

COVID-19 Severity by Smoking Status

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There has been recent conversation about the role that smoking status may play in severity of COVID-19 disease. To investigate this role, we examined the relationship between smoking status, as documented in the electronic health record, and general outcome severity of COVID-19 in a large national cohort of adult COVID-19 positive patients.

The following analysis includes 132,288 patients 19+ years old who are COVID-19 positive. 81% had a smoking status recorded in their electronic health record as of May 4, 2020. Data are pooled from 31 health systems representing 300 hospitals spanning 18 states and covering 135 million patients.

Figure 1 shows the distribution of patients' worst severity by smoking status and age for COVID-19 positive patients with a smoking status on file. There does not currently appear to be a clear pattern in worse outcomes for any smoking status. This may be due to the large number of patients who have not had COVID-19 long enough to have an outcome. Another possible reason is that there is no pattern to detect. COVID-19 outcomes by smoking status are shown for additional age groups in Table 1.

COVID-19 Outcomes by Smoking Status and Age

(n=107,220)

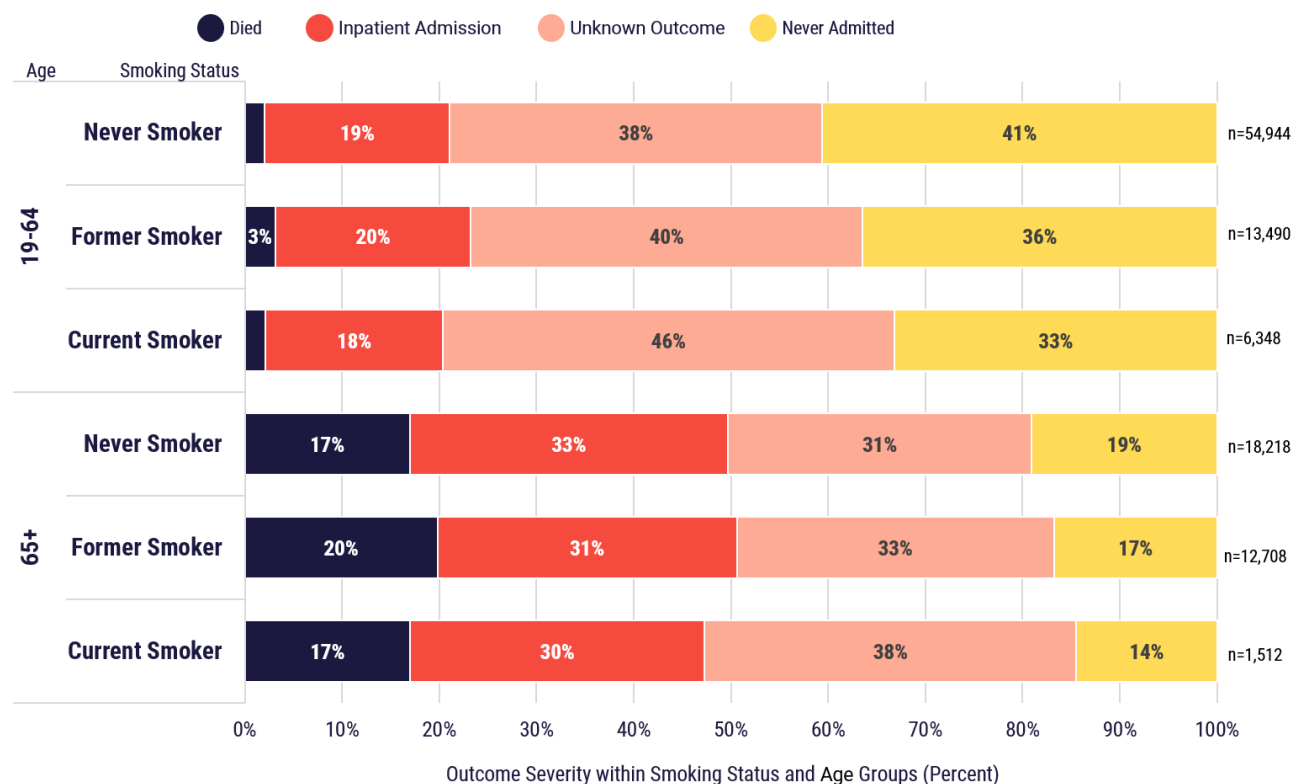


Figure 1: COVID-19 worst severity by smoking status and age group. Some rows may not add to 100% due to rounding.

Until more patients have known outcomes, it remains unclear whether or not smoking status is related to COVID-19 outcomes. Researchers who are investigating smoking and COVID-19 may find this information useful as they continue to examine this relationship.

COVID-19 Outcomes by Smoking Status

All Age Groups

n = 107,220

Age Group	Smoking Status	COVID-19 Outcome				Total Patients
		Died	Inpatient Admission	Unknown Outcome	Never Admitted	
19-44	Never	0.6%	14.2%	39.9%	45.3%	25,713
	Former	0.6%	13.7%	42.7%	43.0%	4,070
	Current	0.6%	13.3%	47.9%	38.2%	2,949
45-54	Never	2.1%	20.9%	38.1%	38.9%	14,654
	Former	2.2%	19.1%	40.7%	37.9%	3,442
	Current	2.0%	19.1%	45.6%	33.3%	1,581
55-64	Never	4.4%	25.8%	35.6%	34.2%	14,577
	Former	5.3%	25.1%	38.4%	31.2%	5,978
	Current	4.8%	25.3%	45.0%	24.9%	1,818
65-74	Never	10.7%	33.2%	31.5%	24.7%	8,887
	Former	12.8%	30.9%	35.6%	20.7%	5,816
	Current	13.5%	31.1%	39.6%	15.8%	986
75-84	Never	20.2%	35.1%	29.5%	15.1%	5,270
	Former	23.3%	32.6%	29.7%	14.5%	4,366
	Current	20.7%	30.2%	36.1%	12.9%	410
85+	Never	26.4%	28.7%	33.0%	11.9%	4,061
	Former	30.0%	27.5%	30.7%	11.8%	2,526
	Current	33.6%	23.3%	34.5%	8.6%	116

Table 1: COVID-19 outcomes by smoking status for additional age groups. Some rows may not add to 100% due to rounding.

Term	Definition
COVID-19 Patient	Patient with a positive SARS-CoV-2 lab result or a COVID-19 diagnosis. Start Date: The earlier of the earliest positive SARS-CoV-2 lab result collection date or earliest diagnosis noted date
Positive COVID-19 Lab Result	A final result flagged as abnormal for one of the lab components identified by individual health systems for SARS-CoV-2. Positive/Start Date: Date the test was performed
COVID-19 Diagnosis	A patient with one of the following codes in one of the listed diagnosis settings. Diagnosis Code: U07.1 (ICD-10), 840539006 (SNOMED) Diagnosis Setting: Encounter Diagnosis, Billing Diagnosis, Problem List, Hospital Problem, Discharge Diagnosis
COVID-19 Related Admission	A hospital admission during which the patient has a positive SARS-CoV-2 lab test or COVID-19 diagnosis, OR a hospital admission with any respiratory diagnosis which happens within 14 days of the patient's COVID-19 "start date." Respiratory Diagnosis Codes: J00-J99 (ICD-10)
COVID-19 Related Death	A COVID-19 patient with a death date or discharge date with discharge disposition of deceased within 6 weeks of their COVID-19 start date.
COVID-19 Known Outcome	A patient with a known outcome either was never admitted within 6 weeks of their COVID-19 "start date," was admitted and subsequently discharged from hospital, or died.
Smoking Status	A patient's most recently documented smoking tobacco use. The smoking status was divided into three categories for this analysis: never smoker, current or former smoker, and patients with unknown smoking status.
Never Smoker	A patient whose most recent smoking status was "Never Smoker" or "Passive Smoke Exposure – Never Smoker."
Current Smoker	A patient whose most recent smoking status was "Current Every Day Smoker," "Current Some Day Smoker," "Heavy Tobacco Smoker," "Light Tobacco Smoker," "Smoker," or "Smoker, Current Status Unknown."
Former Smoker	A patient whose most recent smoking status was "Former Smoker."
Unknown Smoking Status	A most recent smoking status that was left empty, was "Never Assessed" or "Unknown if Ever Smoked."

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