theoretical possibility. The other possible route of transmission was airborne.[8,9] However, none of these 9 cases had entered the COVID-19 wards, and only 1 had entered the wards where patients were receiving aerosol-generating procedures for only a short time. Thus, it is not likely that they were infected through airborne transmission.

This report also highlights the importance of IPC training for temporary staff in healthcare settings. One study reported that hospital cleaning staff have a higher rate of seropositivity (12 of 96, 6%) compared to other professions.[10] Most of the study participants had received basic IPC training at least once, but none had received COVID-19–specific IPC training. Information about COVID-19 including the disease itself, preventive measures, and the outbreak situation was not shared frequently, and adequate PPE was not provided for these workers. In many healthcare facilities, the temporary staff are often neglected population in terms of IPC training; however, they are also at risk of SARS-CoV-2 infection. COVID-19–specific IPC training for temporary staff is needed in every hospital and facility not only to prevent their infection but also to guarantee the prevention of the spread of disease by these workers.

Our study has several limitations. First, we could not test environmental samples for each event. Second, there was possible recall bias for contact within 2 weeks before symptom onset. However, most of the participants were elderly people who were unlikely to have had an enjoyable personal life after work during the national state of emergency. Third, this finding was based on the wild-type variant circulating before February 2021 in Japan and may not reflect the transmissibility of other variants.

In summary, contact transmission of SARS-CoV-2 can occur among healthcare workers including temporary staff, and they need to be trained to strictly implement hand hygiene and to use appropriate PPEs for SARS-CoV-2, including eye protection.

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Effect of coronavirus disease 2019 (COVID-19) pandemic on catheter-related bloodstream infections: Control measures should not be relaxed

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To the Editor—Patient safety is a healthcare discipline that aims to minimize adverse events and eliminate preventable harm in health care.[1] Patient safety strategies involve the implementation interventions, supervision, surveillance of critical processes, and prevention and control of infections. These strategies include the control of healthcare-associated infections (HAIs) by recognizing risk factors for infection in patients as well as implementing preventive procedures, education, and good practices.[2]

Among HAIs, central-line–associated bloodstream infection (CLABSI) has a high impact on the health of patients, causing thousands of deaths annually and costing billions of dollars globally. Several strategies have been implemented to reduce the incidence of CLABSI in health institutions, including the

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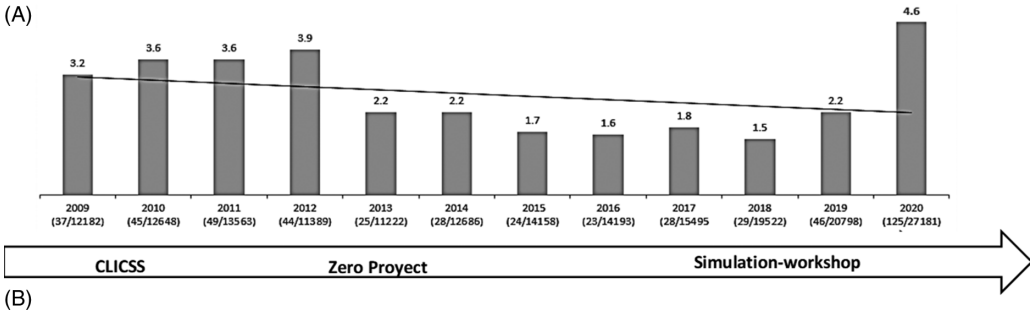
(A)



(B)

Characteristic	2019	2020
No-COVID-19 Critial Care Unit	2.02 (14/6910)	3.89 (10/2568)
COVID-19 Critial Care Unit	-	8.99 (67/7449)
NO-COVID-19 Ward	2.0 (24/11605)	2.3 (23/9846)
COVID-19 Ward	-	3.8 (6/1576)

*1000 line-days

Fig. 1. (A) CLABSI rate and the interventions carried out by the institution. After the CLICSS and zero project interventions, there was a 14.3% decrease in the number of CLABSI cases, and in 2016 a 4.2% decrease with a sustained trend. (B) CLABSI cases in 2019 and 2020 in intensive care units and the general ward, discriminated by COVID-19 and no–COVID-19 area.

implementation of surveillance programs, which has reduced these infections.[3,4] However, Patel et al[5] investigated the effect of the COVID-19 pandemic on cather-related bloodstream infections (CRBSI) cases in the United States. In this study, the CLABSI increased rate from 0.68 to 0.87 events per 1,000 catheter days.[5]

The Fundación Santa Fe de Bogotá (FSFB) is a teaching hospital in Colombia focused on the fulfillment of national and international standards of higher-level and patient-centered care, such as the Joint Commission or Planetree. Due to the COVID-19 pandemic, a patient surge was expected in parallel with the epidemiological surges in Europe and the United States and the the first COVID-19 case in Colombia in March 2020. The FSFB restructured its care services in response to the oncoming pandemic. One strategy was to separate areas and beds of general hospital wards, intensive care unit (ICUs), and emergency departments (EDs) for patients with and without COVID-19 using a progressive process that considered the number of cases reported in Bogota and the rest of the country. During the expansion phase, new personnel were hired to manage COVID-19 patients, and employees were transferred among several nursing and respiratory therapy areas. Despite previous actions to improve the quality and safety of patients, the rates of CLABSI increased.

In the FSFB, an epidemiological surveillance system was implemented in 2002 to monitor different strategies implemented to reduce the number of CRBSIs (Fig. 1.A). With the addition of COVID-19 patients, the use of central vascular access, length hospital stay, and in-hospital mortality increased. CLABSI rates also increased (Fig. 1B).

In an analysis by Patel et al,[5] the increase in CLABSI cases was accompanied by changes in adherence to institutional infection control policies to mitigate the increase in the number of patients and the lack of personnel and supplies. Other contributing factors included reduced contact time with patients and the difficulties in catheter-related revisions and activities, especially during pronation of COVID-19 patients.

In our institution, the SHELL model (software, hardware, environment, liveware, liveware) was used to develop hypotheses about intervention measures to control CLABSIs.[6] No explicit or implicit modification to the care or surveillance protocols was made. The staff education process was maintained with the usual intensity. Initially, the permanent use of gloves during the work shift was considered to address the increase in CRBSI events due to the difficulty in performing hand hygiene. However, this protocol was modified to allow hand hygiene and changing gloves during the work shift, without a concomitant change in the number of CLABSI cases. During the pandemic, FSFB guaranteed the availability of all the necessary supplies for patient care, including all of the elements for the insertion of vascular devices and care bundles. Hospital areas were modified to accommodate the high number of patients. The distance between patients in the intensive care unit was less than normal. Pronating COVID-19 patients caused a decrease in direct monitoring of catheter conditions and possibly reduced device-maintenance activities. Also, new employees for or personnel transferred to COVID-19 areas may have neglected maintenance and monitoring procedures. Most of these new workers are professionals with no experience in catheter care bundles. Although they received training, their lack of experience and the overwhelming increase in the use of invasive devices related to COVID-19 patient care, as well as burnout in the course of dealing with the pandemic, likely contributed to carelessness in catheter maintenance. Although educational activities were similar in intensity, direct surveillance and supervision activities decreased as entry to isolation areas was curtailed for members of the HAI surveillance team.

Our analysis identified a systematic, multiple-cause failure associated with the loss of control over CLABSI indicators. Therefore, to reduce the number of cases, an intervention bundle across many areas was necessary. As part of the improvement process, systematic education for and feedback to the medical and nursing staff were verified. The institutional commitment to patient safety and quality care was reinforced. Proper functioning

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of the surveillance process was confirmed, as well as the supervision and notification of cases. In addition, new physical elements were added for catheter insertion and care bundles.

Regardless of the circumstances, along with guaranteeing the availability of supplies and personnel, it is essential to guarantee the safe care of patients. The prevention and reduction of healthcare-associated infections is a urgently needed to avoid morbidity and mortality, longer hospital stays, and additional care costs due to the COVID-19 pandemic, which has required the national health system to provide timely and safe care for a significantly larger number of patients.

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in vaccinated and unvaccinated healthcare personnel in a Veterans' Affairs healthcare system

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To the Editor—Coronavirus disease 2019 (COVID-19) mRNA vaccines substantially reduce but do not eliminate the risk for symptomatic and asymptomatic severe acute respiratory coronavirus virus 2 (SARS-CoV-2) infections in healthcare personnel.[1–5] In a recent report, 5 (12%) of 43 fully vaccinated personnel acquired mildly symptomatic or asymptomatic SARS-CoV-2 infection after higher-risk household exposures.[6] Ongoing surveillance studies are needed to determine whethe such postvaccination "breakthrough" infections are caused by variants of concern with reduced in vitro susceptibility to neutralization by vaccine-induced antibodies.[7] Surveillance studies can also provide comparative data on COVID-19 in unvaccinated personnel.

The study protocol was approved by the Cleveland Veterans' Affairs Medical Center's institutional review board. We examined the incidence and clinical characteristics of COVID-19 in fully vaccinated versus unvaccinated personnel at the Cleveland VA Medical Center from February 1, 2021, through May 15, 2021. Personnel were considered fully vaccinated if >2 weeks had passed since their second dose of the BNT162b2 vaccine. Partially vaccinated personnel with COVID-19 were excluded. Personnel health and infection control databases were reviewed to obtain information on exposure history, symptoms, and suspected transmission clusters based on contact tracing investigations. We used the Fisher exact test to compare the percentage of vaccinated versus unvaccinated employees developing COVID-19.

Nasopharyngeal respiratory samples were tested by reverse transcriptase polymerase chain reaction (RT-qPCR) for SARS-CoV-2 RNA using a TaqPath COVID-19 CE-IVD RT-PCR Kit (ThermoFisher, Waltham, MA). Positive samples were further screened by multiplex qPCR for the presence of S gene L452R, E484K, N501Y mutations, S gene 69/70 deletion, and ORF1a 3675/3677 deletion to identify potential variants of concern or interest. Samples with cycle threshold <30 were subjected to an additional multiplex RT-qPCR for a deletion in the ORF1a gene (ORF1a Δ3675-3677)[8] and an N501Y spike mutation.[8,9] Any samples containing any of these alterations were then subjected to whole-genome sequencing for lineage identification using the

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