Nippon AMR One Health Report (NAOR) 2017

October 18, 2017

The AMR One Health Surveillance Committee

Executive summary

Background: Japan's "National Action Plan on Antimicrobial Resistance (AMR) 2016-2020" endorses current status and monitoring of antimicrobial-resistant bacteria and national antimicrobial use as an important strategy for both evaluating the impact of the action plan on AMR and planning future national policy. For global monitoring and reporting, WHO has launched the Global Antimicrobial Resistance Surveillance System (GLASS) for the worldwide gathering and sharing of data on AMR in humans. Japan contributes to GLASS by providing our national data. Accordingly, it is crucial for Japan to show the current status and progress of our AMR policy to not only domestic stakeholders but also the global community in order to accelerate and advance the policy on AMR.

Method: The AMR One Health Surveillance Committee, comprised of experts on AMR in the areas of human health, animals, food and the environment, discussed current surveillance/monitoring systems and reviewed published research on AMR and antimicrobial use. Data on the proportion of antimicrobial resistance among major pathogens in the human medical setting were derived from the Japan Nosocomial Infections Surveillance (JANIS) program organized by the Ministry of Health, Labour and Welfare of Japan. Data on the proportion of antimicrobial resistance among animals and related antimicrobial sales were derived from the Japanese Veterinary Antimicrobial Resistance Monitoring System (JVARM) implemented by the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF). Moreover, we obtained data on sales and consumption of antimicrobials for human use from the Japan Antimicrobial Consumption Surveillance (JACS) program and the National Database of Health Insurance Claims and Specific Health Checkups of Japan (NDB). Data on the distribution of antimicrobial feed additives were provided by the Food and Agricultural Materials Inspection Center (FAMIC) and the Japan Scientific Feeds Associations (JSFA). Data on the amount of domestic shipment of antimicrobials used as agricultural chemicals was from MAFF. Data on antimicrobial resistance patterns of pathogens, which are not monitored by current surveillance and monitoring systems but considered pertinent from a public health perspective, and public awareness toward AMR were obtained from individual published research. The latest data available, mostly up to 2015, are included.

Results: In Japan, the proportion of carbapenem resistance in Enterobacteriaceae such as Escherichia coli and Klebsiella pneumoniae remained at around 1% during the observed period, despite its global increase in humans. Likewise, the proportion of vancomycin-resistant enterococci in humans was less than 1%. The proportion of Escherichia coli resistant against the third generation cephalosporins and fluoroquinolones, however, was increasing; and that of methicillin-resistant Staphylococcus aureus (MRSA) accounted for approximately 50%. Penicillin-resistant Streptococcus pneumoniae (PRSP) accounted for approximately 40% of all detected pneumococcus in cerebral spinal fluid samples. Furthermore, oral antimicrobial agents accounted for about 90% of the total sales in Japan.

Among all oral antimicrobial agents sold, rates of defined daily dose per 1,000 inhabitants per day (DID) of cephalosporins, macrolides and quinolones were higher than that of penicillins.
In animals, monitoring of resistant bacteria in cattle, pigs and chickens was conducted. The proportion of antimicrobial-resistant Escherichia coli and Salmonella spp. derived from diseased animals tended to be higher than those derived from healthy animals. It appeared that tetracycline resistance was more common, although the degree of the resistance depended on animal and bacterial species. The proportion of third generation cephalosporin- and fluoroquinolone-resistant Escherichia coli, the indicator bacteria, derived from health animals, was low and remained mostly less than 10% during the observed period. Monitoring of antimicrobial resistance in aquaculture and fisheries has been conducted since 2011: specifically, the resistance of Lactococcus garvieae and Photobacterium damselae subsp. picicida taken from diseased fish (Seriola) and Vibrio parahaemolyticus obtained from aquaculture-environment sampling. The sales volume of antimicrobials used for animals including food-producing animals, fish and companion animals was calculated in tons of the active ingredients, which were based on the sales volume of antibiotics and synthetic antimicrobials mandated by the Regulations for Veterinary Drugs (Ordinance of the Ministry of Agriculture, Forestry and Fisheries No. 107 of 2004). The antimicrobials sales volume for veterinary use appeared to be decreasing over the years, with figures of 854.50 tons, 793.75 tons and 780.88 tons for 2009, 2011 and 2013, respectively. Tetracyclines represented the largest share of total antimicrobial sales volume, accounting for about 40%, whereas both the third generation cephalosporins and fluoroquinolones were less than 1% of the total sales volume.

Conclusion: The use of cephalosporins and quinolones and the proportion of resistance to those antimicrobials were higher in humans. In contrast, tetracyclines were more commonly used in animals and tetracycline resistance was high among animals. Overall, the surveillance and monitoring of antimicrobial resistance in human and animals are well established in Japan, whilst there is still much to be desired in terms of comprehensive monitoring systems for the environment and food. Further discussion is needed for new surveillance and monitoring systems in those areas. Regarding the current, already-implemented surveillance and monitoring systems, further discussions for new methods of analyses considering bias, enhancement of quality assurances and inter-surveillance comparisons are needed in order to improve the accuracy of those systems. By addressing each challenge, we hope that our effort can help uncover mechanisms and inter-connectivity with regard to the development and transmission of antimicrobial resistance among humans, animals, agriculture, food and the environment.

This is the Executive Summary of Nippon AMR One Health Report (NAOR) 2017.
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