



Letter to the Editor

Multi-drug-resistant infections in the COVID-19 era: a framework for considering the potential impact



Sir,

The recent report by Jolivet *et al.* highlights the progress being made on multi-drug-resistant (MDR) infections [1]. However, this report predates the coronavirus disease 2019 (COVID-19) pandemic and it is unclear what the impact will be on MDR infections globally. There are reports of high use of broad-spectrum antibiotics in the hospital setting, recognized as a risk factor for hospital-acquired infections (HAIs) with MDR organisms [2–4]. Recent data have also highlighted significant rates of hospital-acquired pneumonia [2]. High rates of admission, shortages of staff and personal protective

equipment (PPE), and high-acuity patients with prolonged stays in overcrowded facilities may also affect the rates of HAI with MDR pathogens [2,3]. Moreover, severe COVID-19, which particularly affects elderly patients with multiple comorbidities, may be an important factor in determining changes in colonization pressure [2–4]. Equally, wider recognition of the importance of HAIs, with stricter hygiene policies, high use of PPE, and patients being cared for in new temporary hospitals, could all mitigate against this threat [2,3]. Table I summarizes the potential relative impact of these various factors to provide a conceptual framework for determining the overall impact [2–6].

Novel cost-effective surveillance programmes of MDR HAIs in both high- and low/middle-income countries will be even more important in the post-COVID-19 era, combined with enhanced stewardship interventions. These need to be planned for now, to facilitate future integration with any future pandemic surveillance.

Conflict of interest statement

None declared.

Table I

Potential impact of coronavirus disease 2019 (COVID-19) on hospital transmission of multi-drug-resistant organisms (MDROs)

	Factors that may favour MDRO transmission	Factors that may prevent MDRO transmission
Infection prevention and control practices and use of PPE	Shortage of PPE due to the rapid increase in people admitted with COVID-19 [3–5]	Isolation of patients with COVID-19, application of enhanced standard precautions (hand hygiene policy and respiratory hygiene), use of PPE (when available) and appropriate environmental disinfection procedures [3–5]
Hospital overcrowding	The need for large-scale medical assistance exceeds the availability of hospital beds, resulting in overcrowded facilities [3,6]	Lack of beds in ICUs has led to new facilities being developed both within and outside current hospital ICU settings, many with existing colonization with MDROs [3,5]
HCWs	High rates of staff sickness and nosocomial acquisition of COVID-19, leading to low HCW:patient ratios [3,5,6]	COVID-19-designed ICUs with dedicated HCWs may have decreased cross-transmission of nosocomial infections [3,4]
Demographic features of patients affected by COVID-19	Elderly patients with comorbidities require prolonged hospitalization with mechanical ventilation support with high use of broad-spectrum antibiotics [2–4]	Lower rates of admission to hospital from long-term care facilities may lead to fewer transmission cycles between long-term care facilities and hospitals [2–4]

PPE, personal protective equipment; HCW, healthcare worker; ICU, intensive care unit.

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References

- [1] Jolivet S, Lolom I, Bailly S, Bouadma L, Lortat-Jacob B, Montravers P, et al. Impact of colonisation pressure on acquisition of extended-spectrum β -lactamase-producing Enterobacteriaceae and methicillin-resistant *Staphylococcus aureus* in two intensive care units: a 19-year retrospective surveillance. *J Hosp Infect* 2020;105:10–6.
- [2] Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395:1054–62.
- [3] Phua J, Weng L, Ling L, Egi M, Lim CM, Divatia JV, et al. Asian Critical Care Clinical Trials Group. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations. *Lancet Respir Med* 2020;8:506–17.
- [4] Siegel JD, Rhinehart E, Jackson M, Chiarello L. Healthcare Infection Control Practices Advisory Committee. Management of multidrug-resistant organisms in health care settings 2006. *Am J Infect Control* 2007;35(Suppl. 2):S165–93.
- [5] Liu Y, Li J, Feng Y. Critical care response to a hospital outbreak of the 2019-nCoV infection in Shenzhen, China. *Crit Care* 2020;24:56.
- [6] Kaier K, Mutters NT, Frank U. Bed occupancy rates and hospital-acquired infections – should beds be kept empty? *Clin Microbiol Infect* 2012;18:941–5.

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