Journal of Global Antimicrobial Resistance 8 (2017) 70–73

Contents lists available at ScienceDirect

Journal of Global Antimicrobial Resistance

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

Short Communication

The new Korean action plan for containment of antimicrobial resistance

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ARTICLE INFO

Article history:
Received 24 August 2016
Received in revised form 23 October 2016
Accepted 31 October 2016
Available online 23 December 2016

Keywords:
Korea
Antimicrobial resistance
Action plan
Policy

ABSTRACT

Background: The Korean national action plan on antimicrobial resistance (AMR) was established on 11 August 2016 by the Korean Ministry of Health and Welfare.
Methods and results: This article briefly describes the current status of AMR in Korea and introduces six objectives of the action plan, including the prudent use of antimicrobial medicines, prevention of the spread of AMR, strengthening surveillance programmes, awareness improvement, strengthening research and development, and enhancement of international collaboration.
Conclusions: Integrated multisectoral principles are applied to fight AMR more effectively. This 5-year national AMR action plan will be the cornerstone of public health in Korea.

1. Introduction

The World Health Organization (WHO) has reported that antimicrobial resistance (AMR), which is associated with increased antibiotic consumption and inappropriate infection control, will become a major public health threat in the near future [1]. Previous Korean studies documented that infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA) resulted in an increased economic burden (1.8-fold) and prolonged hospital stay (1.25-fold) [2].

To mitigate this threat, countries such as Austria, Canada, the UK and the USA have established their own national strategies. As part of the development process of a national strategic plan for the containment of AMR, the Korea Centers for Disease Control and Prevention (KCDC) participated in the WHO's technical meetings and organised multisectoral meetings to share ideas on national AMR strategies with the One Health concept. In May 2015, the 68th World Health Assembly adopted the global action plan for AMR. As a response to the WHO's global action plan, the Korean steering committee, which was established during previous multisectoral meeting on national AMR strategies, was organised under the Korean Ministry of Health and Welfare (KMoHW). On 11 August 2016, the KMoHW addressed the new Korean 5-year AMR strategy and action plan [3]. This article describes the major concepts of the Korean AMR action plan in response to the current status of AMR in the Republic of Korea.

2. Current status of antimicrobial resistance in Korea

Antimicrobial consumption in Korea is relatively higher [31.7 defined daily doses (DDD) per 1000 inhabitants per day] compared with other member countries of the Organisation for Economic Co-operation and Development (OECD) (23.7 DDD per 1000 inhabitants per day) [4]. In addition, a recent Korean nationwide surveillance study reported that MRSA has become common (ca. 60% of *S. aureus*), and the prevalence of imipenem-resistant *Acinetobacter baumannii* and imipenem-resistant *Pseudomonas aeruginosa* increased from 20% to 62% and from 26% to 42%, respectively, between 2007 and 2013 [5].

From 2003 to 2013, Korea conducted the National Antimicrobial Resistance Safety Control Program, yet the most resistant organisms increased even though the annual investment increased [6]. The lack of awareness and legislation for prudent use of antibiotic prescriptions in medical practice in humans and animals as well as the incomplete surveillance and infection control stewardship programme in the health system is considered major drivers of emerging AMR in Korea.

3. Strategies of the Korean antimicrobial resistance action plan

The goal of the Korean national AMR action plan is to improve public safety by (i) reducing the prescription of antibiotic agents by

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http://dx.doi.org/10.1016/j.jgar.2016.10.013

prudent use and (ii) minimising the spread of AMR in the human (community and healthcare settings) and veterinary sectors. The key objectives with priority areas and measurable indicators are described below and in Table 1.

3.1. Objective 1. Promote the prudent use of antimicrobial medicines

A number of studies have shown that AMR in humans is strongly linked with the volume of antimicrobial use in humans and animals [1,7].

To meet this objective, a bundle of measures will be adopted to promote the appropriate use of antibiotic agents. These include strengthening quality evaluation of antimicrobial use in health care, developing guidelines on antibiotic use to support physicians and veterinarians prescribe based on evidence, and offering educational programmes for staff-related antibiotic stewardship both in the human and animal sectors.

3.1.1. Enforce quality evaluation programmes of antibiotic use in health care

As the common cold is recognised as one of the most inappropriate reasons for antibiotic prescribing [8], Korea initiated the quality evaluation programme of antimicrobial prescriptions for acute upper respiratory infections since 2006 [9] and surgical antibiotic prophylaxis since 2007 [10]. Previous studies showed that these programmes considerably reduced the volume of antibiotics prescribed [9,10]. To evaluate physicians' appropriate use of antibiotic agents, therefore, the evaluation programme will be extended to other types of infectious diseases by the KMoHW.

3.1.2. Develop and distribute prescription guidelines on antibiotic use

The antibiotics that physicians prescribe for common diseases are often inappropriate [11]. In addition, a report indicated that physicians prescribe broader–spectrum agents more often for common infectious diseases [12]. Since timely access to guidelines is important in clinical practice, the KMoHW will develop a pocket guide, internet prescribing tools and a smartphone application to help health professionals provide adequate and timely antimicrobial treatment [13].

3.1.3. Enhance appropriate antibiotic use in the animal sector

A number of studies have documented that the emergence of AMR is strongly associated with resistant pathogens in animals [14]. The strategy of restriction of antibiotic use in food animals includes (i) classifying all classes of antibiotics used in animals as restricted, (ii) initiating quality evaluation of antibiotic prescribing in veterinary clinics, (iii) establishing a mandatory reporting system for the purchase of antibiotic products and (iv) developing infectious diseases treatment guidelines in animals.

Table 1
Summary of the Korean action plan on antimicrobial resistance (AMR), 2016–2020.

Objectives and priority areas	Indicators	Stakeholders	
		Human sector	Environment sector
1. Promote the prudent use of antimicrobial medicines - Enforce quality evaluation programmes of antibiotic use - Develop and distribute prescription guidelines on antibiotic use - Enhance appropriate antibiotic use in the animal sector	Rate of antibiotic prescription in acute respiratory tract infections Rate of antibiotic prescription based on laboratory testing Number of restricted antibiotics in animal sectors	KCDC, HIRA, MoHW	MFAFF, MOF
2. Prevent the spread of AMR - Improve institutional policies regarding infection prevention and control - Timely determination of patients infected with resistant pathogens	Rate of washing hands of physicians Rate of nosocomial infections in ICUs Number of infectious diseases specialists in a hospital	KCDC, MoHW	MFAFF, MOF
3. Strengthen the surveillance system - Improve and support AMR surveillance at hospital and community levels - Improve surveillance of antibiotic consumption	Isolation rate of MRSA, VRE and CRE Amounts of antibiotic consumption of humans and animals	KCDC, HIRA, MoHW	MFAFF, MOF, MFDS
4. Improve awareness	Rate of people believing antibiotics help to treat common cold Rate of people quitting antibiotics without physician agreement	KCDC, MoHW	MFAFF, MOF, MFDS
5. Strengthen research and development	Amount of investment Number of development of diagnostic kits and new drugs	KCDC, MoHW, MSIP, MoSF, MoI	MFDS, MOF
6. Enhance international collaboration	Amounts of international funds contributed Number of international meetings participated	KCDC, MoHW, MoFA, MoSF	MFDS, MFAFF

KCDC, Korean Centers for Disease Control and Prevention; HIRA, Health Insurance Review and Assessment; MoHW, Ministry of Health and Welfare; MFAFF, Ministry for Food, Agriculture, Forestry and Fisheries; MOF, Ministry of Oceans and Fisheries; ICU, intensive care unit; MRSA, methicillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococci; CRE, carbapenem-resistant Enterobacteriaceae; MFDS, Ministry of Food and Drugs Safety; MSIP, Ministry of Science, ICT and Future Planning; MoSF, Ministry of Strategy and Finance; MoI, Ministry of Interior; MoFA, Ministry of Foreign Affairs.