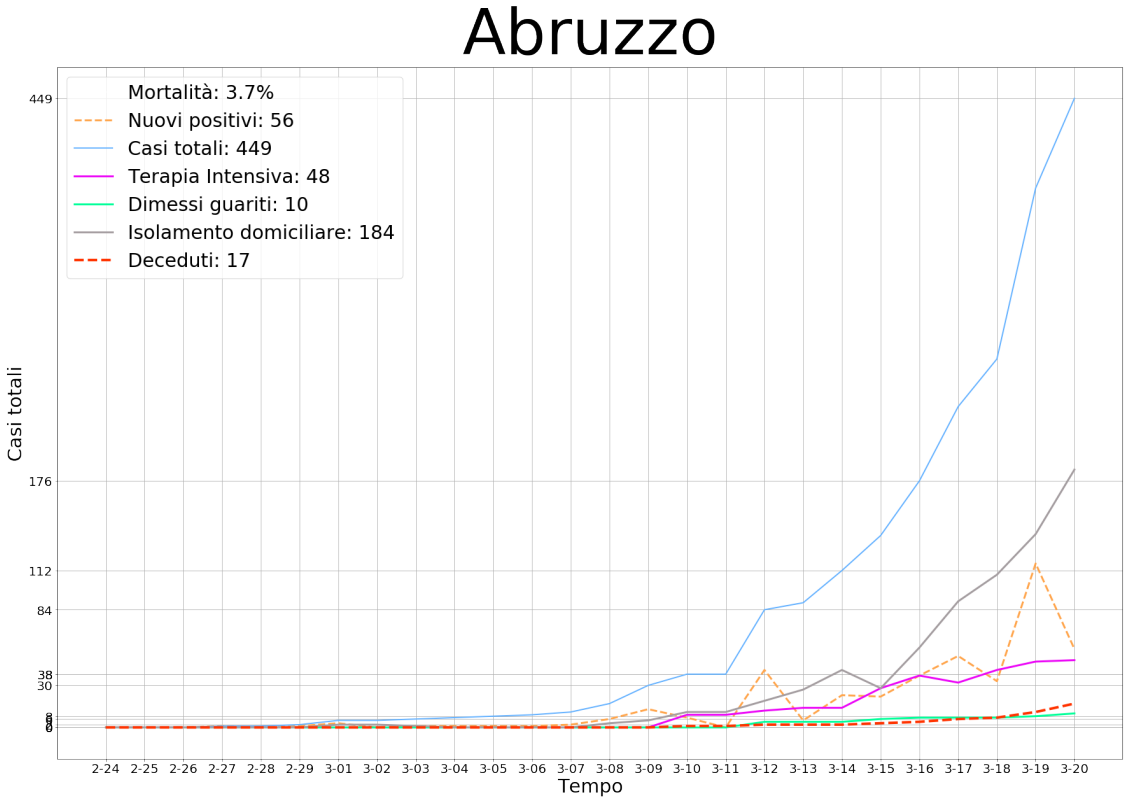
[20]:
```
# Lista regioni

regione_tot = ['Abruzzo', 'Basilicata', 'P.A. Bolzano', 'Calabria', 'Campania',␣
 ↪'Emilia Romagna',
               'Friuli Venezia Giulia', 'Lazio', 'Liguria', 'Lombardia',␣
 ↪'Marche', 'Molise', 'Piemonte', 'Puglia',
               'Sardegna', 'Sicilia', 'Toscana', 'P.A. Trento', 'Umbria',␣
 ↪"Valle d'Aosta", 'Veneto'
]
df.columns
```

[20]:
```
Index(['data', 'stato', 'codice_regione', 'denominazione_regione', 'lat',
       'long', 'ricoverati_con_sintomi', 'terapia_intensiva',
       'totale_ospedalizzati', 'isolamento_domiciliare',
       'totale_attualmente_positivi', 'nuovi_attualmente_positivi',
       'dimessi_guariti', 'deceduti', 'totale_casi', 'tamponi'],
      dtype='object')
```

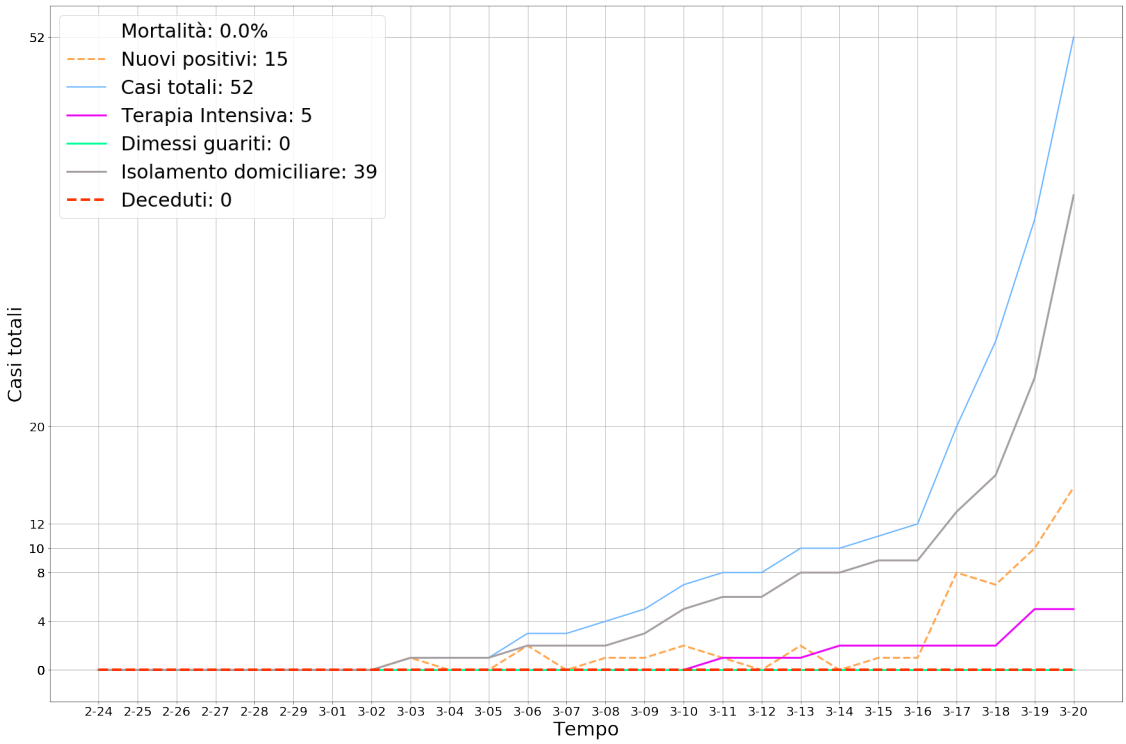
[26]:
```
# Manipolazione lista regioni per ottenere i dati raggruppati per regione.

for z in regione_tot:
    regione = df.loc[df['denominazione_regione'] == z]
    x1 = regione.data
    x2 = regione.totale_casi
    x3 = regione.terapia_intensiva
    x4 = regione.deceduti
    x5 = regione.dimessi_guariti
    x6 = regione.nuovi_attualmente_positivi

    ticks = []
    ticks_1 = []

    x = []
    for f in x1:
        x.append(f[6:10])

    legenda_casi_totali = []
    for casi in x2:
        legenda_casi_totali.append(casi)

    for w in legenda_casi_totali:
        if w % 2 == 0:
            ticks.append(w)
        else:
            pass


    legenda_terapia_intensiva = []
    for casi in x3:
        legenda_terapia_intensiva.append(casi)

    legenda_deceduti = []
    for casi in x4:
        legenda_deceduti.append(casi)

    legenda_guariti = []
    for casi in x5:
        legenda_guariti.append(casi)

    legenda_nuovi_positivi = []
    for casi in x6:
        legenda_nuovi_positivi.append(casi)

    ticks_1.append(legenda_casi_totali[-1])
    ticks.extend(ticks_1)
```

```
    totale_casi = regione.totale_casi
    terapia_intensiva = regione.terapia_intensiva
    deceduti = regione.deceduti
    dimessi_guariti = regione.dimessi_guariti
    nuovi_positivi = regione.nuovi_attualmente_positivi
    iso_domic = regione.isolamento_domiciliare

    legenda_iso_domic = []
    for domic in iso_domic:
        legenda_iso_domic.append(domic)

    plt.rcParams["figure.figsize"]=30,20

    plt.rc('ytick', labelsize=20)
    plt.rc('xtick', labelsize=20)
    plt.rc('axes', labelsize=30)

    plt.title("{}".format(z), fontsize=100)
    plt.yticks(ticks)

    plt.xlabel("Tempo")
    plt.ylabel("Casi totali")

    toll_1_tot = int(legenda_casi_totali[-1])
    toll_2_tot = int(legenda_deceduti[-1])
    death_toll = (toll_2_tot/toll_1_tot)*100
    conv_deth_toll = str(death_toll)

    plt.plot(death_toll, color='#FFFFFF', label="Mortalità: {}%".
↪format(conv_deth_toll[:3]))
    plt.plot(x, nuovi_positivi, color="#ffa64d", linewidth=3, linestyle="--",␣
↪label="Nuovi positivi: {}".format(legenda_nuovi_positivi[-1]))
    plt.plot(x,totale_casi, color='#66b3ff', linewidth=2, label='Casi totali:␣
↪{}'.format(legenda_casi_totali[-1]))
    plt.plot(x,terapia_intensiva, color='#EC08F7', linewidth=3, label='Terapia␣
↪Intensiva: {}'.format(legenda_terapia_intensiva[-1]))
    plt.plot(x,dimessi_guariti, color='#00ff99', linewidth=3, label='Dimessi␣
↪guariti: {}'.format(legenda_guariti[-1]))
    plt.plot(x, iso_domic, color="#A59EA1", linewidth=3, label='Isolamento␣
↪domiciliare: {}'.format(legenda_iso_domic[-1]))
    plt.plot(x,deceduti, color='#ff3300', linestyle="--", linewidth=4,␣
↪label='Deceduti: {}'.format(legenda_deceduti[-1]))
    plt.legend(prop={'size': 30})
    plt.grid()
```

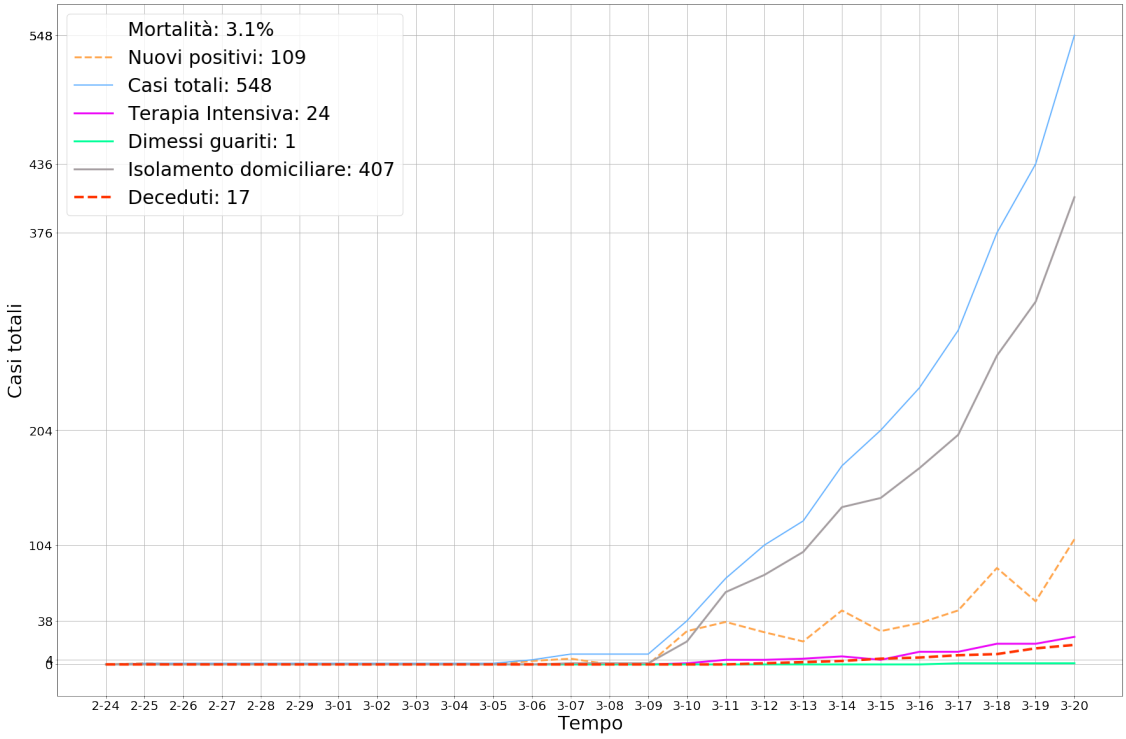
```
    # Togliendo il commento tutti i grafici verranno salvati in formato .png in␣
↪locale
    # plt.savefig('Estrazioni_reg/{}.png'.format(z))
    plt.show()
    plt.clf()
```



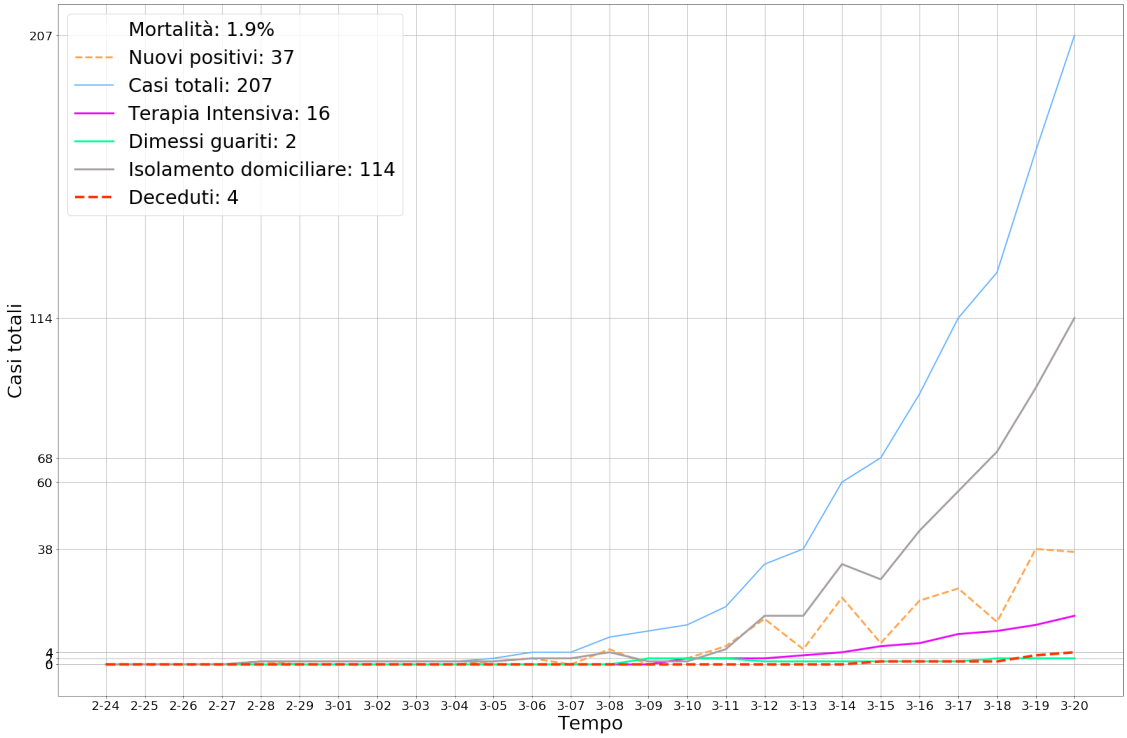
Basilicata



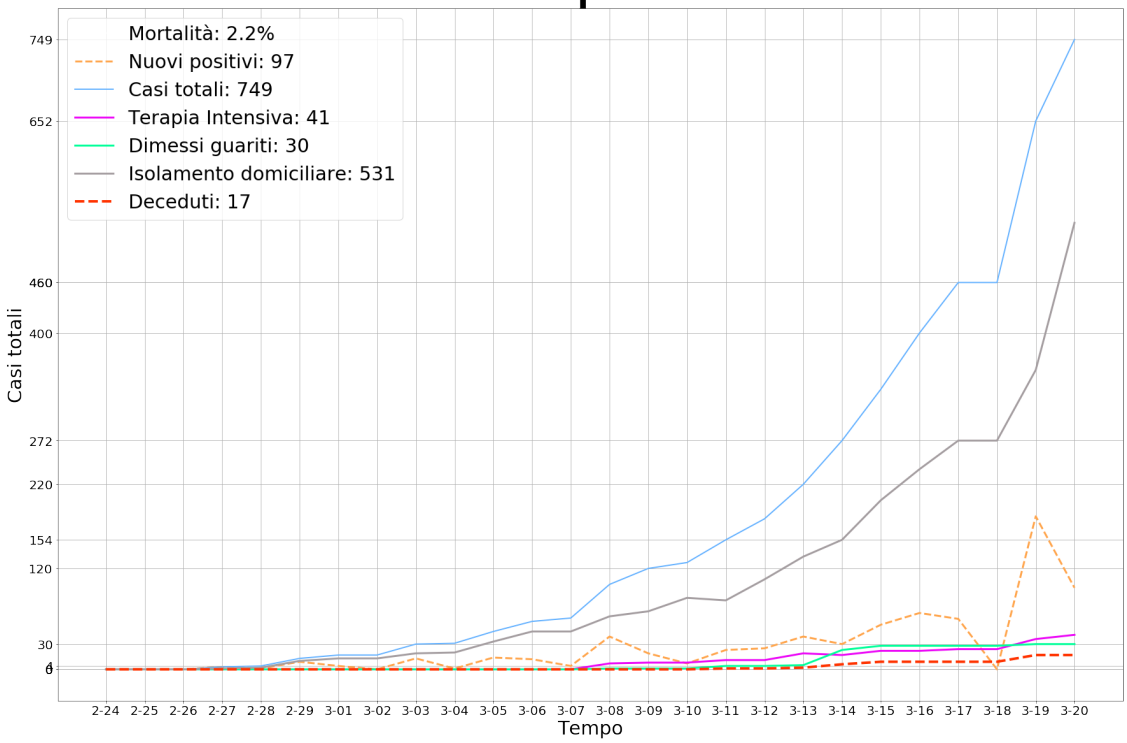
P.A. Bolzano



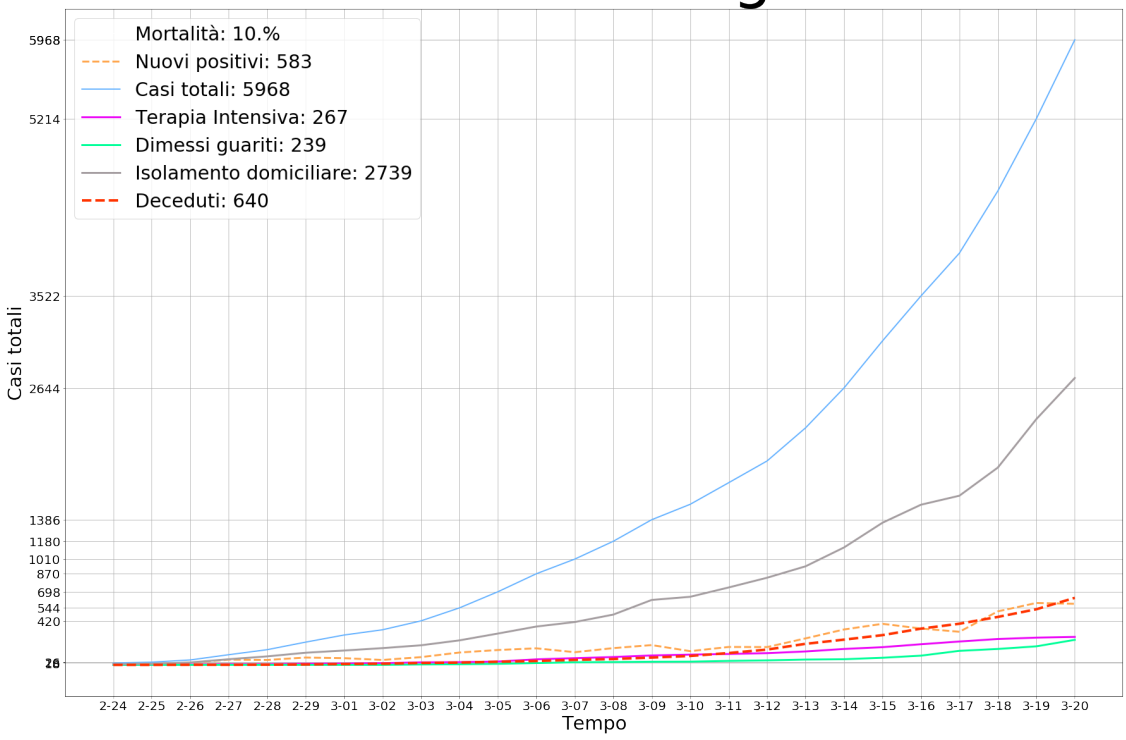
Calabria


Mortalità: 1.9%
Nuovi positivi: 37
Casi totali: 207
Terapia Intensiva: 16
Dimessi guariti: 2
Isolamento domiciliare: 114
Deceduti: 4
Casi totali
207
114
68
60
38
4
2
0
2-24 2-25 2-26 2-27 2-28 2-29 3-01 3-02 3-03 3-04 3-05 3-06 3-07 3-08 3-09 3-10 3-11 3-12 3-13 3-14 3-15 3-16 3-17 3-18 3-19 3-20
Tempo

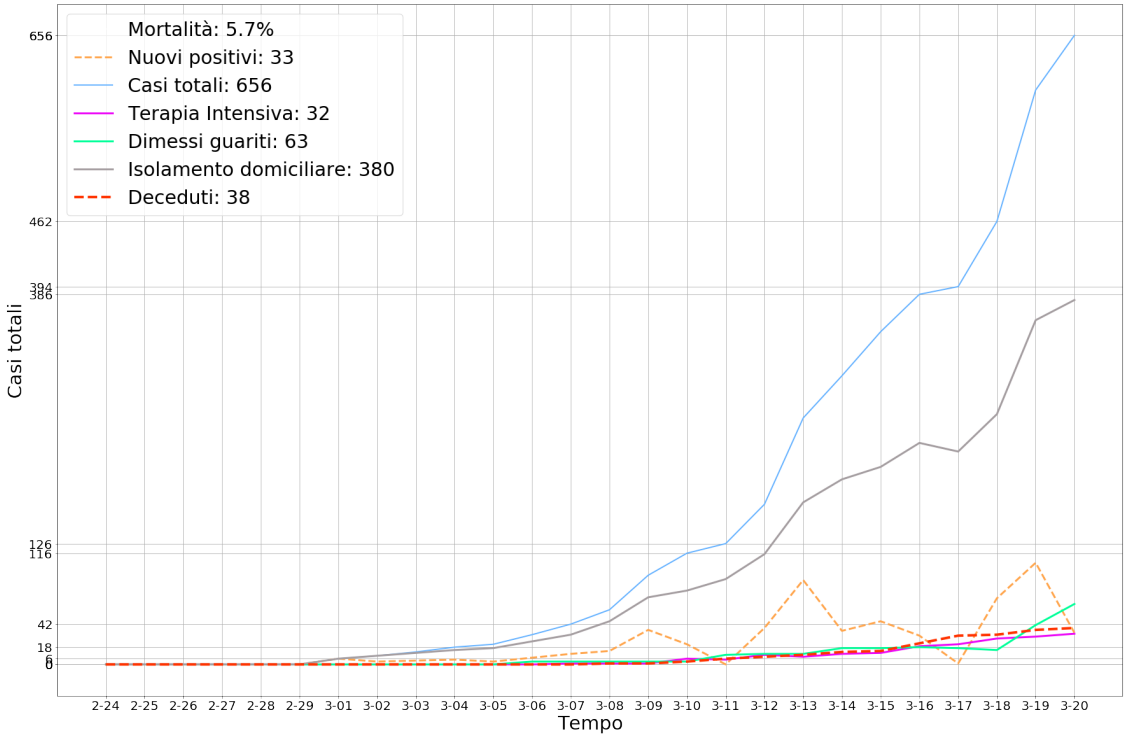
Campania



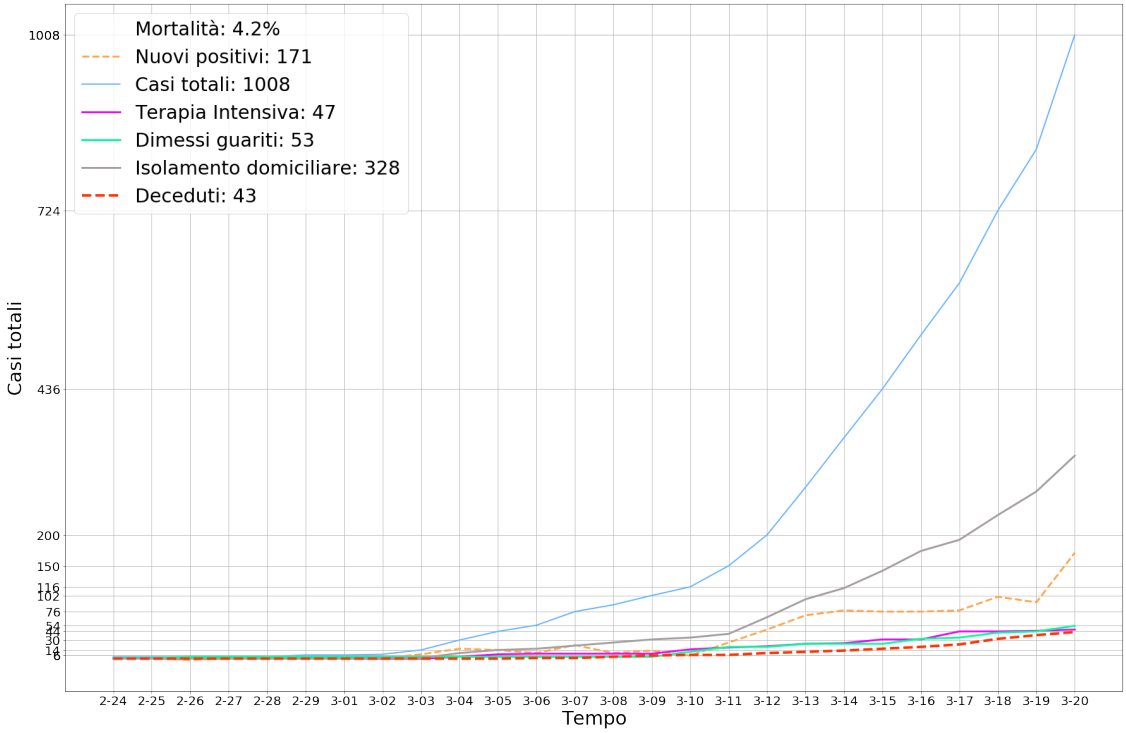
Emilia Romagna



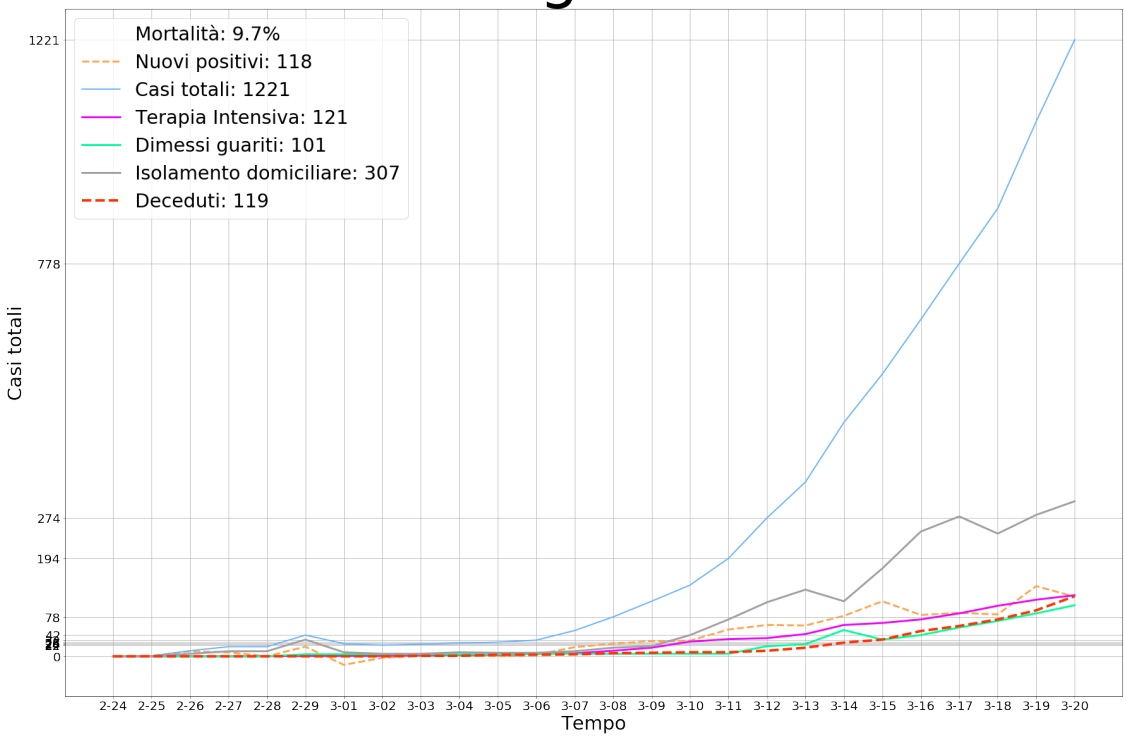
Friuli Venezia Giulia



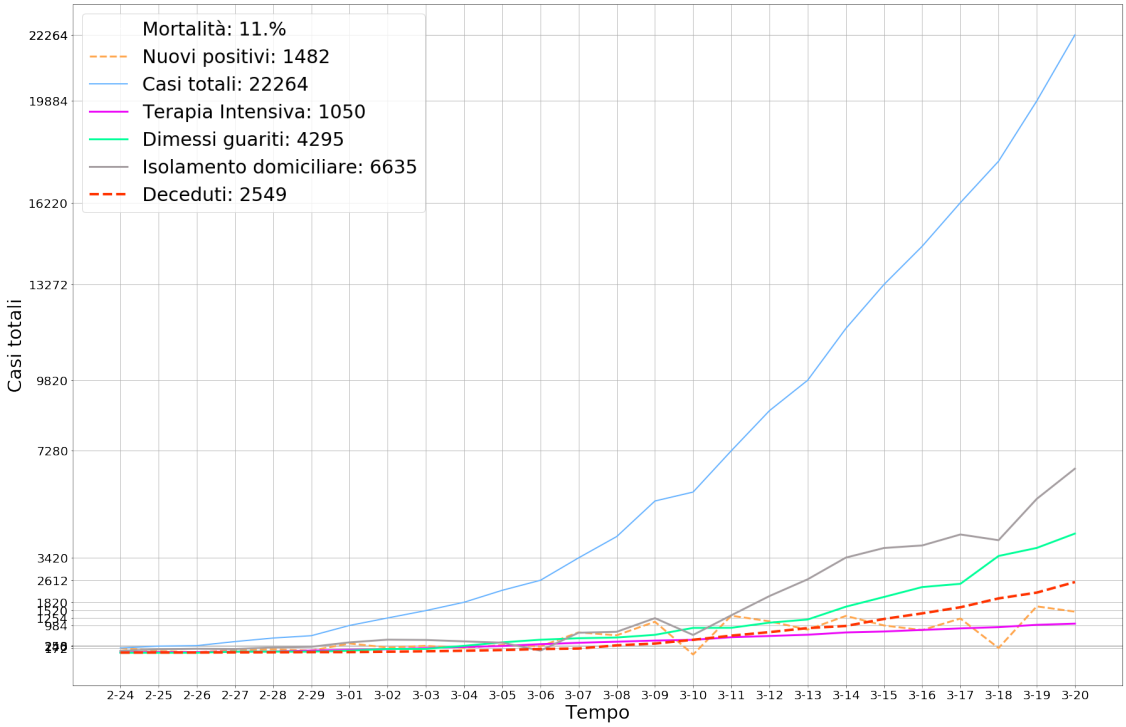
Lazio



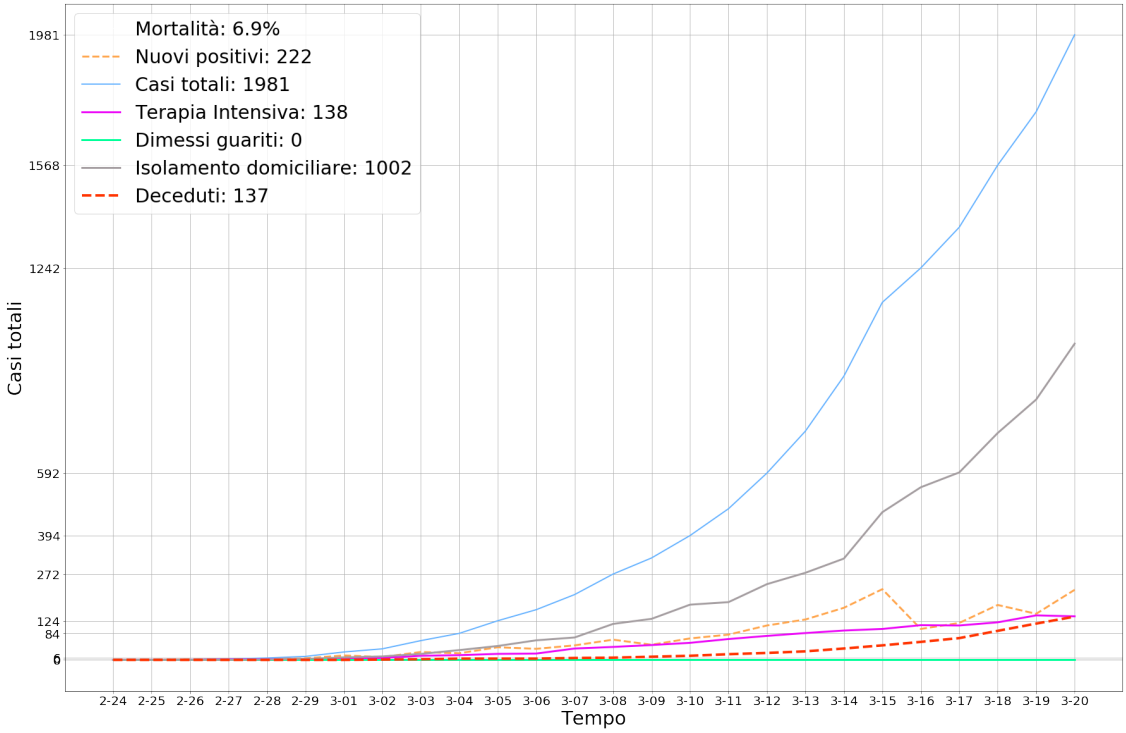
Liguria



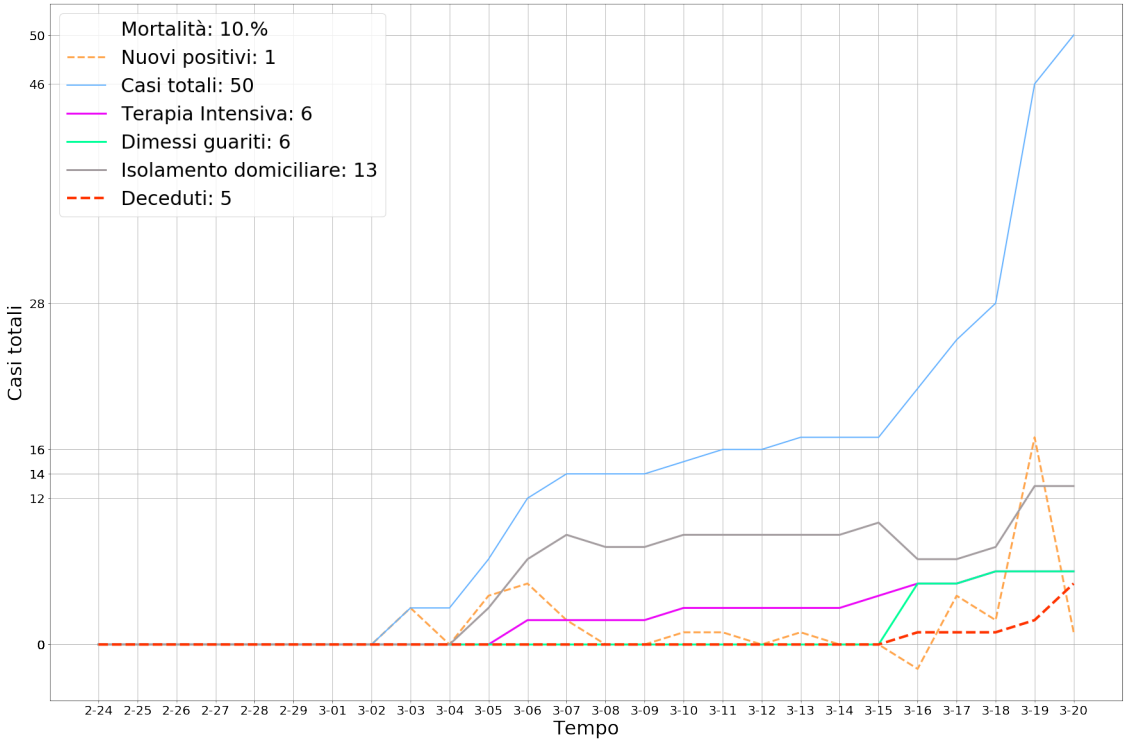
Lombardia


Mortalità: 11.%
Nuovi positivi: 1482
Casi totali: 22264
Terapia Intensiva: 1050
Dimessi guariti: 4295
Isolamento domiciliare: 6635
Deceduti: 2549
Casi totali
22264
19884
16220
13272
9820
7280
3420
2612
1820
1520
1254
984
2-24 2-25 2-26 2-27 2-28 2-29 3-01 3-02 3-03 3-04 3-05 3-06 3-07 3-08 3-09 3-10 3-11 3-12 3-13 3-14 3-15 3-16 3-17 3-18 3-19 3-20
Tempo

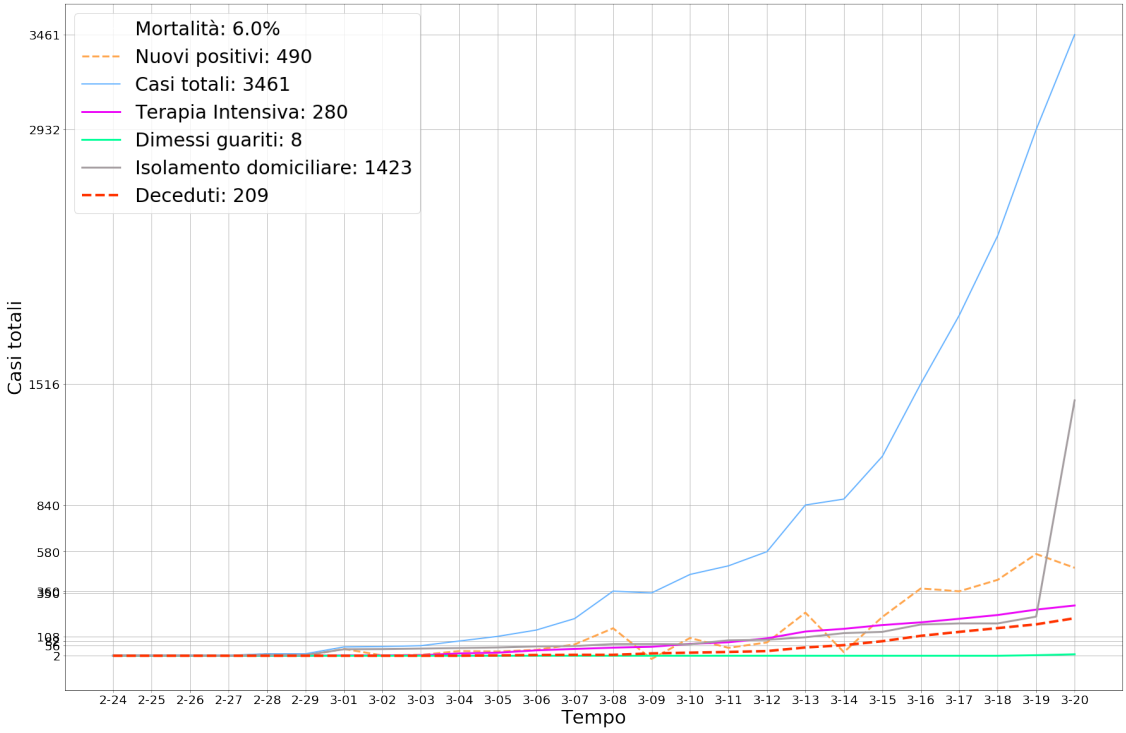
Marche



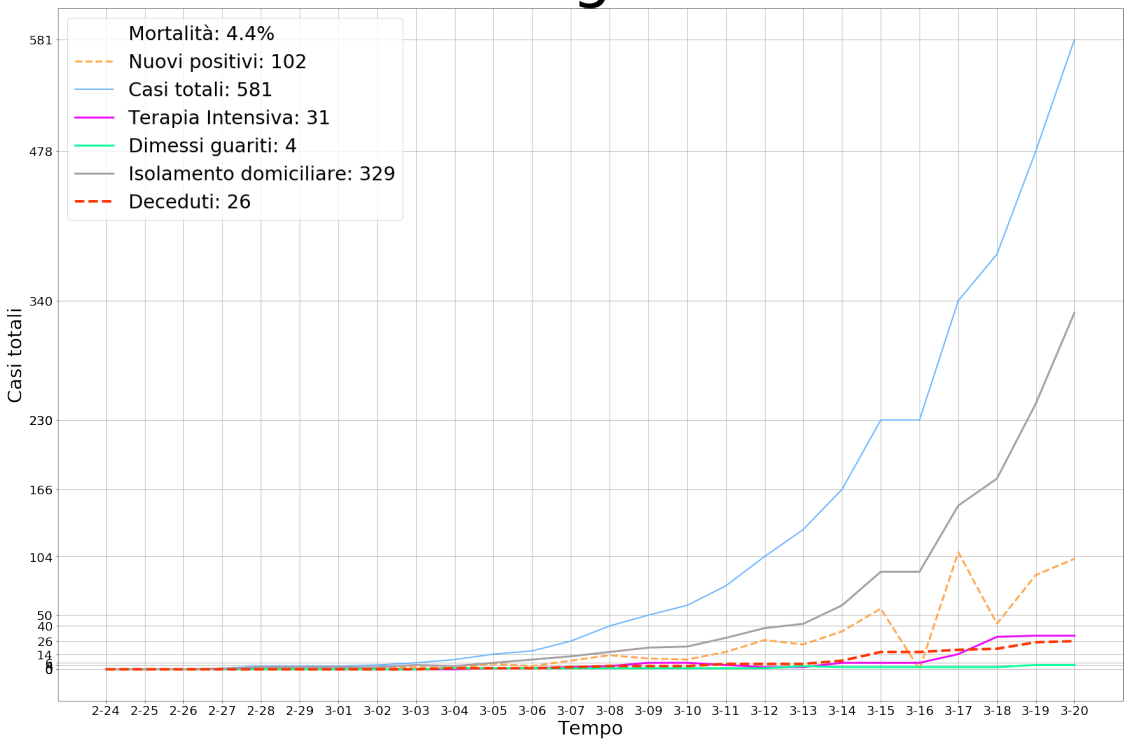
Molise



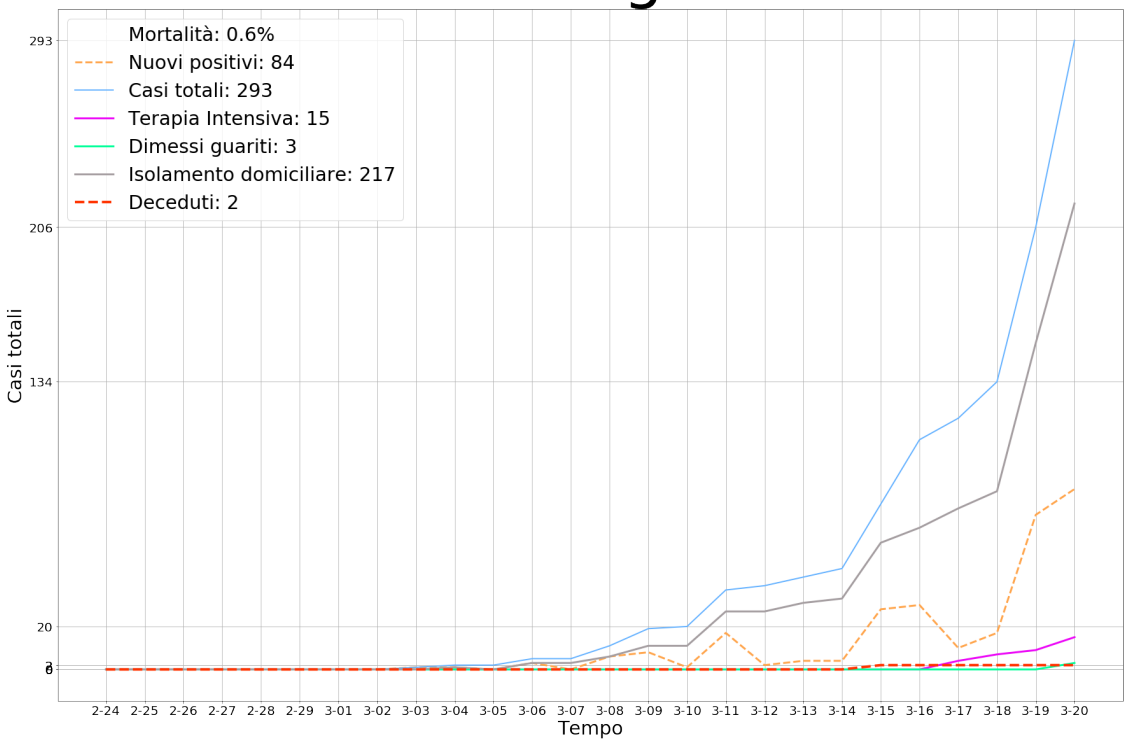
Piemonte


Mortalità: 6.0%
Nuovi positivi: 490
Casi totali: 3461
Terapia Intensiva: 280
Dimessi guariti: 8
Isolamento domiciliare: 1423
Deceduti: 209
Casi totali
3461
2932
1516
840
580
350
198
56
2
2-24
2-25
2-26
2-27
2-28
2-29
3-01
3-02
3-03
3-04
3-05
3-06
3-07
3-08
3-09
3-10
3-11
3-12
3-13
3-14
3-15
3-16
3-17
3-18
3-19
3-20
Tempo

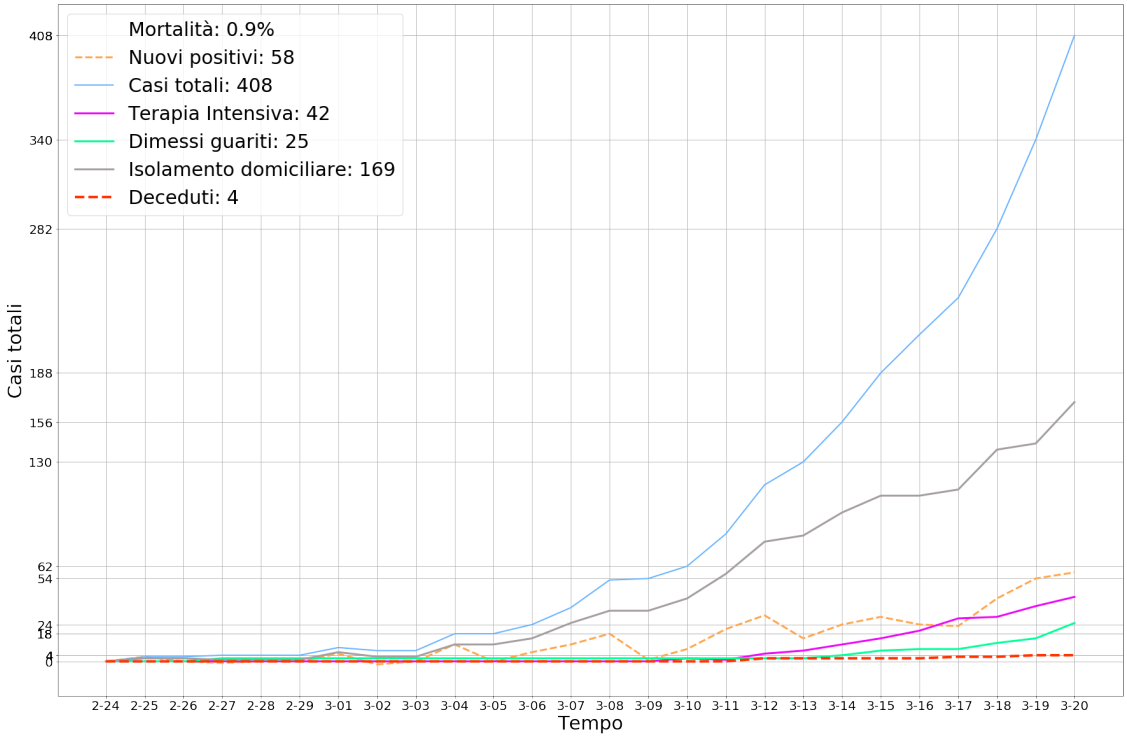
Puglia



Sardegna



Sicilia


Mortalità: 0.9%
Nuovi positivi: 58
Casi totali: 408
Terapia Intensiva: 42
Dimessi guariti: 25
Isolamento domiciliare: 169
Deceduti: 4
Casi totali
Tempo
408
340
282
188
156
130
62
54
24
18
4
0
2-24
2-25
2-26
2-27
2-28
2-29
3-01
3-02
3-03
3-04
3-05
3-06
3-07
3-08
3-09
3-10
3-11
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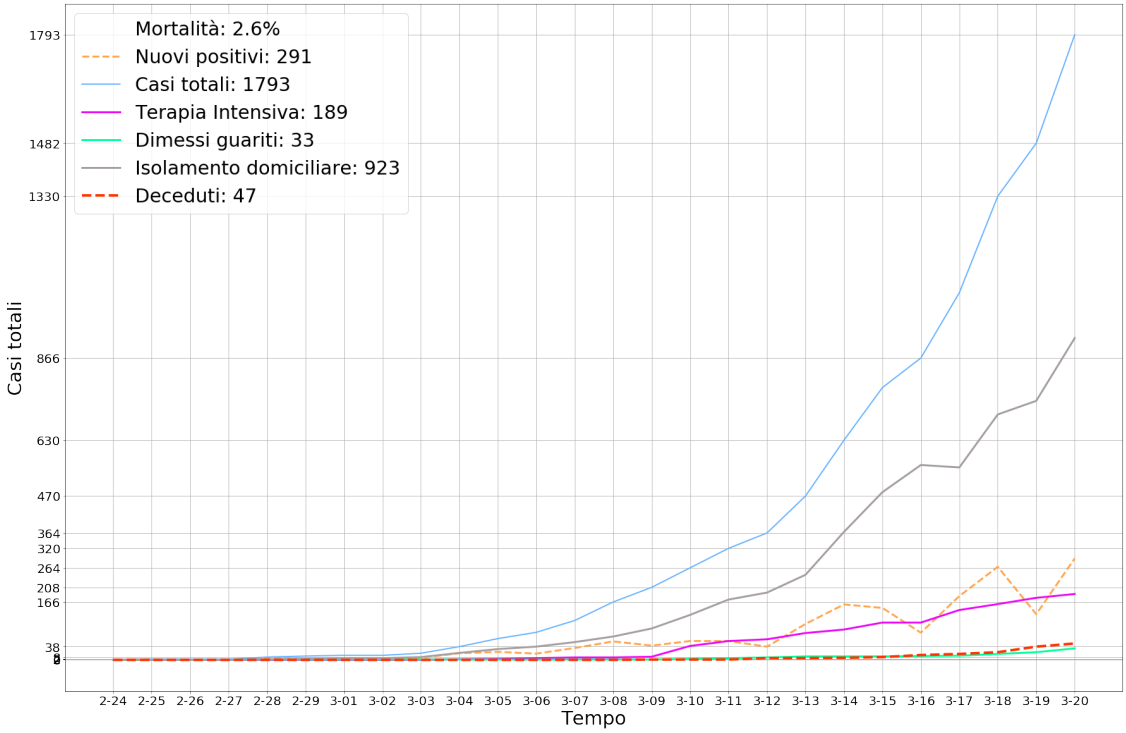
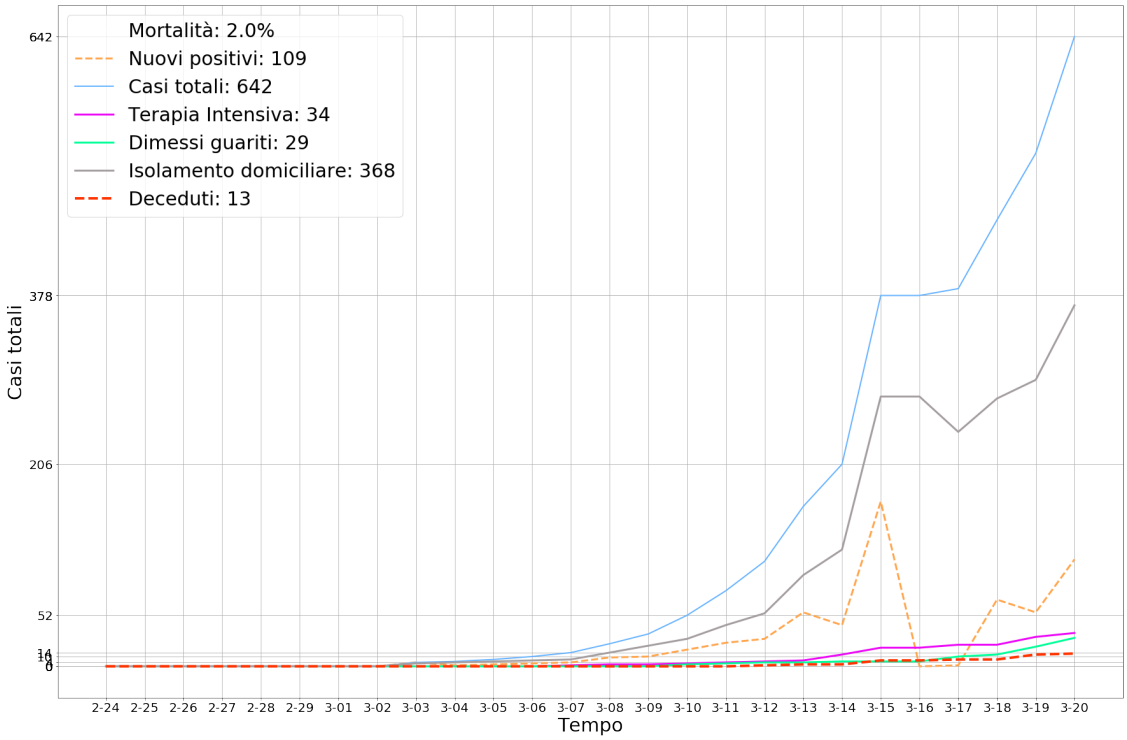
3-14
3-15
3-16
3-17
3-18
3-19
3-20

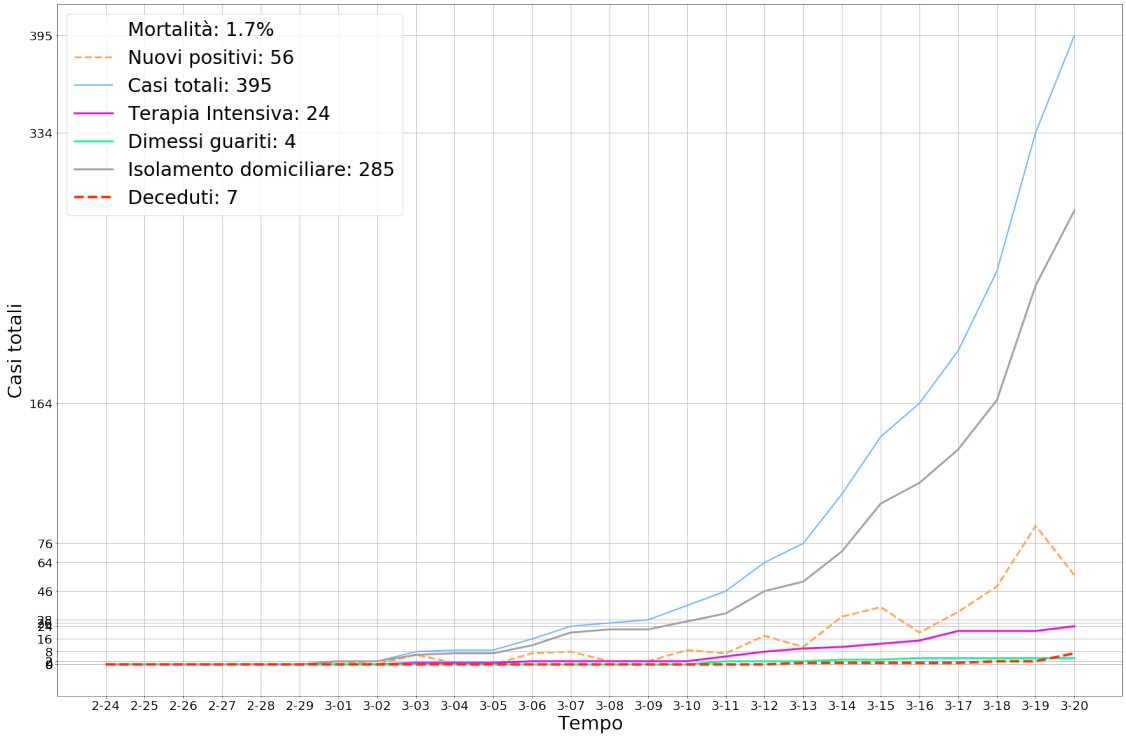
Toscana



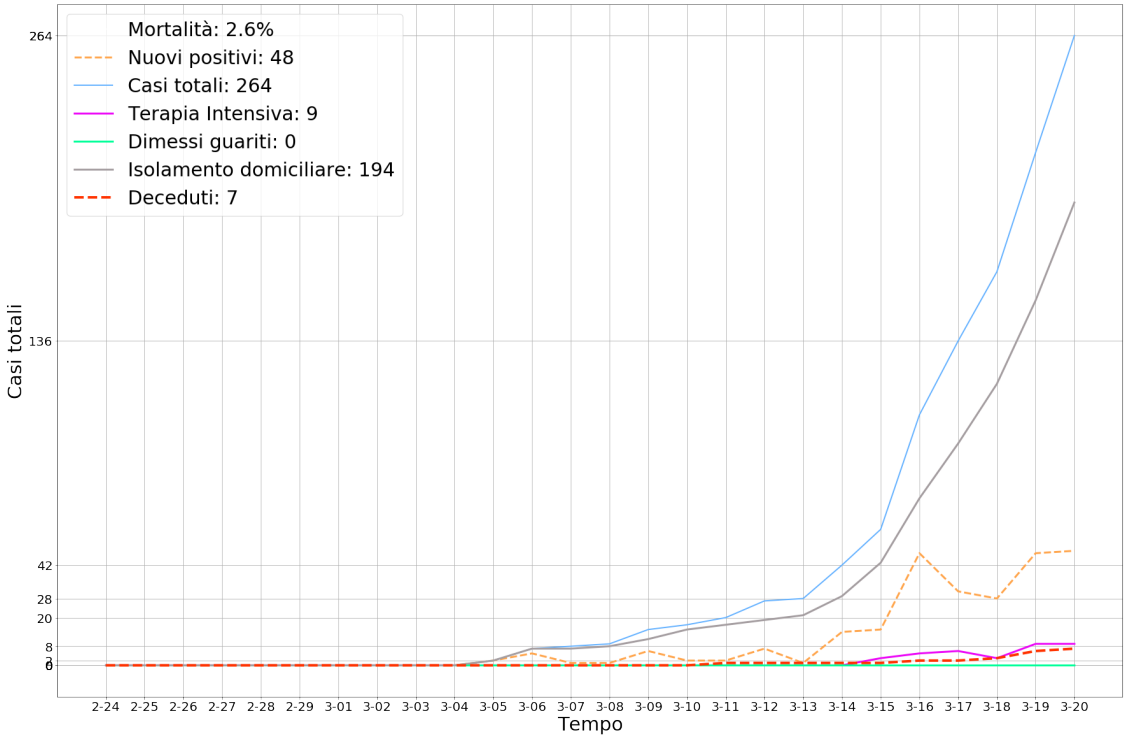
P.A. Trento



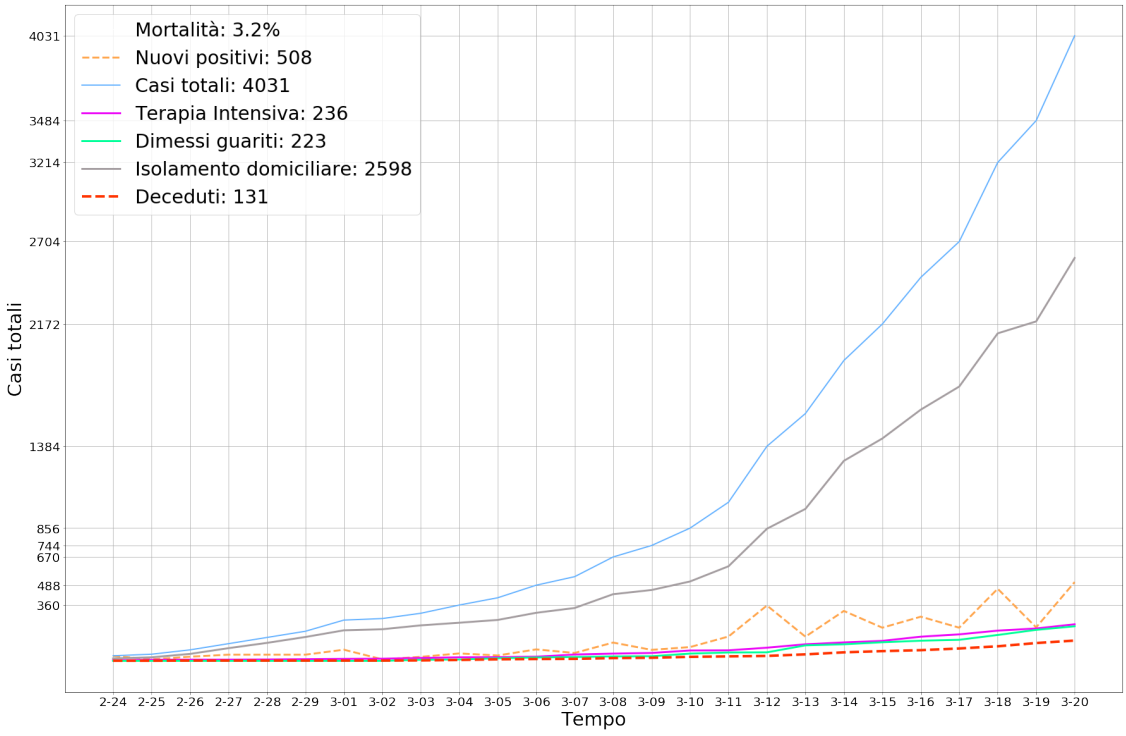
Umbria


Mortalità: 1.7%
Nuovi positivi: 56
Casi totali: 395
Terapia Intensiva: 24
Dimessi guariti: 4
Isolamento domiciliare: 285
Deceduti: 7
Casi totali
395
334
164
76
64
46
32
24
16
8
4
0
2-24 2-25 2-26 2-27 2-28 2-29 3-01 3-02 3-03 3-04 3-05 3-06 3-07 3-08 3-09 3-10 3-11 3-12 3-13 3-14 3-15 3-16 3-17 3-18 3-19 3-20
Tempo

Valle d'Aosta



Veneto



```
<Figure size 2160x1440 with 0 Axes>
```

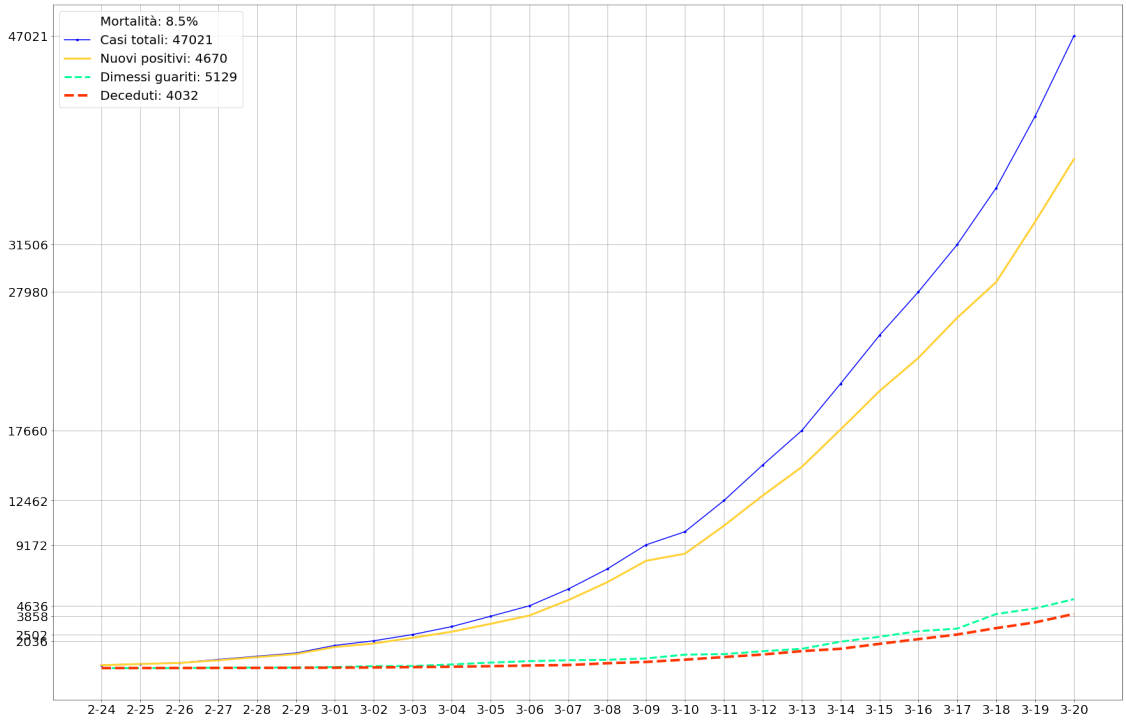
[27]:
```
# dati-andamento-nazionale
df_nazionale = pd.read_csv('COVID-19/dati-andamento-nazionale/
 ↪dpc-covid19-ita-andamento-nazionale.csv')
```

[28]:
```
x1 = df_nazionale.data
x = []
for f in x1:
    x.append(f[6:10])

totale_casi = df_nazionale.totale_casi

tot_nuovi_postivi = []
tot_deceduti = []
tot_guariti = []
casi_totali = []
ticks = []
ticks_1 = []

for p in totale_casi:
    casi_totali.append(p)

for w in totale_casi:
    if w % 2 == 0 and w > 2000:
        ticks.append(w)
    else:
        pass

for w1 in df_nazionale.nuovi_attualmente_positivi:
    tot_nuovi_postivi.append(w1)

for w2 in df_nazionale.dimessi_guariti:
    tot_guariti.append(w2)

for w3 in df_nazionale.deceduti:
    tot_deceduti.append(w3)



ticks_1.append(casi_totali[-1])
ticks.extend(ticks_1)
```

```
nuovi_positivi = df_nazionale.totale_attualmente_positivi
totale_deceduti = df_nazionale.deceduti
totale_guariti = df_nazionale.dimessi_guariti

plt.yticks(ticks)


plt.rc('ytick', labelsize=12)
plt.rc('xtick', labelsize=10)

plt.rcParams["figure.figsize"]=20,20

toll_1_tot = int(casi_totali[-1])
toll_2_tot = int(tot_deceduti[-1])

death_toll = (toll_2_tot/toll_1_tot)*100
conv_deth_toll = str(death_toll)

plt.plot(death_toll, color='#FFFFFF', label="Mortalità: {}%".
 ↪format(conv_deth_toll[:3]))
plt.plot(x, totale_casi, 'b.-',label='Casi totali: {}'.format(casi_totali[-1]))
plt.plot(x, nuovi_positivi, color='#FFD133', linewidth=3, label="Nuovi positivi:
 ↪ {}".format(tot_nuovi_postivi[-1]))
plt.plot(x, totale_guariti, color='#00ff99', linestyle="--", linewidth=3,␣
 ↪label='Dimessi guariti: {}'.format(tot_guariti[-1]))
plt.plot(x, totale_deceduti, color='#ff3300', linestyle="--", linewidth=4,␣
 ↪label='Deceduti: {}'.format(tot_deceduti[-1]))

plt.title("Andamento nazionale", fontsize=100)
plt.legend(prop={'size': 20})
plt.grid()



print(death_toll)
print(ticks)
```

```
8.574892069500862
[2036, 2502, 3858, 4636, 9172, 12462, 17660, 27980, 31506, 47021]
```

Andamento nazionale



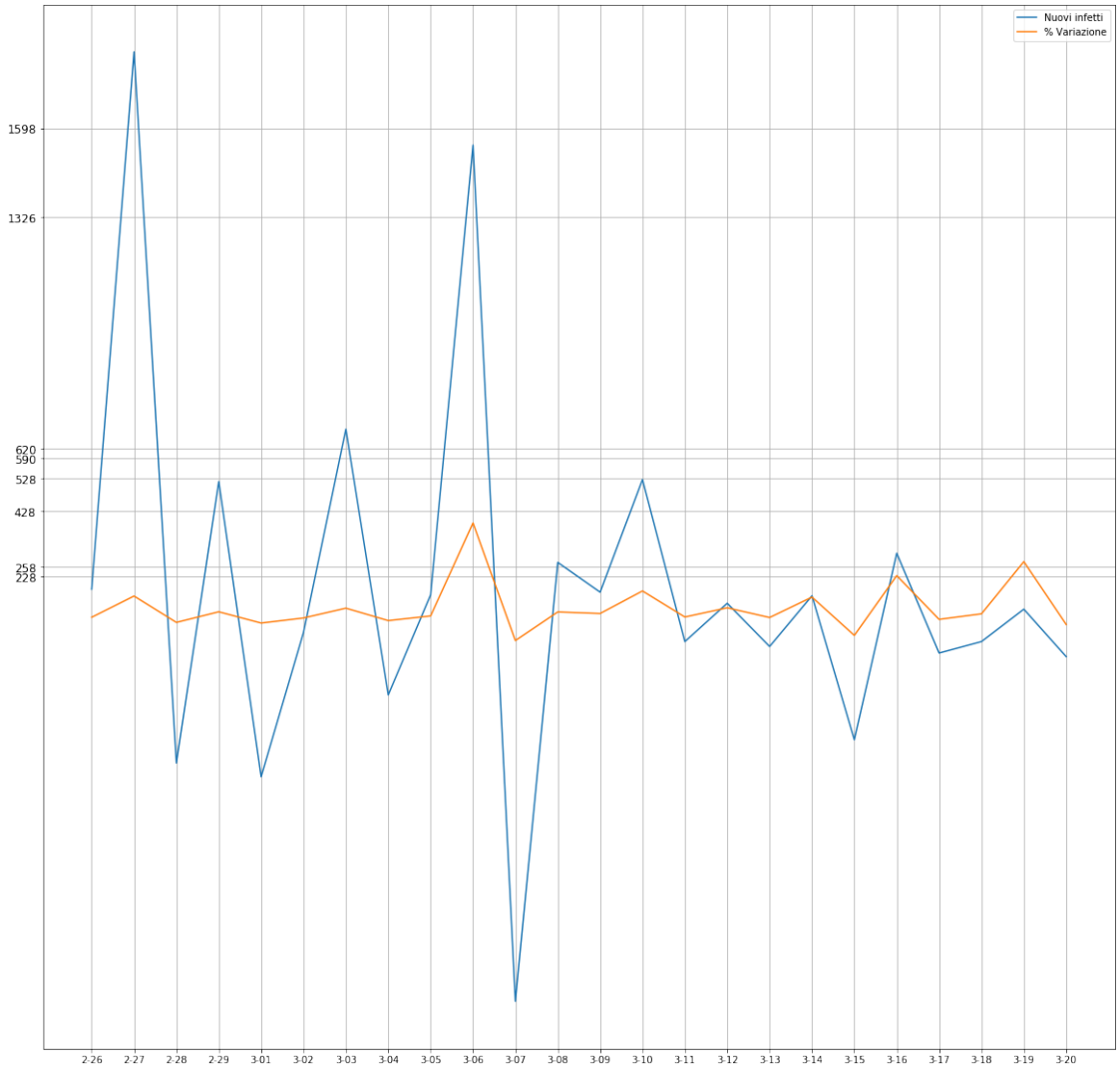
1.1 Inizo modello

[29]:
```
fcst = []
fcst_inv = []
fcst_inv_disp = []
fcst_inv_pari = []

x1 = df_nazionale.data
x2 = []
for f in x1:
    x2.append(f[6:10])

for w in range(len(tot_nuovi_postivi)):
    fcst.append(w)

for m in fcst:
    if m != 1 and m != 0:
        fcst_inv_pari.append(m * (-1))
    else:
        pass

for t in fcst:
```

```
    if t != 0:
        fcst_inv_disp.append(t * (-1))


res = []
res3 = []
for q,l in zip(fcst_inv_disp, fcst_inv_pari):

    f = int(tot_nuovi_postivi[q])
    z = int(tot_nuovi_postivi[l])
    res1 = f - z
    res2 = (f/z)*100
    res.append(res1)
    res3.append(res2)

model = []
last = []

for ext in tot_nuovi_postivi:
    if ext % 2 == 0 and ext > 90:
        model.append(ext)
    else:
        pass

last.append(tot_nuovi_postivi[-1])
model.extend(last)

print(model)

adapt = x[2:]
print(res3)


plt.yticks(model)



plt.plot(adapt, res, label="Nuovi infetti")
plt.plot(adapt, res3, label= "% Variazione")
plt.legend()
plt.grid()
plt.show()
```

```
[228, 528, 258, 428, 590, 620, 1326, 1598, 2076, 2116, 2470, 2648, 4480, 4670,
4670]
[104.24107142857142, 169.18429003021146, 88.59150217464034, 121.01214574898786,
86.57553452506134, 102.07513416815743, 132.08884688090737, 94.086260560249,
```

```
108.33333333333333, 392.43856332703217, 33.103879849812266, 120.51282051282051,
115.80786026200873, 184.6774193548387, 105.08474576271188, 133.18284424379232,
103.50467289719627, 165.89147286821705, 48.86363636363637, 231.57894736842107,
97.85407725321889, 114.77832512315271, 274.3243243243243, 82.22222222222221]
```



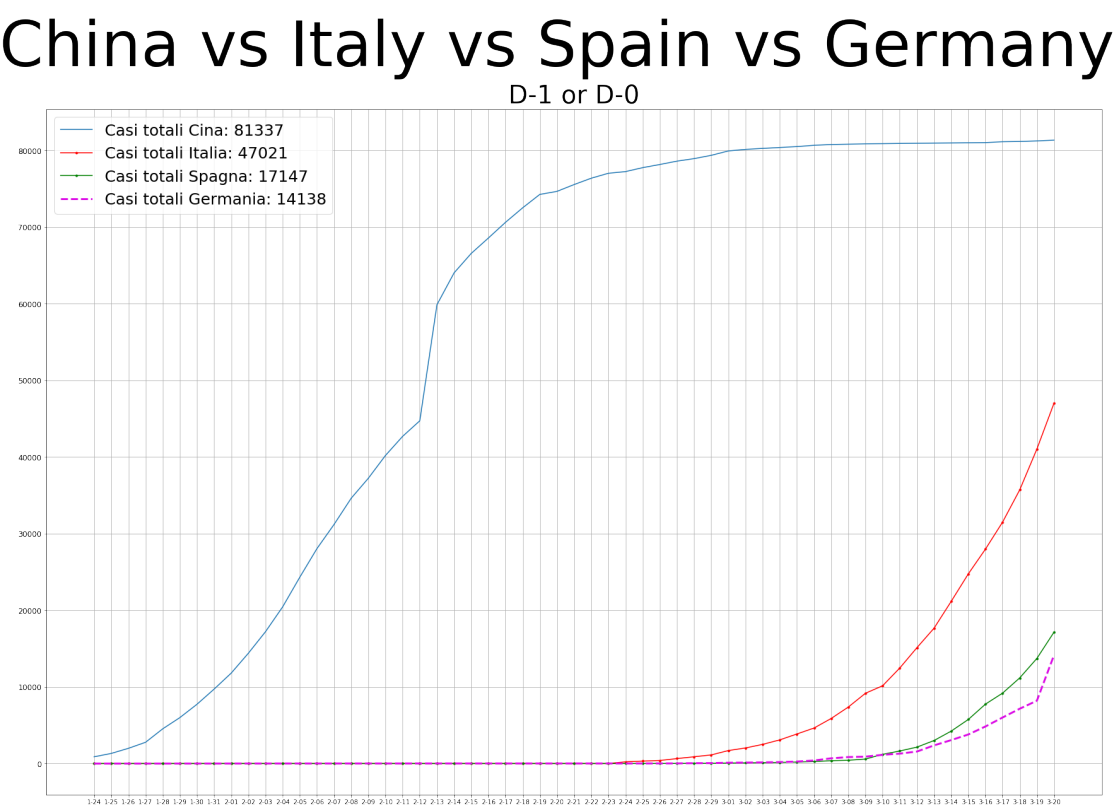
[30]:
```
df_cina = pd.read_csv('full_data.csv')
```

[31]:
```
df_cina.columns
```

[31]:
```
Index(['date', 'location', 'new_cases', 'new_deaths', 'total_cases',
       'total_deaths'],
      dtype='object')
```

[32]:
```
cina_totale = df_cina.loc[df_cina['location'] == 'China']

spain_totale = df_cina.loc[df_cina['location'] == 'Spain']

gremania_totale = df_cina.loc[df_cina['location'] == 'Germany']

cina_casi_totale = cina_totale.total_cases

cina_adapt_total = []

for t in cina_casi_totale:
    cina_adapt_total.append(t)

total_cases_cina_conv = cina_adapt_total



italy_adapt = []

for sempo in cina_totale.date:
    italy_adapt.append(sempo[6:10])

comp = 0

deviatio = []

for pop in totale_casi:
    deviatio.append(pop)

for _ in range(55):
    deviatio.insert(0,comp)

spain = []
for x in spain_totale.total_cases:
    spain.append(x)

for _ in range(0):
    spain.insert(0, comp)

germania = []
for x in gremania_totale.total_cases:
    germania.append(x)

for _ in range(0):
    germania.insert(0, comp)
```

```
plt.rc('ytick', labelsize=12)
plt.rc('xtick', labelsize=10)

plt.rcParams["figure.figsize"]=30,20

plt.plot(italy_adapt[24:], total_cases_cina_conv[24:], label='Casi totali Cina:␣
 ↪{}'.format(cina_adapt_total[-1]))
plt.plot(italy_adapt[24:], deviatio[24:], 'r.-',label='Casi totali Italia: {}'.
 ↪format(casi_totali[-1]))
plt.plot(italy_adapt[24:], spain[24:], 'g.-',label='Casi totali Spagna: {}'.
 ↪format(spain[-1]))
plt.plot(italy_adapt[24:], germania[24:],␣
 ↪color="#DC0DE6",linestyle="--",linewidth=3,label='Casi totali Germania: {}'.
 ↪format(germania[-1]))

#plt.fill_between(italy_adapt[24:], total_cases_cina_conv[24:])
#plt.fill_between(italy_adapt[24:], deviatio[24:])

plt.suptitle("China vs Italy vs Spain vs Germany", fontsize=100)
plt.title("D-1 or D-0", fontsize=40)
plt.legend()
plt.legend(prop={'size': 25})
plt.grid()
```



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