Table 1. Summary of observed scrub and drying times by antisepsis product and facility.

	Mean scrub time-s (SD)	Mean dry time-s (SD)
Antisepsis product		
CHG/IPA (n=11)	4.1 (3.2)	1.1 (1.4)
IPA (n=37)	4.3 (3.5)	1.3 (2.0)
Facility		
A (n=19)	4.6 (4.0)	1.4 (1.9)
B (n=29)	3.8 (3.4)	0.9 (0.7)

antiseptic scrub times and dry times. **Results:** In total, 8 focus groups involving 28 nurses revealed access to the antiseptic product and lesser workload as best-practice facilitators of needleless-connector disinfection. Identified barriers were often the opposite of the facilitators, particularly the time required per needleless connector access using IPA and knowledge deficits regarding the need for disinfection between multiple needleless-connector accesses. From 36 observations, including a total of 48 access events, we determined that the mean scrub times were below the recommended times, especially for IPA (Table 1). Drying time after use of either antisepsis product was negligible. **Conclusions:** A lack of access to the disinfection product, emergency situations, and increased workload were perceived barriers to needleless-connector disinfection. Observed scrub times and drying times were shorter than recommended, much more so for IPA. These deficits in the performance of needleless-connector disinfection may increase the risk of CLABSI. Ongoing education and periodic competency evaluation of needleless-connector disinfection are needed to imbed and sustain best practices.

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Perceptions and emotions of infection control team member during the COVID-19 pandemic in Germany

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Background: We conducted an anonymous survey in compliance with German data protections regulations among participants of the annual infectious disease and control meeting in Freiburg, Germany, in October 2021. **Methods:** In total, 391 surveys were returned: 188 from nurse infection control practitioners (ICPs) and 66 from specially infection control trained physicians (STPs). We report the results of these 2 subgroups regarding their perceptions and emotions during the pandemic. Descriptive statistics and χ^2 test with $P < .05$ were used when applicable. **Results:** Shortages of medical masks or FFP2 masks during the first pandemic wave in 2020 were reported by 48.5% STPs and 57.4% ICPs. STPs and ICPs relied equally on information provided by the Robert Koch Institute, the WHO, the ECDC and the CDC. Occupational health information was sought significantly more often by ICPs; only 17% of ICPs never used this source versus 51.5% of STPs ($P < .001$). Most ICPs (58%) and STPs (51%) described their relationship to local authorities as good as well as communication with institutional leaders (69.7%). Fewer ICPs (36.1%) felt frequently appreciated during the pandemic compared to 45.5% of STPs and more ICPs (25%) reported frustration than STPs (18.2%). However, the differences were not statistically significant. Rarely, ICPs (2.1%) or STPs (1.5%) felt unsafe at work and only 1.6% of ICPs and no STPs reported loss of motivation. In addition, 13.8% of ICPs and 12.1% of STPs often felt overwhelmed, but only 3.2% of ICPs and no STPs felt hopeless. Their self-reported competency was rated as high by 75% of ICPs and 69.7% of STPs. The 5 most frequent free-text comments regarding "lessons learned" pertained to better crisis communication, better supply chain management, precise regulations, "less talking more doing," and mandatory vaccination. The most frequent free-text general comments pertained to maintain basic hygiene measures in private and public life because of the pandemic. **Conclusions:** Our survey results indicate a high level of resilience among members of infections control teams in German medical institutions despite obvious shortcomings in supplies during the first wave of the pandemic. There were no significant differences between physician and nurse members of infection control teams regarding their perceptions and emotions, indicating a homogenous situation within the teams. The high level of self-perceived competency has likely helped deal with the pandemic and prevented the feeling of loss of control implied in the question items "feeling overwhelmed" and "hopeless."

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Epidemiologic risk factors and occupation analysis of COVID-19 cases, hospitalizations, and deaths—southern California, 2020

Patricia Cummings; Theresa Ubano Perez; Megan Sidana and Charmaine Peters

Background: COVID-19 occupational exposures have been examined using death certificates and employment data from the Bureau of Labor Statistics and the O*Net database in the United States. However, no studies have examined cases, hospitalizations, and deaths by occupation using hospital records.[1] We analyzed COVID-19 cases using hospitalization data from a large, rural community hospital to fill this gap in the evidence base. **Methods:** A retrospective cross-sectional study design was used to examine patients with COVID-19 from March 1 through July 31, 2020. We examined demographic characteristics, such as age, sex, race or ethnicity, and length of stay (LOS), among those who tested positive for SARS-CoV-2. Epidemiological risk factors were also analyzed, including smoking status, body mass index (BMI), alcohol use, and occupation. Occupational data were processed using the National Institute for Occupational Safety and Health Industry and Occupation Computerized Coding System. Homemakers, disabled persons or retirees, students or minors, and listed occupations with insufficient information were excluded from the analysis. Occupations were categorized into 23 major occupation groups based on the 2018 Standard Occupational Classification System. To examine whether certain occupations are at a higher risk due to COVID-19, we stratified the analysis by overall cases, hospitalizations, and deaths. Microsoft Power BI Desktop and IBM SPSS version 28.0.0.0 software were used to analyze the data. This study was reviewed and approved by the local institutional review board. **Results:** In total, 2,132 COVID-19 diagnoses with 1,049 total hospitalizations were identified during the study period. Most cases were in the group aged 50–64 years, white race, and/or Hispanic ethnicity (Table 1). Most cases never or rarely drank alcohol, were nonsmokers, and had a BMI ≥30 (Table 2). The average LOS among those hospitalized for COVID-19 was 6.46 days. The occupational analysis revealed a higher frequency of cases among those in management (n = 95, 14%) and healthcare (n = 83, 12%), with those in management (n = 40, 14%) and sales (n = 29, 10%) having the highest frequency of being hospitalized. However, the highest frequency of deaths occurred among those in building and grounds cleaning and maintenance occupations (13%) (Table 3). **Conclusions:** This study describes the burden of COVID-19 in a rural area with a large aging population and highlights

Table 1. Descriptive Analysis of COVID-19 Patients at a Large Rural Community Hospital System, Southern California, March 1, 2020 to July 31, 2020.

	All COVID-19 Diagnoses n (%)	COVID-19 Hospitalizations n (%)	COVID-19 Deaths n (%)
Total	2,132 (100)	1,044 (100)	112 (100)
Demographics			
Gender			
Female	1107 (51.9)	484 (46.3)	43 (38.4)
Male	1025 (48.1)	560 (53.6)	69 (61.6)
Average Age (Median)	50.6 (51.0)	50.6 (51.0)	75.1 (74.0)
Age groups			
0-4	5 (0.2)	--	--
5-17	39 (1.8)	<5	--
18-29	360 (16.9)	46 (4.4)	--
30-39	308 (14.4)	69 (6.6)	<5
40-49	306 (14.4)	102 (9.8)	<5
50-64	534 (25.0)	283 (27.1)	18 (16.1)
65-74	284 (13.3)	218 (20.9)	35 (31.3)
75-84	203 (9.5)	211 (20.2)	22 (19.6)
85+	93 (4.4)	114 (10.9)	34 (30.4)
Race			
American Indian/Alaska Native	8 (0.4)	<5	<5
Asian/Native Hawaiian or Other Pacific Islander	34 (1.6)	12 (1.1)	<5
Black or African American	33 (1.5)	30 (2.9)	<5
White	1,311 (61.5)	660 (63.2)	72 (64.3)
Other Race	717 (33.6)	332 (32.0)	31 (27.7)
Missing/Unknown	29 (1.4)	6 (0.6)	<5
Ethnicity			
Hispanic or Latino	1,167 (54.7)	494 (47.3)	48 (42.9)
Non-Hispanic or Latino	918 (43.1)	540 (51.7)	62 (55.4)
Missing/Unknown	47 (2.2)	10 (1.0)	2 (1.8)

Table 2. Length of Stay and Risk Factors Associated with COVID-19 among Patients at a Large Rural Community Hospital System, Southern California, March 1, 2020 to July 31, 2020.

	All COVID-19 Diagnoses n (%)	COVID-19 Hospitalizations n (%)	COVID-19 Deaths n (%)
Total	2,132 (100)	1,044 (100)	112 (100)
Length of Stay			
Average LOS (Standard Deviation (SD))	--	6.46 (6.59)	--
Average LOS among Females (SD)	--	6.10 (6.82)	--
Average LOS among Males (SD)	--	6.76 (6.38)	--
Alcohol Use			
No/Never/Not currently	746 (35.0)	629 (60.2)	64 (57.1)
Yes	614 (28.8)	337 (32.3)	30 (26.8)
Blank/Not Asked/Defer	772 (36.2)	78 (7.5)	18 (16.1)
Smoking Status			
Current smoker	54 (2.5)	25 (2.4)	<5
Former smoker	364 (17.1)	221 (21.2)	43 (38.4)
Never Smoker	824 (38.6)	444 (42.5)	61 (54.5)
Unknown/Blank	344 (16.1)	28 (2.7)	13 (11.6)
Passive smoke exposure – Never smoker	6 (0.3)	<5	--
BMI			
Underweight (<18.5)	35 (1.6)	37 (3.5)	<5
Normal/Healthy Weight (18.5-24.9)	407 (19.1)	249 (23.9)	35 (31.3)
Overweight (25.0-29.9)	582 (27.3)	294 (28.2)	25 (22.3)
Obese (>30.0)	739 (34.7)	463 (44.3)	47 (42.0)
Blank/Missing	369 (17.3)	3 (0.3)	1 (0.9)

Table 3. Occupational Analysis of COVID-19 Patients at a Large Rural Community Hospital, Southern California, March 1, 2020 to July 31, 2020.

Occupation Group	Overall n (%)	Hospitalizations n (%)	Deaths n (%)
Total	682 (100)	292 (100)	54 (100)
Occupation (n=682)[1]			
Management	95 (13.9)	40 (13.7)	<5
Business and financial operations	21 (3.1)	10 (3.4)	<5
Computer and mathematical science	6 (0.9)	<5	<5
Architecture and Engineering	9 (1.3)	7 (2.4)	--
Life, physical, and social science	<5	2 (0.7)	<5
Community and social service	9 (1.3)	5 (1.7)	<5
Legal	5 (0.7)	<5	--
Education, training and library	25 (3.7)	14 (4.8)	5 (9.3)
Arts, design, entertainment, sports, and media	18 (2.6)	9 (3.1)	<5
Healthcare practitioner and technical	83 (12.2)	25 (8.6)	<5
Healthcare support	35 (5.1)	10 (3.4)	<5
Protective service	17 (2.5)	9 (3.1)	<5
Food preparation and serving related	36 (5.3)	12 (4.1)	<5
Building and grounds cleaning and maintenance	54 (7.9)	24 (8.2)	7 (13.0)
Personal care and service	28 (4.1)	8 (2.7)	--
Sales and related	72 (10.6)	29 (9.9)	6 (11.0)
Office and administrative support	69 (10.1)	26 (8.9)	<5
Farming, fishing, and forestry	12 (1.8)	10 (3.4)	<5
Construction and extraction	23 (3.4)	11 (3.8)	<5
Installation, maintenance and repair	16 (2.3)	12 (4.1)	<5
Production	8 (1.2)	<5	<5
Transportation and material moving	34 (5.0)	20 (6.8)	<5
Armed Forces	<5	<5	<5

[1] A total of n=105 were excluded from the occupational analysis: 40=homemaker; 10=unemployed/retired; 6=student/minor; 9=declined; 5=unknown/blank; <5=disabled; 27=insufficient information.

potential health disparities among severe cases and deaths in different occupational groups.

1. Baker MG, Peckham TK, Seixas NS. Estimating the burden of United States workers exposed to infection or disease: a key factor in containing risk of COVID-19 infection. *PLoS One* 2020;15:e0232452.

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COVID-19 among healthcare workers of a tertiary-care hospital in Singapore

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Background: Singapore General Hospital (SGH) is the largest acute tertiary-care hospital in Singapore. Healthcare workers (HCWs) are at risk of acquiring COVID-19 in both the community and workplaces. SGH has a robust exposure management process including prompt contact tracing, immediate ring fencing, lock down of affected cubicles or single room isolation for patient contacts, and home isolation orders for staff contacts of COVID-19 cases during the containment phase of the pandemic. Contacts were also placed on enhanced surveillance with PCR testing on days 1 and 4 as well as daily antigen rapid tests (ARTs) for 10 days after exposure. Here, we describe the characteristic of HCWs with COVID-19 during the third wave of the COVID-19 pandemic. **Methods:** This retrospective observational study included all SGH HCWs who acquired COVID-19 during the third wave (ie, the 18-week period from September 1 to December 31, 2021) of the COVID-19 pandemic. Univariate analysis was used to compare characteristics of work-associated infection (WAI) and community-acquired infection (CAI) among HCWs. **Results:** Among a workforce of >10,000 at SGH, 335 HCWs acquired COVID-19 during study period. CAI (exposure to known clusters or household contact) accounted for

Figure 1: Epidemiology curve of SGH HCW COVID-19 acquisition

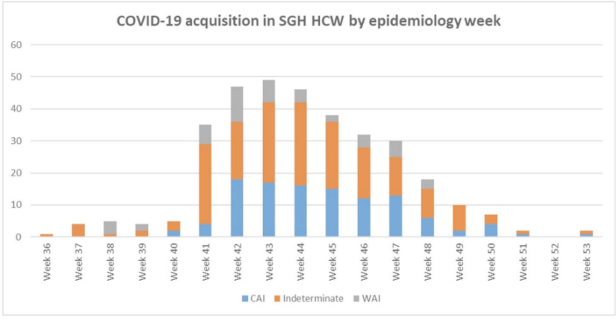

Figure 2: Epidemiology curve of weekly new COVID-19 cases in Singapore