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.

Journal of Hospital Infection 107 (2021) 114—115

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin

Letter to the Editor

Enhanced antibiotic resistance as a collateral COVID-19 pandemic effect?

Sir,

I have read with interest the recent editorial which alerts about the impact of coronavirus disease 2019 (COVID-19) pandemic on antimicrobial stewardship [1].

Antibiotic resistance selection/development is a multifactorial phenomenon in which all factors converge in a common trend: selective antibiotic pressure on micro-organisms [2]. Antibiotics kill susceptible bacteria, so that bacteria possessing or acquiring genes that confer resistance to those antibiotics are selected in a Darwinian manner. Furthermore, while often not considered, non-antibiotic agents, such as biocides or toxic substances, can also contribute to this pressure by favouring the selection/development of resistance to specific antibiotics [3].

Whereas COVID-19 is a viral infection, the pandemic is strongly fuelling direct antibiotic pressure on micro-organisms. It has been reported that 72% of COVID-19 patients attending hospitals have received antimicrobial agents, despite only 8% being co-infected by bacteria or fungi [3]. In addition, several antibiotics have been proposed or explored to treat COVID-19 [1,3]. In addition to the increased pressure exerted on clinical settings, this information on the use of antibiotics to treat COVID-19 is readily accessible to the general public on the Internet and in the daily news and television programmes. The combination of the fear of COVID-19 and the lack of adequate knowledge of the utility of antibiotics has a direct impact on over-the-counter access to antibiotics, especially in low- and middle-income countries with weak antibiotic control measures and limited access to health facilities. In this connection, it has been reported that 68.9% of COVID-19 patients reported the use of antibiotics (mainly azithromycin and ceftriaxone) prior to hospital admission, with a self-medication rate of 33.0% [4]. Moreover, COVID-19 has resulted in an exponential growth in biocide use worldwide, possibly inducing further indirect pressure contributing to the selection of antibiotic-resistant bacteria [3]. This picture has expanded worldwide since the beginning of 2020 and may strongly favour the selection and development of highly resistant micro-organisms, which may in turn aggravate the fragile status of patients attended in certain areas such as intensive care units. Accordingly, fatal co-infections by extremely drug-resistant and pan-resistant micro-organisms have been reported in COVID-19 patients [5].

Antibiotic resistance has a direct impact on patient outcomes, resulting in increased mortality rates and pessimistic predictions warning of approximately 10 million deaths by 2050 [6]. Antibiotic resistance also has a strong impact on the economy. In a scenario of high levels of antibiotic resistance, the World Bank has predicted direct global healthcare costs of US$1.2 trillion and a reduction in gross domestic product of 3.8% (US$6.1 trillion) by 2050 [7]. In this scenario, antibiotic resistance is a formidable threat for achieving the UN Sustainable Development Goals.

Although it would be naive to think that the aforementioned direct and indirect pressures towards selection of antibiotic-resistant micro-organisms will decrease in the near future, or that adequate containment measures will be applied in a general and disciplined manner during the COVID-19 pandemic period, the current panorama requires strong reinforcement of antibiotic control measures. In this scenario, studies focused on determining the evolution of antibiotic resistance levels pre pandemic to the present are of special relevance to establish accurately the effects on therapeutic schedules for bacterial infections during the present pandemic, and are essential to design strategies to mitigate these effects. We cannot afford to further relax the control and containment measures of antimicrobial use.

Acknowledgements

I thank D. Pringle for English language correction.

Conflict of interest statement
None declared.

Funding sources
J.R. was supported by Fondo Nacional de Desarrollo Científico, Tecnológico y de Innovación Tecnológica (FONDECYT — Perú) within the 'Proyecto de Mejoramiento y Ampliación de los Servicios del Sistema Nacional de Ciencia, Tecnología e Innovación Tecnológica' (contract: 08-2019-FONDECYT-BM-INC-INV).

References

[1] Lynch C, Mahida N, Gray J. Antimicrobial stewardship: a COVID casualty? J Hosp Infect 2020;106:401—3. https://doi.org/10.1016/j.jhin.2020.10.002.

https://doi.org/10.1016/j.jhin.2020.11.010

[2] Ruiz J. Reflexión acerca del concepto de "Una salud". Rev Peru Med Exp Salud Publica 2018;35:657—62. https://doi.org/10.17843/rpmesp.2018.354.3821.
[3] Getahun H, Smith I, Trivedi K, Paulin S, Balkhy HH. Tackling antimicrobial resistance in the COVID-19 pandemic. Bull WHO 2020;98:442—442A. https://doi.org/10.2471/BLT.20.268573.
[4] Zavala-Flores E, Salcedo-Matienzo J. Medicación prehospitalaria en pacientes hospitalizados por COVID-19 en un hospital público de Lima-Perú. Acta Med Peru 2020;37:393—5. https://doi.org/10.35663/amp.2020.373.1277.
[5] Sharifipour E, Shams S, Esmkhani M, Khodadadi J, Fotouhi-Ardakani R, Koohpaei A, et al. Evaluation of bacterial co-infections of the respiratory tract in COVID-19 patients admitted to ICU. BMC Infect Dis 2020;20:646. https://doi.org/10.1186/s12879-020-05374-z.
[6] O'Neill (chair) J. Review on antimicrobial resistance. Antimicrobial resistance: tackling a crisis for the health and wealth of nations. HM Government/Wellcome Trust; 2014. Available from: https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations_1.pdf [last accessed November 2020].
[7] World Bank Group. Drug-resistant infections. A threat to our economic future. Washington DC: International Bank for Reconstruction and Development/World Bank; 2017.

J. Ruiz*
Laboratorio de Genética Molecular y Bioquímica, Universidad Científica del Sur, Lima, Peru

* Corresponding author. Address: Laboratorio de Genética Molecular y Bioquímica, Universidad Científica del Sur, Panamericana Sur Km 19, Lima, Peru. Tel.: +51 1 610 6400.
E-mail addresses: joruiz.trabajo@gmail.com, jruizb@cientifica.edu.pe

Available online 17 November 2020