Characteristics of SARS-CoV-2 patients dying in Italy
Report based on available data on May 28th, 2020

1. Sample

The present report describes characteristics of 31,851 SARS-CoV-2 patients dying in Italy.* Geographic distribution across the 19 regions and 2 autonomous provinces of Trento and Bozen is presented in the table below. Data are update to May 28th, 2020.

Tabel 1. Geographic distribution of deceased patients SARS-CoV-2 positive

REGION	N	%
Lombardia	15,954	50.1
Emilia Romagna	4,083	12.8
Piemonte	2,711	8.5
Veneto	1,899	6.0
Liguria	1,453	4.6
Toscana	1,020	3.2
Marche	925	2.9
Lazio	686	2.2
Puglia	496	1.6
Trento	465	1.5
Abruzzo	398	1.2
Campania	361	1.1
Friuli Venezia Giulia	333	1.0
Bolzano	291	0.9
Sicilia	286	0.9
Valle d'Aosta	143	0.4
Sardegna	131	0.4
Calabria	91	0.3
Umbria	75	0.2
Basilicata	28	0.1
Molise	22	0.1
Total	**31,851**	**100.0**

* SARS-CoV-2 related deaths presented in this report are those occurring in patients who test positive for SARS-CoV-2RT by PCR, independently from pre-existing diseases.

2. Demographics

Mean age of patients dying for SARS-CoV-2 infection was 80 years (median 81, range 0-100, IQR 74 -88). Women were 13,042 (40.9%). *Figure 1* shows that median age of patients dying for SARS-CoV-2 infection was 20 years higher as compared with the national sample diagnosed with SARS-CoV-2 infection (median age 62 years). *Figure 2* shows the absolute number of deaths by age group. Women dying for SARS-CoV-2 infection had an older age than men (median age women 85 - median age men 79).

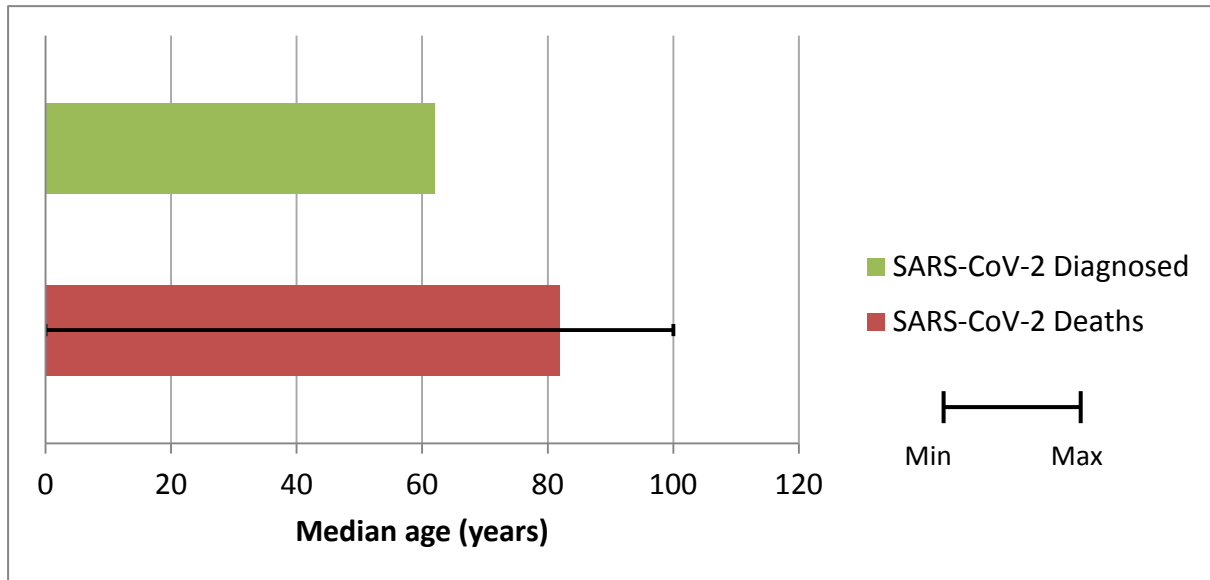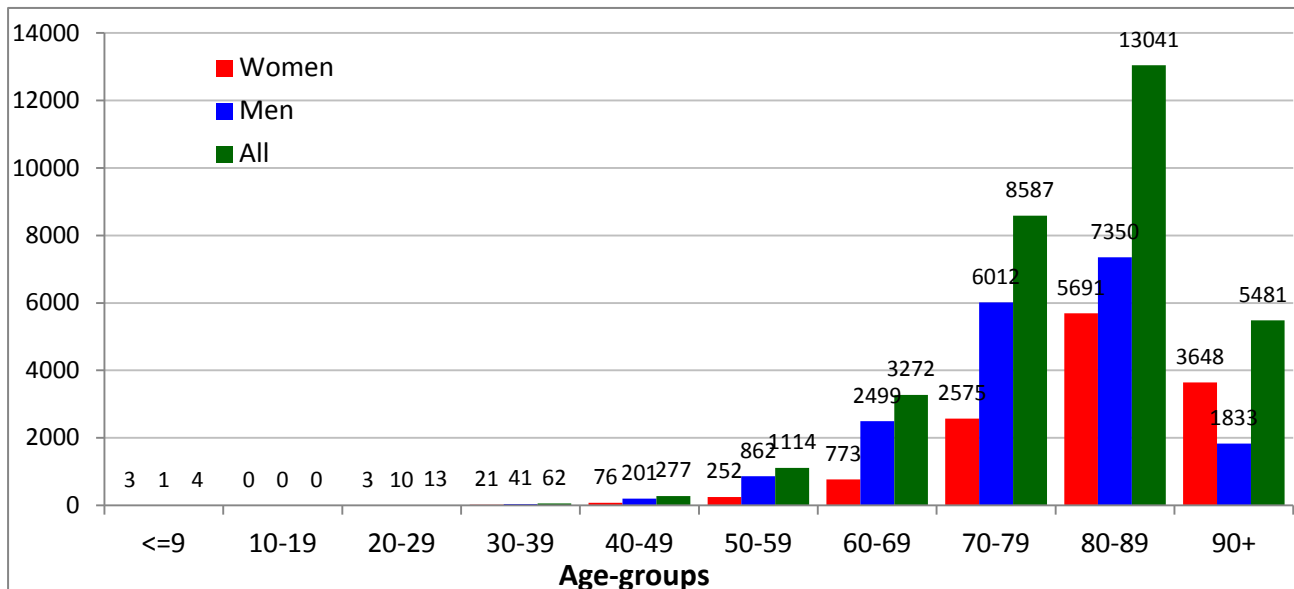**Figure 1.** *Median age of patients with SARS-CoV-2 infection and SARS-CoV-2 positive deceased patients*

Figure 2. *Absolute number of deaths by age group*

3. Pre-existing conditions

Table 1 presents most common comorbidities diagnosed before SARS-CoV-2 infection. Data on diseases were based on chart review and was available on 3,200 patients dying in-hospital for whom it was possible to analyse clinic charts. Mean number of diseases was 3.3 (median 3, SD 1.9). Overall, 4.1% of the sample presented with a no comorbidities, 14.9% with a single comorbidity, 21.5% with 2, and 59.5% with 3 or more.

Before hospitalization, 23% of SARS-CoV-2 positive deceased patients followed ACE-inhibitor therapy and 16% angiotensin receptor blockers-ARBs therapy. This information can be underestimated because data on drug treatment before admission were not always described in the chart.

Table 1. *Most common comorbidities observed in SARS-CoV-2 positive deceased patients*

Diseases	N	%
Ischemic heart disease	902	28.2
Atrial Fibrillation	707	22.1
Heart failure	507	15.8
Stroke	323	10.1
Hypertension	2172	67.9
Type 2-Diabetes	961	30.0
Dementia	509	15.9
COPD (Chronic Obstructive Pulmonary Disease)	529	16.5
Active cancer in the past 5 years	511	16.0
Chronic liver disease	129	4.0
Chronic renal failure	654	20.4
Dialysis	63	2.0
Respiratory failure	163	5.1
HIV Infection	7	0.2
Autoimmune diseases	123	3.8
Obesity	353	11.0
Number of comorbidities		
0 comorbidities	131	4.1
1 comorbidity	477	14.9
2 comorbidities	689	21.5
3 comorbidities and over	1903	59.5

Table 3 presents the most common pre-existing chronic pathologies in patients who died, separately in men (n = 2,140 and women (n = 1,060). The average number of pathologies observed in women is 3.3 (median 3, Standard Deviation 1.9). In men the average number of pathologies observed is 3.2 (median 3, Standard Deviation 1.9).

Tabella 3. *Most common comorbidities observed in SARS-CoV-2 positive deceased patients by gender*

| *Diseases*	**Women** N	%	**Men** N	%
Ischemic heart disease	*224*	*21.1*	*678*	*31.7*
Atrial Fibrillation	*245*	*23.1*	*462*	*21.6*
Heart Failure	*194*	*17.7*	*313*	*14.3*
Stroke	*110*	*10.4*	*213*	*10.0*
Hypertension	*736*	*69.4*	*1436*	*67.1*
Type 2-Diabetes	*299*	*28.2*	*662*	*30.9*
Dementia	*242*	*22.8*	*267*	*12.5*
COPD (Chronic Obstructive Pulmonary Disease)	*134*	*12.6*	*395*	*18.5*
Active cancer in the past 5 years	*172*	*16.2*	*339*	*15.8*
Chronic liver disease	*30*	*2.8*	*99*	*4.6*
Chronic renal failure	*192*	*18.1*	*462*	*21.6*
Dialysis	*18*	*1.7*	*45*	*2.1*
Respiratory failure	*54*	*5.1*	*109*	*5.1*
HIV Infection	*0*	*0.0*	*7*	*0.3*
Autoimmune diseases	*62*	*5.8*	*61*	*2.9*
Obesity	*118*	*11.1*	*235*	*11.0*
Number of comorbidities				
0 comorbidities	*28*	*2.6*	*103*	*4.8*
1 comorbidity	*153*	*14.4*	*324*	*15.1*
2 comorbidities	*236*	*22.3*	*453*	*21.2*
3 comorbidities and over	*643*	*60.7*	*1260*	*58.9*

4. *Diagnosis of hospitalization*

In 92.3% of hospitalizations, conditions (e.g. pneumonia, respiratory failure) or symptoms (e.g. fever, dyspnoea, cough) compatible with SARS-CoV-2 were mentioned. In 227 cases (7.7% of cases) the diagnosis of hospitalization was not related to the infection. In 34 cases the diagnosis of hospitalization concerned exclusively neoplastic pathologies, in 84 cases cardiovascular pathologies (for example Acute Myocardial Infarction-AMI, heart failure, stroke), in 28 cases gastrointestinal pathologies (for example cholecystitis, perforation of the intestine, intestinal obstruction, cirrhosis), in 81 cases other pathologies.

5. Symptoms

Figure 3 shows symptoms most commonly observed at hospital admission. Fever, dyspnoea and cough were the most commonly observed symptoms, while diarrhoea and haemoptysis were less commonly observed. Overall, 5.7% of patients did not present any symptoms at hospital admission.

Figure 3. *Most common symptoms observed in SARS-CoV-2 positive deceased patients*
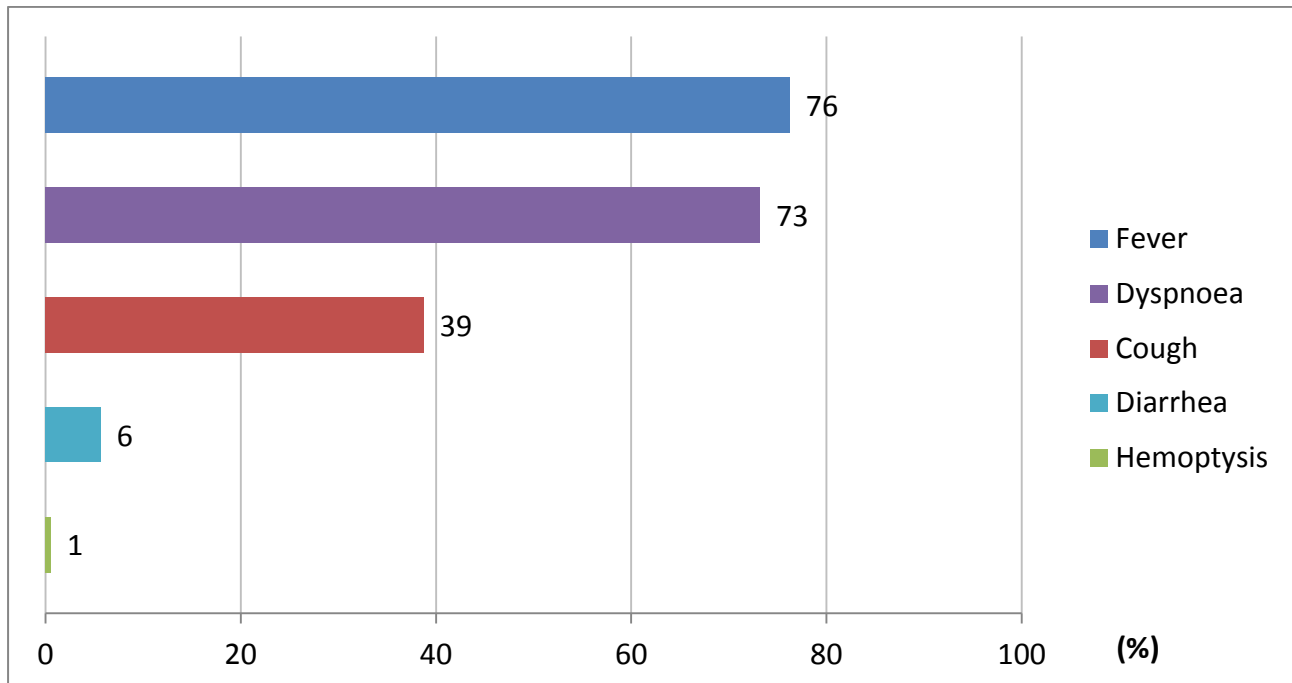
6. Acute conditions

Acute Respiratory Distress syndrome was observed in the majority of patients (**96.9% of cases**), followed by acute renal failure (22.3%). Superinfection was observed in 12.6% and acute cardiac injury in 10.8% of cases.

7. Treatments

Antibiotics were used by 86% of patients during hospital stay, while less used were antivirals (59%) and corticosteroids (38%). Concomitant use of these 3 treatments was observed in 22.7% of cases.

Out of SARS-CoV-2 positive deceased patients, 4.0% were treated with Tocilizumab during hospitalization.

8. Time-line

Figure 4 shows, for SARS-CoV-2 positive deceased patients, the median times, in days, from the onset of symptoms to death (11 days), from the onset of symptoms to hospitalization (5 days) and from hospitalization to death (6 days). The time from hospitalization to death was 4 days longer in those who were transferred to intensive care than those who were not transferred (9 days vs. 5 days).

Figure 4. *Median hospitalization times (in days) in SARS-CoV-2 positive deceased patients*
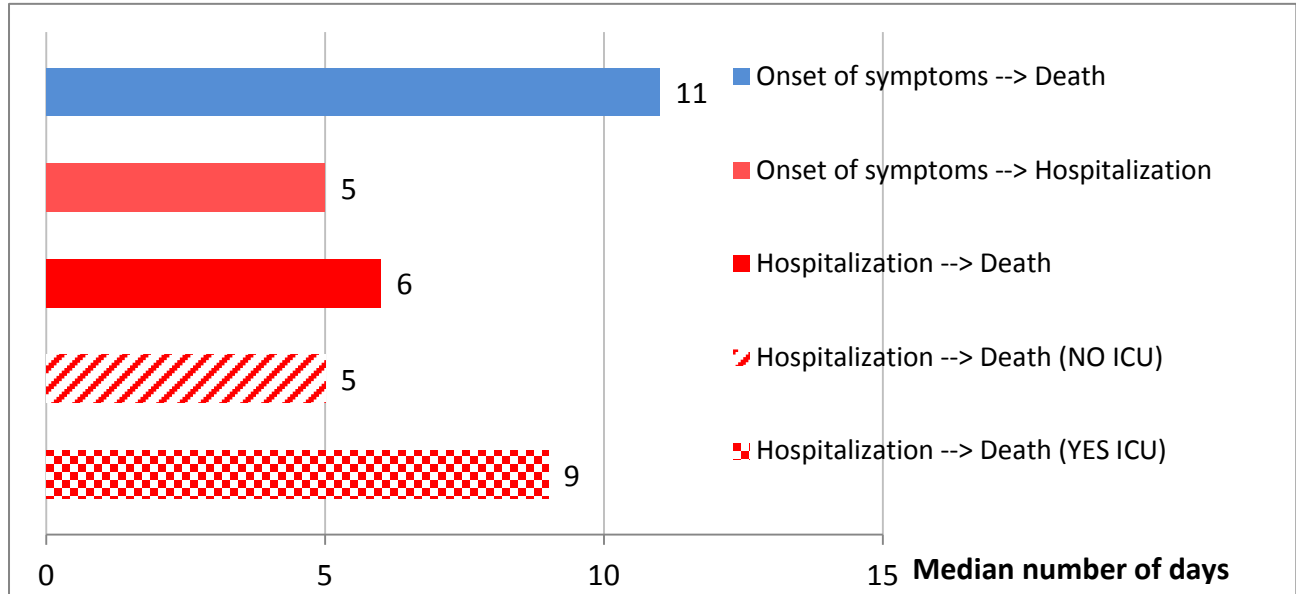
9. Deaths under the age of 50 years

As of May 28th, 356 out of the 31,851 (1.1%) positive SARS-CoV-2 patients under the age of 50 died. In particular, 79 of these were less than 40 years (52 men and 27 women), age range between 0 and 39 years. For 11 patients under the age of 40 years no clinical information is available; out of the remaining ones, 54 had serious pre-existing pathologies (cardiovascular, renal, psychiatric pathologies, diabetes, obesity) and 14 had no major pathologies.

This report was produced by SARS-CoV-2 Surveillance Group

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