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Immunization decision-making in the Republic of Korea: The structure and functioning of the Korea Advisory Committee on Immunization Practices

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ABSTRACT

The Korea Advisory Committee on Immunization Practices (KACIP), established by law in the early 1990s, makes recommendations on a range of issues related to the National Immunization Program. The Committee consists of 15 members and always includes the two government officials who belong to the Korea Centers for Disease Control and Prevention and the Korea Food and Drug Administration. Other members usually come from affiliated organizations and serve for 2-year terms. The KACIP depends on special-topics sub-committees or temporary advisory committees to gather and analyze data and to make recommendations which are normally reached by consensus and implemented by public sector health providers and private providers.

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1. Introduction

Immunization is among the most effective public health measures to prevent disease. Recommendations concerning the use of new vaccines, based on evidence – such as vaccine safety, efficacy and cost-effectiveness, and the public's acceptance of the vaccine – are thus critical to improve a country's public health. The Korea Advisory Committee on Immunization Practices (KACIP) is an advisory organ of the Ministry of Health (MoH) that provides advice and guidance on the control of vaccine-preventable diseases (VPD). In recent years, a number of new vaccines have been introduced into the National Immunization Program (NIP) (Tables 1 and 2), with the KACIP playing an increasingly larger and more visible role in the decision-making process. This article describes the history and structure of the KACIP, meeting procedures, the process of developing recommendations, and limitations in how the KACIP functions.

2. History of the KACIP

The MoH ordered the establishment of the KACIP in June 1992 to advise the MoH on the control of VPD and immunization-related

policy. The goal of establishing the KACIP was to both prevent and control VPD and ensure the safety of vaccination. The main responsibilities of the KACIP are to: (1) designate diseases to be targeted for immunization and remove diseases from the list, as needed; (2) develop plans for the control of communicable diseases; and (3) develop practical guidelines and policies for immunization. These responsibilities of the Committee cover both the private sector – which provides around 60% of immunizations in the country – and the public sector. However, only public facilities are mandated by law to follow all KACIP recommendations approved by the MoH. In August 1994, the KACIP became a legal entity under the Prevention of Contagious Diseases Act [1]. This was prompted by reports of adverse events associated with Japanese Encephalitis vaccination, subsequently shown to be due to poor storage of the vaccine. With its legal designation came detailed rules concerning the structure, terms of reference and functioning of the Committee. The first Committee established under these rules began in February 1995 and discussed a number of key topics, including the development of guidelines for the NIP, the issue of compensation for vaccine-related injuries, introduction of *Haemophilus influenzae* type b (Hib) vaccine, guidelines for vaccination against Korean hemorrhagic fever, and a review of a sero-epidemiologic survey of diphtheria in adults. The Committee also established a sub-committee for the investigation of vaccine-related injuries, which was separated from the KACIP and became the Advisory Committee on Vaccine Injury Compensation in 2003.

Committee members are appointed to 2-year terms that all begin at the same time, and thus a new committee is formed every 2 years. However certain officials, who serve as a result of their position within the government will remain on the Committee for as

Abbreviations: Epi, Expanded Program of Immunization; KACIP, Korea Advisory Committee on Immunization Practices; KCDC, Korea Centers for Disease Control and Prevention; KFDA, Korea Food and Drug Administration; MoH, Ministry of Health; NIP, National Immunization Program; WHO, World Health Organization; WPRO, Western Pacific Regional Office.

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Table 1
The history of vaccination in the Republic of Korea.

Year	Key milestones or activities
1912	Vaccines for cholera and smallpox was introduced
1948	Bacillus Calmette–Guérin (BCG) vaccine was introduced
1954	Expanded Program of Immunization was established by government decree (to cover 8 diseases, including typhoid, diphtheria, pertussis, tetanus, tuberculosis, cholera, and smallpox)
1955	Diphtheria/pertussis/tetanus (DPT) vaccine was introduced
1965	Measles vaccine was introduced
1973	Japanese Encephalitis vaccine introduced
1980	Measles–mumps–rubella (MMR) vaccine was introduced
1995	Hepatitis B vaccine was included in National Immunization Program
1997	2nd MMR dose was added to the routine immunization schedule
2001	Measles catch up campaigns were initiated in response to epidemics
2004	Tetanus/diphtheria (Td) vaccine was introduced Oral polio vaccine was replaced by inactivated polio vaccine
2005	Varicella vaccine was added to the infant vaccine schedule
2006	Achievement of measles elimination was declared
2007	Certification of the achievement of control of vertical transmission of hepatitis B was granted by World Health Organization
2009	The Korea Centers for Disease Control and Prevention begins program to provide free vaccines to participating private sector providers and facilities

long as they remain in their position (see next section). Despite this intention, the duration of the current – seventh – committee, which was formed in October 2007, has been extended to a third year, because of the many issues it has been dealing with that still need to be resolved. This is the first time that the Committee's term has been extended and the terms will go back to 2 years in 2010. Among the items on the agenda of the current committee have been: a review of national immunization strategies; the control of measles; how to control a hepatitis A outbreak; the control of varicella and mumps; whether to change the strain of Bacillus Calmette–Guérin (BCG) vaccine and route of administration (from intradermal to transdermal); and the issue of subsidizing the cost of Expanded Program of Immunization (EPI) vaccines provided through the private sector, through which the majority of immunizations in Korea are given. Based on a recommendation by the KACIP, the Government has decided to partially subsidize the cost of all EPI vaccines administered at private health facilities that agree to participate in this program, starting in 2009 (with parents now paying 70% instead of 100% of the vaccine cost).

3. Composition of the KACIP

The KACIP consists of a Chairperson and specialists in internal medicine, paediatrics, obstetrics, microbiology, preventive medicine and nursing. The Committee also includes a representative from a consumer group, the Director of Disease Prevention at the Korea Centers for Disease Control and Prevention (KCDC), and the Director of Biologics at the Korea Food and Drug Administration (KFDA). Apart from the two government officials mentioned above, all other members usually come from the affiliated organizations

Table 2
Vaccines included in the National Immunization Program in the Republic of Korea, 2009.

Bacillus Calmette–Guérin BCG (intradermal)
Hepatitis B
Diphtheria/tetanus/pertussis (DTP)
Inactivated poliovirus vaccine (IPV)
Measles/mumps/rubella (MMR)
Varicella
Japanese Encephalitis vaccine (inactivated)
Tetanus/Diphtheria (Td, adult)
Influenza
Typhoid fever (oral Ty21a and Vi polysaccharide) for food handlers and travellers to developing countries
Korean hemorrhagic fever

shown in Fig. 1, which each nominate one member. The total number of Committee members is usually around 15. The Secretariat of the Committee is within the KCDC, which funds, organizes and prepares for the meetings, and at whose headquarters the meetings are held. The Chairperson rotates every term (i.e., 2 years) and can be selected from any field or affiliated organization. Over the years, Committee members have made recommendations to include more female members, representatives from civil society, and people from rural areas, though to date there are no minimum requirements or quotas for representation of these groups.

Korean Medical Association
Korean Nurses Association
Korean Pediatric Society
The Korean Association of Pediatric Practitioners
The Korean Association of Internal Medicine
Korean Society of Obstetrics and Gynecology
The Korean Society for Preventive Medicine
The Korean Society of Infectious Diseases
National Cancer Center
The Korea Institute for Health and Social Affairs
Korea Health Industry Development Institute
International Vaccine Institute
Korea National Council of Consumer Organizations

Fig. 1. Affiliated organizations of the KACIP.

KACIP members are appointed by the MoH and, with the exception of the Director of Disease Prevention at the KCDC and the KFDA's Director of Biologics, they serve for a term of 2 years. Members can serve more than one term, and although there are no formal rules dictating the length of time members can serve on the Committee, historically members serve no more than two terms (i.e., 4 years). Representatives of the affiliated organizations nominate candidates and forward their names to the KCDC Director for review. The list of nominees is then sent to the Health Minister, who makes the final selection. All members are given an official appointment letter.

When a person joins the KACIP, he or she must sign a declaration of confidentiality. Members have an obligation to notify the Committee if they have any business with a vaccine producer (e.g., as a consultant) and, if so, they must resign from the Committee. They must also report to the KCDC if they own any stock in vaccine companies, reclude themselves from voting on an issue with which they are personally involved or if they are stockholders in a vaccine company, and avoid interviews with the press if relevant officials are not present. Members are given an allowance for travel expenses to attend the meetings. Members have an obligation to attend every meeting – barring emergencies – and may be dismissed if they miss two meetings in a row without giving a reason.

In addition to these members, external experts, such as principal investigators of vaccine clinical trials, KFDA officials involved in vaccine licensure, and more rarely, scientists from vaccine companies, may be asked to participate in certain meetings as *ex-officio* members to lend their expertise on a particular topic. These experts cannot, however, participate in decision-making.

4. Rules governing KACIP meetings and areas that the Committee addresses

According to the written rules governing the KACIP in the Prevention of Contagious Diseases Act, the Committee must meet at least four times a year, and additional meetings can be held, as needed, upon the request of the Minister of Health or more than half of the Committee members, with approval by the Chairperson. In 2009, for example, a total of eight meetings were held, many to discuss planning for the introduction of a vaccine against the new H1N1 strain of influenza.

The Director of the Division of VPD Control and the NIP sets up the agenda for each meeting, based on suggestions from KACIP members, KCDC staff, other experts and *ex-officio* members, and members of KACIP sub-committees (described below). The decision to add a topic, such as the introduction of a new vaccine, to the KACIP agenda can be prompted by the licensure of a new vaccine by the KFDA for use in the private sector, the declaration of a new goal by the World Health Organization (see Section 7), an outbreak or increase in incidence of a VPD, or when specific issues related to a vaccine arise (such as reports of adverse events). Industry personnel cannot directly propose agenda topics for KACIP meetings, but can suggest them through others, such as KFDA or KCDC staff or clinical trial researchers.

The scope of work of the Committee includes the following areas and issues:

- disease control measures for VPD, including enhanced surveillance, improved case management, and immunization;
- the introduction and use of new vaccines, including ones recently licensed by the KFDA;
- recommendations concerning vaccine schedules, including target ages, number of doses and interval between doses;
- vaccines for high-risk groups and for adults;
- vaccine formulations;

- which vaccine to recommend when there are more than one against a given disease; and
- recommendations for additional studies to aid decision-making, such as sero-epidemiological surveys for a VPD or vaccine cost-effectiveness analyses;

Other agenda items in recent meetings have included: a review of data on the H1N1 influenza outbreak in Korea and what target groups to prioritize for flu vaccination; a review of vaccine adverse events; changes in vaccine supply; and setting priorities for the Korean NIP among new vaccines such as those against hepatitis A, Hib, pneumococcal pneumonia, rotavirus, and human papilloma virus (HPV).

As written in the Contagious Diseases Act, KACIP meetings are, in principle, open to the public, and people wishing to attend a meeting as observers, such as vaccine producers, members of civil organizations or academia, must complete a written application at least 5 days before the meeting. However, the Chairperson can hold a meeting behind closed doors, if particularly sensitive or controversial topics are being discussed. This was the case for a meeting held in 2009 to decide which groups to target for H1N1 influenza vaccination.

5. Sub-committees and special working groups

In 2003, the KACIP established a number of sub-committees that function as working groups to gather, analyze, present information and make recommendations on specific topics to inform the Committee's decision-making. There are now 12 sub-committees, each with a specific area of expertise or focus (Table 3). New sub-committees can be created or existing ones disbanded, upon recommendation by the KACIP; however, all current sub-committees have been in existence since 2003. They are usually made up of less than 20 members, including some KACIP members, representatives of the affiliated organizations and from academia, as well as other external experts. As with the KACIP, representatives from vaccine companies cannot serve on sub-committees. The Director of the KCDC appoints the chairs of the sub-committees, who are sometimes members of the KACIP. Sub-committee members are recommended by the KCDC Director, the Chair of the sub-committee and KACIP members, and are approved by the KCDC Director. As with KACIP members, terms for sub-committee members are 2 years. There are no rules governing the frequency of meetings of the various sub-committees; rather they meet as necessary, such as when a topic related to their areas of focus is on the agenda of upcoming KACIP meetings.

In addition to these 12 long-term sub-committees, specific working groups or advisory committees are sometimes established on a temporary basis by the KCDC in response to new situations, such as the emergence of a new disease or the declaration of global disease elimination goals by World Health Organization (WHO). These working groups function very much the same as the longer-term sub-committee, reporting their findings and recommendations to the KACIP. Two such working groups are the Advisory Committee for the Maintenance of Measles Elimination Status and the Advisory Committee on the Prevention of Hepatitis B Vertical Transmission. A new working group established in 2009 is the Advisory Committee on H1N1 influenza virus, which is tasked with gathering data and making recommendations regarding immunization against this new pandemic flu strain. This committee, made up of experts in paediatrics, internal medicine, immunology, infectious disease, and preventive medicine, has developed a set of recommendations for consideration by the KACIP, addressing priority groups to target for vaccination, includ-

Table 3
The sub-committees of the Korea Advisory Committee on Immunization Practices.

Sub-committee	Main areas addressed
Tuberculosis	Route of administration, selection of vaccine strain
Hepatitis A/hepatitis B vaccines	Control of hepatitis A, including setting guidelines for immunization; seroprevalence of hepatitis B to determine vaccine's efficacy
DTaP/polio vaccines	Strategies for Td immunization for adolescents and adults; polio eradication strategies
Measles–mumps–rubella vaccines	Strategies for the elimination of measles and rubella and control of mumps
Japanese Encephalitis vaccines	Review of sero-epidemiological surveys of Japanese Encephalitis; consideration of use of live vaccine (SA 14-14-2) as an alternative to the mouse-brain derived/killed vaccine
Influenza vaccines and adult immunization	Identification of priority target groups for seasonal influenza vaccination; development of strategies and guidelines for adult immunization against influenza
Immunization registry	Development and assessment of the web-based immunization registry program; development of immunization reference manual for health workers
Vaccine adverse events	Review of data from surveys of vaccine adverse events
Varicella vaccines	Review of the efficacy of and develop strategies for varicella immunization
Haemophilus influenza type b/pneumococcus vaccines	Monitoring of disease burden in Korea and of disease burden and vaccination policy in other countries. Also examined data on rotavirus for National Immunization Program prioritization for one meeting
Human papilloma virus vaccines	Introduction of vaccine and review of adverse events following immunization; examination of disease burden in Korea
Immunization policy	Establishment of priorities for the National Immunization Program and analysis of the cost-effectiveness of immunization

ing identifying chronic diseases that put people at high risk; the timing of vaccination; and the development of a reference manual for H1N1 vaccination.

6. Evidence and factors influencing decision-making

When a decision has been made to add a topic to the agenda for the KACIP to address, the KCDC requests the appropriate sub-committee or advisory committee to review all relevant data, gather the opinions of experts, and suggest policy recommendations. If no sub-committee or advisory committee yet exists that can address the topic, the KACIP requests the KCDC to gather relevant data for their review.

In considering the introduction of a new vaccine or other change in the NIP, the relevant sub-committee and the KACIP examine all available data – both published and unpublished – on the disease burden in Korea, including clinical characteristics of the disease, and incidence, mortality, and case fatality rates. If local disease burden data are lacking, the sub-committee will examine available data from other countries, such as Japan, or will recommend that a local study be conducted.

The sub-committee also compiles and analyzes data on the efficacy, effectiveness, and safety of the vaccine, including side effects and contraindications. Sources of information on the vaccine include clinical trials conducted both in Korea and in other countries, WHO position papers, recommendations published by the U.S. Centers for Disease Control and Prevention (www.cdc.gov), and the European Centre for Disease Prevention and Control website (www.ecdc.europa.eu). Information on the availability of a vaccine supply and sources of the vaccine are also considered. External experts are often asked to provide information and their views concerning the vaccine at both the sub-committee and KACIP meetings. For instance, the officer from the KFDA who was responsible for licensure of the vaccine in Korea may be asked to provide information on the vaccine's immunogenicity in the local population, safety profile, and clinical trial results.

WHO recommendations are another key factor influencing decisions, including the goals and policies of the Western Pacific Regional Office (WPRO). The regional goals to eliminate measles and prevent the transmission of hepatitis B from mother to infant were instrumental in the establishment of the special advisory

groups for each topic and the enactment of national policies to reach both goals (see Section 7).

At the same time, the KCDC often compiles and reviews economic data on the disease and vaccine, including the cost, affordability and financial sustainability of implementing the new vaccine program, as well as the vaccine's cost-effectiveness (in terms of cost/QALY). This information, presented to the KACIP, is often gathered and analyzed with assistance from a local economist or expert in preventive medicine. While global economic data from WHO or from other countries are often used as a reference, data from Korea are always preferred, and local studies are sometimes recommended, since the economic and disease burden parameters change from country to country. The results of economic evaluations conducted by vaccine producers usually are not considered, because of the obvious concern of bias.

The KACIP and sub-committees do not have set rules on ranking the various factors and types of data (e.g., disease burden vs. vaccine cost-effectiveness) in order of importance when making recommendations. This is because specific factors, such as the potential for disease outbreaks, whether the disease has seasonal peaks, and the groups most affected by the disease (e.g., children vs. adults), differ for each disease and thus the committee considers the preponderance of data when making recommendations.

Sub-committees also make recommendations concerning measures for controlling the disease they focus on that go beyond immunization. For example, in response to an outbreak of pertussis among infants, in 2009, the Sub-committee on Diphtheria/Tetanus/Pertussis and Polio held meetings to develop recommendations concerning case management and surveillance, as well as immunization. These recommendations included the isolation of pertussis patients and the distribution of antibiotics for prophylactic use among the patient's contacts; polymerase chain reaction testing to diagnose all suspected pertussis patients, where available; a survey to determine what proportion of patients with chronic cough have pertussis; and the replacement of the tetanus–diphtheria (Td) booster for adolescents with the new tetanus–diphtheria–acellular pertussis (Tdap) vaccine. The KCDC ordered the implementation of the medical-related recommendations immediately in public health facilities, while the vaccine-related recommendations have been sent to the KACIP to address at its next meeting in 2010.

7. Case study on KACIP's role in reducing perinatal transmission of hepatitis B

The launch and successful implementation of Korea's Hepatitis B Perinatal Transmission Prevention Program illustrates the important role of both the World Health Organization in setting goals for the National Immunization Program, and the KACIP and ancillary working groups in developing practical recommendations to achieve these goals. In 2002, the Western Pacific Office of WHO (WPRO) set the goal for the region to reduce hepatitis B transmission from mothers to their infants, with a benchmark for countries to achieve a seroprevalence rate of hepatitis B surface antigen (HBsAg) in children 5 years and older of <2% by 2012 [2]. In response, the KACIP established the following goals: (1) reduce the seroprevalence rate of HBsAg in the total population to <1% within 10 years; (2) achieve 95% coverage of the 3rd dose of hepatitis B vaccine in infants; and (3) strengthen the disease surveillance system to monitor and evaluate progress with hepatitis B control.

The KCDC then established the Advisory Committee on the Prevention of Hepatitis B Vertical Transmission, which recommended a series of strategies to meet the KACIP's goals. These strategies included:

- (1) screening all pregnant women for chronic hepatitis B infection;
- (2) providing prophylactic treatment (hepatitis B immunoglobulin) to all infants born to HBsAg positive mothers;
- (3) vaccinating all infants against hepatitis B.

To ensure compliance among providers and patients in the private sector, the government implemented a voucher program. Through this program, private clinics were given free vouchers, which were then distributed to pregnant women, who could use them to in lieu of payment to cover the costs of vaccination of their infant, a screening test to detect the hepatitis B surface antigen and surface antibody following the third dose of the vaccine, and revaccination for infants who fail to show an immune response to the vaccine. The private clinics then submit the vouchers to the city or state government to receive reimbursement for these services. The vouchers also serve as a data tracking device, as patient information on the voucher is sent to the Korea CDC hepatitis B database. As a result of this program, the prevalence of HBsAg among blood donors has been reduced to 0–0.4% and coverage among infants for the third hepatitis B dose is 94%. WHO certified Korea as having achieved the control of vertical transmission of hepatitis B in 2008.

8. The decision-making process

Once the sub-committee compiles and reviews the epidemiological, vaccine, and economic data and hears from KCDC and external experts, members try to reach a consensus on recommendations concerning control measures for the disease in question, including immunization; target groups for vaccination; route of administration; and other key considerations. If the sub-committee cannot reach a consensus, it is the prerogative of the Chairperson to decide what recommendations to give to the KACIP. A senior officer from the KCDC summarizes the data, opinions and recommendations coming from the sub-committee and includes this information in a bound document prepared for KACIP members for each meeting. This document also includes information and views from KCDC and other (non-industry) experts, as well as the meet-

ing agenda, recommendations from the previous meeting, and the terms of reference of the Committee.

During the meetings of the KACIP, experts, including *ex-officio* members, officials from the KFDA or the KCDC or members of the relevant sub-committee, give presentations or are asked to express their views. Members then discuss each issue in depth and develop recommendations, usually by consensus. An officer of the KCDC records the recommendations or other results of the meeting, which the KACIP Chairperson submits to the Director of the KCDC, who in turn transmits the recommendations to the MoH. The minutes of the KACIP meetings are given to the KCDC Director and other staff, but are not made public.

While most decisions made by the Committee are approved by the MoH and thus implemented, KACIP recommendations are not legally binding, and there have been times where recommendations were not implemented for some time due to a lack of funding or the need to revise laws in order to enact the policy change. For example, the program recommended by the KACIP to subsidize part of the costs of EPI vaccines administered at private health facilities (described above) required that the Prevention of Contagious Diseases Act be revised, before it could be implemented.

9. Dissemination and implementation of KACIP recommendations

If a recommendation is approved by the MoH, officials of the KCDC then develop a budget to cover the costs of the new policy change (e.g., the introduction of a new vaccine), and plan the steps necessary to implement the recommendation, working with both public and private health facilities and organizations. The Public Relations Department of the KCDC then prepares public education materials, such as brochures, posters, and vaccine information statements or factsheets to alert the public and medical community of the new recommendations. In the case of a recommendation involving the introduction of a new vaccine or changes in vaccination guidelines, the KCDC, which publishes a national reference manual on the epidemiology and prevention of VPD [3], in cooperation with the KACIP and the Korean Medical Association, revises the manual to include the new recommendations. Updated guidelines incorporating the recommendations are also posted on the KCDC's website (www.cdc.go.kr).

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Conflict of interest statement

The authors state that they have no conflict of interest.

References

- [1] Ministry of Health. Prevention of Contagious Disease Act. Seoul: Korean Centers for Disease Control and Prevention; 2009.
- [2] World Health Organization. Guidelines for certification of achievement of Hepatitis B control goal in the Western Pacific Region, <www.who.int/immunization/sage/WPRO_hepb.ExecSummary.pdf>;2007 [accessed 8.11.09].
- [3] Division of Vaccine-Preventable Diseases. Epidemiology and prevention of vaccine-preventable disease. 1st ed. Seoul: Korean Centers for Disease Control and Prevention; 2006.