

## Response from the Authors

**Microbiological colonization of healthcare workers' mobile phones in a tertiary-level Italian intensive care unit**

Dear Editor,

We thank Dr SMJ Mortazavi for his interest in our paper (Galazzi et al., 2019) and for the opportunity for discussion.

As Mortazavi explained in detail, radioadaptation of microorganisms may play a role in antibiotic resistance (Taheri et al., 2017). Actually, we did not take into consideration this potential issue in our study, so this was a chance to study this topic. Although only few articles address this specific issue in the clinical setting, we agree that this phenomenon could play a potentially fundamental role. In fact, the use of the mobile phone is part of our daily working life and antibiotic resistance is one of the biggest threats to global health and it is rising dangerously to high levels worldwide. The consequences are longer hospitalisation, higher medical costs and raised mortality (World Health Organization, 2019). Every day all over the world people use devices based on radiofrequency (not only mobile phones, but also cordless phones and wi-fi enabled devices) and the environmental effects of the radiation on the biological functions of living cells represent an emerging area of interest in human health. Several studies were conducted to confirm the effects of electromagnetic radiation on cell functions, however the findings obtained in these studies were controversial (Taheri et al., 2017). A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk, but up to now, no specifically adverse health effects have been established as being caused by mobile phone use (World Health Organization, 2014). In particular, electromagnetic fields can affect functional parameters (cell growth and antimicrobial susceptibility) (Taheri et al., 2017) but we think that before stating that radioadaptation of bacteria in terms of extreme resistance to antibiotics can be life threatening for humans, we should demonstrate that all this can be translated into a real clinical issue.

As we wrote in the study limits, we did not analyse the use of the mobile phone by categories of healthcare workers (doctors, nurses and healthcare assistants) but we only asked through a short questionnaire their habits during work activity. What we found was that 86% of them used it during the work shift. In particular the 87.5% of doctors uses the mobile phone for medical applications and the 60.7% of nurses as a calculator. We assume that the healthcare workers had used their mobile phones only

for short periods of time, thus the degree of exposure to radiofrequency could have only been minimal. But we did not measure it, as well as we did not record antibiograms of microorganisms colonising the mobile devices because this was not the primary aim of the study.

Mobile phones have become indispensable in our society and in hospital settings too. Infection prevention systems and specific protocols regarding their use should be implemented. We also remind that, independently of mobile phones or other types of devices, the first and the main important action against health-care-associated infections is the hand washing before and after every patient contact (World Health Organization, 2009).

Considering all these aspects future studies are needed in order to address the problem in an exhaustive way.

**Appendix A. Supplementary data**

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.iccn.2019.03.005>.

**References**

- Galazzi, A., Panigada, M., Broggi, E., Grancini, A., Adamini, I., Binda, F., et al., 2019. Microbiological colonization of healthcare workers' mobile phones in a tertiary-level Italian intensive care unit. *Intensive Crit. Care Nurs.* 52, 17–21.
- Taheri, M., Mortazavi, S.M.J., Moradi, M., Mansouri, S., Hatam, G.R., Nouri, F., 2017. Evaluation of the effect of radiofrequency radiation emitted from wi-fi router and mobile phone simulator on the antibacterial susceptibility of pathogenic bacteria *listeria monocytogenes* and *Escherichia coli*. *Dose-Response* 15 (1). <https://doi.org/10.1177/1559325816688527>.
- World Health Organization, 2009. Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care. World Health Organization, Geneva.
- World Health Organization, 2014. Electromagnetic Fields and Public Health: Mobile Phones. <https://www.who.int/en/news-room/fact-sheets/detail/electromagnetic-fields-and-public-health-mobile-phones> (accessed 13.03.2019).
- World Health Organization, 2019. Antibiotic resistance. <https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance> (accessed 13.03.2019).

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