Characteristics and Risk Factors of Hospitalized and Nonhospitalized COVID-19 Patients, Atlanta, Georgia, USA, March–April 2020

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We compared the characteristics of hospitalized and nonhospitalized patients who had coronavirus disease in Atlanta, Georgia, USA. We found that risk for hospitalization increased with a patient's age and number of concurrent conditions. We also found a potential association between hospitalization and high hemoglobin A1c levels in persons with diabetes.

Information about care-seeking behavior, symptom duration, and risk factors for progression to severe illness in nonhospitalized patients with coronavirus disease (COVID-19) aids in resource planning, disease identification, risk stratification, and clinical management of nonhospitalized patients (*1*–*6*). We built on a previous analysis comparing hospitalized and nonhospitalized COVID-19 patients, which found that hospitalized patients were more likely to be ≥65 years of age, men, Black, diabetic, or obese (*7*). We describe symptom patterns, duration of illness, and care-seeking behavior among nonhospitalized patients and explore the relationships between hospitalization and the number, control, and interaction of concurrent medical conditions and age. We defined control as how well a disease is managed in the patient, as measured by hemoglobin A1c levels in diabetics, number of classes of hypertension medication being taken by patients with hypertension, and BMI among patients with obesity.

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The Study

We enrolled hospitalized and nonhospitalized patients ≥18 years of age with laboratory-confirmed COVID-19 (defined as a positive real-time reverse transcription PCR result for severe acute respiratory syndrome coronavirus 2) treated at 6 acute care hospitals and outpatient clinics affiliated with a single academic hospital system in the Atlanta, Georgia, USA, metropolitan area during March 1–April 7, 2020, as previously described (*7*). In this investigation, we compared characteristics and symptoms of hospitalized and nonhospitalized persons using χ^2, Fisher exact, or *t*-test as appropriate.

We conducted univariable and multivariable logistic regression analyses to explore the associations between age group and number of underlying conditions on risk for hospitalization. We conducted separate analyses to model the associations and interactions of diabetes, hypertension, and obesity

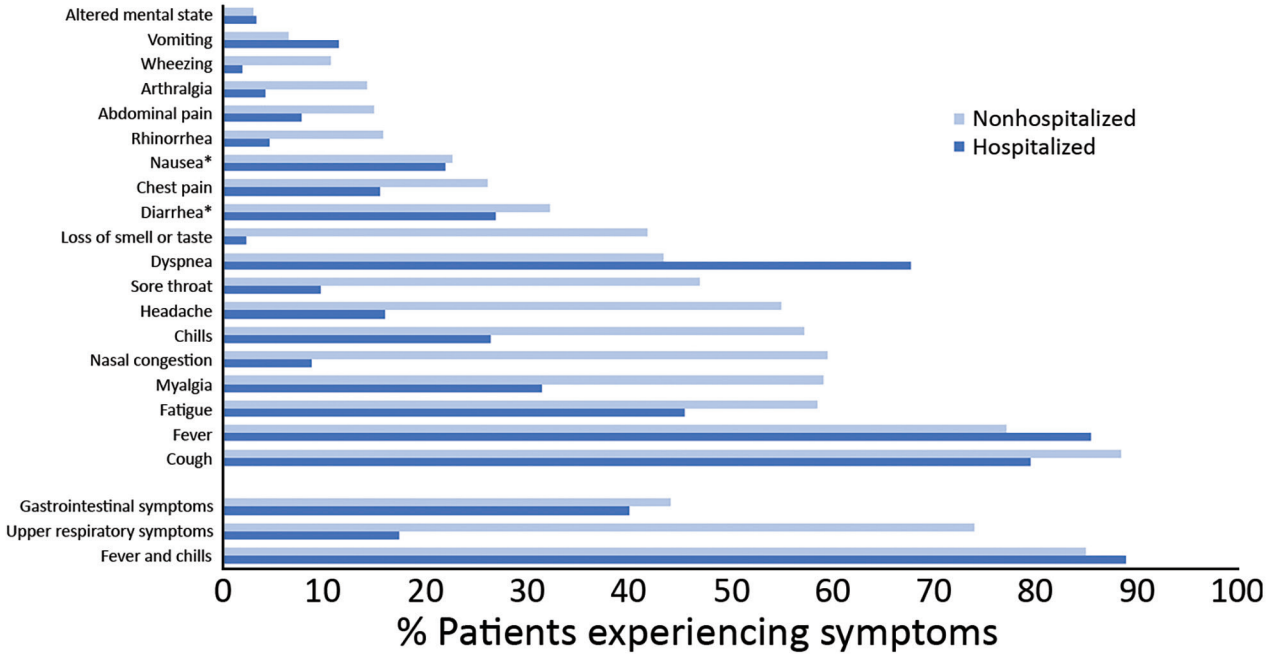

Figure. Symptoms of coronavirus disease among hospitalized and nonhospitalized patients, Atlanta, Georgia, USA, 2020. Gastrointestinal symptoms include vomiting, nausea, diarrhea, and abdominal pain. Upper respiratory symptoms include sore throat, rhinorrhea, and nasal congestion. *p≥0.01.

with hospitalization for COVID-19. We then used univariable and multivariable logistic regression to investigate whether the severity or control of concurrent conditions was associated with increased risk for hospitalization. We modeled the association between body mass index (BMI) and hospitalization. Further, we investigated whether use of multiple classes of hypertension medication was associated with hospitalization among patients with hypertension and the association of elevated levels (≥7%) of hemoglobin A1c (HbA1c) and hospitalization among patients with diabetes. This level was chosen because a value <7% is considered an indicator of adequate blood glucose control in patients with diabetes (*8*). Multivariable models were adjusted for characteristics previously associated with hospitalization in these populations (*7*) (Appendix, https://wwwnc.cdc.gov/EID/article/27/4/20-4709-App1.pdf).

We enrolled 311 nonhospitalized and 220 hospitalized patients in this study (Appendix Tables 1–3). We reviewed patient medical records and found that upper respiratory system symptoms including rhinorrhea, nasal congestion, and pharyngitis were more common among nonhospitalized patients than hospitalized patients (74% vs. 17%; p = 0.01). In contrast, hospitalized patients had dyspnea more frequently than did nonhospitalized patients (68% vs. 43%; p = 0.01) (Figure 1). Of 147 nonhospitalized patients with available information on symptom duration, 67 (46%) reported symptoms lasting ≥21 days.

Of 311 nonhospitalized patients, 135 (43%) had their first contact with the healthcare system for their COVID-19 illness on a telephone triage line, 23 (7%) at the emergency department, and 141 (45%) at an ambulatory care clinic (Table 1). Of nonhospitalized patients, 85% sought in-person care (i.e., ambulatory care, emergency department, or urgent care) a single time for their COVID-19 illness. A subset of 188 non-

Table 1. Treatment settings of 311 nonhospitalized patients with coronavirus disease, Atlanta, Georgia, USA, 2020*

Treatment setting	Value
First interaction	
Ambulatory care	141 (45)
Telephone triage line	135 (43)
Emergency department	23 (7)
Other†	12 (4)
All interactions	
Ambulatory care	269 (87)
Telephone triage line	210 (68)
Emergency department	45 (15)
Other†	22 (7)
Median no. visits (IQR)	1 (1–1)
Ambulatory care	1 (1–1)
Telephone triage line	1 (1–2)
Emergency department	1 (1–1)

*Values are no. (%) patients except as indicated. IQR, interquartile range.
†Includes retail health, telehealth, and urgent care.

hospitalized patients had information in their medical records about all their COVID-19 healthcare visits. These 188 patients had 400 documented healthcare visits: 188 (47%) ambulatory care, 167 (42%) telehealth, 39 (10%) in-person emergency department, and 6 (2%) urgent care visits. Within this subset, 57% of visits among those patients with symptoms lasting ≥21 days were telehealth appointments; 56% of visits among those with symptoms <21 days were in-person primary care visits.

Odds of hospitalization increased with advancing age (50–59 years of age, adjusted odds ratio [aOR] 2.1, 95% CI 0.7–6.6; 60–69 years, aOR 4.1, 95% CI 1.3–13.3; ≥70 years, aOR 9.2, 95% CI 2.7–31.0). The aOR of hospitalization demonstrated a dose-dependent relationship with number of concurrent conditions (1 condition, aOR 1.8, 95% CI 0.8–3.7; 2 conditions, aOR 2.3, 95% CI 1.1–4.8; ≥3 conditions, aOR 4.2, 95% CI 1.9–9.1) (Table 2).

Among patients with hypertension, the odds of hospitalization demonstrated a possible dose-dependent increase among patients taking multiple classes of hypertension medications; however, precision of estimates was limited by small sample size (Table 2). Among patients with diabetes, those with a recent HbA1c score ≥7% had an increased risk for hospitalization (aOR 4.1, 95% CI 0.9–19.1); however, precision of estimates was limited by small sample size. Among obese patients (BMI ≥30), BMI was not associated with increasing odds of hospitalization (Table 2). In the multivariable analyses, we did not detect significant additive or multiplicative interaction between diabetes and obesity, hypertension and obesity, or hypertension and diabetes (Appendix Table 4).

Conclusions

Symptoms lasting ≥21 days were common among nonhospitalized patients in this investigation; however, <20% of these patients had >1 in-person healthcare visit for COVID-19 during acute illness. These extended symptom durations, in conjunction with limited care-seeking behavior, suggest that many mildly ill COVID-19 patients can self-manage

Table 2. Risk factors for hospitalization among patients with coronavirus disease, Atlanta, Georgia, USA, 2020*

Characteristic	Hospitalized, no. (%)	Nonhospitalized, no. (%)	Crude OR (85% CI)	Adjusted OR (95% CI)
Age, y				
Total	220 (100)	311 (100)		
18–29	5 (2)	52 (17)	Referent	Referent†
30–39	24 (11)	79 (25)	3.0 (1.1–8.2)	1.4 (0.4–4.6)
40–49	36 (16)	54 (17)	6.3 (2.3–16.8)	3.0 (0.9–9.5)
50–59	41 (19)	63 (20)	6.4 (2.4–16.9)	2.1 (0.7–6.6)
60–69	56 (26)	41 (13)	13.9 (5.2–37.2)	4.1 (1.3–13.3)
≥70	58 (26)	22 (7)	25.7 (9.2–71.4)	9.2 (2.7–31.0)
No. concurrent conditions				
Total	220 (100)	311 (100)		
0	21 (10)	122 (39)	Referent	Referent‡
1	48 (22)	80 (26)	3.5 (1.9–6.3)	1.8 (0.8–3.7)
2	71 (32)	68 (22)	6.0 (3.4–10.6)	2.3 (1.1–4.8)
≥3	80 (36)	41 (13)	12.2 (6.6–22.4)	4.2 (1.9–9.1)
Hemoglobin A1c§				
Total	81 (100)	30 (100)		
<7%	17 (21)	17 (57)	Referent	Referent¶
≥7%	38 (47)	7 (23)	3.3 (1.2–9.4)	4.1 (0.9–19.1)
Missing data	26 (32)	6 (20)		
Obesity				
Total	220 (100)	311 (100)		
<30	86 (39)	123 (40)	Referent	Referent#
30–34	65 (30)	52 (17)	1.8 (1.2–3.0)	2.6 (1.3–5.0)
35–40	34 (16)	26 (8)	1.9 (1.0–3.5)	2.2 (1.0–4.8)
>40	25 (11)	26 (8)	1.6 (0.8–2.9)	1.8 (0. 7–4.5)
Missing data	10 (5)	84 (27)		
No. classes of hypertension medications**				
Total	142 (100)	101 (100)		
0	20 (14)	13 (13)	Referent	Referent#
1	38 (27)	42 (42)	0.7 (0.3–1.6)	0.7 (0.3–2.0)
2	48 (34)	33 (33)	1.0 (0.5–2.4)	1.6 (0.6–4.5)
≥3	36 (25)	13 (13)	1.9 (0.7–5.0)	1.8 (0.5–6.0)

*OR, odds ratio.
†Adjusted for number of underlying conditions, race, sex, insurance, and smoking (including current or former smoking).
‡Adjusted for age, race, sex, insurance, and smoking (including current or former smoking).
§Among patients with diabetes.
¶Adjusted for age, race, sex, healthcare personnel status, and hypertension.
#Adjusted for age, race, sex, healthcare personnel status, and diabetes.
**Among patients with hypertension.

their symptoms. Because telemedicine was the second most common healthcare delivery method in our investigation, we hypothesize that it might have provided ongoing patient support and decreased the need for in-person healthcare visits (*9*). These findings can assist healthcare providers with anticipatory guidance for patients and caregivers and can inform decisions about allocation of resources for healthcare delivery.

We found that age and number of underlying conditions were associated with a dose-dependent increase in likelihood of hospitalization. Elderly COVID-19 patients frequently have multiple conditions that increase risk for hospitalization and serious infection (*10*). However, we did not find a significant additive or multiplicative interaction between the 3 most common underlying conditions among study participants: hypertension, diabetes, and obesity.

We hypothesized that degree of control of underlying conditions would affect risk for hospitalization. We found that the aORs for hospitalization were higher among patients with diabetes who had elevated mean levels of HbA1c and among patients with hypertension taking an increasing number of hypertension medications. Although not statistically significant, these findings may suggest an association between the management of concurrent conditions and COVID-19 disease severity. Despite obesity's association with increased risk for severe illness and death from COVID-19 (*11*,*12*), we did not find an increasing risk for hospitalization with increasing BMI among persons with obesity.

A limitation of our study is that, because of small sample sizes, our analyses might have lacked power to detect a significant association between degree of control of underlying conditions and hospitalization. In addition, our sample comprised patients at a single hospital system during a limited timeframe, and thus our results might not be generalizable to other populations. Because this hospital system prioritized certain persons (e.g., older patients, patients with underlying conditions, and healthcare personnel) for outpatient SARS-COV-2 testing, these persons might be overrepresented among the nonhospitalized patients in our sample. We were also not able to assess symptom resolution among all patients during the timeframe of this investigation and therefore might not have accounted for all follow-up healthcare visits for COVID-19.

In conclusion, although many nonhospitalized patients in this study reported symptoms lasting ≥21 days, most cases of COVID-19 among nonhospitalized patients were managed with a single ambulatory care visit and telehealth follow-up appointments. Patients of increasing age, with a greater number of underlying conditions, and with poor management of those conditions might be at higher risk for hospitalization and severe disease from COVID-19.

About the Author

Dr. Pettrone is an Epidemic Intelligence Service Officer in the Division of Vital Statistics, National Center for Health Statistics, Centers for Disease Control and Prevention. Her research interests include infectious disease and public health.

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Appendix

Methods

Data Collection

Hospitalized and nonhospitalized patients ≥18 years of age with laboratory-confirmed coronavirus disease (COVID-19) (defined as a positive real-time reverse transcription PCR for severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) who were treated at 6 acute care hospitals and outpatient clinics affiliated with a single academic hospital system in the Atlanta metropolitan area were included in the study. Patients who were hospitalized for COVID-19 during March 1–30, 2020 (including those who stayed for observation or died in the emergency department) were sequentially selected from lists provided by the health system and reviewed over a 3-week period in April 2020.

Nonhospitalized patients were identified from the provided lists of patients ≥18 years of age who tested positive for SARS-CoV-2 during March 1–April 7, 2020 and were not hospitalized (including outpatient and nonadmitted emergency department patients). During this time, the healthcare system operated a telephone triage line to manage patients with COVID-19–compatible symptoms. Patients with signs of severe illness (e.g., severe shortness of breath, confusion, or hemoptysis) were directed to the emergency department. Other symptomatic persons could receive outpatient SARS-CoV-2 testing through the healthcare system; because testing capacity was limited, appointments were prioritized for healthcare personnel and persons at high risk for severe illness, such as persons ≥65 years of age and those with underlying conditions, including diabetes mellitus, cardiovascular disease, and chronic respiratory disease. Telephone and telehealth follow-up calls were conducted for some patients. Trained personnel

reviewed information from electronic medical records (EMR) during April 7–May 15, 2020 on patient demographics, occupation, medications, underlying conditions, and symptoms using REDCap version 8.8.0 (https://projectredcap.org/software).

Analytic Methods

We categorized patients as having 0, 1, 2, or ≥3 of the following conditions: hypertension, diabetes mellitus, chronic kidney disease, chronic lung disease, HIV, chronic liver disease, history of organ transplant, cardiovascular disease, autoimmune or rheumatologic disease, obesity, and cancer. Obesity was defined as having a body mass index (BMI) ≥30. We considered insured patients to be those possessing private, Medicare, Medicaid, or other insurance policies. Race was classified as black or nonblack; data could not be disaggregated for other races or analyzed by ethnicity because of small sample sizes. We counted the number of classes of hypertension medication prescribed to patients (beta blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, calcium channel blockers, thiazide diuretics, hydralazine, clonidine, or other); we analyzed combination medications by their individual components. Occupation was obtained from the EMR. Healthcare personnel (HCP) were defined as persons whose occupations included patient contact or possible exposure to infectious agents in the healthcare setting (*1*). Among the nonhospitalized group, care-seeking behavior was defined as having a COVID-19–related encounter with a healthcare provider documented in the medical record. We counted all healthcare encounters related to COVID-19 illness including doctor's office and urgent care visits (together classified as ambulatory care visits), emergency room visits, telehealth visits in which symptoms or care was reviewed, and calls to the telephone triage line. We compared characteristics and symptoms of hospitalized and nonhospitalized persons using X^2 or Fisher's exact tests for categorical variables; continuous variables are described with means and their standard deviations and compared with *t*-tests. We considered p values <0.05 to be significant.

Characteristics associated with hospitalization in this population have been described previously (*2*). We conducted further univariable and multivariable logistic regressions to explore the effects of additional age strata and multiple medical conditions (instead of individual conditions) on risk for hospitalization. The full multivariable logistic regression model included 6 age strata (18–29, 30–39, 40–49, 50–59, 60–69, and ≥70 years), number of underlying conditions (0, 1, 2, and ≥3), race, sex, insurance, and smoking (including current or former

smoking), as all of these characteristics were previously associated with hospitalization in this population (*2*). Firth's correction was used to account for small sample size in some groups (*3*). Because ≈50% of the nonhospitalized patients were HCP, possibly because of testing priorities in March–April 2020 (n = 168; 54%), we repeated multivariable models that excluded HCP as a sensitivity analysis.

We further explored the 3 most common medical conditions among the hospitalized and nonhospitalized populations: hypertension, diabetes, and obesity, all of which have been associated with increased risk of severe illness from COVID-19 (*4–8*). Diagnoses of hypertension and diabetes were identified from the medical history documented in the EMR; obesity was defined using calculations of BMI from weight and height recorded in the EMR. We investigated the effect of combinations of these 3 conditions, as well as degree of severity or control of these conditions, on risk for hospitalization. Among patients with hypertension, we investigated whether use of multiple classes of hypertension medication, considered a potential indicator of hypertension severity, was associated with hospitalization. Among patients with diabetes, we investigated the association of hemoglobin A1c (proportion of glycosylated hemoglobin in the blood tested within ≤1 year of when the medical records was reviewed for this study) and risk for hospitalization. Hemoglobin A1c levels were categorized as values <7% or ≥7%; this level was chosen as it is considered an indicator of adequate blood glucose control in patients with diabetes (*9*). Because of small sample size in the concurrent condition combination model (which tested for interactions between hypertension, diabetes, and obesity), we could not adjust for all previously identified risk factors. Therefore, we used confounding variables documented in the published literature, including: age (18–44, 45–64, and ≥65 years of age), race, HCP status, and the third comorbidity not used in the interaction term (*10–12*). Similarly, the models evaluating degree of control of concurrent conditions (BMI, number of antihypertensive medications, and hemoglobin A1c value) included age (18–44, 45–64, and ≥65 years of age), race, sex, HCP status, and hypertension (among patients with diabetes) and diagnosis of diabetes (all other models). We assessed additive interaction by calculating relative excess risk caused by interaction.

For all models, nonhospitalized patients were limited to those with a medical history and medication list documented in the EMR (n = 288). Multivariable models were limited to patients with complete data for all included variables; patients with missing data on any variable were

excluded from the analysis and the distribution and number of missing values were assumed to be random. All analyses were performed using SAS version 9.4 (SAS Institute Inc., https://www.sas.com). This activity was reviewed by the US Centers for Disease Control and Prevention. The study was conducted in accordance with applicable federal law and Centers for Disease Control and Prevention policy and by the Georgia Department of Public Health as an institutional review board–exempt public health evaluation.

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Appendix Table 1. Concurrent conditions among patients with coronavirus disease, Atlanta, Georgia, USA, 2020

Condition	Hospitalized, no. (%)* n = 220	Nonhospitalized, no. (%)* n = 311
Hypertension	142 (65)	101 (32)
Diabetes	81 (37)	30 (10)
Type I	2 (1)	2 (1)
Type II	74 (34)	28 (9)
Hemoglobin A1c, mean (SD)	8.1 (2.3)	6.8 (1.8)
Immunocompromising conditions	18 (8)	23 (7)
HIV/AIDS	5 (2)	10 (3)
Leukemia or lymphoma	1 (<1)	2 (1)
Solid organ or stem cell transplant	1 (<1)	0
Immunosuppressant use	12 (5)	11 (4)
Chronic kidney disease	38 (17)	7 (2)
End-stage renal disease	14 (6)	1 (<1)
Chronic lung disease	45 (20)	56 (18)
Asthma	22 (10)	40 (13)
Chronic obstructive pulmonary disease or emphysema	8 (4)	0
Obstructive sleep apnea	12 (5)	14 (5)
Interstitial lung disease	3 (1)	0
Sarcoidosis	0	3 (1)
Obesity		
BMI <30	86 (39)	123 (40)
BMI ≥30	124 (56)	104 (33)
Cardiovascular disease	56 (25)	36 (12)
Coronary artery disease	28 (13)	14 (5)
Cerebrovascular disease or stroke	5 (2)	4 (1)
Aortic regurgitation	7 (3)	9 (3)
Atrial fibrillation	12 (5)	9 (3)
Congestive heart failure	23 (10)	2 (1)
Other	10 (5)	14 (5)
Chronic liver disease	5 (2)	4 (1)
Alcoholic hepatitis	1 (<1)	0
Hepatitis B or C	3 (1)	0
Nonalcoholic fatty liver disease	1 (<1)	1 (<1)
Other	0	2 (1)

*Values are no. (%), except where indicated. BMI, body mass index.

Appendix Table 2. Characteristics of coronavirus disease patients with hypertension, diabetes, or obesity, Atlanta, Georgia, USA, 2020

Characteristic	Hospitalized, n (%)	Nonhospitalized, n (%)
Hypertension	142	101
Age, y		
18–29	0	3 (3)
30–39	8 (6)	12 (12)
40–49	12 (8)	18 (18)
50–59	27 (19)	31 (31)
60–69	44 (31)	24 (24)
≥70	51 (36)	13 (13)
Race		
Black	113 (80)	68 (67)
Nonblack	23 (16)	25 (25)
Missing data	6 (4)	8 (8)
Sex		
M	72 (51)	39 (39)
F	70 (49)	62 (61)
Insurance		
No	6 (4)	3 (3)
Yes	135 (95)	97 (96)
Missing data	1 (1)	1 (1)
Smoking		
Never	90 (63)	75 (74)
Current	8 (6)	3 (3)

Characteristic	Hospitalized, n (%)	Nonhospitalized, n (%)
Past	37 (26)	16 (16)
Missing data	7 (5)	7 (7)
Diabetes	81	30
Age, y		
18–29	1 (1)	2 (7)
30–39	7 (9)	4 (13)
40–49	5 (6)	3 (10)
50–59	18 (22)	9 (30)
60–69	23 (28)	9 (30)
≥70	27 (33)	3 (10)
Race		
Black	66 (81)	21 (70)
Nonblack	13 (16)	5 (17)
Missing data	2(2)	4 (13)
Sex		
M	42 (52)	10 (33)
F	39 (48)	20 (67)
Insurance		
No	7 (9)	1 (3)
Yes	74 (91)	29 (97)
Smoker		
Never	55 (68)	22 (73)
Current	2 (2)	1 (3)
Past	19 (23)	4 (13)
Missing data	5 (6)	3 (10)
Obesity	123	104
Age, y		
18–29	4 (3)	14 (13)
30–39	19 (15)	23 (22)
40–49	22 (18)	23 (22)
50–59	29 (24)	30 (29)
60–69	32 (26)	11 (11)
≥70	17 (14)	3 (3)
Race		
Black	103 (84)	67 (64)
Nonblack	16 (13)	23 (22)
Missing data	4 (3)	14 (13)
Sex		
M	55 (45)	29 (28)
F	68 (55)	75 (72)
Insurance		
No	13 (11)	6 (6)
Yes	109 (89)	96 (92)
Missing data	1 (1)	2 (2)
Smoker		
Never	88 (72)	86 (83)
Current	8 (7)	1 (1)
Past	22 (18)	13 (13)
Missing data	5 (4)	4 (4)

Appendix Table 3. Detailed characteristics of hospitalized and nonhospitalized patients with coronavirus disease, Atlanta, Georgia, USA, 2020*

Characteristic	Patients, no. (%) Total hospitalized n = 220	Total nonhospitalized n = 311	Hospitalized, non-HCP n = 212	Nonhospitalized, non-HCP n = 143
Age, y				
18–29	5 (2)	52 (17)	3 (1)	16 (11)
30–39	24 (11)	79 (25)	23 (11)	22 (15)
40–49	36 (16)	54 (17)	35 (17)	24 (17)
50–59	41 (19)	63 (20)	39 (18)	33 (23)
60–69	56 (25)	41 (13)	55 (26)	27 (19)
≥70	58 (26)	22 (7)	57 (27)	21 (15)
Race				
Black	174 (79)	139 (45)	168 (79)	70 (49)
Nonblack	36 (16)	100 (32)	34 (16)	53 (37)
Missing data	10 (5)	72 (23)	10 (5)	20 (14)
Sex				
F	106 (48)	197 (63)	101 (48)	72 (50)
M	114 (52)	114 (37)	111 (52)	71 (50)
Insurance				
No	22 (10)	20 (6)	21 (10)	8 (6)
Yes	195 (89)	285 (92)	188 (89)	133 (93)
Missing data	3 (1)	6 (2)	3 (1)	2 (1)
Smoker				
Nonsmoker	157 (71)	230 (74)	151 (71)	105 (73)
Smoker	54 (25)	37 (12)	52 (25)	24 (17)
Missing data	9 (4)	44 (14)	9 (4)	14 (10)
No. concurrent conditions				
0	21 (10)	122 (39)	20 (9)	44 (31)
1	48 (22)	80 (26)	46 (22)	38 (27)
2	71 (32)	68 (22)	69 (33)	38 (27)
≥3	80 (36)	41 (13)	77 (36)	23 (16)

*HCP, healthcare personnel.

Appendix Table 4. Multiple concurrent conditions among coronavirus disease patients, Atlanta, Georgia, USA, 2020*

Conditions	Patients, n (%) Hospitalized (n = 220)	Nonhospitalized (n = 288)	Estimate†	SE	p value	RERI (95% CI)
Hypertension and diabetes						
Intercept			−0.8952	0.3345	<0.01	0.08 (−4.09 to 4.26)
Hypertension	77 (35)	72 (25)	0.2496	0.3118	0.64	
Diabetes	16 (7)	6 (2)	1.1662	0.5804	0.04	
Hypertension + diabetes	65 (30)	19 (7)	−0.1448	0.6974	0.84	
Diabetes and obesity						
Intercept			−0.9403	0.3392	<0.01	0.34 (−4.80 to 5.48)
Obesity	70 (32)	81 (28)	0.8239	0.2982	<0.01	
Diabetes	25 (11)	8 (3)	1.3913	0.5128	<0.01	
Diabetes + obesity	53 (24)	13 (5)	−0.4829	0.6533	0.46	
Hypertension and obesity						
Intercept			−1.0593	0.3550	<0.01	−1.36 (−3.79 to 1.07)
Hypertension	53 (24)	29 (10)	0.6455	0.3944	0.10	
Obesity	41 (19)	46 (16)	1.0671	0.3700	<0.01	
Hypertension + obesity	82 (37)	48 (17)	−0.8162	0.5130	0.11	

*RERI: relative excess risk due to interaction; SE, standard error.
†Adjusted for age, race, healthcare personnel status, and other concurrent conditions.