The world now faces the urgent issue of growing prevalence of antimicrobial resistance among bacteria.\(^1\) The main culprit is likely to be inappropriate overuse of antimicrobials in healthcare as well as agriculture. Despite this problem, there are little activity of the development of new antimicrobials by pharmaceutical companies. Thus we should change our behaviors to reduce selection pressure for resistant organism or to even perhaps to increase non-antimicrobial strategy such as immunization.

After the World Health Assembly adopted the global action plan in 2015, the Ministry of Health, Welfare and Labour, Japanese government, also announced the national action plan. The plan looks ambitious in terms of the targeted magnitudes for reducing antimicrobial use but this ambition should be accompanied by strategic and still practical way of achieving it which demands co-operations of all stakeholders, including physicians, patients, pharmaceutical companies, insurers, agricultural workers, and politicians.

Historically Japanese academic and educational societies related to infectious diseases have tended to focus intensively on microbiological research but did not pay enough attention to education of clinical infectious diseases and research of infectious disease epidemiology. This insufficient clinical and epidemiological thinking might have been fundamental reason to explain grossly inappropriate use of antimicrobials and yet almost complete lack of awareness of it in Japanese healthcare.

Scientific communities in Japan should consider providing greater opportunities to physicians who aim to be leaders of education of clinical infectious diseases and research of infectious disease epidemiology. They will be likely to contribute to proper handling of various infectious diseases with media attention such as an outbreak of multi-drug resistant *Acinetobacter* in Japanese hospitals.

So now what can generalist physicians in Japan do for achieving the action plan? First, we have to understand and implement antimicrobial stewardship inpatient as well as outpatient settings. Unnecessary use of antimicrobials should be minimized. Especially patients with self-limiting upper respiratory infections do not need antimicrobials. When needed, priority should be given to the use of time-honored essential drugs such as penicillins which still maintain effectiveness against many organisms. We should also realize the importance of using antibiotics with narrow spectrum which tend to be less expensive and with less selection pressure for resistant organism. In another words, newer more expensive antibiotics can have yet unknown side effects with higher selection pressure due to their broad spectrum. Liberal use of macrolides as non-antimicrobials should also be minimized.

Second, generalist physicians can have a unique role to educate patients about the importance of proper antimicrobial use. Communication between physicians...
and patients are crucial moment to promote wise choice of healthcare interventions. This approach has also been adopted by Choosing wisely campaigns internationally and is critical for successful implementation of the action plan.

Third, generalist physicians should work in collaboration with infectious diseases specialists. Shortage of infectious diseases specialists is another pressing issue in Japan since there are a huge number of hospitals throughout Japan and a limited number of infectious disease specialists available. Best solution for this problem can be generalist physicians since frequently the best infectious diseases practice can be found among generalist physicians since they take care of all possible organs and anatomies of patients just like infectious diseases specialists do. They also know all the febrile conditions are not from infectious diseases but can be from other disease such as autoimmune diseases or cancer.

References