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Author Contributions

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antibiotics, several antimicrobial stewardship programs have been implemented by the government over the last decade in Korea.⁴ Despite these government-led efforts, antibiotic consumption, especially for broad-spectrum antibiotics, have continued to increase.⁵

Considering the lack of progress in reducing antibiotic consumption, we suspect efforts to improve awareness of antibiotics and to promote voluntary participation in antimicrobial stewardship programs at the individual hospital level may prove more beneficial. Interestingly, providing antibiotic consumption numbers for comparison among individual hospital has been found to be an effective strategy through which to promote antimicrobial stewardship.⁶ Accordingly, the Centers for Disease Control and Prevention (CDC) operates the National Healthcare Safety Network (NHSN) and seeks to help individual hospitals analyze data on hospital-wide antibiotic use and to compare one's data to national benchmarks.⁷

In 2019, the Korean CDC initiated a project to develop a system for measuring and comparing antibiotic usage rates in hospitals in Korea. As a part of this project, the Korean Society of Infectious Diseases has begun to work in cooperation with the Korean Society for Antimicrobial Therapy and the Health Insurance Review & Assessment Service (HIRA) to develop a means with which to classify antibiotic usage in Korean hospitals using a modified Delphi method.

To do so, two series of modified Delphi studies were performed from July to August 2019. The first series sought to classify antibiotics used in Korean hospitals; the second was conducted to analyze antibiotic components according to antibiotic classes. Each Delphi study included two rounds of surveys in order to gather opinions and to refine the information related to each.

The questions for the survey in the first round were adopted from the antibiotic classification of the NHSN.⁸ We excluded antibiotics not available in Korea at the point of the survey. The appropriateness of each question was evaluated by a four-point Likert scale (1 = very inappropriate, 2 = inappropriate, 3 = appropriate, and 4 = very appropriate). In addition to closed-ended questions, the survey participants could freely express their opinions about the items. The questions for the survey in the second round were developed to reflect responses in the first round: some items were modified or added if > 30% of the respondents expressed the same opinion. The mean score for each question and opinions obtained from the first round were presented in the questionnaire as a reference. The evaluation of each question was performed using a four-point Likert scale, as in the first round.

We recruited a total of 12 panel experts, including infectious diseases physicians (10), a professor of preventive medicine (1), and a researcher at the HIRA Service (1). All of them had a Ph.D. as their highest level of education. The questionnaire was sent to these individuals via e-mail and reminders were sent if the survey had not been returned. Each survey was open for 1 week.

To analyze responses provided in the survey, content validity ratios (CVRs) were calculated. We used the formula $CVR = (n_e - N/2)/(N/2)$, where n_e represents the number of panel experts rating an item as "appropriate" (score of 3 or 4) and N represents the entire number of panelists. The minimum CVR was determined by the number of experts participating in each round and set to 0.56 for the 12 participants.⁹

The response rates for each round in the first series were 58.3% (7/12) and 75.0% (9/12), respectively. **Table 1** shows the results of the surveys. Most of the subjects in the NHSN's antibiotic classification for adults were accepted, except for "antibacterial agents posing the

