Combating antimicrobial resistance in Hong Kong: where are we and where should we go?

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Antimicrobial resistance (AMR) has been declared one of the top ten global public health threats facing humanity by the World Health Organization (WHO) in 2019.[1] The WHO has estimated that, by 2050, the number of deaths attributed to AMR will be as high as 10 million each year, exceeding those caused by cancer (8.2 million).[2] The coronavirus disease 2019 (COVID-19) pandemic has exacerbated the AMR situation globally. In 2020, the Centers for Disease Control and Prevention of the United States reported more cases of carbapenem-resistant *Acinetobacter* (increased by 78%), antifungal-resistant *Candida auris* (increased by 60%), and carbapenem-resistant Enterobacterales (increased by 35%) than in 2019, possibly due to more and sicker patients during the pandemic who required more frequent and longer use of catheters and ventilators, personal protective equipment and laboratory supply challenges, fewer healthcare staff, and longer lengths of stay.[3] Outbreaks of multidrug-resistant organisms, including carbapenem-resistant *Acinetobacter baumannii*,[4,5] *C auris*[6] and Enterobacterales,[7] as well as vancomycin-resistant Enterococcus,[8,9] have been reported in healthcare facilities. In a systematic review that identified 17 outbreaks during the COVID-19 pandemic caused mainly by carbapenem-resistant *Acinetobacter baumannii* and *C auris*, inadequate personal protective equipment or hand hygiene adherence, personal protective equipment shortage, and high antibiotic use were the most commonly reported modifiable factors contributing to the outbreaks.[10] In some countries, antimicrobial stewardship programmes in hospitals were adversely affected or even suspended.[11,12] Hong Kong is not immune to these challenges, and substantial resource have been diverted to tackle the COVID-19 pandemic.

Despite these constraints, considerable progress has been made in Hong Kong, according to directives as described in the Hong Kong Strategy and Action Plan on Antimicrobial Resistance (2017-2022).[13] The AMR Information System was established in October 2021 to collate, analyse, and report data from various departments of the Hong Kong SAR Government and the Hospital Authority. This system provides well-organised and transparent access to surveillance data on the human side covering AMR and antimicrobial use (AMU). Antimicrobial resistance and AMU involving food animals are also now included in a regular surveillance programme, and a long-term food surveillance system on AMR has been established. Enhanced regulatory measures against the illegal sale of antimicrobials, health promotional activities, and collaboration between healthcare providers and community partners to advocate appropriate use of antimicrobials have been effective. The percentage of total supply of antibiotics to community pharmacies gradually decreased from around 18.5% in 2016 to 5.6% in 2021. Under the Antibiotic Stewardship Programme in Primary Care initiative, new guidance notes and patient information sheets on seven common infections have been developed to drive appropriate antibiotic use by primary care doctors. Coupled with antimicrobial stewardship programmes implemented in hospitals, the proportion of the total antimicrobial supply classified as the "Access" group under WHO classification (ie, those showing lower resistance potential than antibiotics in the other groups) reached 61.9% in 2020 and 65.8% in 2021 in Hong Kong, above the 60% target set by the WHO. Data from the Hospital Authority in 2021 reflected that 94.5% use of two broad spectrum antibiotics, namely piperacillin/tazobactam and meropenem, were found to be appropriately used in medical, surgical and orthopaedic and traumatology specialty of acute hospitals.[14]

The Hong Kong SAR Government is also tackling AMR on other fronts. For animal health, a policy is being prepared for "veterinary prescription-only medication supply".[14] To reduce the incidence of infection, infection prevention and control training is in place, with over 30 000 attendances per year in the human health sector and 6000 in the food sector. The Department of Health has also been offering free seasonal influenza vaccination and pneumococcal vaccination to eligible target groups, which helps reduce potential complications from these diseases, such as secondary bacterial infections and AMU. Under the "One Health" framework, the Department of Health, the Agriculture, Fisheries and Conservation Department, and the Food and

Environmental Hygiene Department have joined together to launch publicity activities to echo the annual World Antibiotic Awareness Week to promote proper use of antibiotics. To encourage research, AMR has been included as one of the thematic priorities in the open call for investigator-initiated projects under the Health and Medical Research Fund, and 33 related projects have been funded in the 2017 to 2020 round of open call applications.

Nevertheless, many challenges to further improve the AMR situation remain. A sustained high rate of methicillin-resistant *Staphylococcus aureus* bacteraemia was detected after 48 hours of admission in public hospitals in the past few years. Data reported to the Centre for Health Protection indicate that the number of cases of carbapenemase-producing Enterobacteriaceae discharged to residential care homes for the elderly has been doubled from 242 cases in 2019 to 526 cases in 2021. Since the first case of C auris, an emerging multidrug-resistant fungus, reported in Hong Kong in July 2019, more cases and outbreaks in public hospitals have been reported.[15,16] Despite a reduction of AMU among community pharmacies and general practitioners in 2020 and 2021, it is possible for rebound of respiratory illnesses and resurge of AMU in these settings after relaxation of public health measures for COVID-19. Health promotion on AMR is still needed: in a survey of the general public, 54.0% of respondents mistakenly identified cold and flu as treatable with antibiotics.[17] Moreover, comprehensive data on AMU and AMR among general practitioners are lacking. There is also limited scientific knowledge on the role of the environment in the evolution of AMR.

In his Policy Address on 19 October 2022, the Chief Executive of Hong Kong pledged to promulgate a new plan on AMR for the next 5 years. To tackle this public health threat and address challenges ahead, Hong Kong Strategy and Action Plan on Antimicrobial Resistance (2023-2027)[14] adopts six key policy areas: strengthen knowledge through surveillance and research; optimise use of antimicrobials in humans and animals; reduce incidence of infection through effective sanitation, hygiene and prevention measures; improve awareness and understanding of AMR through effective communication, education and training; promote research on AMR; and strengthen partnerships and foster engagement of relevant stakeholders. Among the 21 objectives in the Action Plan, five are identified as priority interventions: surveillance and control of AMR in ready-to-eat food; strengthening regulation of record keeping for prescription-only antimicrobials in community pharmacies; enhancement of antimicrobial stewardship programme in public hospitals; a territory-wide decolonisation programme for multidrug-resistant organism in residential care homes for the elderly; and conducting regular surveys among the general public on AMR to inform strategies on health promotion.

The theme for the 2022 World Antibiotic Awareness Week (18-24 November) is "Contribute Together to Combat Antimicrobial Resistance!". Antimicrobial resistance is everyone's business. The Hong Kong Centre for Health Protection has a dedicated page (https://www.chp.gov.hk/en/features/47850.html) with the latest information on AMR for the general public and healthcare workers. With concerted effort from healthcare professionals and all other concerned parties, we can combat AMR together in the coming 5 years and beyond.

Author contributions

The author contributed to the editorial, approved the final version for publication, and takes responsibility for its accuracy and integrity.

Conflicts of interest

The author has declared no conflict of interest.

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