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## EDITORIAL

## Antimicrobial resistance, infection prevention and control, and conflict in the Middle East



Before the arrival of coronavirus disease 2019 (COVID-19), infectious disease physicians and public health professionals were arguably most preoccupied with antimicrobial resistance (AMR) as the existential threat to global human health. Dame Sally Davies, the Chief Medical Officer of England from 2011 to 2019, spent much of her career advocating for better governance of, and innovative approaches to, antimicrobial stewardship, and coordinated global investment in new antibiotics, improved diagnostics and antibacterial vaccines (Davies and Oxlade, 2021). Her successor in the post has been entirely consumed with advising on the national response to COVID-19. This has included an urgent need to raise public awareness of, and provide resources for, infection prevention and control (IPC) in community and healthcare settings (Noh et al., 2020).

The need for generous resourcing of, and strict adherence to, IPC measures in healthcare settings has been brought to the fore by COVID-19; even health systems in high-income countries are struggling to prevent nosocomial severe acute respiratory syndrome coronavirus-2 infection (Lumley et al., 2021). In this issue of *IJID*, El Mouallem et al. provide a timely reminder that IPC has long presented a far greater challenge in conflict settings (El Mouallem et al., 2021). Based on their experience with IPC in Médecins Sans Frontières (MSF) projects in Gaza, Mosul and Yemen, they describe how physicians and other healthcare professionals in such settings are on the front line in more than one sense.

Of particular concern is that conflict settings are incubators for the most threatening and pernicious of AMR pathogens, namely, those that are resistant to multiple antimicrobial agents. El Mouallem et al. (2021) report high prevalence of multi-drug-resistant (MDR) *Staphylococcus aureus* and Enterobacteriaceae in isolates from patients treated at MSF centres in Gaza and Mosul. Whilst the background context to the emergence of MDR organisms in the Middle East might include poor antibiotic stewardship, including inappropriate prescribing, suboptimal adherence, self-medication, counterfeit drugs, and lack of expertise and resources to culture and test isolates for drug susceptibility, these regional factors are greatly magnified by the effects of conflict.

These include the destruction of health facilities and laboratories; loss of healthcare workers and laboratory staff; disrupted supply of personal protective equipment, disinfectants, laboratory consumables and electrical power; and displacement of the population into overcrowded and unsanitary camps.

Other conflict-specific factors include the severity of wounds inflicted by projectiles and explosives, and delays in obtaining immediate treatment and reconstructive surgery, leading to chronic

or recurrent infection. It has also been suggested that environmental contamination by heavy metals from munitions in urban war zones could be a driver of AMR in the Middle East, as MDR strains of *Acinetobacter baumannii* have been isolated with increasing frequency from conflict-related wounds (Bazzi et al., 2020).

COVID-19 has brought global disparities in healthcare provision into stark relief, and shown that ‘none of us are safe until all of us are safe’. The same adage applies to AMR, the threat of which has been exacerbated in the short term by COVID-19 and will grow in the long term after the pandemic unless dealt with in a comparable manner (Strathdee et al., 2020). From the perspective of conflict-affected areas, where the impacts of COVID-19 and AMR are particularly acute, El Mouallem et al. (2021) argue that similar responses are needed to both, including prioritizing research to inform evidence-based operational guidelines for conflict settings, ensuring access to bacterial culture and susceptibility testing, raising awareness of AMR, and delivering context-specific training in IPC.

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