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Coronavirus Cov19: The Status in Italy Taken as An Example of The Virus Spreading in The World

Cornelli U[1], Belcaro G[2], MR Cesarone[2] and Roberto Cotellese[3]

[1]*Loyola University School of Medicine, Chicago.*

[2]*OOLEX Center for COVID Irvine 3 Labs, Pescara, Italy.*

[3]*University G. d'Annunzio Pescara, Italy.*

***Correspondence:**
Cornelli Umberto Piazza Novelli 5 Milan Italy.
Belcaro Givanni Italy.
Cerarone Maria Rosaria Italy.
Roberto Cotellese Italy.

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ABSTRACT

Background: *The cov19 is becoming a problem in most of the developed countries.*

Material and Methods: *Data of positive cases and deaths due to Cov19 in the month of March were retrieved from the official documents released by the Italian Protezione Civile Dept. The curves of the growth were analyzed in terms of crude numbers and differential values among days. The data were correlated with some demographic, social, and environmental variables.*

Results: *Cov19 is affecting the most productive areas of Italy, particularly the Northen territory and Marche in the center of Italy. The correlation of the growth was positive for population density, people living in flat land and mountains, number of industries, number of workers, and GP. The temperature of places where people get together is usually kept between 21-23°C and low humidity, which allow the viral spreading. The positive cases are estimated in about 8% of the population, with a death rate 0.96 % of the cases (with of for Cov19). These figures are hardly sustainable for any Health System. Despite the pick seems apparently already reached, the reduction of the cases up to affordable numbers will take a long time.*

Conclusion: *Cov19 is affecting particularly the most prosperous Italian Regions, were the high interaction among people is the common life style. This was causing a rapid diffusion of the virus, and an unsustainable effort for emergency rooms in the hospitals. The Italian situation can be a mirror of the disease progression in many other countries.*

Keywords

Coronavirus, Environment, Demographic variables, Social variables.

Introduction

The dramatic event of the Cov19 in Italy was stimulating all the investigators in the field of medicine to give some contribution to the comprehension of the disease.

From our side, we were trying to describe the progression and effects of Cov19 using some of the methods typical for the analysis of a pandemic disease.

Material and Methods

Data in relation to the Cov19 positive cases and deaths - due or presumably due to the viral infection- were recorded from the daily Official Bulletin publically released by the Dept of the Italian Protezione Civile [1].

The demographical variables (population, density/Km2) were taken by Tuttitalia.it [2]; the GP (Goss Profit) was taken from True numbers.it 2020 publication [3]; the numbers and causes of death were retrieved from the official data set of ISTAT (Istituto Nazionale Statistica) [4]; the data regarding the characteristic of the Italian territory (flat land, mountains, and hills), the temperature, and rainfall were taken from the Centro Meteo Italiano [5].

Statistical methods

For the correlation among variables the values of least square "r" were calculated using $p<0.05$ as cut-off for the statistical significance, which is more severe than the relative correction through Robust Regression [6,7].

Results

Coronavirus positive tests

The Cov19 positive test in the different Regions are listed in Table 1 and 2 reported from the public records of the Protezione Civile [1].

These figures contain the bias of the number oropharyngeal swabs which was different in every Region, according to the local Government decision. This discrepancy do not allow to determine the real differences among Regions and represents only the "tip of the iceberg". However, still the values seem to indicate that the pick has been already reached, (Figure 1), and differentials values (cases in Day X2- Day X1) are slowly diminishing starting from March 21st (Figure 2).

The last surveillance on swabs indicates that about 8 % of the Italian population was positive. This could mean that theoretically about 4.8 million of the Italian population could be affected by Cov19 despite asymptomatic.

Region	Lom	Laz	Cam	Sic	Ven	EmR	Pie	Pug	Tos	Cal
Inhab	10.02	5.90	5.84	5.06	4.91	4.45	4.39	4.06	3.74	1.97
March 1	984	6	17	9	263	285	49	3	13	1
2	1254	7	17	7	273	335	51	4	13	1
3	1520	14	30	7	307	420	56	6	19	1
4	1820	30	31	18	360	544	82	9	38	1
5	2251	44	45	18	407	698	108	14	61	2
6	2612	54	57	24	488	870	143	17	79	4
7	3420	76	61	35	543	1010	207	26	113	4
8	4189	87	101	53	670	1180	360	40	166	9
9	5469	94	102	54	744	1386	350	50	208	11
10	5791	116	127	62	856	1533	453	59	264	13
11	7280	150	154	83	1023	1739	501	77	320	19
12	8725	181	175	113	1384	1947	580	103	357	32
13	9820	277	220	130	1595	2263	840	129	470	38
14	11685	357	272	156	1937	2644	873	166	630	60
15	13272	436	333	188	2172	3093	1111	230	781	68
16	14649	523	400	213	2473	3522	1516	230	866	89
17	16220	607	460	237	2704	3931	1879	340	1053	114
18	17713	724	460	282	3214	4525	2341	383	1330	129
19	19884	823	652	340	3484	5214	2932	478	1482	169
20	22264	1008	749	408	4031	5698	3461	581	1793	207
21	25515	1190	844	490	4617	6705	3572	675	2012	235
22	27206	1383	936	630	5122	7555	4420	786	2277	273
23	28761	1540	1026	721	5505	8535	4861	906	2461	292
24	30703	1728	1101	846	5948	9254	5515	1005	2699	319
25	32346	1901	1199	994	6442	10054	6024	1093	2972	351
26	34889	2096	1310	1164	6935	10816	6534	1182	3226	393
27	37298	2295	1454	1250	7497	11588	7092	1334	3450	494
28	39415	2505	1592	1359	7930	12383	7671	1458	3817	555
29	41007	2706	1759	1460	8358	13119	8206	1549	4122	614
30	42161	2914	1952	1555	8724	13531	8712	1712	4412	647
31	43208	3095	2092	1647	9155	14074	9301	1803	4608	659
Total March	42952	3089	2079	1643	8964	13857	9290	1800	4507	658

Table 1: Number of Cov19 positive cases (March) in Italian Regions up to 1.97 million inhabitants.
Legenda: Lom: Lombardia; Laz: Lazio; Cam: Campania; Sic: Sicilia; Ven: Veneto; EmR: Emilia Romagna; Pie: Piemonte; Pug: Puglia; Tos: Toscana; Cal: Calabria; inhab = inhabitants.

Region	Sar	Lig	Mar	Abr	FVG	TAA	Umb	Bas	Mol	VdA
Inhab	1.65	1.57	1.53	1.32	1.22	1.06	0.89	0.57	0.31	0.13
March 1	0	25	25	5	6	1	2	0	0	0
2	0	22	35	5	9	1	2	0	0	0
3	1	24	61	6	13	5	8	1	3	0
4	2	26	84	7	19	5	9	1	3	0
5	2	28	124	8	22	7	9	1	7	2
6	5	32	159	9	31	10	16	3	12	7
7	5	51	207	11	42	23	24	3	14	8
8	11	78	272	17	57	26	26	4	14	9
9	19	109	323	30	93	42	28	5	14	15
10	20	141	394	38	116	90	37	7	15	17
11	37	194	479	38	126	152	46	8	16	20
12	39	274	592	80	156	151	62	8	16	27
13	43	345	725	89	257	288	76	10	17	28
14	47	463	899	112	301	379	107	10	17	42
15	77	559	1133	137	347	582	153	11	17	57
16	107	667	1242	176	386	619	164	12	21	105
17	117	778	1371	229	394	676	197	20	25	136
18	134	887	1568	263	462	831	247	27	28	165
19	206	1059	1737	385	599	959	334	37	46	215
20	293	1221	1981	449	565	1190	395	52	50	264
21	330	1436	2153	529	790	1403	462	66	61	313
22	339	1665	2421	587	874	1632	521	81	66	364
23	359	1924	2596	663	930	1747	577	90	67	393
24	421	2116	2736	698	992	1881	648	92	73	400
25	442	2305	2934	813	1139	2080	710	113	73	401
26	494	2567	3114	946	1223	2203	802	134	103	408
27	530	2696	3196	1017	1317	2394	884	151	109	452
28	624	2822	3373	1133	1436	2614	969	182	123	511
29	638	3076	3558	1293	1480	2808	1023	202	127	584
30	682	3217	3684	1345	1501	3007	1051	214	134	584
31	772	3416	3825	1041	1593	3117	1078	226	144	628
Total March	722	3374	3814	1399	1593	3117	1078	226	144	628

Table 2: Number of Cov19 positive cases (March) in the Italian Regions with < 1.97 million inhabitants.
Legenda: Sar: Sardegna; Lig: Liguria; Mar: Marche; Abr: Abruzzo; FVG: Friuli Venezia Giulia; TAA: Trentino Alto Adige; Umb: Umbria; Bas: Basilicata; Mol: Molise: VdA: Val d'Aosta; Inhab = inhabitants.

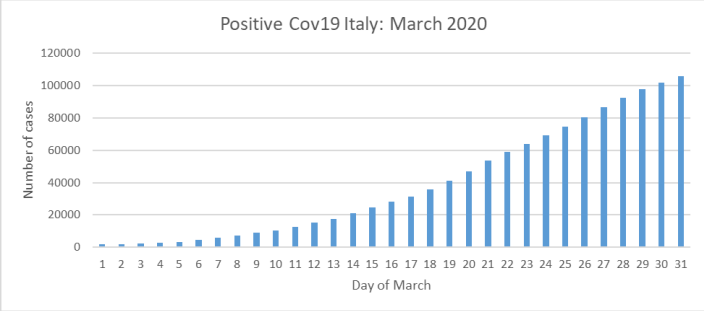

Figure 1: Distribution of the number of Cov19 positive cases in March 2020.

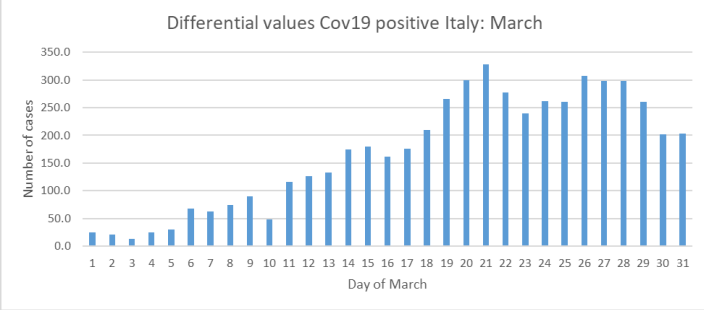

Figure 2: Distribution of the differential values of Cov19 positive cases in March 2020.

In relation to the values of each Region, it is evident that the most affected were those of the Nord of Italy and Marche which is located in the center of Italy. Data were reported in Table 3.

Region	Cov19 Positive/1000	Part of Italy
Lom	4.29	North
Laz	0.52	Center
Cam	0.36	South
Sic	0.32	Island
Ven	1.83	North
EmR	3.11	North
Pie	2.11	North
Pug	0.44	South
Tos	1.08	Center
Cal	0.33	South
Sar	0.47	Island
Lig	2.18	North
Mar	2.49	Center
Abr	1.06	Center
FVG	1.31	North
TAA	2.93	North
Umb	1.21	Center
Bas	0.40	South
Mol	0.46	South
VdA	4.95	North
r Vs Population	0.1242: p> 0.05	

Table 3: Number of Cov19 positive cases/1000 people (March) in the Italian Regions.

No correlation was found between positive/1000 inhabitants and the total population in the Regions.

Death with/for Cov19

The problem of the death due to the Cov19 pneumonia is still equivocal, since most of the cases were also affected by one or more diseases and with age > 60 years [8]. The analysis was considering the deaths as for the records of The Protezione Civile and is reported in Tables 4 and 5.

According to the report of ISS (Istituto Superiore di Sanità of March 13 2020) [8] only 1,1 % of the people who died had no concomitant diseases, 26.1 % had 1 chronic disease and remaining 72.7 % had 2 or more diseases. The curves regarding the deaths are reported in Figure 3 and Figure 4.

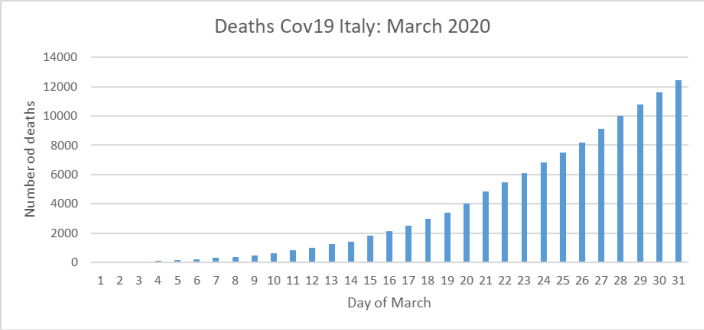

Figure 3: Distribution of deaths due to or with Cov19 in March 2020.

In the case of deaths, pick seems to be reached around March 27.

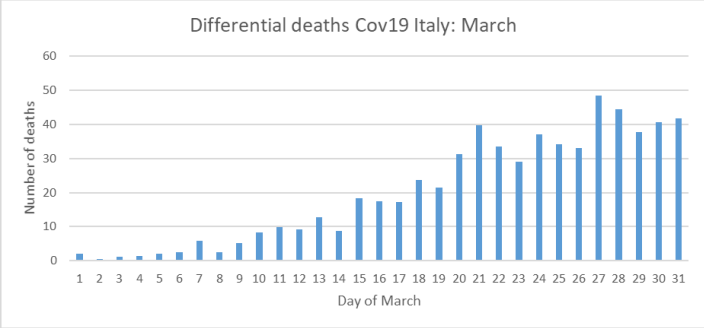

Figure 4: Distribution of the differential's values of deaths due to Cov19 in March 2020.

Region	Lom	Laz	Cam	Sic	Ven	EmR	Pie	Pug	Tos	Cal
Inhab	10.02	5.90	5.84	5.06	4.91	4.45	4.39	4.06	3.74	1.97
March 1	31	2	2	0	2	4	0	0	0	0
2	31	2	2	0	2	16	0	0	0	0
3	52	0	3	0	4	19	0	0	0	0
4	73	0	4	0	6	22	0	1	0	0
5	96	0	0	0	10	30	2	1	0	0
6	135	1	0	0	12	37	4	1	0	0
7	233	1	0	0	13	48	5	0	0	0
8	267	3	0	0	18	56	5	3	0	0
9	333	5	0	2	20	70	13	0	1	1
10	468	6	0	0	26	85	17	3	1	0
11	617	6	1	0	29	113	23	5	1	0
12	744	9	1	2	32	146	26	5	5	0
13	890	11	2	2	42	201	46	5	5	0
14	966	13	6	2	55	241	59	8	6	0

15	1218	16	9	2	63	284	81	16	8	1
16	1420	19	9	2	69	346	111	16	14	1
17	1640	23	9	3	80	393	133	18	17	1
18	1959	32	9	3	94	458	154	19	22	1
19	2168	38	17	4	115	531	175	25	38	3
20	2549	43	17	4	131	640	209	26	47	4
21	3095	50	22	6	146	715	238	29	72	5
22	3456	73	29	8	169	816	283	31	91	8
23	3776	63	49	13	192	892	315	37	109	7
24	4178	80	56	20	216	985	374	44	129	10
25	4474	95	74	25	258	1077	449	48	142	11
26	4861	106	83	33	287	1174	449	65	158	14
27	5402	118	98	39	313	1267	569	69	177	18
28	5944	124	109	57	262	1344	617	71	198	21
29	6360	136	117	65	392	1443	684	86	215	25
30	6818	150	125	76	413	1538	749	91	231	31
31	7199	162	133	81	477	1644	854	110	244	36
Total March	7176	160	131	81	477	1644	854	110	244	36

Table 4: Number of deaths due to Cov19 and/or concomitant diseases (March) in Italian Regions up to 1.97 million inhabitants.
Legenda: Lom: Lombardia; Laz: Lazio; Cam: Campania; Sic: Sicilia; Ven: Veneto; EmR: Emilia Romagna; Pie: Piemonte; Pug: Puglia; Tos: Toscana; Cal: Calabria; Inhab: Inhabitants in million.

Region	Sar	Lig	Mar	Abr	F VG	TAA	Umb	Bas	Mol	VdA
Inhab	1.65	1.57	1.53	1.32	1.22	1.06	0.89	0.57	0.31	0.13
March 1	0	0	0	0	0	1	0	0	0	0
2	0	0	0	0	0	1	0	0	0	0
3	0	0	0	0	0	5	0	0	0	0
4	0	0	0	0	0	5	0	0	0	0
5	0	1	6	0	0	7	0	0	0	0
6	0	3	4	0	0	10	0	0	0	0
7	0	3	6	0	0	23	0	0	0	0
8	0	4	7	0	1	26	0	0	0	0
9	0	6	10	0	1	42	0	0	0	0
10	0	7	13	1	3	90	0	0	0	0
11	0	8	18	1	6	0	0	0	0	1
12	0	11	22	2	8	2	0	0	0	1
13	0	17	27	2	10	4	1	0	0	1
14	0	27	36	2	13	5	1	0	0	1
15	2	33	46	3	14	11	1	0	0	1
16	2	50	57	4	22	12	1	0	1	2
17	2	60	69	6	30	15	1	0	1	2
18	2	73	92	7	31	16	2	0	1	3
19	2	91	115	11	36	26	2	0	2	6
20	2	119	137	17	38	30	7	0	5	7
21	4	152	154	22	42	48	10	0	7	8
22	7	171	184	33	47	58	16	0	7	9
23	11	212	203	38	54	70	16	1	7	12
24	15	231	231	46	64	94	19	1	8	19
25	18	254	287	52	70	117	19	1	8	24
26	19	280	310	63	72	134	20	1	8	28

27	21	331	336	68	76	162	21	3	9	37
28	27	358	364	76	87	184	28	3	9	41
29	27	377	386	88	98	193	31	4	9	43
30	28	397	417	101	107	221	33	5	9	50
31	31	428	452	115	113	240	37	7	9	56
Total March	31	428	452	115	113	240	37	7	9	56

Table 5: Number of deaths due to Cov19 pneumonia and/or concomitant diseases (March) in Italian Regions with < 1.97 million inhabitants.
Legenda: Sar: Sardegna; Lig: Liguria; Mar: Marche; Abr: Abruzzo; FVG: Friuli Venezia Giulia; TAA: Trentino Alto Adige; Umb: Umbria; Bas: Basilicata; Mol: Molise: VdA: Val d'Aosta; Inhab: Inhabitants in million.

The distribution in the Regions in terms of Deaths/1000 people is reported in Table 6.

Region	Cov19 Deaths/1000	Part of Italy
Lom	0.716	North
Laz	0.027	Center
Cam	0.022	South
Sic	0.016	Island
Ven	0.097	North
EmR	0.370	North
Pie	0.194	North
Pug	0.027	South
Tos	0.065	Center
Cal	0.018	South
Sar	0.019	Island
Lig	0.273	North
Mar	0.294	Center
Abr	0.087	Center
FVG	0.093	North
TAA	0.226	North
Umb	0.042	Center
Bas	0.012	South
Mol	0.029	South
VdA	0.441	North
r Vs Population	0.3641 p> 0.05	

Table 6: Number of Cov19 deaths/1000 people (March) in the Italian Regions.

The deaths distribution was parallel to the positive cases, again with more consistent figures in the Northern of Italy and Marche.

Considering the ratio between positive to Cov19 and death, the values correspond to 11.8 % which is an extremely high ratio compared to the other countries where the virus started to be present. An estimation about the deaths was done only for pneumonia, compared to the only data available (year 2018). Data are summarized in Table 7.

Region	Expected Deaths March 2020	Actual Deaths March 2020	Multiplier
Lom	211	7176	34.1
Laz	122	160	1.3
Cam	38	131	3.5
Sic	55	81	1.5
Ven	110	477	4.3
EmR	121	1644	13.6
Pie	96	854	8.9
Pug	39	110	2.8
Tos	91	244	2.7
Cal	38	36	1.0
Sar	21	31	1.5
Lig	42	428	10.1
Mar	38	452	11.8
Abr	21	115	5.6
FVG	37	113	3.1
TAA	29	240	8.2
Umb	19	37	2.0
Bas	6	7	1.2
Mol	4	9	2.2
VdA	3	56	17.7
Total	1139	12401	

Table 7: Death due to pneumonia In the Italian Regions: expected data Vs actual data.

The deaths for pneumonia were dramatically increased in Lombardia, where the increase was about 8 to 10 times higher. Lower figures were found in other regions such as Emilia Romagna, Piemonte, Liguria, Marche, and Trentino Alto Adige, creating sometimes an unaffordable problem of emergency rooms.

For the other Regions, despite the figures were much lower, they still represent a problem which needs to be solved creating new emergency beds.

Demographic/social/environmental variables of Cov19

We tried to consider the Cov19 evolution on the light of different

Region	PopulationTotal x10^6	Density Km^2	Population x 10^6			GP €/year x 10^3	Companies	
			Flat land	Hill	Mount		N	Workes
Lom	10.02	422	4.71	1.24	4.06	38.84	814867	3986410
Laz	5.90	342	1.17	3.18	1.54	33.88	368153	1551470

Cam	5.84	424	0.86	2.97	2.02	18.59	394451	1654847
Sic	5.06	194	0.71	3.1	1.23	17.68	325839	1311011
Ven	4.91	267	2.77	0.72	1.24	33.27	125861	427163
EmR	4.45	199	2.13	1.2	1.11	36.29	322887	101852
Pie	4.39	172	1.16	1.33	1.90	31.49	124011	406025
Pug	4.06	206	2.17	1.84	0.06	18.65	436430	1868354
Tos	3.74	162	0.31	2.49	0.94	31.54	344353	1027665
Cal	1.97	128	0.17	0.97	0.82	16.98	83702	351875
Sar	1.65	68	0.30	1.12	0.22	21.01	88138	361303
Lig	1.57	286	0.00	0.55	1.02	32.25	252478	730704
Mar	1.53	162	0.00	1.06	0.47	28.08	268790	721707
Abr	1.32	121	0.00	0.46	0.81	25.58	98008	301550
FVG	1.22	153	0.46	0.23	0.52	31.36	66604	229548
TAA	1.06	79	0.00	0.00	1.06	42.58	11221	36426
Umb	0.89	104	0.00	0.62	0.26	25.29	103802	289904
Bas	0.57	56	0.046	0.26	0.27	21.87	108336	262247
Mol	0.31	69	0.00	0.14	0.17	20.65	20794	52488
VdA	0.13	39	0.00	0.00	0.13	38.94	34968	102330
Total	60.59		16.99	23.49	20.11	567.22	4.4×10^6	15.8×10^6

Table 7: Demographic/social variables in the Italian Regions in 2020.

variables such as the total population, the population density, the population in different territories, the number of companies settled in the Regions, and the relative number of workers in 2019. Some of the environmental variables were also analyzed and the results are reported in table 7 and 8 (limited to the month of March 2020).

Region	Temp March Max °C	Temp March Min °C	Rainfall March mm
Lom	11.8	2.4	75.7
Laz	13.1	5.4	66.1
Cam	15.0	7.0	69.0
Sic	15.5	8.2	48.6
Ven	12.8	3.6	68.4
EmR	10.8	2.6	59.0
Pie	11.4	3.2	70.5
Pug	13.9	6.3	55.7
Tos	10.8	4.2	66.0
Cal	12.7	6.4	76.9
Sar	14.2	7.1	54.3
Lig	12.9	5.7	90.3
Mar	11.7	4.7	50.5
Abr	7.0	-0.5	54.5
FVG	11.6	2.7	96.0
TAA	5.0	-3.5	48.3
Umb	14.0	3.0	62.0
Bas	8.5	2.5	68.5
Mol	11.5	5.0	50.5
VdA	-8.0	-14.0	15.0
Total			1246.0

Table 8: Environmental variables in the Italian Regions for the month of March 2019.

The correlations among variables are reported in Table 9.

Variables	Vs Cov19 Positive r values	Vs Cov19 Deaths r values
Population	**0.7417**	**0.6961**
Density	**0.5599**	**0.5256**
Population Flat Land	**0.8525**	**0.7978**
Population Hills	0.0550	0.0212
Population Mountains	**0.8418**	**0.8125**
Number of companies	**0.7295**	**0.7351**
Number of workers	**0.7177**	**0.7499**
GP	**0.4746**	0.4104
Temperature March Mx	0.0837	0.0578
Temperature March Min	-00162	-0.0308
Rainfall March	0.2217	0.2024

Table 9: Correlation between positive cases or deaths for Cov19 and demographic, social and environmental variables.

The values in bold characters are statistically significant (r: $p < 0.05$)

Discussion

The data reported in the present evaluation represent the trends of the Cov19 in the Italian Regions limited to the month of March 2020.

There are some limitations in the analysis both in the measure of positive cases and relative deaths.

In relation to the positive cases, the data are not homogeneous

in all the territory, since some of the Regions were asking for the oropharynx swabs to the general population and other to the symptomatic people only, with: or only for patients in hospital.

A bias can be also present for the diagnosis of death, which can be a mixture of deaths due to Cov19 or with Cov19. Moreover, the expected death rates for pneumonia were based upon data regarding 2018 because those of 2019 were not publically available.

The records of the temperature and rainfalls were those recorded in 2019. In general, the modifications during years are very well correlated, however, the climate changes in 2020 could be consistent with some important modification.

Despite these biases, we think that the data of the present report may give a sufficient information about the Cov19 spreading through Italy. It seems evident that the most affected Regions were the most productive and prosperous of Italy, and with the highest GP, which means that an economical crisis due to Cov19 can be expected.

The productivity is usually bound to an active interconnection among people, who usually in the month of March are working in places with air conditioning (21-23°C and low humidity), and after/before work are use to step in the supermarkets, theatres, restaurants, bars and cinemas which are similarly air conditioned. In relation to the territory, the correlations were shown in flat land and mountains but not in the hills.

This may be interpreted as due to the higher viral concentration in the flat land which can be reduced because of the temperature and ventilation in the hills, and again concentrate in the mountains due to air temperature. The air pollutions in terms of PM (Particulate Matter) was not considered, but it is known that is higher in the productive areas.

Despite in the month of March few of the daily activity is spent "outside" still the air contamination even for few hours can be the trigger of the infection. Many medical doctors died because of Cov19 (55 at April 4th), particularly those taking care of patients both inside or outside of the hospitals.

One issue was not considered in the present study consisting of the gender difference in deaths. In the ISS (Istituto Superiore di Sanità) report of March, the deaths were respectively about 72 % in males and 28 % in females, most > 60 years old. Young age seem to be much less affected by Cov19, even if some cases is now documented. Many theories can be launched because of these differences in the infection, one for sure is related to the oxidative stress which can bound the females protection and the young people infection, but for the moment there are no sufficient data to support this hypothesis.

In terms of therapy, the assisted ventilation was fundamental for survival, together with many different type of treatment consisting of the use of antivirals, and anti-inflammatory drugs. The treatment was not the aim of this report, though no official protocols could be settled for the moment.

In particular, more attention should be addressed to the aerosol therapy with products with antiviral and anti-inflammatory activity, because much lower concentration can be used directly affecting the virus and with higher bioavailability. This could be important for the prevention also. In terms of prevention, the lock down seems to be the more efficient method and has been applied in every countries were Cov19 is becoming violent.

The use of masks has become a problem because of the shortage, particularly in hospitals and for the home care. May be is important to suggest that masks can be regenerated via disinfection (alcohol, hydrogen peroxide, heating at 60°C) and can be done in hospitals which are equipped for these procedures. Considering the figures in Italy, it is almost impossible to determine the real impact of Cov19 on the population. It has been calculated that 8 % of the swabs were positive, meaning that the figures over time may reach 4.8 million of people, and considering death due to or with Cov19 in the month of March, a therotical number of > 450,000 can be reached in a relatively short period of time, despite the 50 % of the cases who were cured.

This may indicate that even once the peak is reached, the problem will not be solved, because the Cov19 curves (positive cases and relative deaths) can be shifted to the right, taking theoretically many months if not years to reach the point 0, which hardly will be obtained.

This virus can to be already part of human meta-organism, and the negativity of the oropharynx swabs does not mean that Cov19 disappeared from the body, and the antibody determination in plasma is becoming necassary as the production of a vaccine. For the moment, it is urgent to create protocols for the therapy -as it has been done for AIDS and viral hepatitis- and think of an inhalation curative/preventive method to limit the infection. The use of diluted eucalyptol as aerosol in hot water can be an alternative to be tested for prevention, since most of the terpenes are antiviral.

At last, we think that China has a great responsibility for this disaster, and a more transparent information should have been given to the other Countries in the light of a real scientific collaboration.

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UC conceived the trial; GB, MRC, RC were collecting the data; UC wrote the text.

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