workload due to COVID-19 triggered the outbreak is not supported by its persistence into March 2021, at which point the number of COVID-19 patients hospitalized in Omaha was greatly reduced.

One hospital system has reported an increase in CLABSI rates >50% associated with the pandemic.[6] Others have noted that prone positioning of COVID-19 patients interfered with regular inspections and ready access to central-line sites, compromising their care and increasing the frequency of CLABSI.[7] However, none of the patients had been placed in the prone position. Other hospitals reported an increase in CLABSIs secondary to changes in infection prevention protocol among nurses to reduce the frequency of contact with patients and to combat the shortage of PPE and supplies during the COVID-19 pandemic.[8]

In contrast to our experience, some hospitals reported that the rate of CLABSI and other healthcare-associated infections decreased significantly due to stricter precautions put in place due to COVID-19.[9]

The Swiss cheese model of error prevention hypothesizes that undesirable events occur when multiple measures intended to prevent errors are simultaneously compromised.[10] In the face of COVID-19, this outbreak developed at a time that at least 3 separate barriers were compromised, which may be consistent with the Swiss cheese model.

Our conclusions have limitations. First, we do not know whether CHG discs were absent in all the CLABSI patients. However, we suspect that was the case. Several factors may have led to less use of discs during the ouotbreak, and efforts to reinforce the importance of discs were associated with termination of the outbreak. Second, changes in nursing staff deployment might explain the occurrence of the outbreak. Nonetheless, even though the number of patients hospitalized in Omaha with COVID-19 during the outbreak period decreased, the outbreak persisted for five months.

Acknowledgments.

Financial support. No financial support was provided relevant to this article.

Conflicts of interest. All authors report no conflicts of interest relevant to this letter.

References

1. Zimlichman E, Henderson D, Tamir O, *et al.* Healthcare-associated infections: a meta-analysis of costs and financial impact on the US healthcare system. *JAMA Intern Med* 2013;173:2039–2046.
2. Gupta P, Thomas M, Patel A, *et al.* Bundle approach used to achieve zero central-line–associated bloodstream infections in an adult coronary intensive care unit. *BMJ Open Qual* 2021;10:e001200.
3. Talbot III TR, Stone EC, Irwin K, Overholt AD, Dasti M, Kallen A. Updated recommendations on the use of chlorhexidine-impregnated dressings for prevention of intravascular catheter-related infections, 2017. Centers for Disease Control and Prevention website. www.cdc.gov/infectioncontrol/guidelines/bsi/c-i-dressings/index.html. Published 2017. Accessed July 21, 2021.
4. Timsit JF, Schwebel C, Bouadma L, *et al.* Chlorhexidine-impregnated sponges and less frequent dressing changes for prevention of catheter-related infections in critically ill adults: a randomized controlled trial. *JAMA* 2009;301:1231–1241.
5. Drews FA, Bakdash JZ, Gleed JR. Improving central-line maintenance to reduce central-line–associated bloodstream infections. *Am J Infect Control* 2017;45:1224–1230.
6. Fakih MG, Bufalino A, Sturm L, *et al.* Coronavirus disease 2019 (COVID-19) pandemic, central-line–associated bloodstream infection (CLABSI), and catheter-associated urinary tract infection (CAUTI): the urgent need to refocus on hardwiring prevention efforts. *Infect Control Hosp Epidemiol* 2022;43:26–31.
7. Stifter J, Sermersheim E, Ellsworth M, *et al.* COVID-19 and nurse-sensitive indicators: using performance improvement teams to address quality indicators during a pandemic. *J Nurs Care Qual* 2021;36:1–6.
8. Patel PR, Weiner-Lastinger LM, Dudeck MA, *et al.* Impact of COVID-19 pandemic on central line-associated bloodstream infections during the early months of 2020, National Healthcare Safety Network. *Infect Control Hosp Epidemiol* 2021. doi: 10.1017/ice.2021.108.
9. Heidempergher M, Sabiu G, Orani MA, Tripepi G, Gallieni M. Targeting COVID-19 prevention in hemodialysis facilities is associated with a drastic reduction in central venous catheter-related infections. *J Nephrol* 2021;34:345–353.
10. Reason J. Human error: models and management. *BMJ* 2000;320:768–770.

Reduced *Klebsiella pneumoniae* carbapenemase–producing *K. pneumoniae* (KPC-KP) colonization in a hematological-emergency setting during the coronavirus disease 2019 (COVID-19) pandemic

Alessandro Laganà MD, Gianluca Ferri MD, Mauro Passucci MD, Martina Salvatori MD, Maria Laura Bisegna MD, Francesca Paoletti MD, Francesco Aji MD, Massimo Breccia MD, Gregorio Antonio Brunetti MD, Giacomo Salvatore Morano MD, Giorgia Annechini MD, Ida Carmosino MD, Maurizio Martelli MD and Corrado Girmenia MD

UOSD Pronto Soccorso e Accettazione Ematologica, AOU Policlinico Umberto I, Sapienza University of Rome, Italy

To the Editor—The coronavirus disease 2019 (COVID-19) pandemic prompted hospitals worldwide to adopt infection control measures to reduce viral transmission. As could have been predicted, during the pandemic, decreases in the incidence of other notifiable infectious diseases have been reported worldwide.[1–3] Although an increase of multidrug-resistant infections diffusion has been reported in COVID-19 departments related to the intensity of care, in COVID-19–free departments COVID-19–associated interventions may have led to a favorable change in transmission dynamics involving healthcare-associated pathogens.[2,4,5]

Author for correspondence: Corrado Girmenia, E-mail: girmenia@bce.uniroma1.it

Cite this article: Laganà A, *et al.* (2022). Reduced *Klebsiella pneumoniae* carbapenemase–producing *K. pneumoniae* (KPC-KP) colonization in a hematological-emergency setting during the coronavirus disease 2019 (COVID-19) pandemic. *Infection Control & Hospital Epidemiology*, 43: 1963–1965, https://doi.org/10.1017/ice.2022.92

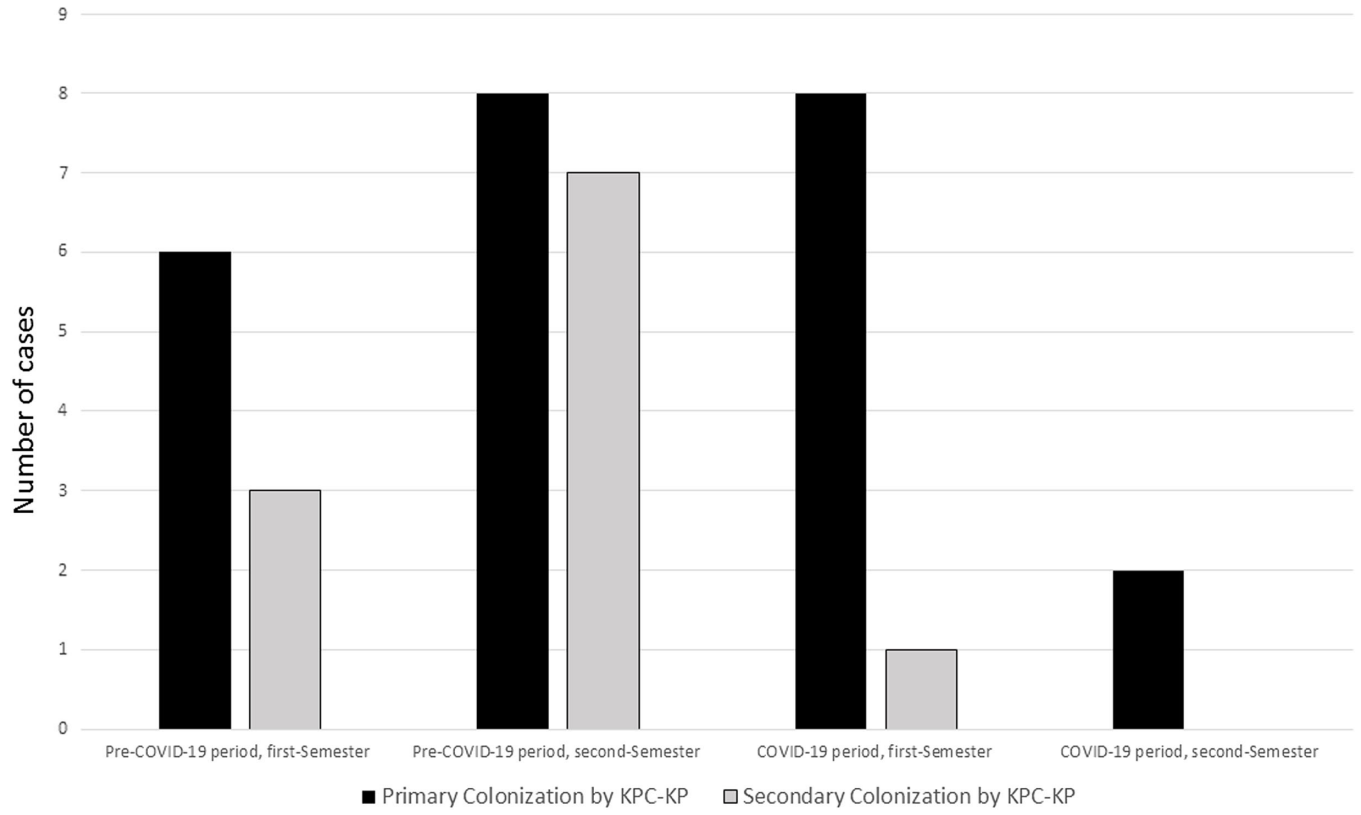

Fig. 1. Distribution of KPC-KP colonization cases in a pre–COVID-19 period and in a COVID-19 period at a hematologic emergency unit.

For several years, in view of the wide diffusion of *Klebsiella pneumoniae* carbapenemase–producing *K. pneumoniae* (KPC-KP), active surveillance to detect its spread and the application of infection control measures have been implemented at the hematology departments and the outpatient hematologic emergency unit (HEU) of the AOU Policlinico Umberto I of Rome.[6] Nevertheless, although an improved outcome of KPC-KP infections was obtained, the bacteria continued to spread widely.[7] We defined primary colonization as cases with a known history for KPC-KP colonization in the previous 3 months or rectal swab positive for KPC-KP at admission. Patients with a negative history for KPC-KP and with a negative rectal swab at admission, when discovered to be colonized by KPC-KP during the hospitalization, were considered secondary colonization cases.

From March 9, 2020, according to COVID-19 national government and hospital guidelines, intensified infection control measures took place in the hematology departments and HEU of our Institute to prevent patients with hematological diseases and healthcare personnel from becoming infected by severe acute respiratory coronavirus virus 2 (SARS-CoV-2) as well as to guarantee continuity of care in a COVID-19–free setting.[8] A reduction of KPC-KP diffusion since March 2020 was observed at the hematology departments of our institution. The colonization rate in hospitalized patients dropped from 52.5% in November 2019–February 2020 to 15.5% in March–August 2020 ($P < .0001$) and secondary colonization fell from 27.5% to 8% during these periods ($P = .0003$).[9]

Similarly, we observed that these interventions led to a progressive decrease in the frequency of KPC-KP colonization transmission also among patients admitted to the HEU. To confirm the role of such measures in the reduction of KPC-KP transmission, we retrospectively compared the spread of KPC-KP colonization among patients hospitalized at the HEU from March 9, 2019 through March 8, 2020 (period 1) and the following year (March 9, 2020 through March 8, 2021, period 2). The same KPC-KP colonization screening (culture and real-time PCR assay on rectal swab at hospital admission and weekly during hospitalization) was applied during the 2 periods.

During the 2 periods, 3,760 patients acceded to the HEU (1,755 in period 1 and 2005 in period 2), and 404 of these were hospitalized in the HEU ward [209 (11.8%) in period 1 and 195 (9.8%) in period 2]. These 404 hospitalized patients represented the study population. Patient characteristics (age, sex, underlying hematologic disease, hematologic disease stage) were comparable in the 2 periods. The reason for hospital admission was an infectious complication in 112 cases (53.6%) in period 1 and for 90 cases (46.1%) in period 2 ($P = .16$). In period 1, the mean days of hospitalization was 11 (median, 8; range, 2–42) and in period 2, the mean days of hospitalization was 10 (mean, 8; range, 2–59; $P = .12$).

Overall, 35 cases of KPC-KP colonization were documented: 24 cases of primary colonization and 11 cases of secondary colonization (Fig. 1). Of the 11 secondary colonization cases, 10 were observed in the period 1 and the last one was observed in the first semester of the period 2. In the second semester of period 2, just 2 cases of primary colonization were detected and no case of secondary colonization occurred. All of the cases of secondary colonization concerned patients hospitalized for >8 days: 10 (9.8%) of 102 in period 1 versus 1 (1.1%) of 94 in period 2 ($P = .01$). Overall, in period 2 we observed a nonsignificant 25.6% reduction in the total KPC-KP primary colonization cases ($P = .53$). However, we observed a significant reduction in the second semester of the period 2 and a 90% reduction in the KPC-KP secondary

https://doi.org/10.1017/ice.2022.92 Published online by Cambridge University Press

colonization cases ($P = .01$). The reduction of cases of KPC-KP colonization cannot be attributed to a lower intensity of monitoring strategy, which was strictly adhered to during period 2.

Despite the application of infection control measures, nosocomial transmission of KPC-KP represented an unsolved problem along the last decade at our institution.[6,7] Since March 2020, an important reduction of KPC-KP cases has been observed at the hematology departments,[9] which has resulted in the progressive reduction of cases of colonization in discharged patients who eventually attended the HEU. Thus, few cases of primary colonization were observed at the HEU during the second half of period 2. The COVID-19–related infection control measures led to decreased spread of KPC-KP, with a 90% reduction of secondary cases at the HEU even though this service is characterized by unpredictable and intensive care activities with high infectious risk.

Infection control measures for KPC-KP are similar to those implemented during the COVID-19 pandemic.[10] However, according to our experience, the infection control procedures recommended for the prevention of nosocomial infections have been more effective during the COVID-19 period than in the past. The concern about being infected by SARS-CoV-2 or about transmitting it to patients and/or family members has probably strengthened compliance with certain measures, such as hand hygiene and social distancing, by healthcare personnel and patients themselves.

In conclusion, the strategies that we put in place in our institution, including the HEU dedicated to outpatients, successfully prevented the transmission of SARS-CoV-2 to hospitalized patients and avoided the horizontal transmission of KPC-KP.

Acknowledgments.

Financial support. No financial support was provided relevant to this article.

Conflicts of interest. All authors report no conflicts of interest relevant to this article.

References

1. Chen B, Wang M, Huang X, *et al.* Changes in incidence of notifiable infectious diseases in China under the prevention and control measures of COVID-19. *Front Public Health* 2021;9:728768.
2. Ullrich A, Schranz M, Rexroth U, *et al.* Impact of the COVID-19 pandemic and associated nonpharmaceutical interventions on other notifiable infectious diseases in Germany: an analysis of national surveillance data during week 1-2016–week 32-2020. *Lancet Reg Health Eur* 2021;6:100103.
3. O'Toole RF. The interface between COVID-19 and bacterial healthcare-associated infections. *Clin Microbiol Infect* 2021;27:1772–1776.
4. Gaspari R, Spinazzola G, Teofili L, *et al.* Protective effect of SARS-CoV-2 preventive measures against ESKAPE and *Escherichia coli* infections. *Eur J Clin Invest* 2021;51:e13687.
5. Falcone M, Tiseo G, Arcari G, *et al.* Spread of hypervirulent multidrug-resistant ST147 *Klebsiella pneumoniae* in patients with severe COVID-19: an observational study from Italy, 2020–21. *J Antimicrob Chemother* 2022:dkab495.
6. Micozzi A, Gentile G, Minotti C, *et al.* Carbapenem-resistant *Klebsiella pneumoniae* in high-hematological patients: factors favoring spread, risk factors, and outcome of carbapenem-resistant *Klebsiella pneumoniae* bacteremias. *BMC Infect Dis* 2017;17:203–215.
7. Micozzi A, Gentile G, Santilli S, *et al.* Reduced mortality from KPC-*K. pneumoniae* bloodstream infection in high-risk patients with hematological malignancies colonized by KPC-*K. pneumoniae*. *BMC Infect Dis* 2021;21:1079.
8. Girmenia C, Gentile G, Micozzi A, *et al.* COVID-19 in patients with hematologic disorders undergoing therapy: perspective of a large referral hematology center in Rome. *Acta Haematol* 2020;143:574–582.
9. Micozzi A, Assanto GM, Cesini L, *et al.* Reduced transmission of *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae* (KPC-KP) in patients with haematological malignancies hospitalized in an Italian hospital during the COVID-19 pandemic. *JAC Antimicrob Resist* 2021;17(3):dlab167.
10. Tsioutis C, Eichel VM, Mutters NT. Transmission of *Klebsiella pneumoniae* carbapenemase (KPC)–producing *Klebsiella pneumoniae*: the role of infection control. *J Antimicrob Chemother* 2021;76 suppl 1:i4–i11.

Antifungal drug shortage in India amid an increase in invasive fungal functions during the coronavirus disease 2019 (COVID-19) pandemic

Ashitha B. Arun[1], Mohammad Mehedi Hasan[2], Sudhan Rackimuthu[3], Irfan Ullah[4], Tanveer Mir[5] and Anwesha Saha[6]

[1]St Joseph's College, Bangalore, India, [2]Department of Biochemistry and Molecular Biology, Faculty of Life Science, Mawlana Bhashani Science and Technology University, Tangail, Bangladesh, [3]Father Muller Medical College, Mangalore, Karnataka, India, [4]Kabir Medical College, Gandhara University, Peshawar, Pakistan, [5]Department of Internal Medicine, Wayne State University, Detroit, Michigan, United States and [6]Department of Biotechnology; Heritage Institute of Technology, Kolkata, West Bengal, India

To the Editor—Even as India is struggling to recover from an annihilating second wave of the coronavirus disease 2019 (COVID-19) pandemic, a rare yet lethal fungal infection mucormycosis caused by *Mucormycetes*, colloquially called the "black fungus," is wreaking new havoc at alarming rates. This opportunistic disease is infecting patients that have recovered or are recovering from COVID-19.[1,2]

More concerning than the infection itself is the shortage of the antifungal drug used for its treatment, amphotericin B. The pandemic has disrupted entire global supply and manufacture chains, causing a dire shortage of this essential drug. As the country witnesses a 2-fold increase in the number of mucormycosis cases, the government is scrambling to provide treatment for the increasing in-flow of patients. The central government is working to provide free treatment in public hospitals, incentivizing import

Author for correspondence: Mohammad Mehedi Hasan, E-mail: mehedi.bmb.mbstu@gmail.com

Cite this article: Arun AB, *et al.* (2022). Antifungal drug shortage in India amid an increase in invasive fungal functions during the coronavirus disease 2019 (COVID-19) pandemic. *Infection Control & Hospital Epidemiology*, 43: 1965–1966, https://doi.org/10.1017/ice.2021.426