Characteristics of SARS-CoV-2 patients dying in Italy
Report based on available data on September 7th, 2020

1. Sample

The present report describes characteristics of 35,563 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 September 7th, 2020.

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

REGION	N	%
Lombardia	16,863	47.4
Emilia Romagna	4,450	12.5
Piemonte	4,122	11.6
Veneto	2,129	6.0
Liguria	1,583	4.5
Toscana	1,146	3.2
Marche	988	2.8
Lazio	895	2.5
Puglia	565	1.6
Abruzzo	472	1.3
Campania	471	1.3
Trento	405	1.1
Friuli Venezia Giulia	358	1.0
Sicilia	311	0.9
Bolzano	292	0.8
Valle d'Aosta	146	0.4
Sardegna	136	0.4
Calabria	97	0.3
Umbria	81	0.2
Basilicata	30	0.1
Molise	23	0.1
Total	**35,563**	**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 82, range 0-109, IQR 74-88). Women were 15,155 (42.6%). *Figure 1* shows that median age of patients dying for SARS-CoV-2 infection was more than 20 years higher as compared with the national sample diagnosed with SARS-CoV-2 infection (median age 58 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).

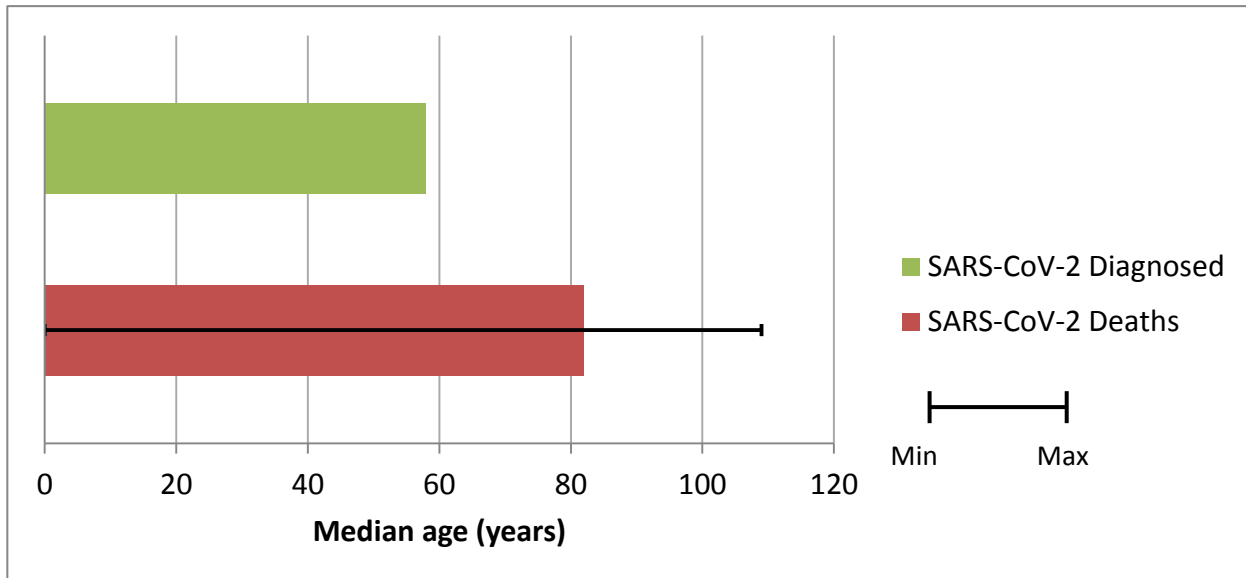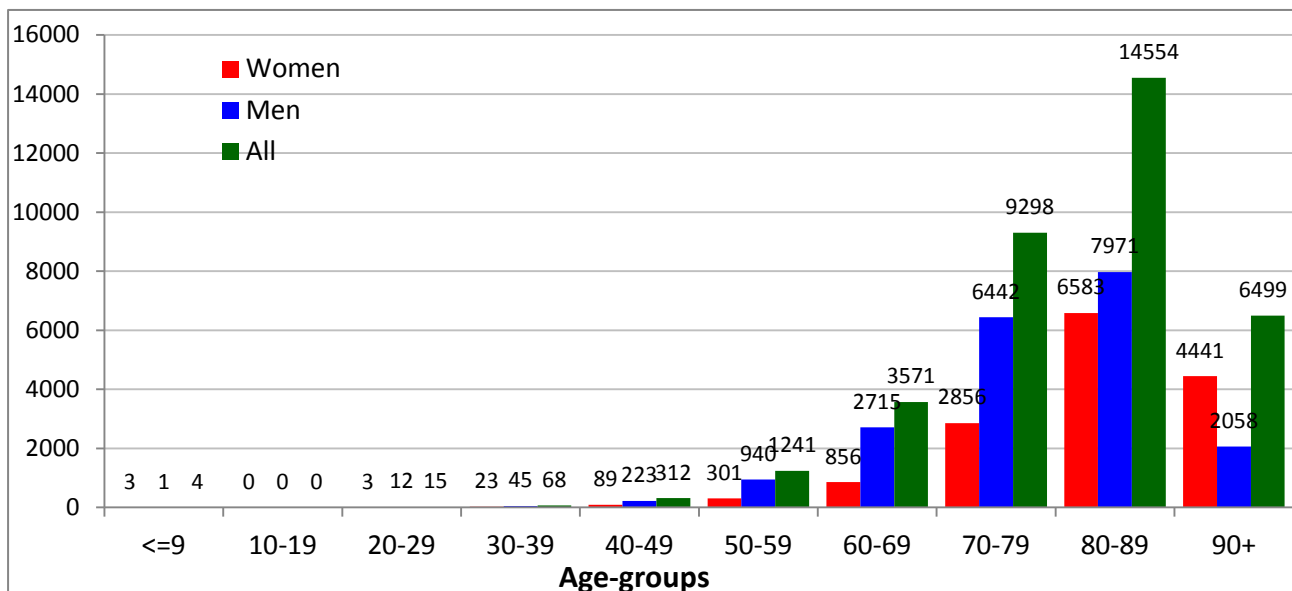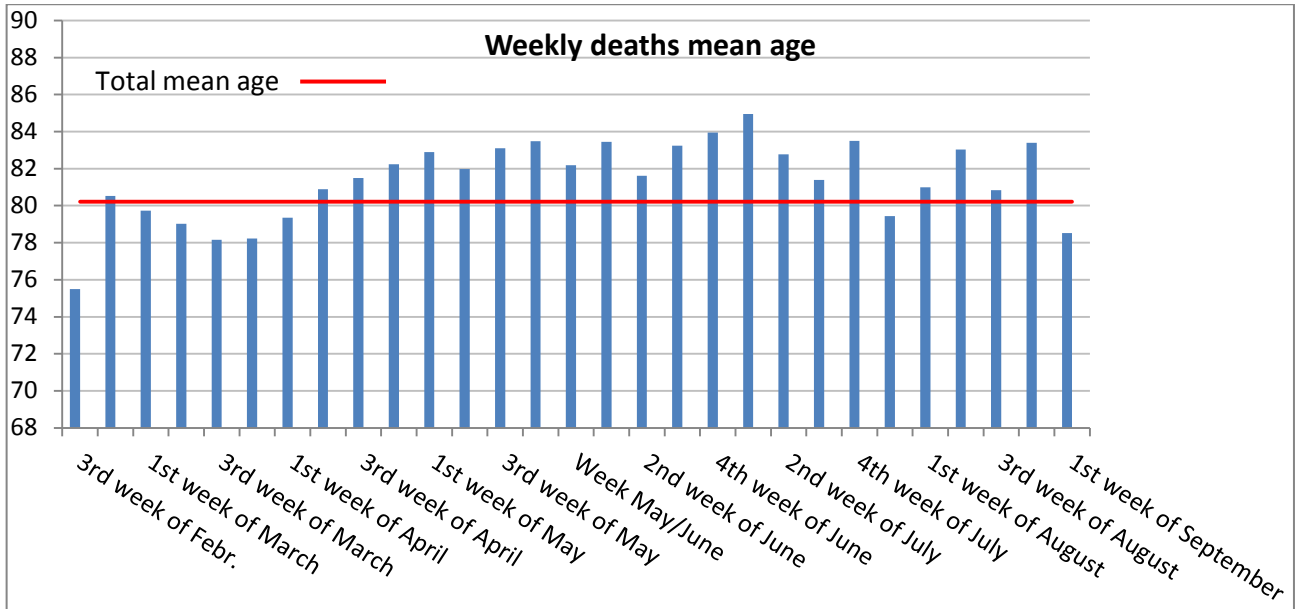**Figure 1.** *Median age of patients with SARS-CoV-2 infection and SARS-CoV-2 positive deceased patients*

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

Note: For 1 deceased person, age was not possible to be evaluated

Figure 3 shows the trend in the average age of SARS-CoV-2 positive deceased patients per calendar week, starting from the 3rd week of February 2020 (the date of the first death dates back to 21st February 2020). The average age of weekly deceased persons has substantially increased up to 85 years (1st week of July) and then dropped slightly.

Figure 3. *Mean age of SARS-CoV-2 positive deceased patients by week of death*

3. Pre-existing conditions

Table 2 presents most common comorbidities diagnosed before SARS-CoV-2 infection. Data on diseases were based on chart review and was available on 4,190 patients dying in-hospital for whom it was possible to analyse clinic charts. Mean number of diseases was 3.4 (median 3, SD 2.0). Overall, 3.8% of the sample presented with a no comorbidities, 13.6% with a single comorbidity, 20.1% with 2, and 62.6% with 3 or more.

Before hospitalization, 22% of SARS-CoV-2 positive deceased patients followed ACE-inhibitor therapy and 15% 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 2. *Most common comorbidities observed in SARS-CoV-2 positive deceased patients*

Diseases	N	%
Ischemic heart disease	1173	28.0
Atrial Fibrillation	979	23.4
Heart failure	671	16.0
Stroke	445	10.6
Hypertension	2755	65.8
Type 2-Diabetes	1237	29.5
Dementia	833	19.9
COPD (Chronic Obstructive Pulmonary Disease)	717	17.1
Active cancer in the past 5 years	702	16.8
Chronic liver disease	188	4.5
Chronic renal failure	858	20.5
Dialysis	85	2.0
Respiratory failure	247	5.9
HIV Infection	7	0.2
Autoimmune diseases	168	4.0
Obesity	434	10.4
Number of comorbidities		
0 comorbidities	158	3.8
1 comorbidity	568	13.6
2 comorbidities	841	20.1
3 comorbidities and over	2623	62.6

Table 3 presents the most common pre-existing chronic pathologies in patients who died, separately in men (n = 2,677 and women (n = 1,513). The average number of pathologies observed in women is 3.5 (median 3, Standard Deviation 2.0). In men the average number of pathologies observed is 3.3 (median 3, Standard Deviation 2.0).

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

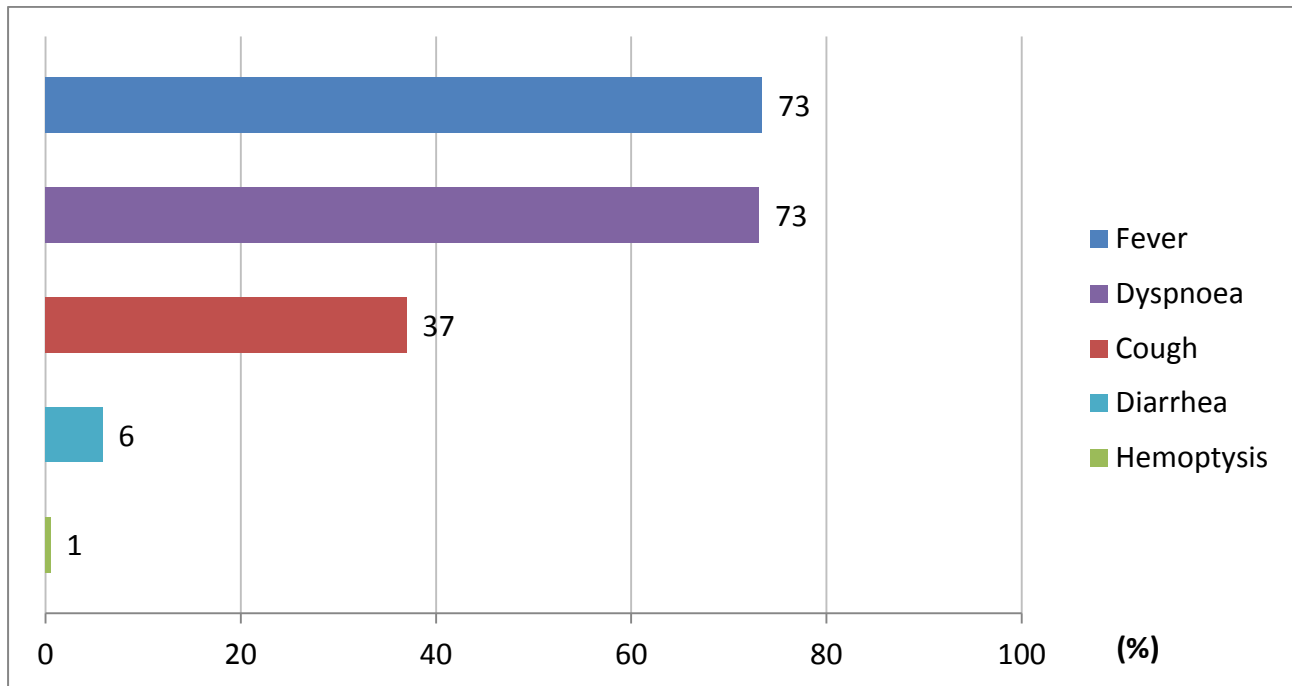| Diseases	Women N	Women %	Men N	Men %
Ischemic heart disease	344	22.7	829	31.0
Atrial Fibrillation	375	24.8	604	22.6
Heart Failure	281	18.1	390	14.3
Stroke	171	11.3	274	10.2
Hypertension	1016	67.2	1739	65.0
Type 2-Diabetes	414	27.4	823	30.7
Dementia	431	28.5	402	15.0
COPD (Chronic Obstructive Pulmonary Disease)	200	13.2	517	19.3
Active cancer in the past 5 years	249	16.5	453	16.9
Chronic liver disease	56	3.7	132	4.9
Chronic renal failure	287	19.0	571	21.3
Dialysis	27	1.8	58	2.2
Respiratory failure	96	6.3	151	5.6
HIV Infection	0	0.0	7	0.3
Autoimmune diseases	89	5.9	79	3.0
Obesity	156	10.3	278	10.4
Number of comorbidities				
0 comorbidities	37	2.4	121	4.5
1 comorbidity	184	12.2	384	14.3
2 comorbidities	295	19.5	546	20.4
3 comorbidities and over	996	65.8	1626	60.7

4. *Diagnosis of hospitalization*

In 91.3% of hospitalizations, conditions (e.g. pneumonia, respiratory failure) or symptoms (e.g. fever, dyspnoea, cough) compatible with SARS-CoV-2 were mentioned. In 334 cases (8.7% of cases) the diagnosis of hospitalization was not related to the infection. In 50 cases the diagnosis of hospitalization concerned exclusively neoplastic pathologies, in 113 cases cardiovascular pathologies (for example Acute Myocardial Infarction-AMI, heart failure, stroke), in 46 cases gastrointestinal pathologies (for example cholecystitis, perforation of the intestine, intestinal obstruction, cirrhosis), in 125 cases other pathologies.

5. Symptoms

Figure 4 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, 6.8% of patients did not present any symptoms at hospital admission.

Figure 4. *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 (**95.3% of cases**), followed by acute renal failure (23.2%). Superinfection was observed in 17.5% and acute cardiac injury in 10.9% of cases.
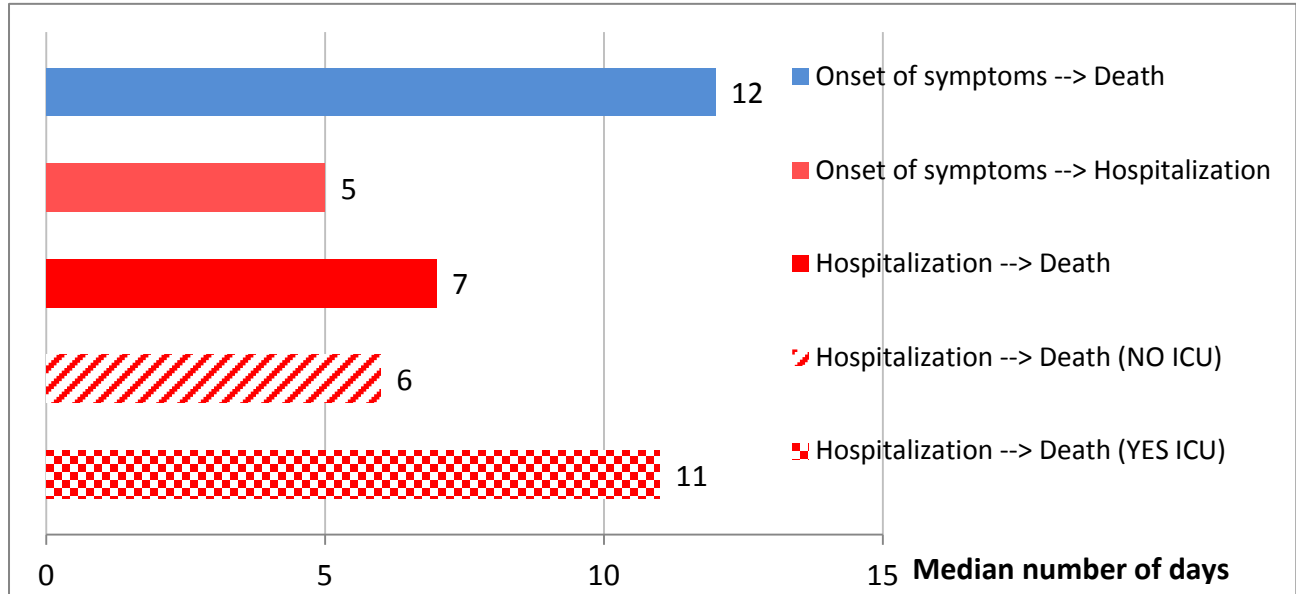
7. Treatments

Antibiotics were used by 86.5% of patients during hospital stay, while less used were antivirals (58.8%) and corticosteroids (42.5%). Concomitant use of these 3 treatments was observed in 26.2% of cases.

Out of SARS-CoV-2 positive deceased patients, 4.6% were treated with Tocilizumab during hospitalization.

8. Time-line

Figure 5 shows, for SARS-CoV-2 positive deceased patients, the median times, in days, from the onset of symptoms to death (12 days), from the onset of symptoms to hospitalization (5 days) and from hospitalization to death (7 days). The time from hospitalization to death was 5 days longer in those who were transferred to intensive care than those who were not transferred (11 days vs. 6 days).

Figure 5. *Median hospitalization times (in days) in SARS-CoV-2 positive deceased patients*

9. Deaths under the age of 50 years

As of September 7th, 399 out of the 35,563 (1.1%) positive SARS-CoV-2 patients under the age of 50 died. In particular, 87 of these were less than 40 years (58 men and 29 women), age range between 0 and 39 years. For 9 patients under the age of 40 years no clinical information is available; out of the remaining ones, 64 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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