

Introduction

Antimicrobial resistance – a global public health threat

1. Antimicrobial resistance (AMR) arises when microorganisms (e.g. bacteria, viruses, fungi and parasites) evolve to become resistant to previously effective antimicrobials. This results in infections which are harder to treat, with an increased risk of further spread, morbidity and mortality¹. AMR has been declared as one of the top ten global public health threats facing humanity by the World Health Organization (WHO) in 2019². It is estimated by WHO that deaths attributed to AMR will be as high as 10 million in 2050, which is even larger than the current number of deaths caused by cancer (8.2 million)³.
2. AMR occurs naturally over time through genetic changes and can affect humans and animals. It develops when microorganisms adapt and grow in the presence of antimicrobials (including properly used antimicrobials). However, AMR is accelerated by the misuse and overuse of antimicrobials. Among all antimicrobials, resistance to antibiotics for treatment of bacterial infection is the most serious. Resistant microorganisms are often acquired through ingestion of or contact with colonised or infected animals, food or humans, or their contaminated environment. Microorganisms which are resistant to one or more classes of antimicrobials are termed Multidrug-Resistant Organisms (MDROs)⁴. Examples of important MDROs include Methicillin-resistant *Staphylococcus aureus* (MRSA), Carbapenemase-producing *Enterobacteriaceae* (CPE), Vancomycin-Resistant *Enterococcus* (VRE), Vancomycin-intermediate / resistant *Staphylococcus aureus* (VISA/VRSA), Multi-drug resistant *Pseudomonas aeruginosa* (MRPA) and *Candida auris*.

3. AMR has no respect for borders and direction and can be transmitted in a bi-directional manner from animals to humans and vice versa. To combat AMR, actions taken by the healthcare sector alone are not enough and concerted efforts from the public are crucial. “One Health”, an integrated, unifying approach that aims to achieve optimal and sustainable health outcomes for people, animals, and ecosystems, has been advocated by the WHO to ensure that all stakeholders and all sectors are involved and working with concerted effort⁵ (**Figure 1**).

Figure 1: One health approach to antimicrobial resistance



4. The **High Level Steering Committee on Antimicrobial Resistance (HLSC)** was set up in May 2016 to call for collaboration, synergy and cross-fertilisation of all professional sectors under a “One Health” framework in response to AMR. Chaired by the then Secretary for Food and Health, it comprises representatives from relevant government departments, public and private hospitals, healthcare organisations, academia and relevant professional bodies.
5. Under the HLSC, an **Expert Committee on Antimicrobial Resistance (EC)** was established in October 2016 to provide expert opinions on priority areas for actions for the HLSC’s consideration. It comprises local and overseas experts in the fields of human and veterinary medicine, microbiology, public health, pharmacology and agriculture.

Implementation of Hong Kong Strategy and Action Plan on Antimicrobial Resistance (2017-2022)

6. Under the leadership of the HLSC, the **Hong Kong Strategy and Action Plan on Antimicrobial Resistance (2017-2022)** was launched in July 2017. By adopting the “One Health” approach, it outlined a total of 19 objectives, 43 strategic interventions and 71 activities under six key areas –
 1. Strengthen knowledge through surveillance and research;
 2. Optimise use of antimicrobials in humans and animals;
 3. Reduce incidence of infection through effective sanitation, hygiene and preventive measures;
 4. Improve awareness and understanding of AMR through effective communication, education and training;
 5. Promote research on AMR; and
 6. Strengthen partnerships and foster engagement of relevant stakeholders.
7. Since the launch of the Action Plan, a series of actions against AMR have been implemented in accordance with the strategies laid out in the plan by different action parties, including the then Food and Health Bureau (FHB), Department of Health (DH), Hospital Authority (HA), Agriculture, Fisheries and Conservation Department (AFCD), and Food and Environmental Hygiene Department (FEHD).

8. A mid-term review⁶ conducted in 2020 showed that good progresses have been made in combating AMR in Hong Kong when compared with the situation of 2016. Relevant activities had been carried out according to the timeline pledged in the Action Plan. Towards the conclusion of the current Action Plan, a number of notable achievements in combating AMR had been made –

- Surveillance of AMR and antimicrobial use across the human, animal and food sectors in Hong Kong, which encompasses data collection, analysis and dissemination, is now conducted via a centralised platform⁷;
- Adoption of WHO GLASS surveillance standard and use of WHO AWaRe benchmark as a benchmarking of the drug usage in Hong Kong;
- Inter-sectoral contribution under the “One Health” approach had been put into practice;
- Surveillance findings are published on a regular basis to the stakeholders and public via different channels, including the website of the Centre for Health Protection, as well as submission to Regional Office for the Western Pacific of WHO;
- Regulatory and control measures were promoted at the community pharmacy level to reduce the illegal sales of antimicrobials.

9. Nevertheless, despite the above successes, the threat of AMR still remains. The situation of MDROs in Hong Kong remained worrisome. Some notable examples include –

- Local public hospitals have reported a higher rate of methicillin-resistant *Staphylococcus aureus* (MRSA) bacteraemia detected after 48 hours of admission in 2020, 2021 and the first quarter of 2022, compared with previous years⁸;
- The number of cases of Carbapenemase-producing *Enterobacteriaceae* (CPE) discharged to Residential Care Homes for the Elderly (RCHEs) rose from 242 cases in 2019 to 260 cases in 2020, and then sharply to 526 cases in 2021;
- The first case of *Candida auris*, an emerging multidrug resistant fungus, was reported in Hong Kong in July 2019. More cases have been reported since, with outbreaks involving public hospitals.

10. Undoubtedly, the impact of the Coronavirus disease 2019 (COVID-19) pandemic on the AMR situation cannot be overlooked as it spanned across the second half of the current Action Plan. While the pandemic is still on-going, a number of effects have been identified^{9,10,11} –

- Diversion of resources, including laboratory capacity, healthcare and public health worker manpower, consumables, have undermined the efforts of antimicrobial stewardship programmes;
- Weakened infection control due to fatigue and heavy workload of healthcare workers, and shortages of personal protective equipment in the early phase of pandemic may have facilitated transmission of MDROs;
- Surge of hospital admission may increase the risk of healthcare-associated infections and the transmission of MDROs, which in turn may lead to increased antimicrobial use;
- Disruption to routine immunisation activities, due to COVID-19-related measures, has led to reductions in overall vaccination coverage globally, potentially leading to an overuse of antimicrobials;
- The increased risk of secondary bacterial infection among patients with COVID-19 has led to the increased use of antibiotics. Moreover, those with COVID-19 complications may require mechanical ventilation or other invasive devices, which increases the risk of acquiring hospital-associated MDROs;
- Nevertheless, the pandemic has led to enhanced infection control measures among healthcare workers and the high alertness of personal hygiene among the general public. Increased fear of attending healthcare facilities and postponement of elective hospital procedures has resulted in fewer medical consultations and antibiotic prescriptions;
- The various public health measures, such as wearing masks, personal hygiene and social distancing, has led to decreased transmission of other infectious diseases through the respiratory route and person-to-person contact¹².

11. Taking the above into account, it is important to carry forward the success and progress achieved in the first Action Plan and continue our fight against AMR.

Second Strategy and Action Plan on Antimicrobial Resistance for Hong Kong

12. As stipulated in the 2021 Policy Address, the Government will review the implementation experience of the first Action Plan and draw up the second plan to map out response strategies for the next phase. Under the steering of HLSC and EC, preparation of the second Action Plan was started in 2021.

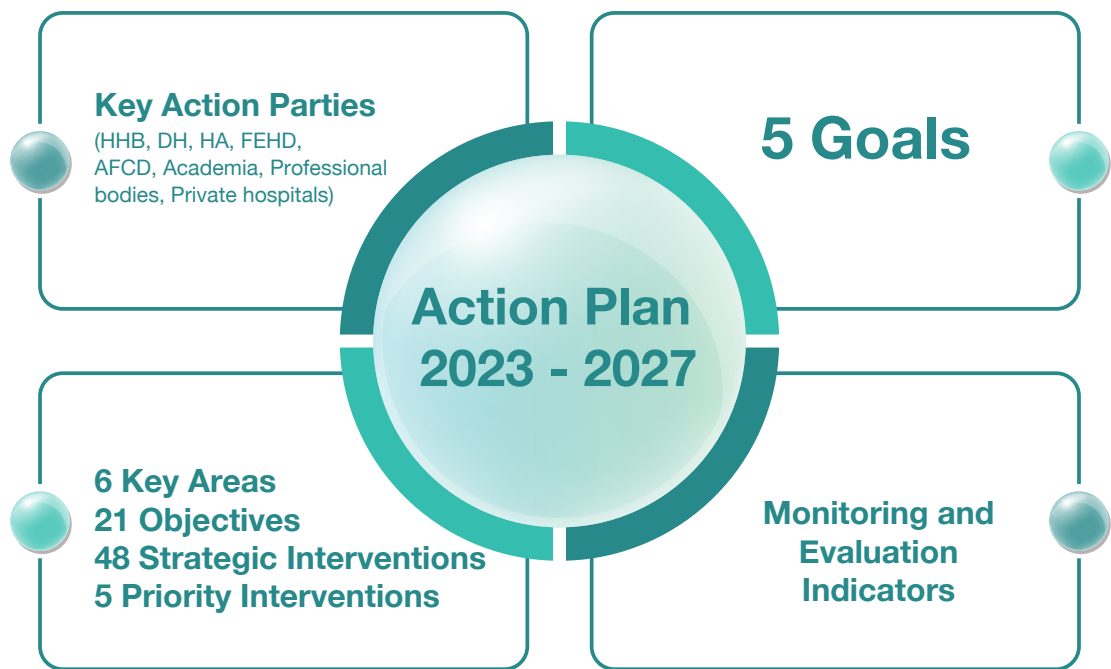
13. In its 6th meeting held in May 2021, the HLSC endorsed the goals of the second Action Plan as follow -

- To slow the emergence of resistant bacteria and prevent the spread of resistant infections (i.e., minimise the development and spread of AMR) as the ultimate goal;
- Promote and support a “One Health” approach to AMR;
- Focus on strengthening existing systems and mainstreaming of efforts to combat AMR;
- Address major challenges identified in addressing AMR and build upon best practices across health, development, financing, and research and development; and
- The recommendations should support mobilisation and action by all stakeholders.

Strategic Framework of the Action Plan (2023-2027)

14. This second Action Plan, covering the years from 2023 to 2027, is aligned with the WHO’s *Global Action Plan on Antimicrobial Resistance*¹³. As endorsed by the HLSC, the **six key areas** of the first Action Plan will be adopted. Under the “One Health” approach involving various multi-sectoral key action parties, it highlighted a total of **21 objectives** and **48 strategic interventions (Figure 2)**.

Figure 2: Framework of the Hong Kong Strategy and Action Plan on Antimicrobial Resistance (2023-2027)



15. To enable the Government and stakeholders to focus resources and address the threat of AMR more effectively, this Action Plan will also feature a number of priority interventions. In addition, a series of indicators have been defined to facilitate monitoring of its progress and evaluation. They will be further described in the ensuing sections.
16. After consulting and soliciting the supporting from the relevant stakeholders from different sectors, disciplines and organisations, a list of activities were proposed under each strategic intervention. They are summarised in the **Summary Table of Actions**.