Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Table 1
Geometric Means (GMs) and SEs of SARS-CoV-2 TrimericS IgG Serum Concentration at Baseline Assessment (Prior to Vaccination, T0), 2 and 6 Months After First Dose (T1 and T2), and 2 Months After Third Dose (T3) in Nursing Home Residents

	SARS-CoV-2 TrimericS IgG Serum Concentration, BAU/mL											
	T0: Prior to Vaccination			T1: 2 mo After First Dose			T2: 6 mo After First Dose			T3: 2 mo After Third Dose		
	GM	SE	*P* Value	GM	SE	*P* Value	GM	SE	*P* Value	GM	SE	*P* Value
Whole sample (n=144)	4.9	0.1	<.001	833.7	89.8	Ref.	92.0	8.7	<.001	3597.9	339.5	<.001
Sex												
Women (n=104)	5.0	0.1	<.001	812.0	103.3	Ref.	98.3	11.9	<.001	3690.6	663.9	<.001
Men (n=40)	4.8	0.1	<.001	892.7	183.0	Ref.	95.3	18.5	<.001	3562.9	397.5	<.001
Age group												
<80 y (n=35)	4.8	0.14	<.001	1176.1	255.0	Ref.	124.8	23.9	<.001	4832.0	919.1	<.001
≥80 y (n=109)	5.0	0.08	<.001	746.4	91.7	Ref.	83.4	9.0	<.001	3272.8	352.7	<.001

Ref., reference.
All participants received 2 doses of BNT162b2 vaccine 3 weeks apart and a third dose of an mRNA vaccine (mRNA-1273 or BNT162b2) between 6 and 9 months from the first vaccine dose. GMs were compared across the 4 time points (T1 is the reference).

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Administrator Turnover in Oregon Assisted Living and Residential Care Communities, March 2020–February 2021

The impact of the COVID-19 pandemic on residents and staff of assisted living and residential care (AL/RC) facilities has been sizable,[1] yet little is known about how the pandemic affected their administrators and their job stability.[2] Considering the crucial role that administrators play in the delivery of high-quality care and staffing in residential long-term settings,[3–6] this research letter describes the turnover experience among Oregon AL/RC administrators and its organizational and structural correlates during the first year of the COVID-19 pandemic (March 2020–February 2021).

Administrative records were retrieved from Oregon Department of Human Services (the licensing agency) for 549 AL/RC facilities licensed and operated during the study period (see Supplemental Material for details about AL/RC licensing in Oregon). The dependent variable was a community-level binary indicator that measured whether the administrator as of March 1, 2020, had left their position by February 28, 2021 (stayers = 0, leavers = 1). Organizational characteristics included in the analysis were the number of licensed beds, whether the AL/RC facility was endorsed for memory care (MC) (0 = non-MC, 1 = MC), whether the AL/RC facility had a contract to serve Medicaid residents (0 = non-Medicaid, 1 = Medicaid), nonprofit status (0 = for-profit, 1 = nonprofit), and the tenure of

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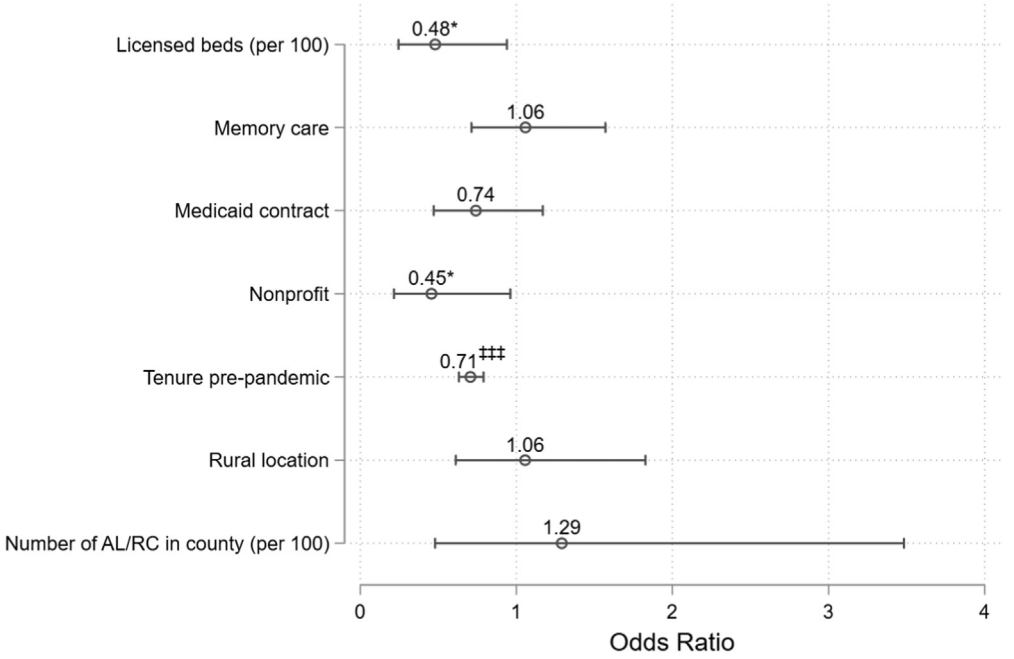

Fig. 1. Exponentiated coefficients (odds ratios) and 95% CIs from a logistic regression model that includes all covariates listed (N = 549). AL/RC, assisted living and residential care. *$P < .05$, †$P < .01$, ‡$P < .001$.

administrator as of March 1, 2020, in years. Structural characteristics included rural location (0 = urban, 1 = rural) and the number of AL/RC facilities licensed in the county (see Supplemental Material for detailed variable descriptions).

AL/RC facilities in the study had an average of 52 licensed beds; 38% were endorsed to provide memory care and 77% had a contract to serve Medicaid residents (Supplementary Table S1). Almost 10% were nonprofit, and 40% were in rural areas. At the beginning of the pandemic, in March 2020, the average administrator tenure was 2.3 years. Among one-third (36%) of AL/RC facilities, the administrator employed at the beginning of the pandemic left the position within the year.

Figure 1 shows odds ratios and 95% CIs of leaving the job during the study period from a logistic regression model that included all available organizational and structural characteristics. Each 100 beds and nonprofit status both halved the odds of the administrator employed at the beginning of the pandemic leaving that position. Each year of prepandemic tenure decreased the odds by 29%. None of the other covariates were significantly associated with likelihood of an administrator change during the study period.

The high rate of administrator turnover and its accompanying correlates (ie, size, nonprofit status, and prepandemic tenure) have implications for interventions aimed at improving quality of care in this setting as well as indirect, negative effects on quality of care. For instance, administrator turnover can lead to loss of institutional support and memory,[7] an integral part of sustainable quality improvement interventions.[8] Furthermore, high management turnover can result in a workforce environment unsupportive of direct care workers, leading to high turnover among the latter.[6] Finally, differential administrator turnover can exacerbate the existing inequalities between groups of AL/RCs (eg, small vs large; nonprofit vs for-profit).

This study has several limitations. First, it is observational and hence cannot rule out unobserved heterogeneity or reverse causality. Second, because of data limitations, the administrators who left their position and those who were fired were combined in the outcome measure, potentially confounding some of the observed associations. Finally, although Oregon has a regulatory requirement that AL/RCs report changes to administrators, and state surveyors can cite for violations of this requirement, data accuracy was not independently confirmed. However, to address this issue and allow more time for any late reports of administrator changes, the study focused on an earlier part of the pandemic.

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Centenarians From Long-Term Care Facilities and COVID-19–Relevant Hospital Admissions

Although the number of centenarians is increasing rapidly in many countries around the world,[1] there is evidence of lower morbidity among centenarians (100+ years of age) and supercentenarians (110+ years)[2,3] and more extended stays in long-term care facilities (LTCFs) than in younger cohorts of oldest-old.[4] Although evidence is still sparse, hints exist on protective effects in centenarians during the COVID-19 pandemic.[5,6] In contrast, a study of excess mortality rates in centenarians who lived in LTCF in the Lombardy region, Italy, found no survival advantage of centenarians compared to those aged 50 and 80 years.[7] However, this study only looked into all-cause mortality without information on COVID-19. Men seem to be particularly resilient, which could be due to stronger selection effects. Further, among 12 infected centenarian residents from LTCFs in Marseille, France, centenarians showed a higher mortality rate than younger residents.[8] Although we outlined COVID-19-related mortality rates among older adults in LTCFs compared with prior years,[9] analyses that stratify these rates for the oldest old and centenarians are lacking.

Methods

Hospital-related claims data by a major health and long-term care insurance fund in Germany during 3 waves of the pandemic (January 2020 until June 2021) have been analyzed. COVID-19–relevant hospital admissions were assessed by a confirmed COVID-19 diagnosis (*ICD* U07.1) and COVID-19–relevant primary diagnosis.[10] Thirty-day mortality has been 54.8% (CI 53.8%-55.8%). Chi-square tests and a multivariable logistic regression model to compare the rates across age and gender categories have been established. The regression model, which included all hospital cases from the study population, age, gender, and COVID-19–relevant comorbidities (see Kohl et al[9] and Günster et al[10]; HIV and Down syndrome were excluded because of small numbers), have been specified as independent variables and death in hospital was the dependent variable [adjusted odds ratios (aORs) will be presented]. The ethical review board approved the study.

Results

A total of 412,101 residents aged 80 years and older have been inspected. Of those, 238,904 were aged 80-89 years and 164,933 were 90-99 years (Table 1). At age 80-89 years, men (74.3%) were hospitalized more often than women (63.8%), but less often at age 90-99 years (25.4% and 35.5%, respectively) and 100+ (0.3% and 0.7%). Among the 8264 centenarians from LTCFs, 11 men and 43 women had a confirmed COVID-19 diagnosis in a hospital, of whom 73% (8/11) and 74% (32/43) died in hospital. Although the COVID-19–related hospital admission rates were vastly lower in male as well as female centenarians than in the other age groups, the case fatality rates of female centenarians were significantly higher, but not in male ones. Among the centenarians, 15 residents (all female) were 110 years and older (ie, supercentenarians) and for none of the supercentenarians a hospital admission was recorded. In the multivariable logistic regression model, compared with age 80-89 years, those aged 90-99 (aOR 1.41, 95% CI 1.29-1.55, $P < .001$) and those aged 100+ (aOR 2.91, 95% CI 1.61-5.58, $P = .001$) had an elevated risk of dying. Men had an increased risk of dying (aOR 1.68, 95% CI 1.54-1.83, $P < .001$).

Discussion

We found lower rates of COVID-19–relevant hospital admissions in centenarians than in the younger cohorts of oldest old residents in LTCFs, where the hypothesis of COVID-19–specific resilience in centenarians should be further investigated.[2,3] However, very likely lower admissions rates could be due to the fact that centenarians were treating differently when it came to COVID-19 infections. This could include a priority for ambulant treatment or that infection prevention measures have been applied more rigorously to centenarians than to their younger counterparts. Although the rates of admission were lower for centenarians, the COVID-19 hospital mortality was higher in female centenarians, providing evidence for age and gender effects even among the oldest old. Concerning gender differences, males have been hospitalized more often aged 80-89 years, but less often aged 90-99 and 100+ years.

Table 1
COVID-19 Cases and COVID-19–Related Deaths in Hospital by Age and Gender

COVID-19 Wave 1-3	Age 80-89 y		Age 90-99 y		Age 100+ y	
	Women, n (%)	Men, n (%)	Women, n (%)	Men, n (%)	Women, n (%)	Men, n (%)
Total	168,122 (54.0)	70,780 (70.2)	135,557 (43.6)	29,266 (29.0)	7482 (2.4)	782 (0.8)
COVID-19-relevant hospital admission	4117 (63.8) {2.4}	2709 (74.3) {3.8}	2291 (35.5) {1.7}	927 (25.4) {3.2}	43 (0.7) {0.6}	11 (0.3) {1.4}
COVID-19 hospital mortality	1944 (59.7) [47.2]	1635 (71.8) [60.4][a]	1281 (39.3) [55.9]	633 (27.8) [68.3][b]	32 (1.0) [74.4][c]	8 (0.4) [72.7][a,b,c]

Percentages in parentheses refer to rate in gender group. Percentages in curly braces refer to the rate of COVID-19–related hospital admission of the age by gender group. Percentages in the square brackets refer to the case fatality in each age by gender group. Percentages with the same superscript are not significantly different at the $P < .05$ level.