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## Research Letters

## Clinical Features of SARS-CoV-2 Infection in Italian Long-Term Care Facilities: GeroCovid LTCFs Observational Study

The burden of COVID-19 in long-term care facilities (LTCFs) was high worldwide. According to an Italian national survey, during the first pandemic wave, of the 33.8% of residents who died with COVID-19–like symptoms, only 7.4% had tested positive to a SARS-CoV-2 swab test because of limitations in accessing diagnostic tests.<sup>1</sup> The prevalence of frailty, multimorbidity, and dementia,<sup>2,3</sup> as well as the frequent atypical or asymptomatic manifestations of COVID-19 in such populations,<sup>4</sup> were some of the factors that contributed to the spread of the infection in this setting. The picture was further complicated by the fact that a substantial number of residents suffered from conditions that mimic SARS-CoV-2 infection.<sup>5</sup> In this study, we aimed to investigate the clinical features associated with SARS-CoV-2 infection and mortality due to COVID-19 in Italian LTCFs.

A prospective study with a 60-day follow-up was performed in a sample of Italian LTCFs, from March 1, 2020, up to December 31, 2020, as part of the GeroCovid Observational study, a multicenter and multisetting study, evaluating the impact of the COVID-19 pandemic on the health of individuals aged  $\geq 60$  years in acute, outpatient, and LTC settings.<sup>6</sup> The GeroCovid cohort consists of 39 LTCFs from 6 Italian regions, 9 of which reported positive COVID-19 cases. The total number of residents in the facilities involved was 2380; of these, a subsample of 586 aged  $\geq 60$  years was enrolled based on the presence of signs and symptoms suspect for COVID-19 or on a judgment of high risk of infection. The residents who had a direct physical contact or a stay in a closed environment with a COVID-19–confirmed case with no suitable personal protective equipment (close contact) were considered at high risk of infection. Furthermore, all new patients admitted to a facility and all residents readmitted after a hospital stay were also considered at high risk of infection. The residents at high risk or with COVID-19–like symptoms underwent SARS-CoV-2 swab testing. Based on the swab results and the above risk factors of infection, we categorized the residents into 3 groups: (1) positive SARS-CoV-2 swab; (2) negative SARS-CoV-2 swab with close contact (asymptomatic); and (3) negative SARS-CoV-2 swab with clinical suspicion (symptomatic). For each participant, we collected data on demographic characteristics, lifestyle, chronic diseases, and clinical outcome in an electronic registry.<sup>7</sup> These characteristics were compared among the 3

groups of residents through chi-squared or Fisher exact tests for the categorical variables, and generalized linear model or the Wilcoxon sum-rank test, as appropriate. Multivariate Cox proportional hazard models were used to identify factors associated with death.

As reported in [Table 1](#), SARS-CoV-2–positive residents were older compared with both SARS-CoV-2–negative groups. The median number of chronic diseases was 3 among SARS-CoV-2–positive residents, 2 among asymptomatic, and 5 among symptomatic SARS-CoV-2–negative residents.

Concerning the patterns of chronic diseases, we found that dementia or cognitive impairment and central and peripheral arterial disease were more prevalent in SARS-CoV-2–positive residents compared with SARS-CoV-2–negative groups; arterial hypertension, cardiomyopathy, osteoarthritis, and poor nutritional status were more prevalent in SARS-CoV-2–negative residents with suspicious symptoms compared to SARS-CoV-2 asymptomatic and SARS-CoV-2–positive residents. The mortality of SARS-CoV-2–positive residents was 21.6%, compared to 10.8% among SARS-CoV-2–negative symptomatic residents [hazard ratio (HR) 0.27, 95% confidence interval (CI) 0.12–0.59,  $P = .001$ ], and 1.8% among SARS-CoV-2–negative asymptomatic residents (HR 0.07, 95% CI 0.02–0.25,  $P = .001$ ).

Our results are partly in line with those of previous studies. For instance, the frequency of hypertension among patients with COVID-19 who were enrolled in other studies ranged between 15% and 35%.<sup>7</sup> In our sample, the lower prevalence of hypertension found among SARS-CoV-2–positive residents compared to symptomatic or asymptomatic SARS-CoV-2–negative individuals, may be interpreted as part of the phenomenon of “reverse epidemiology”; that is, some degrees of hypertension may protect against all-cause mortality.<sup>8</sup> On the other hand, asymptomatic SARS-CoV-2–negative residents with a history of close contact had the lowest prevalence of neurologic diseases, dementia, and malnutrition, whereas SARS-CoV-2–positive individuals appeared to be more likely to present such conditions. As already underlined by previous study, our data support the higher risk that individuals with dementia may have in getting SARS-CoV-2 infection.<sup>9</sup> Finally, worthy of interest is the high mortality found among SARS-CoV-2–negative symptomatic residents, who were likely to have experienced non–SARS-CoV-2 infections or exacerbations of their chronic conditions. Overall, these findings suggest that attributing death to COVID-19 only based on epidemiologic or clinical criteria, without confirmation by nasopharyngeal swab test, may be misleading and probably contributed to overestimating COVID-19–related mortality in the LTC setting, especially during the first pandemic wave.

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Angela Marie Abbatecola, MD [RSA INI Città Bianca, Veroli (FR)], Domenico Andrieri, MD [RSA Villa Santo Stefano, S. Stefano di

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**Table 1**  
Characteristics of Older Adults Enrolled in the GeroCovid LTCFs Study by SARS-CoV-2 Positive or Negative Swab Test, Clinical Suspicion, and High Risk of Infection

	SARS-CoV-2–Positive (n = 179)	SARS-CoV-2–Negative With Close Contact (Asymptomatic) (n = 203)	SARS-CoV-2–Negative With Clinical Suspicion (Symptomatic) (n = 121)	P Value
Age, y, mean±SD	85.6 ± 8.2	83.5 ± 9.0	84.8 ± 8.8	.05
Sex, female, n (%)	135 (75.4)	156 (76.9)	91 (75.2)	.93
Smoking status, n (%)				.54
Current smoker	1 (1.5)	3 (3.5)	5 (5.3)	
Ex-smoker	14 (20.3)	11 (12.9)	16 (16.8)	
Nonsmoker	54 (78.3)	71 (83.5)	74 (77.9)	
Chronic diseases, n (%) <sup>‡</sup>				
Arterial hypertension	82 (46.6)	127 (76.5)	91 (75.2)	<.001
Cardiomyopathy*	75 (42.4)	24 (27.0)	64 (53.8)	<.001
Atrial fibrillation	6 (6.1)	7 (8.9)	16 (14.7)	.11
Central and peripheral arterial disease	68 (38.9)	12 (13.3)	17 (14.3)	<.001
Cardiac failure	13 (10.6)	13 (16.1)	16 (14.6)	.48
Stroke	30 (24.4)	9 (11.0)	18 (16.5)	.044
Diabetes (type 1 or 2)	47 (27.2)	40 (37.7)	32 (26.7)	.12
Depression	65 (31.4)	47 (42.7)	35 (29.7)	.07
Osteoarthritis	66 (54.1)	21 (25.6)	71 (67.0)	<.001
COPD <sup>†</sup>	26 (15.1)	22 (23.2)	26 (21.9)	.187
Chronic renal failure	16 (9.2)	6 (6.9)	23 (19.8)	.006
Chronic liver disease	10 (5.7)	9 (10.3)	3 (2.5)	.06
Obesity	14 (12.0)	4 (5.4)	17 (15.7)	.10
Poor nutritional status	33 (28.0)	2 (2.7)	42 (38.5)	<.001
Psychiatric disorders	46 (43.0)	77 (48.1)	55 (51.4)	.46
Nervous system disorders	73 (68.2)	42 (26.4)	62 (56.9)	<.001
Dementia or cognitive impairment	45 (42.5)	10 (6.3)	35 (33.0)	<.001
Total number of chronic diseases, median (Q1, Q3)	3 (2, 5)	2 (1, 3)	5 (3, 6)	.002
Chronic diseases, n (%)				<.001
0, 1, 2	20 (11.2)	76 (37.4)	1 (0.8)	
3+	159 (88.8)	127 (62.6)	120 (99.2)	

Q1, quartile 1; Q3, quartile 3; SD, standard deviation.

\*Ischemic, valvulopathy, or arrhythmia.

<sup>†</sup>Or other bronchopneumopathies.

<sup>‡</sup>Information before COVID-19 incidence.

Rogliano (CS)], Francesco Raffaele Addamo, MD [RSA San Giovanni di Dio, Patti (ME)], The GeroCovid LTCFs Working Group members are as follows (in alphabetical order). Rachele Antognoli, MD [RSA Villa Isabella, Pisa], Paola Bianchi, BA [Associazione Nazionale Strutture Territoriali e per la Terza Età, Roma], Carmine Cafariello, MD [RSA Villa Sacra Famiglia, IHG, Roma; I RSA Geriatria, IHG, Guidonia (RM); III RSA Geriatria, IHG, Guidonia (RM); RSA Estensiva, IHG, Guidonia (RM); RSA Intensiva, IHG, Guidonia (RM)], Valeria Calsolaro, MD [RSA Villa Isabella, Pisa], Francesco Antonio Campagna, MD [Centro di Riabilitazione San Domenico, Lamezia Terme (CZ)], Sebastiano Capurso, MD [RSA Bellosguardo, Civitavecchia (RM)], Silvia Carino, MD [RSA San Domenico, Lamezia Terme (CZ); Centro di Riabilitazione San Domenico, Lamezia Terme (CZ); RSA Villa Elisabetta, Cortale (CZ); Casa Protetta Madonna del Rosario, Lamezia Terme (CZ)], Manuela Castelli, MD [ASP Golgi Redaelli, Istituto Geriatrico Camillo Golgi, Abbiategrasso (MI)], Arcangelo Ceretti, MD [ASP Golgi Redaelli, Istituto Geriatrico Camillo Golgi, Abbiategrasso (MI)], Mauro Colombo, MD [ASP Golgi Redaelli, Istituto Geriatrico Camillo Golgi, Abbiategrasso (MI)], Antonella Crispino, MD [RSA Villa Santo Stefano, S. Stefano di Rogliano (CS); RSA Villa Silvia, Altilia Grimaldi (CS)], Roberta Cucunato, MD [RSA Villa Santo Stefano, S. Stefano di Rogliano (CS); RSA Villa Silvia, Altilia Grimaldi (CS)], Ferdinando D'Amico, MD [RSA San Giovanni di Dio, Patti (ME); RSA Sant'Angelo di Brolo (ME)], Annalaura Dell'Armi, MD [III RSA Geriatria, IHG, Guidonia (RM)], Christian Ferro, MD [RSA Sant'Angelo di Brolo (ME)], Serafina Fiorillo, ND [RSA Madonna delle Grazie, Filadelfia (VV); Casa di Riposo Mons. Francesco Luzzi, Acquaro (VV); Casa di Riposo Villa Betania, Mileto

(VV); Casa di Riposo Pietro Rosano, Dasà (VV); Casa di Riposo Serena Diocesi, Mileto (VV); Alloggio per Anziani Villa Amedeo, Francavilla Angitola (VV); Casa Albergo Villa Fabiola, Monterosso Calabro (VV); Casa di Riposo Villa Sara, San Nicola da Crissa (VV); Casa di Riposo Don Mottola, Tropea (VV); Casa di Riposo San Francesco, Soriano Calabro (VV); RSA Anziani, Soriano Calabro (VV); Casa di Riposo Suore Missionarie del Catechismo, Pizzo (VV)], Pier Paolo Gasbarri, BS [Associazione Nazionale Strutture Territoriali e per la Terza Età, Roma], Roberta Granata, MD [RSA Villa Sacra Famiglia, IHG, Roma], Nadia Grillo, MD [RSA San Domenico, Lamezia Terme (CZ); Casa di Riposo San Domenico, Lamezia Terme (CZ); RSA Villa Elisabetta, Cortale (CZ)], Antonio Guaita, MD [ASP Golgi Redaelli, Istituto Geriatrico Camillo Golgi, Abbiategrasso (MI)], Marilena Iarrera, MD [RSA Sant'Angelo di Brolo (ME)], Valerio Alex Ippolito, MD [Casa Protetta Villa Azzurra, Roseto Capo Spulico (CS)], Alba Malara, MD [RSA San Domenico, Lamezia Terme (CZ); Casa di Riposo Villa Marinella, Amantea (CS); Casa Protetta Madonna del Rosario, Lamezia Terme (CZ); Casa Protetta Villa Azzurra, Roseto Capo Spulico (CS); Centro di Riabilitazione San Domenico, Lamezia Terme (CZ); RSA Casa Amica, Fossato Serralta (CZ); RSA La Quietè, Castiglione Cosentino (CS); RSA San Domenico, Lamezia Terme (CZ); RSA Villa Elisabetta, Cortale (CZ); RSA Villa Santo Stefano, S. Stefano di Rogliano (CS); RSA Villa Silvia, Altilia Grimaldi (CS)], Irene Mancuso, MD [RSA San Giovanni di Dio, Patti (ME)], Eleonora Marelli, MD [ASP Golgi Redaelli, Istituto Geriatrico Camillo Golgi, Abbiategrasso (MI)], Paolo Moneti, MD [RSA Villa Gisella, Firenze], Fabio Monzani, MD [RSA Villa Isabella, Pisa], Marianna Noale, MSc [RSA AltaVita, Istituzioni Riunite di Assistenza, Padova], Sara Osso, MD [RSA

*La Quiete, Castiglione Cosentino (CS)*], Agostino Perri, MD [*RSA La Quiete, Castiglione Cosentino (CS)*], Maria Perticone, MD [*Casa di Riposo Villa Marinella, Amantea (CS)*], Carmine Romaniello, MD [*RSA INI Città Bianca, Veroli (FR)*]; Marcello Russo, MD [*RSA INI Città Bianca, Veroli (FR)*], Giovanni Sgrò, MD [*RSA Istituto Santa Maria del Soccorso, Serrastretta (CZ)*]; *RSA San Vito Hospital, San Vito sullo Jonio (CZ)*; *Casa Protetta Villa Mariolina, Montauro (CZ)*; *Casa Protetta Villa Sant'Elia, Marcellinara (CZ)*], Federica Sirianni, MD [*Casa di Riposo Villa Marinella, Amantea (CS)*], Deborah Spaccaferro, MD [*RSA Estensiva, IHG, Guidonia (RM)*]; *RSA Intensiva, IHG, Guidonia (RM)*], Fausto Spadea, MD [*RSA Casa Amica, Fossato Serralta (CZ)*], Rita Ursino, MD [*I RSA Geriatria, IHG, Guidonia (RM)*].

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Alba Malara, MD\*  
ANASTE-Humanitas Foundation  
Rome, Italy

\* Address correspondence to Alba Malara, MD, ANASTE-Humanitas Foundation, Via dei Gracchi N° 137, Rome, Italy.  
E-mail address: [albamalara@gmail.com](mailto:albamalara@gmail.com)

Marianna Noale, MSc  
Aging Branch  
Neuroscience Institute  
National Research Council  
Padua, Italy

Angela Marie Abbatecola, MD, PhD  
Alzheimer's Disease Clinic Department  
Azienda Sanitaria Locale (ASL) Frosinone  
Italy

Gilda Borselli, BA  
Italian Society of Gerontology and Geriatrics (SIGG)  
Florence, Italy  
Carmine Cafariello, MD  
Geriatrics Outpatient Clinic and Territorial Residences  
Italian Hospital Group  
Rome, Italy

Stefano Fumagalli, MD  
Department of Experimental and Clinical Medicine  
University of Florence  
Florence, Italy

Division of Geriatric and Intensive Care Medicine  
Azienda Ospedaliero-Universitaria Careggi  
Florence, Italy

Pietro Gareri, MD, PhD  
Center for Cognitive Disorders and Dementia (CDCD) Catanzaro Lido  
– ASP Catanzaro  
Italy

Enrico Mossello, MD, PhD  
Department of Experimental and Clinical Medicine  
University of Florence  
Florence, Italy

Division of Geriatric and Intensive Care Medicine  
Azienda Ospedaliero-Universitaria Careggi  
Florence, Italy

Caterina Trevisan, MD, PhD  
Azienda Ospedaliero-Universitaria  
Geriatrics Division  
Department of Medicine (DIMED)  
University of Padua  
Italy

Department of Medical Science  
University of Ferrara  
Italy

Stefano Volpato, MD  
Department of Medical Science  
University of Ferrara  
Italy

Fabio Monzani, MD  
Geriatrics Unit  
Department of Clinical and Experimental Medicine  
University of Pisa  
Italy

Alessandra Coin, MD, PhD  
Azienda Ospedaliero-Universitaria  
Geriatrics Division  
Department of Medicine (DIMED)  
University of Padua  
Italy

Giuseppe Bellelli, MD  
School of Medicine and Surgery  
University of Milano-Bicocca and Acute Geriatric Unit  
San Gerardo Hospital  
Monza, Italy

Chukwuma Okoye, MD  
Geriatrics Unit  
Department of Clinical and Experimental Medicine  
University of Pisa  
Italy

Susanna Del Signore, MD  
*Bluecompanion Ltd*  
*Londra, United Kingdom*

Gianluca Zia, EngD  
*Bluecompanion Ltd*  
*Londra, United Kingdom*

Raffaele Antonelli Incalzi, MD  
*Unit of Geriatrics*  
*Department of Medicine*  
*Campus Bio-Medico University and*  
*Teaching Hospital*  
*Rome, Italy*