

1 The public health system in Korea

In Korea, where compared to the OECD average the population is relatively young and rate of behavioural risk factors comparatively low, the system has perhaps been understandably focused curative, rather than preventive care. However, shifting demographics including rapid aging, key risk factors especially amongst certain population groups notably males, and an increasing burden of chronic disease mean that prevention and public health should be a focus sooner, rather than later. This chapter outlines some of Korea's strengths when it comes to public health policy, notably a collaborative governing approach and rich data infrastructure, as well as areas for strengthening, including stronger primary prevention policies, and scope for more robust chronic disease management.

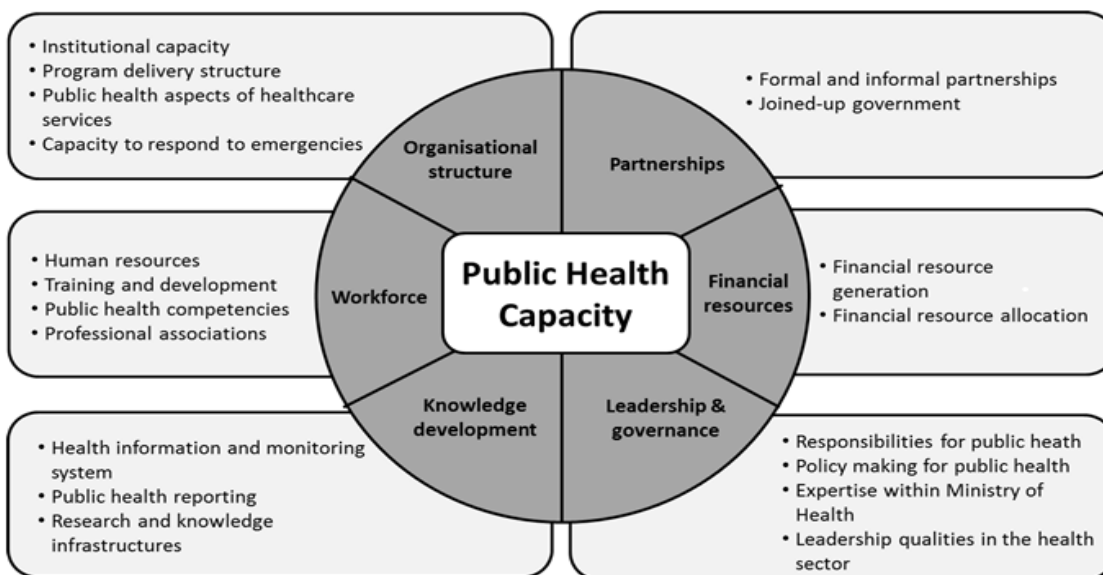
Introduction

Public health issues have gained importance across OECD countries in recent years, as governments grapple with the best way to prevent disease and ill health, and help their populations live longer, healthier lives. Chapter 1 of the OECD Reviews of Public health examine the core public health architecture in place in countries to prevent disease, detect disease early, prevent secondary complications from diseases, and promote good population health and wellbeing. The public health architecture includes all the public, private, and voluntary entities dealing with the organisation of core public health functions such as public health programme delivery and institutional capacity to respond to public health emergencies, workforce such as public health specialists, knowledge development and epidemiological surveillance, formal and informal public health partnerships, financial resources for disease prevention and health promotion, and leadership and governance in the system.

This chapter gives an overview of the epidemiological context and national public health needs in Korea, sets out a summary of the strengths and weaknesses of Korea's public health system, and where weaknesses are identified makes recommendations for policy strengthening. The description of public health policies in this chapter is structured according to a framework for analysing the public health system detailed in Figure 1.1 below.

Figure 1.1. Appraising Korea's public health capacity – analytical framework

Analytical Framework for the OECD Public Health Reviews



Source: Authors' elaboration.

1.1. The public health picture in Korea

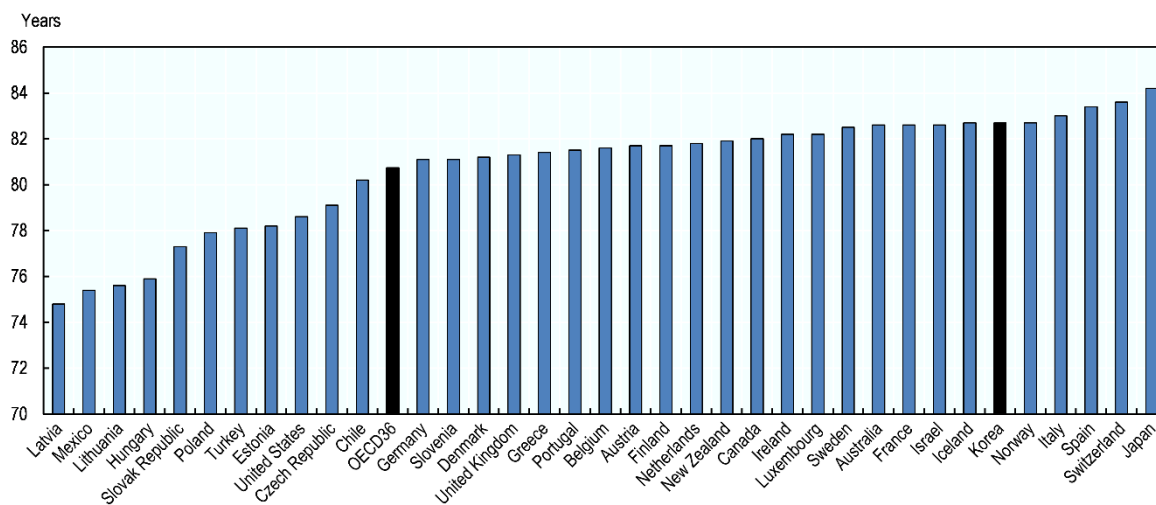
1.1.1. The health status of the Korean population

In Korea, life expectancy at birth was 82.7 years in 2017, higher than the OECD average of 80.8 (see OECD (2019^[1])). It was higher for both men and women: life expectancy for males was 79.7 years,

compared to an OECD average of 78.1 year, and life expectancy for females was 85.7 years compared to an average of 83.4 years (OECD, 2019^[2]).

Figure 1.2. Life expectancy at birth

Life expectancy at birth in OECD countries, 2017 or nearest year

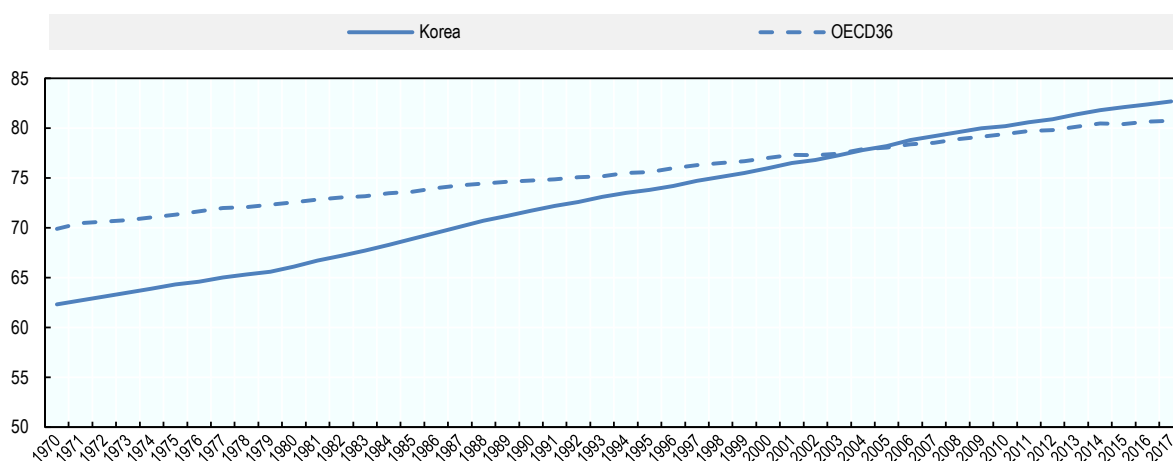


Source: OECD (2019^[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

The high life expectancy in Korea is the result of a rapid increase in the last four decades. While in 1970 Korea’s life expectancy was nearly 8 years less than the OECD average, by 2005 it had caught up with other countries (see Figure 1.3). Since then Korea’s life expectancy has continued to grow at a steeper pace than the OECD on average.

Figure 1.3. Life expectancy at birth over time

Life expectancy at birth in Korea, and OECD average, 1970 - 2017

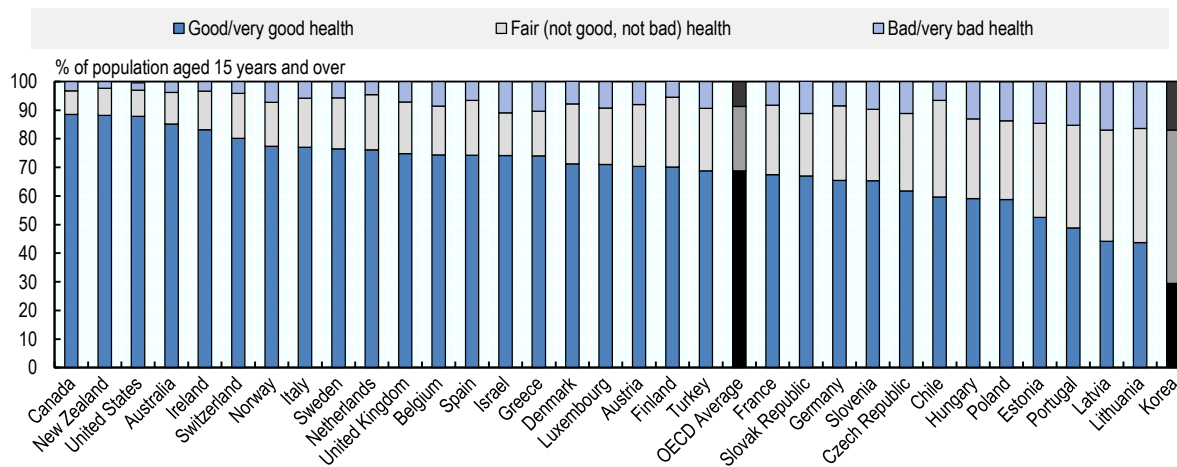


Source: OECD (2019^[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

Nevertheless, while life expectancy is higher than average, these years are not all spent in good health. Korea has the lowest perceived health status of all OECD countries, with only a third of people reporting that they are in good or very good health (see Figure 1.4).

Figure 1.4. Perceived health status

Percentage of population reporting that they are in good/very good, fair, or bad/very health, 2017 or nearest year



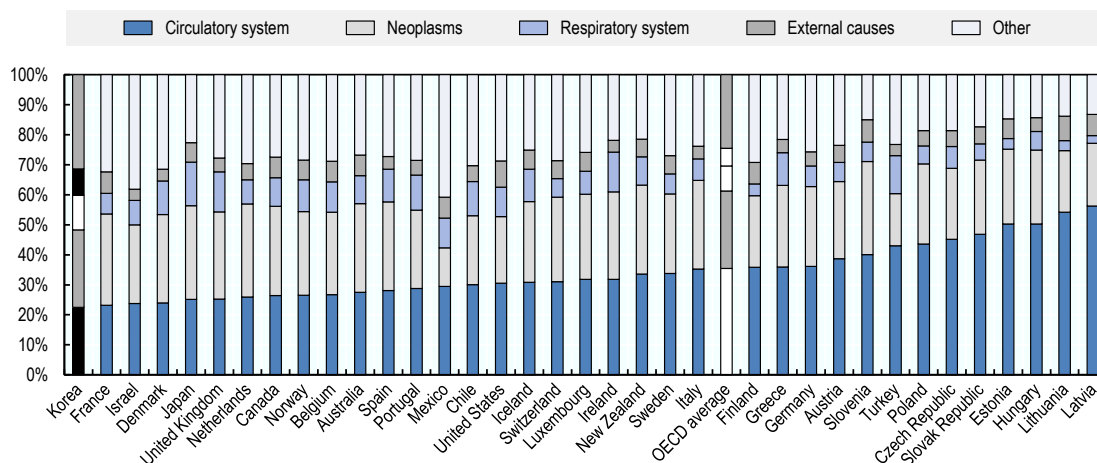
Source: OECD (2019^[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

1.1.2. Burden of disease

Like in many other OECD countries, non-communicable diseases account for the majority of the disease burden in Korea. The top five causes of mortality in Korea are cerebrovascular disease, Alzheimer disease, ischaemic heart disease, lung and liver cancer (IHME, 2017^[3]). While ischaemic heart disease is in the top five, diseases of the circulatory system only account for 23% of mortality in Korea – compared to an OECD average of 35% (see Figure 1.5). Cancers on the other hand account for 26% of mortality, which is the same as the OECD average.

Figure 1.5. Causes of mortality

Percentage of deaths per 100 000 population (age-standardised rates), 2016 or nearest year

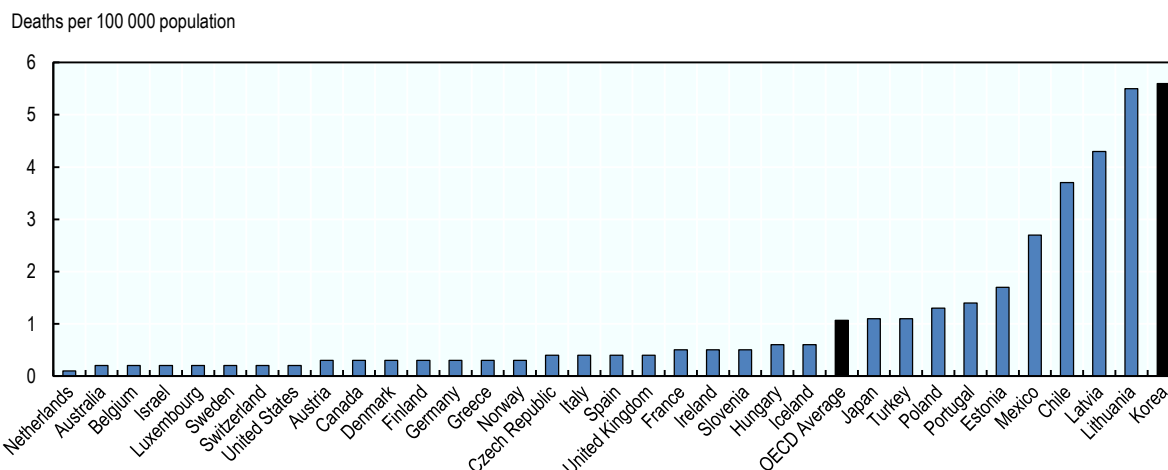


Source: OECD (2019_[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

While the majority of disease burden comes from non-communicable diseases, Korea has a high burden of tuberculosis (TB) as compared to other OECD countries (see Figure 1.6). Korea has 6.0 deaths per 100 000 population per year, compared to an OECD average of 1.0. This public health issue has been on the radar of the Korean Government, and disease management and control plans have reduced the incidence from 100 cases per 100 000 population in 2011 to 77 per 100 000 population in 2016 (Go et al., 2018_[4]).

Figure 1.6. Deaths from tuberculosis

Percentage of deaths per 100 000 population (age-standardised rates), 2017 or nearest year.



Source: OECD (2019_[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

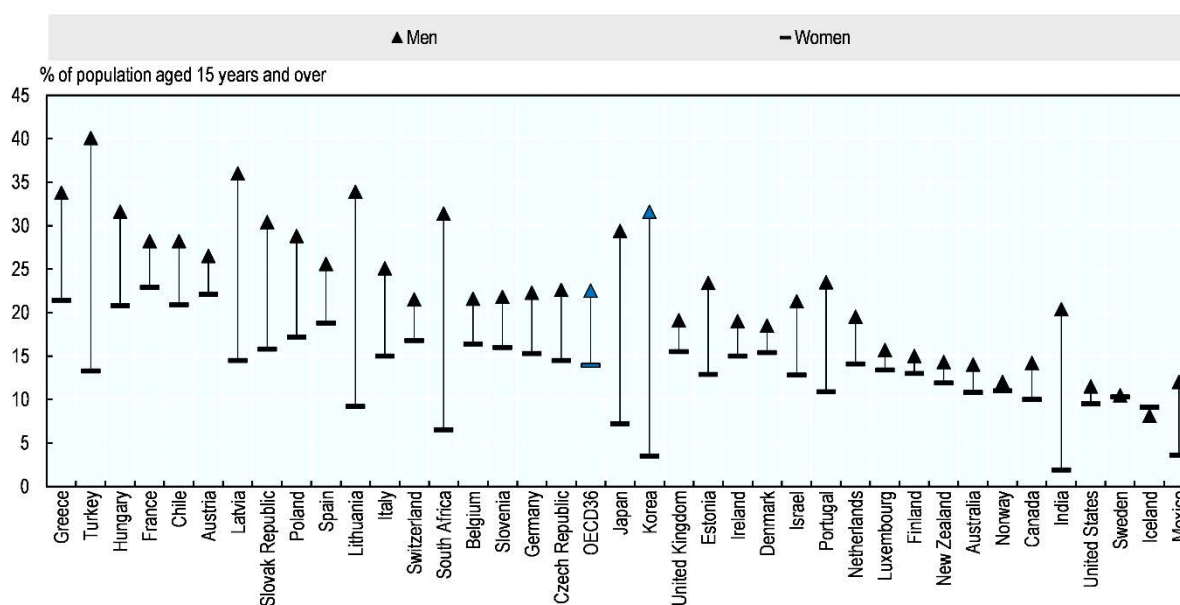
A second Comprehensive Plan on Tuberculosis was due to be released in 2019, and will focus on early detection (for example screening of elderly and high-risk groups), patient care and contact management, expanded development of research, and strengthening the TB response system. Strengthening the response system will include establishing a cross-government response system, strengthening local level response capacity, improving TB awareness, and strengthening international collaboration around TB.

1.1.3. Risk factors

While tobacco consumption among females in Korea is very low compared to the OECD average, males smoke much more than in other OECD countries (see Figure 1.7). Nearly 31.6% of Korean men are daily smokers, compared to an OECD average of 22.5%. However, there has been a decrease – as the prevalence of daily smoking in men was nearly 60% two decades ago (OECD, 2019_[2]).

Figure 1.7. Daily smokers as a percentage of the total population

Percentage of population smoking daily, by sex, 2017 or nearest year



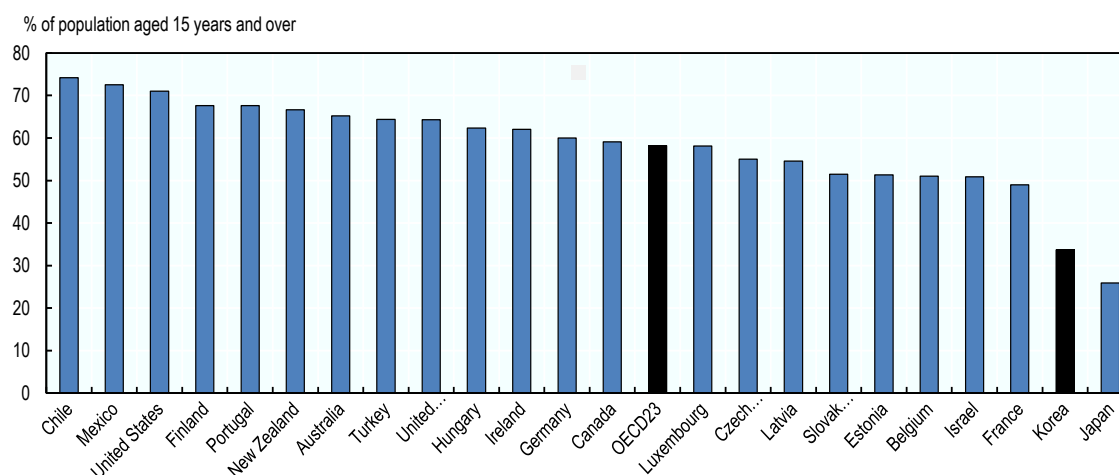
Source: OECD (2019_[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

Alcohol consumption in Korea, at 8.7 litres per person per year, is around the OECD average (OECD, 2019_[2]). However, similar to tobacco, men drink considerably more than women. More patterns and trends on alcohol consumption are described in Chapter 2.

Korea has one of the lowest obesity rates of the OECD, at 5.5%, with 33.7% of the population overweight or obese (see Figure 1.8). Korea also does well when it comes to fruit and vegetable consumption (OECD, 2019_[5]; OECD, 2019_[1]).

Figure 1.8. Adult overweight and obesity

Percentage of population who are overweight or obese (measured), 2017 or nearest year



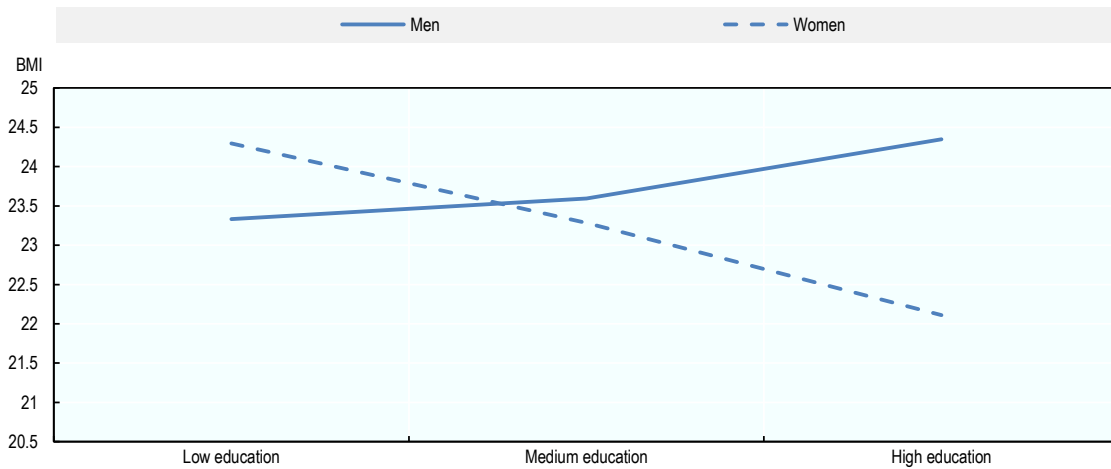
Source: OECD (2019_[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

However, it has been suggested that the international cut-off for obesity at a BMI (body mass index, a value derived from weight and height to determine whether a person carries excess weight) of 30 may not be appropriate for the Korean population. Studies have shown that at a lower BMI, Korean and other Asian ethnicities have relatively high percentages of body fat, as well as the associated higher risk of diabetes and heart disease (WHO Expert Consultation, 2004_[6]). For these populations, a BMI of over 23 represents an increased risk. In 2017, 27.7% of the Korean population had a BMI of over 25 (OECD, 2019_[1]).

In addition, levels of overweight including obesity amongst children aged 5-9 in Korea are above the OECD average. In 2016, the rate of overweight amongst 5-9 year olds in Korea was 31.8%, compared to the OECD average of 31.4%. Korean boys were particularly affected, with 38.0% overweight in 2016, compared to the OECD average of 34.0% (OECD, 2019_[1]).

Looking at BMI and education, different trends can be observed between men and women (see Figure 1.9). For men, BMI increases in men who have a high education level. For women on the other hand, BMI decreases with increasing education level.

Figure 1.9. BMI by educational level and sex, 2014

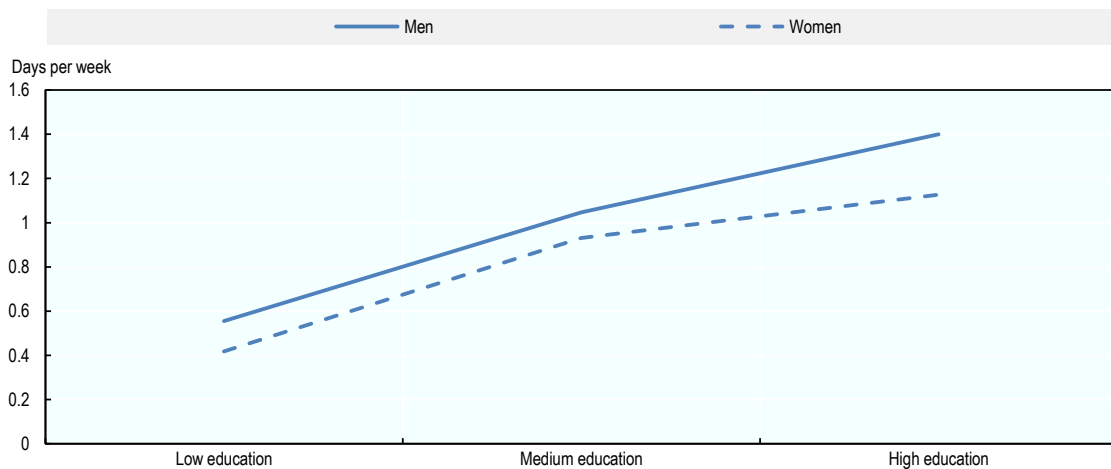


Source: KNHANES (2019^[7]), Korea National Health and Nutrition Examination Survey, https://knhanes.cdc.go.kr/knhanes/sub01/sub01_02.do.

However, when it comes to physical activity, the same trend across educational level is observed for both men and women (see Figure 1.10). For both males and females, higher educational levels are associated with more physical activity.

Figure 1.10. Physical activity by educational level and sex, 2014

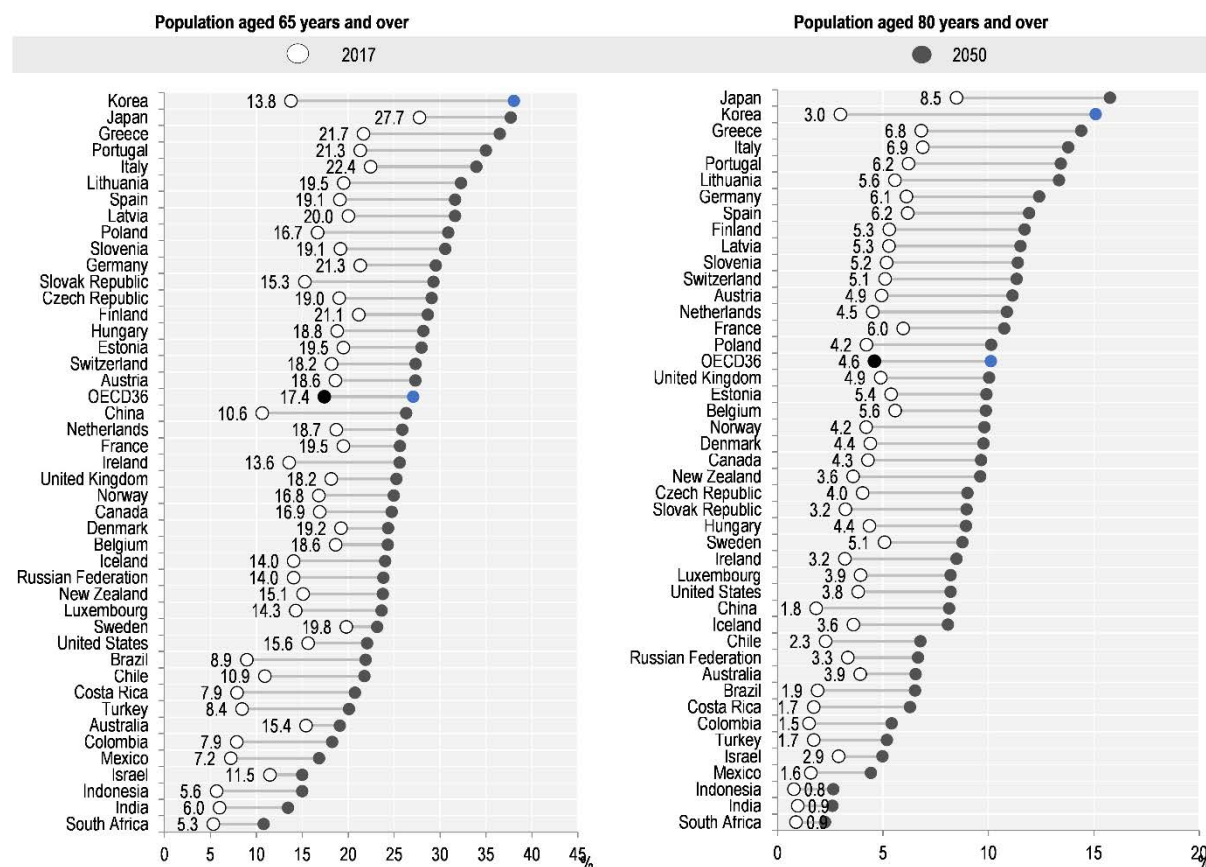
Days per week with at least 10 minutes of moderate intensity physical activity



Source: KNHANES (2019^[7]), Korea National Health and Nutrition Examination Survey, https://knhanes.cdc.go.kr/knhanes/sub01/sub01_02.do.

In addition to behavioural risk factors, the health system in Korea faces a new challenge when its relatively young populations starts to age. While Korea currently has one of the youngest populations among OECD countries, with only 13.8% aged 65 or over, this is expected to increase considerably in the next decades (see Figure 1.11). By 2050, over 38.1% of the population is projected to be 65 or over, and 15.8% of the population are projected to be 80 or over, which would make Korea's population one of the oldest, and one of the fastest aging populations. This change in demographics creates a new public health challenge to support health aging, and diagnose and treat chronic conditions associated with advanced age.

Figure 1.11. Percentage of population aged 65 and over and aged 80 and over, 2017 and projected 2020 population



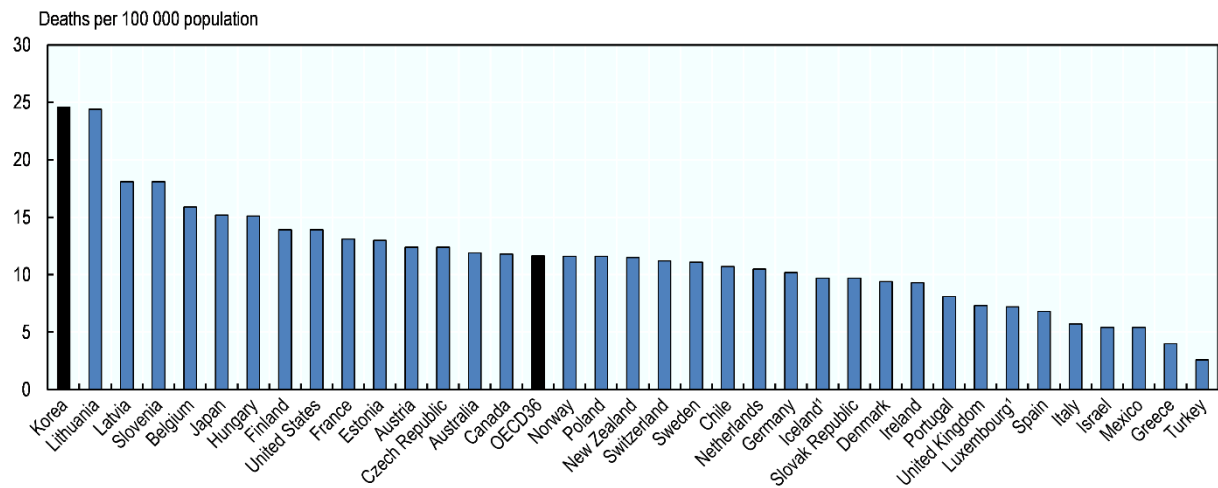
Source: OECD (2019^[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

1.1.4. Mental wellbeing

Korea has by far the highest suicide rate among OECD countries (see Figure 1.12). Intentional self-harm was the number one cause of premature death in 2016 in Korea (IHME, 2017^[3]). Moreover, while in other OECD countries suicide rates have been decreasing; in Korea the rate has increased over the past three decades (see Figure 1.13). However, in the last few years a drop can be observed.

Figure 1.12. Deaths by suicide

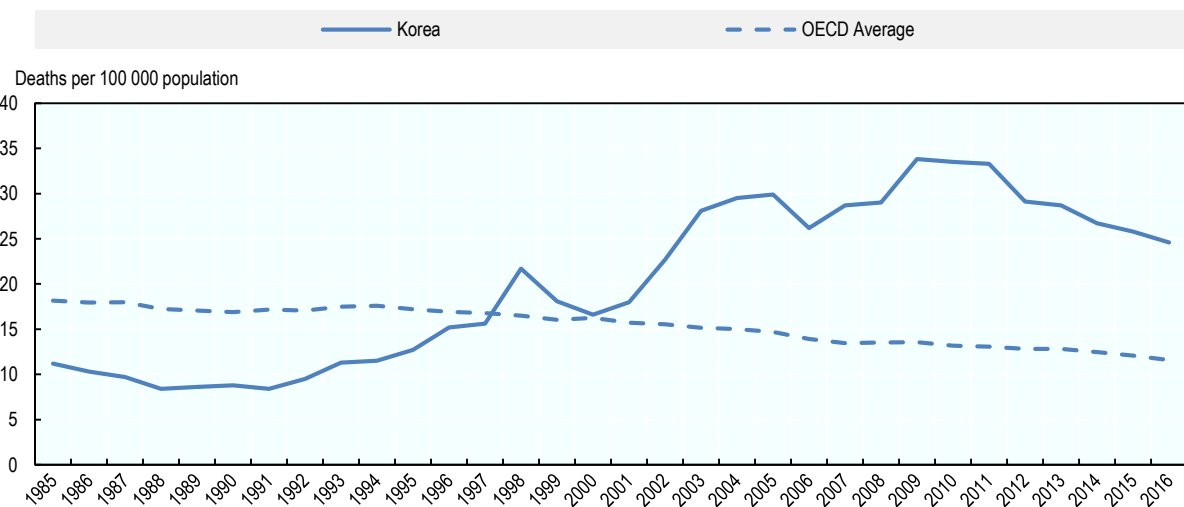
Death by 'intentional self harm' per 100 000 population, 2017 or nearest year



1. Three-year average.

Source: OECD (2019^[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

Figure 1.13. Death by suicide 1985-2016, Korea and OECD Average



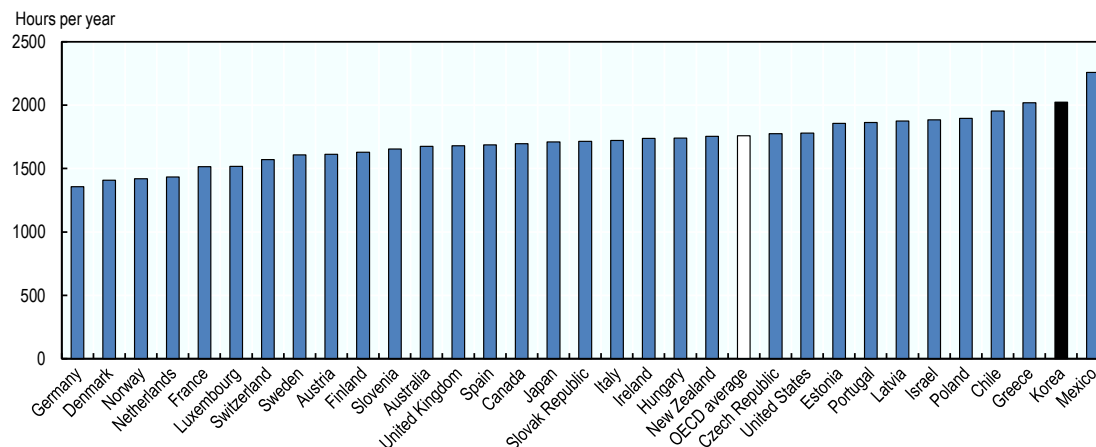
Source: OECD (2019^[1]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

Suicide can be, to an extent, seen as an indicator of the overall mental health status of a population (OECD, 2013^[8]), making Korea's high rates a cause for concern. This is backed up by other studies, which found that more than one-quarter of Koreans had experienced at least one mental disorder in their lifetime (Je Cho et al., 2015^[9]).

One of the contributing factors to the high rates of mental health issues may be long working hours, and work-related stress (Bannai and Tamakoshi, 2014^[10]). Korea has one of the highest working hours per worker among OECD countries (see Figure 1.14). The long working hours, as well as precarious

employment status, have been shown to be associated with higher odds of depressive symptoms in Korean employees (Kim et al., 2016^[11]).

Figure 1.14. Average annual hours worked per worker, 2017



Source: OECD (2018^[12]), *OECD Labour Force Statistics 2018*, <https://stats.oecd.org/index.aspx?DataSetCode=ANHRS>.

Some steps are being taken towards mental health promotion and suicide prevention. The Central Division of Mental Health Policy works closely with regional mental health centres and mental health hospitals; treatment of alcohol addiction is discussed in detail in Chapter 2. Currently, mental health care in Korea is extremely inpatient-based, and Korea has a far higher number of psychiatric inpatient beds than the OECD average (OECD, 2019^[1]; 2014^[13]).

The government set 2019 as the year of suicide prevention to reduce the number of suicide less than 10 000 per year by 2020 and to promote people's mental health in Korea by systematically monitoring those at high risk of suicide (Yonhap, 2018^[14]). The 'Suicide Prevention and Spread of a Culture Promoting Respect for Life' plan makes suicide prevention one of the top policy priorities of the current government (see Box 1.1).

Box 1.1. Suicide Prevention in Korea

The Korean Government, under the administration of President Moon Jae-in, chose to make ‘Suicide Prevention and Spread of a Culture Promoting Respect for Life’ one of their top policy priorities. This administration aims to reduce the suicide rate to 17.0 deaths per 100 000 population by 2022.

The Korean Government established a National Action Plan on Suicide Prevention on January 23rd 2018 (Government of Korea, 2018^[15]). The key components of the National Action Plan are as follows:

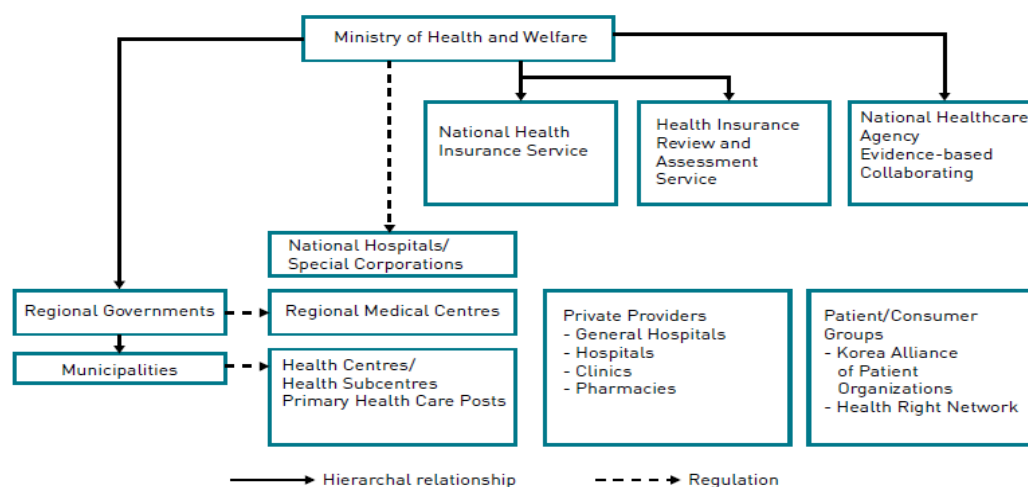
1. A strategic approach based on scientific evidence. Scientific evidence for policy making will be built through the investigation of all 70 000 suicide cases across 5 years (2013-2017). A national suicide surveillance system will be established to identify trends in suicide mortality across local governments and to provide monthly statistics.
2. Establish a whole-of-society network to identify high-risk groups for suicide. Gatekeeper programmes for suicide prevention will be diversified with more trained personnel. Depression screening will be expanded in terms of target age and frequency. Previously, the target ages were limited to 40 and 66. However, the screening cycle has been reduced to every 10 years in 2018, covering ages 40, 50, 60, and 70. In 2019, the coverage will be further expanded to include ages 20 and 30.
3. Eliminate suicide risk factors through active interventions and management. “Mental Health Welfare Centers” will reinforce professional personnel to expand access to community mental health services. Recommendations for press releases on suicide have been revised and disseminated to strengthen the follow-up management of suicide-inducing information and self-harming objects.
4. Suicide prevention through stronger follow-up management. The follow-up management of attempted suicide cases visiting emergency departments will be expanded. Various forms of support will be provided, including self-help group support, financial and administrative assistance, and the undertaking of a psychological autopsy for bereaved families.
5. Population-specific suicide prevention. Suicide prevention plans will be developed targeting respective population groups such as the unemployed, students, and the elderly, as well as high-risk occupations for suicide (e.g. police and firefighters)
6. Development of implementation mechanisms. The Division of Suicide Prevention was established within the Ministry of Health and Welfare in February 2018. The Suicide Prevention Policy Committee was formed in June 2019, chaired by the Prime Minister.

1.2. Organisational structure

1.2.1. The Korean Health System

At the national level, the Ministry of Health and Welfare (MoHW) in Korea is in charge of health policy and planning (Kwon, Lee and Kim, 2015^[16]). The MoHW also runs a number of speciality national hospitals where the private market fails to meet the needs of the population, such as the 17 psychiatric hospitals and three tuberculosis hospitals (see Figure 1.15). The National Health Insurance (NHI) Program is managed by the National Health Insurance Service (NHIS) and the care it covers is reviewed by the Health Insurance Review and Assessment Service (HIRA). While they are separate from the Ministry, the two organisations remain under some indirect control of the MoHW.

Figure 1.15. Overview of the organisation of the Korean health system



Source: Kwon, Lee and Kim (2015_[16]), "Republic of Korea Health System Review", *Health Systems in Transition*, Vol. 5 No. 4, World Health Organization, http://apps.who.int/iris/bitstream/handle/10665/208215/9789290617105_eng.pdf;jsessionid=202657338B0BE096D2E7FC62E0117DC3?sequence=1.

At the sub-national level, the regional governments manage the regional medical centres and other medical facilities according to local needs (Kwon, Lee and Kim, 2015_[16]). Each municipality has one Public Health Centre, which offers basic public health services such as health check-ups, vaccination, antenatal care and basic medical care. In addition, Sub-Health Centres can be established where additional services are required.

Private hospitals play an important role in health care delivery in Korea (Kwon, Lee and Kim, 2015_[16]). Care provided in private clinics and hospitals is covered under the NHI, and its quality is monitored by HIRA.

Health Insurance

Health insurance in Korea is provided by the National Health Insurance (NHI) programme. The health insurance system in Korea has had four major turning points: legislating the Medical Insurance Act in 1963; introducing the compulsory health care system for a corporation with over 500 employees in 1977; achieving universal health coverage in 1989; and integrating regional medical insurances and employed-based medical insurances into a single insurer in 2000. The health coverage in Korea has been gradually expanded from large to medium and small-size companies and from employee to self-employed individuals. Coverage takes the form of a statutory health insurance scheme to which beneficiaries contribute a premium, with no opt-out allowed.

Inpatient care is subject to a 20% co-payment, while in outpatient care the co-payment ranges from 30% to 60% depending on the provider (Kwon, Lee and Kim, 2015_[16]). For people with a low income, the Medical Aid Programme covers both the insurance premium as well as co-payments (NHIS, 2018_[17]). The coverage of NHI was 97.2% of the population in 2018, while 2.8% was covered by Medical Aid Program (NHIS, 2018_[18]).

The NHI covers a set benefits package that focuses on curative care, including diagnosis, treatment, traditional medical care, emergency care, pharmaceuticals and dental care (Kwon, Lee and Kim, 2015_[16]). However, it also includes some preventive care in the form of health check-ups and cancer screening.

Private health insurance plans play both supplementary and complementary roles to the NHI plan (Shin, 2012^[19]). The NHI reported in their “2017 Survey of Public Perceptions Toward the Health Insurance System” that 86.9% of South Korean households had a private insurance such as cancer insurance or accident insurance. This is driven by the high co-payments associated with the NHI. In Korea, 34.3% of health care expenditure in 2017 was paid for out-of-pocket, compared to an OECD average of around 20% (OECD, 2019^[2]). In 2017 the average premium for private health insurance was 287 000 won (USD 263) (Park Ki-yong, 2017^[20]).

Two quasi-government organisations—the National Health Insurance Service (NHIS) and the Health Insurance Review and Assessment Service (HIRA)—run the National Health Insurance (NHI) system for the ministry (Kwon, Lee and Kim, 2015^[16]). NHIS performs across-the-board tasks in health insurance such as managing the eligibilities of the insured, levying and collecting contribution, and managing insurance benefit payments. Additionally, NHIS is responsible for implementing prevention projects for maintaining and improving the health of the insured and their dependents, collecting the 5 major social contributions (health insurance, long-term care insurance, national pension, employment insurance, and industrial accident compensation) Every year, NHIS negotiates medical fees with medical provider associations.

HIRA was established in 2000 based on National Health Insurance Act (Health Insurance Review & Assessment Service, 2018^[21]). HIRA manages reimbursement coverage, pharmaceutical reimbursement applications, coding and pricing of medical devices and diagnostics under the supervision of the health ministry, and is also in charge of medical claims reviews, quality assessment, drug management and Drug Utilisation Review, inspection and payment arrangement. HIRA has data on 46 million patients per year about patients’ diagnosis, treatment, medical history and prescription drugs, which account for 90% of the total population in Korea. In addition, HIRA can access clinical data from the Hospital Quality Data Acquisition System and mortality data from the Ministry of the Interior and Safety. Researchers are allowed to access to the data through HIRA website (Logyoung Kim, 2014^[22]).

The National Evidence-based Healthcare Collaborating Agency (NECA) was founded in 2009 by the Korean Government as an independent agency collaborating with MoHW. The role of NECA is to lead the health technology assessment and generate evidence on clinical effectiveness and cost-effectiveness and cost-effectiveness of health service, health products and technologies, including medical devices, medicines. These assessments contribute to the efficient use of national medical resources.

Long-term care insurance

Korea introduced mandatory long-term care insurance (LTCI) in 2008. LTCI aims to support old people with difficulties in physical activities and to ease the burden of their families. The contribution rate of LTCI is approximately 0.55% of nationally defined income. The contribution amount is decided depending on the contributor’s income and asset status. Those over 65 are eligible for LTCI benefit application, while people under 65 years old living with an illness such as dementia or cerebrovascular disease are also eligible.

The beneficiaries of LTCI are decided by the LTC committee, considering the result of: i) the Korean need-assessment instrument which is composed of 52 items; and ii) the doctor’s opinion. LTCI beneficiaries are categorised into six groups depending on their physical dependency and cognitive functional status: Grade 1 (most severe physical dependency) to grade 4 (low physical dependency), grade 5 (lower physical dependency with dementia) and the grade for cognitive performance support (lowest physical dependency with cognitive impairment).

LTCI beneficiaries can use home care or institutional care. Home care services includes: i) home based personal care; ii) home bathing; iii) home nursing; iv) day care service provided in day care centres; v) short-term respite care provided in respite care centres; and vi) the purchase or lease of assistive devices such as wheelchair. Institutional care is a 24 hour care service provided in long-term care facilities such as nursing home or group home.

The number of LTCI beneficiaries was 585 287 in 2017. Around 70% of LTCI-covered service users choose home care, while around 30% chose institutional care in 2017 (National Health Insurance Service, 2018^[23]). There were 5 304 LTC institutions and 15 073 home care agencies in Korea in 2017 (National Health Insurance Service, 2018^[24]). The number of LTC workforce increased from 224 278 in 2009 to 439 166 in 2017 (Ministry of Health and Welfare & National Health Insurance Service, 2018^[25]).

There are three types of publicly funded long-term care services in Korea. The first one is the services covered by LTCI as explained in the above. The second one is LTC services covered by tax-financed Elderly Care program, which is run by local governments (MOHW, 2017). Around 50 000 elderly persons with a low level of care need, who are not eligible for LTCI benefit, receive long-term care service from the tax-financed elderly care program. The third type of care service is long-term care hospital services covered by national health insurance (Ministry of Health and Welfare, 2017^[26]). Including the 350 thousand of elderly patients in long-term care hospital, the population coverage of the publicly funded long-term care system reaches to 13.8%.

1.2.2. Primary care system

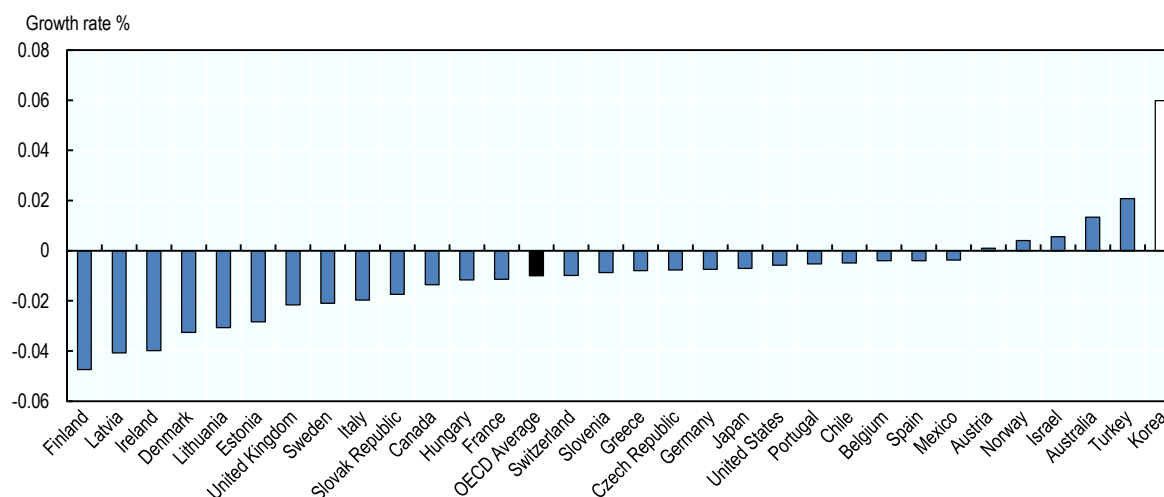
OECD defines primary care as care for non-emergency care, care for chronic condition and gate keeping for the secondary care, and most of OECD countries have a well-developed primary care sector (OECD, 2018^[27]). A well-functioning primary care can effectively respond to a significant number of health care demands, prevent avoidable hospital admission, and contribute to reducing unnecessary health care expenditure and improving outcomes (Ock et al., 2014^[28]).

In Korea, there is not a well-established primary care system, for example a General Practitioners or Family Doctors sector, as seen in many OECD countries (OECD, 2012^[29]). However, patients have access to any specialty clinic in community and general hospital in Korea, and are able to receive the first consultation without a referral letter, except at tertiary hospitals managed by the Korean Government. This free access results in high frequency of medical consultation: in Korea the rate of doctor consultation was 16.6 times a year, compared to the OECD average of 6.8 in 2017; the number of consultations in Korea had increased from 10.6 in 2000 (OECD, 2019^[1]). Patients can also receive primary-level care at public health care centres managed by the local government, staffed by family medicine doctors or other specialists. In terms of medical facilities 90% are private, while Health Centres are public, and studies suggest that elderly people and low-income groups tend to use public health centre more (Sung et al., 2010^[30]).

The population in Korea is currently young, compared to other OECD countries, but is aging rapidly (OECD, 2017^[31]), which will can be expected to increase the burden of chronic diseases. Regular preventive care, and ongoing disease management, are necessary to prevent worsening its conditions or the development of complications.

Such medical management can be provided at primary care, but traditionally Korea has focused on hospital care rather than primary care. At present, the primary care sector is relatively under-developed, and there are also relatively weak incentives to provide preventive services in primary care-equivalent settings, given the fee schedule. Indeed, hospital beds in Korea increased between 2000 and 2017, at a time when other OECD countries decreased the number of hospital beds, shifting focus instead to outpatient settings (see Figure 1.16). Furthermore, the number of avoidable hospital admissions in Korea for chronic obstructive pulmonary disease (COPD), asthma, and uncontrolled diabetes – disorders which can be effectively controlled in the primary care sector – were all above the OECD average in 2017, although these admissions have been falling (Lee et al., 2016^[32]; OECD, 2019^[1]).

Figure 1.16. Average annual growth rate of hospital beds, 2000-17 (or nearest year)



Source: OECD (2019^[11]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

Public Health Centres

There were 254 health care centers, 1 335 sub-health centers, 1 905 primary health care posts, and 46 community health promotion centers across Korea in 2018. Local health administration organisations centered on health care centers, are treated as part of the general comprehensive administration, and are under a dual administrative system. The Ministry of Interior and Safety is responsible for organisation and manpower, and the Ministry of Health and Welfare only provides technical guidance and oversight.

For example, there are 25 community health care centres in Seoul, the capital of Korea. Many of these centres appear to mix public health and primary care functions, and many of them accept phone calls from users even outside of regular working hours, such as at night and over the weekend (Seoul Metropolitan Government, 2014^[33]). A typical public health centre in Seoul would have an outpatient clinic with medical doctors for primary care medicine and preventive care for communicable diseases. A public health centre typically is equipped with basic medical devices such as electrocardiograms, pathology room and radiation room, where patients can receive the primary medicine. Vaccination is also offered at the public health centres.

On average, in Korea, private clinics accounted for 70.5% of the total out-patients visit in 2015, while Public Health Centres accounted for 2.6% of out-patient visits (Lee et al., 2016^[34]). However, in geographically remote areas, a public health centre also plays an important role for local residents. There are more private clinics in metropolitan areas, while there are fewer private clinics in in non-metropolitan area, and in the non-metropolitan area, public health center seems to play greater role in providing primary health care in metropolitan areas. For example, Goesan-gun County in Chungcheongbuk-do Province is surrounded by mountains in the center of Korea, where the access to a medical facility is limited compared to bigger cities in Korea. Goesan-gun County has 11 “sub-health centers” with resident a public health doctors and 28 “primary health care posts”. Besides a public health doctor who has received training for 24 weeks, there are nurses and midwives with qualification to treat patients with basic health problem such as cough, fever, stomachache or diarrhea. They can prescribe some pharmaceuticals subject to regulation. In the center of Goesan-gun, there is a county office, which manages all the sub-health centers and primary health care posts. The primary health care post offers primary health care and preventive care to the local residents. The residents can also enjoy the fitness center and sauna.

1.2.3. Delivery of essential public health operations in Korea

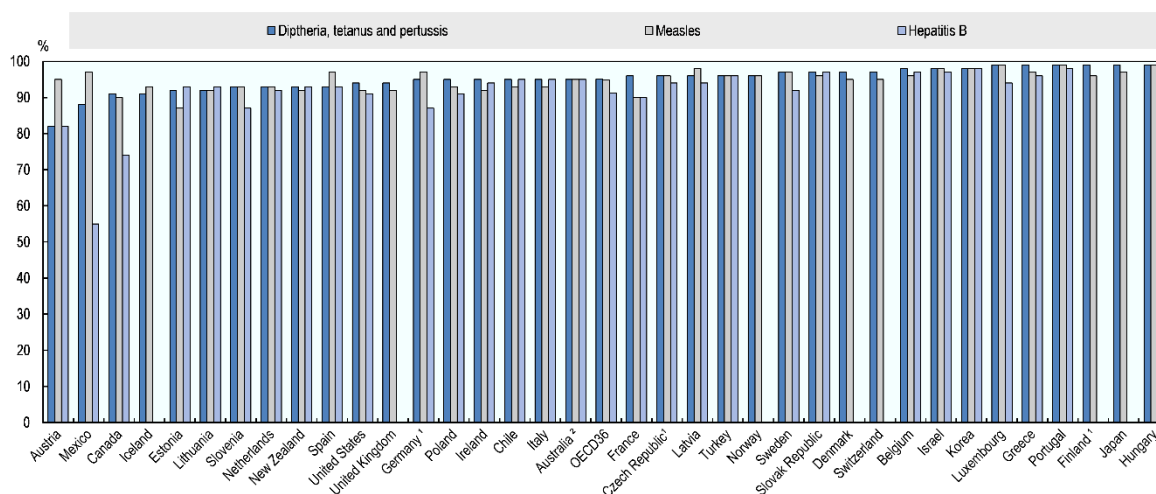
Vaccination programmes in Korea

Vaccination is a key priority for preventive medicine. The Korea Advisory Committee on Immunization Practices (KACIP) was established by law in the early 1990s to make recommendations on the National Immunization Program. KACIP consists of 15 members and always includes the two government officials who belong to the Korea Centres for Disease Control (KCDC) and Prevention and the Korea Food and Drug Administration (Choa et al., 2010^[35]).

KCDC recommends 16 types of vaccination to children under 12 years old, including the National Immunization Program for children, including tuberculosis, human papilloma virus and hepatitis B (Kim et al., 2016^[36]), which covers all the recommended vaccination by WHO (Lee et al., 2018^[37]) (WHO, 2018^[38]). The Korea government supports the total cost of these 16 vaccinations for the eligible children at clinics (KCDC, 2017^[39]).

The vaccination rate at one year of age was 98% in 2015, which is higher than the OECD average of 95% (Figure 1.17). However the rate of full completion of hepatitis B (3 doses of the vaccine by the age of 3), could stand to be improved, as it was reported to be at 80.5% in 2013 (Kwon, 2015^[40]).

Figure 1.17. Percent of children aged 1 vaccinated for diphtheria, tetanus, and pertussis (DTP), measles and hepatitis, 2018 (or nearest year)



1. DTP data are estimated. 2. Measles data are estimated.

Source: OECD (2019^[11]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

After implementing the national measles elimination program, Korea declared the measles had been eliminated in 2006. However, there were 41 cases diagnosed as measles in 2011, which resulted from inadequate rates of vaccination at the required vaccination ages (Park et al., 2013^[41]).

Food Safety Commission for Food and Drug Safety Assurance

The food safety management system in Korea is run by the Ministry of Food and Drug Safety (MFDS) and implemented by local governments in Korea. Domestic foods are managed through three steps: manufacturing, distribution and consumption. At the first stop of manufacturing, MFDS oversees the manufacturing report made by a manager and self-quality inspection. To strengthen the safety level, MFDS

has applied the Hazard Analysis Critical Control Point (HACCP) System since 2002 based on Food Sanitation Act, which assesses harmful elements in raw materials in manufacturing, processing, cooking and distributing of foods. At the stage, foods for sales are tested, and traced in case of food poisoning, by the Food Traceability Information System. In 2015, the Hazardous Food Sales Prevention System was implemented and secure food safety at all the stores selling food products, including department stores, supermarkets and online stores.

People are at higher risk of food poisoning when they eat out, which accounts 72% of food poisoning cases. MFDS takes the lead in preventing food poisoning in cooperation with the other ministries. While MFDS provides education and promotion as prevention, and undertakes investigations into the causes in case of food poisoning, the Ministry of Education manages Meal Service Facilities in Schools. Underground water and pollutants are observed by the Ministry of Environment and the Ministry of Health and Welfare performs the epidemiological investigation of infectious disease with KCDC.

MFDS provides the potential risk of food poisoning outbreaks in Korea on the Food Poisoning Prediction Map By using social net services (MFDS, 2014^[42]).

1.2.4. Environmental Protection

The Environmental Health Bureau in the Ministry of Environment leads on prevention of environmental hazards, including air quality, noise pollution, and chemical hazards, taking a prevention-orientated approach. The Ministry is also seeking to focus on building a bottom-up approach, especially in the planning stages, by developing a network of stakeholders including hospitals and public health centres, working with local government. This model is currently under development, and should be shared more broadly in the years to come.

Currently, the Ministry publishes information on the quality of air, water and soil, and also develops 5-10 year plans for maintaining air, water and soil quality. The Ministry also manages chemical risks; companies are required to register all chemical use with the government, and in the case of a chemical accident or spill, they must report it.

Local governments play an important role in environmental protection, but the central role has recently been strengthened in order to effective response to chemical accidents. One change was to make information on chemical incidents available in real time, rather than based on bi-annual reporting as it had been in the past. The Chemical Substance Management Act was revised in 2018 to provide information on the safety management of chemicals, such as the current status of installation of hazardous chemical handling facilities, to the heads of local governments and their fire departments with using the current chemical comprehensive information system, with the revised Act in effect since June 2019.

Korea has improved chemical management systems after the leak of hydrofluoric acid in 2012, and has transferred the authority to control the facilities where handling hazardous substance from local governments to the central government in 2015 with a view to deal with chemical accidents intensively at a national level. Under the improved systems, the Ministry of Environment (MOE) in the central government is responsible for the management of hazardous substances nationwide, and each local environmental office as MOE's subsidiary body manage their own jurisdiction in the country.

The MOE looked for ways to strengthen the effective and efficient management of chemical substances. As a part of this effort, the National Institute of Chemical Safety (NICS) was established in 2014 as a research organisation covering the overall works of chemical accident such as preventive technologies, studies on dangers of chemical substances and so on.

Furthermore, the MOE has run seven Joint Emergency Centers for Chemical Accident nationwide in cooperation with the National Fire Agency (NFA), the Ministry of Employment and Labor (MOEL), and the Ministry of Trade, Industry and Energy (MOTIE), in order to deal with chemical accidents in major

chemical-based industrial complexes. When a chemical accident occurs, all of the divisions in the Center works together to ensure effective prevention and response to the chemical accident.

The MOE manages the overall response to chemical accidents, including a leak of hazardous substances, and local firefighting offices of each province take charge of emergency response and saving lives at the accident site. When a chemical accident occurs, the MOE should provide the relevant local firefighting office with information such as the type, dangers and control measures of the accident-causing substance, as well as the estimated scope of damage, which makes it possible to address the chemical accident effectively and minimise its damage. In addition, the MOE decides on the scope of the needed intervention by controlling for pollutants in the areas adjacent to the chemical accident site, and looks to protect against potential secondary damage. Such activities are conducted through a consultation onsite between a fire chief from relevant local firefighting office and a government official from the MOE. If a worker is injured, the MOEL participates in the emergency response and if high-pressure gas is leaked, the MOTIE also participates.

Local governments still play an important role at any chemical accident site even though, as mentioned above, they transfer the leadership authority over control of hazardous substance to the MOE. Local governments inform local residents of chemical accident, decide on any eventual evacuation of local residents, and seek to prevent further damage that could be caused by inflow of chemical substances into rivers and streams. Local government agencies also check for any injuries to local residents, and takes the lead on reconstruction after a chemical accident.

Currently, Korean local governments are tasked to work actively to avoid chemical accidents. For instance, local governments review risk management plans that are prepared by facilities of potentially hazardous substances in their own jurisdiction, and informs local residents of the details of any emergency response plan(s). Several local governments enact local ordinance on safety management of chemical substance, and organise governance together with residents and facilities of hazardous substances in the region. Furthermore, local government structures include a committee in which all stakeholders discuss safe management of chemical substances in the jurisdiction, and which develops the local emergency plan to prepare appropriate responses suitable for the specific conditions of each region.

1.2.5. Primary, secondary and tertiary prevention in Korea

Primary prevention

The Health Promotion Division in the MoHW is in charge of promoting public health. The main focus of this Division includes tobacco control, health screening, and nutrition control. Korea Health Promotion Institute (KHPI) was established in 2011 to run health promotion projects through close cooperation with civil organisations and evidence-based policy implementation. The Institute is also in charge of four areas of national policy: smoking reduction, nutrition, alcohol consumption, and active lifestyles. This Institute decides on and manages concrete health promotion programmes and projects according to the policy direction set by MoHW. One of the health policies KHPI towards is supporting the National Health Plan 2020 (HP 2020), the third national health promotion plan, launched in 2020 based on the National Health Promotion Act. This health policy was established to promote national policies on health promotion and disease prevention. KHPI supports policy development and monitors the implementation process.

Physical activity is not currently included in the Health Promotion Act, though a bill to revise the Health Promotion Act has been proposed.

Primary prevention – tobacco consumption

The prevalence of daily cigarette smoking in Korea is higher amongst men than women in Korea (see 'Risk factors' in this chapter), and while Korean women smoke far less than the OECD average, there are more

male daily smokers in Korea than is typical amongst OECD countries. MoHW leads the response to smoking reduction, and part of the taxes on tobacco go towards the Health Promotion Levy, which funds smoking cessation programmes. A range of different policies are in place, most notably national legislation. Since the Health Promotion Act was introduced in Korea in 1995, non-smoking areas have gradually expanded. The smoke-free laws exist in health care facilities, educational facilities except for universities, and restaurants (WHO, 2017^[43]). However, indoor spaces with smoking zones are not considered (by the WHO) as completely smoke-free facilities (WHO, 2003^[44]). Korea's *Health Promotion Act* allows the installation of smoking zones in indoor spaces, including in indoor workplaces, cafes and bars. Indoor spaces in public transportation such as bus, taxi, and train are completely smoke-free pursuant to *the Passenger Transport Service Act and Railroad Safety Act*.

In 2015 the Tobacco tax was increased, and is currently at 70% of the retail price (the WHO guideline on tobacco suggests a 76% tax), significantly increasing the price of tobacco products (Kwak et al., 2017^[45]). A warning image on tobacco products was also introduced three years ago, with a warning statement, and the banning of misleading terms on tobacco products. Currently the image and text cover about half of the package, although the specific pack coverage has not been agreed.

Following the new smoking legislation in 2015, the smoking rate amongst men dropped, but then increased in 2016. The smoking rate amongst women is low and stable. In 2017, the smoking rate decreased again, with male smoking dropping from 40.7% to 38.1% of men between 2016 and 2017, below the 2015 rate of 39.4%. Female smoking rate was 6.0% in 2017, down from 6.4% in 2016.

Some programmes to reduce smoking do exist, along with a number of education programmes that promote smoking cessation. In 2015, NHIS started a smoking cessation support programme that covered consultation and medication costs. In 2016 more than 400 000 smokers had received medical support, with a cessation success rate of approximately 40% (Paek et al., 2018^[46]). There are some provincial 'Quit Smoking Centres', which have been recently established, some including a residential smoking cessation programme. Smoking cessation support programmes are also provided through local public health centres across the country.

Primary prevention – healthy eating

A school meal programme was started in Korea in 1953 under the support of UNICEF, following which the School Meal Act was enacted in 1981, and the educational role of school meals has been gradually increasing. In 2015, all 11 698 of Korea's schools served a free school meal every school day (Kwon, Kim and Lee, 2018^[47]), and has mandatory nutrition standards for schools (OECD, 2019^[5]). There have been nutrition teachers and nutrition staff assigned to schools in Korea since 2007 to improve students' health status and healthy eating habits. The free school meal in Korea should be seen as a significant opportunity to promote healthy eating habits, and restrict access to unhealthy foods. For example in Chile, where obesity and childhood obesity are major concerns, the *Contrapeso* programme increases the healthy food choices available for school meals and restricts the sale of unhealthy products in schools (OECD, 2019^[48]).

Local education offices created a range of educational materials for school children, such as a website, in cooperation with government agencies, the Ministry of Food and Drug Safety and the Ministry of Food, Agriculture, Forestry and Fisheries, the Ministry of Health and Welfare. (Woo, 2015^[49]). The Ministry of Health and Welfare makes educational material, and education for schoolchildren, available through public health centres.

Given that Korean children age 5-9 have a higher rate of overweight than the OECD average for the age group (OECD, 2019^[1]; OECD, 2019^[5]), it would be appropriate to focus policy attention on supporting healthy eating and active lifestyles amongst this age group in particular. Some of Korea's existing policies already stand out as best practice. Korea is one of relatively few countries to have in place mandatory restrictions on food advertising to children: from 2010 Korea prohibited television advertising of energy-dense, nutrition-poor foods between 5:00pm and 7:00 pm, and during the commercial breaks of children's

programmes at other times – a practice that has also been expanded to non-broadcast media (e.g. social media and the internet in general) (OECD, 2019^[5]). As a result, spending on television advertising of energy-dense, nutrition-poor foods (EDNP) fell by 31% for the two four-month periods studied, while spending for advertising on non-EDNP foods advertising increased by 17%, amounting to an overall increase in the total spend on food advertising of 13%.

In other areas, there may be space for stronger policies. For example, food labelling on pre-packaged food, in an easy-to-understand format for example with colour coded information or with a ‘traffic light’ code, has been found to attract consumer interest and increase consumers’ likelihood of seeking healthier alternatives (OECD, 2019^[5]). Front of package nutritional labels are voluntary in Korea at present (ibid), and Korea may wish to consider making front-of-pack labelling of some packaged foods a requirement. Requiring labelling on packaged foods marketed for children, for example sugary breakfast cereals, could be a good place to start, especially if labels were designed in a way that made them easy to spot and read.

1.2.6. Secondary prevention

Secondary prevention aims at early detection of diseases which can be effectively treated, or more effectively treated or managed, if caught at an early stage. Such an approach can increase treatment success, avoid complications, and ultimately reduce morbidity, mortality, and health care costs. Many OECD countries focus on higher risk population for secondary prevention, for instance based on age, medical history and family history, through targeted screening (e.g. for cancer) or health check-ups (e.g. for cardiovascular diseases risk). In 2007, the government introduced a health check programmes, which were also expanded in subsequent years.

Korea has had the National Cancer Screening Program (NCSP) since 1999 for the cancers: gastric, liver, colorectal, breast and cervical cancer. Medical Aid Program recipients and NHI beneficiaries in the lower 50% income bracket are now eligible to free cancer screening (Lee et al., 2011^[50]). In 2017, 68.8% of Korean females aged 50-69 had been screened for breast cancer, compared to the OECD average rate of 59.8% coverage (OECD, 2019^[1]). In 2017 60.7% of females aged 20-69 in Korea had been screened for cervical cancer (based on survey data, based on programme data 57.1% of females had been screened (OECD, 2019^[1]). Based on 2012 data, cancer screening rates for breast, cervical, gastric, colorectal, and liver cancers all exceeded target lifetime rates for men aged 40 or over, and women aged 30 or over specified in national guidelines, notably lifetime screening rates for all cancers except colorectal (65.8% lifetime screening coverage) were at or above 70% (Lee and Lee, 2018^[51]).

In the absence of a strong primary care system, proactive secondary prevention strategies ought to be a priority. For example, management of high blood pressure or cholesterol. However, there are currently clear signs that the Korean health system is focused on curative, rather than preventive, care (see also 1.2.7). Community Health Centres have, traditionally, been the main locus of NCD management, and have sought to identify high-risk groups. However, in light of Korea’s rapidly aging population, and not insignificant risk factors for chronic disease, the current provision may well be insufficient. For example, currently there is just one Community Health Centre for every 300-500 000 population. The current government does appear to be focused on strengthening the primary care-equivalent sector, and strengthening Community Health Centre capacity, but the policy prioritisation of this area should not be understated.

1.2.7. Tertiary prevention

The purpose of tertiary prevention is to reduce the burden of disease by minimising suffering or reducing related impairments and disability. For example, disease management programmes can improve control of diabetes and prevent the development of secondary complications.

Compared to other OECD countries, there are some signs that chronic diseases are not well-managed in Korea. In particular, total rates of admission to hospital for asthma and COPD – conditions for which evidence for effective treatment is well-established and can be delivered by primary care – are higher in Korea than the OECD average. In 2017 there were 81.0 asthma admissions to hospital per 100 000 population in Korea, compared to the OECD average of 41.9 admissions, and there were 182.1 COPD admissions to hospital per 100 000 population in Korea, compared to the OECD average of 183.3 average (OECD, 2019^[11]). Admissions to hospital for congestive heart failure, another condition considered amenable to effective management in primary care settings, were below the OECD average in Korea in 2017 (87.9 admissions per 100 000 population in Korea, compared to the OECD average of 233.0 admissions per 100 000 population) (ibid).

Given that there are already some signs that some chronic diseases could be more effectively managed in Korea, and given Korea's very rapidly aging population will likely bring a higher burden of chronic diseases in the years and decades to come, there is likely a need to put in place effective disease management support systems to avoid growing demand for hospital care. Korea does not have a well-developed primary care sector as seen in many OECD countries, and for example has a very low rate of General Practitioners (see Section 1.7). Therefore, there is a need to find alternative ways of delivering primary care-equivalent services, including chronic disease management, either through structures such as Public Health Centres or Community Health Centres, or through targeted tertiary prevention or disease management programmes.

Korea does have some examples of targeted tertiary prevention and disease management programmes. Starting from December 2018, the Ministry of Health and Welfare has teamed up with local communities and provided comprehensive NCD management services for patients with chronic conditions such as hypertension and diabetes. This is called the “Pilot primary care NCD control program” and it is mostly provided through local clinics. Participating local clinics develop personalised care plans for NCD patients and conduct education, patient management, monitoring, and interim evaluation according to the care plans. Doctors, nurses and nutritionists within the local clinics may provide education on diseases and better lifestyles. If necessary, local community public health institutions may be asked to offer education.

Patient management is undertaken not only through in-person consultation, but also through text messaging, email and smartphone apps. These digital devices are used to monitor patients' blood pressure and glucose levels and to give them recalls and reminders. Every 4 to 6 months, an interim evaluation is carried out to check and document the patients' conditions and health status.

The “pilot primary care NCD control program” is being implemented based on a service model which draws on the strengths of existing pilot NCD control programmes centred on primary care. The pilot programme will be assessed and an improved plan will be developed before moving on to a full implementation. The goal is to strengthen primary health care facilities' capacity to manage NCDs and empower NCD patients to manage their own conditions. By doing so, Korea expects to improve health care service delivery and prevent the deterioration and complications of NCDs.

The ‘Registration Management Project for Hypertension and Diabetes’ has been in place since 2007 under the KCDC (Kim, Yoo and Lee, 2018^[52]). This Project aims to improve the sustained treatment rate of hypertension, diabetes, and to prevent the occurrence, death and disorders of severe cardiovascular diseases such as myocardial infarction and stroke. As of May 2018, 1 446 medical institutions and 2 004 pharmacies and 420 580 patients with hypertension and diabetes are participating in 25 public health centres in 19 regions.

The 'Medical Fee Demonstration Project for Chronic Diseases' was introduced in 2016 by the Ministry of Health and Welfare (Kim, Yoo and Lee, 2018^[52]). This pilot project introduced a non-face-to-face management method for continuous observation and counselling to establish a continuous management system for hypertension and diabetes. The project focus is on strengthening the self-care of chronically ill.

1.3. Leadership and governance

1.3.1. Ministry of Health and Welfare, Regional and Municipal Governments

Across the Korean system, the central government sets the direction for policy, some of which is delivered by regional governments. Regional governments (where there are 34 regional medical centres) and municipalities (where there are 254 health centres) also play a role implementing programmes. Public health policies are largely concentrated centrally, with the Ministry of Health and Welfare undertaking planning, technical support, capacity building, evaluation and financing. For example, national level campaigns, for instance advertising campaigns or tobacco legislation, are run by the central Department of Health Promotion, while Public Health Centers run programmes such as education, or smaller level health promotion advertising or warnings.

The MOHW develops a 5-year plan on health care – the last plan was developed in 2016 – for example addressing vulnerable areas, or medical education needs. Regional and municipal health centres develop a plan every year, which they report to the central government. In 2018, the MOHW established a specialised committee which evaluates regional public health plans, the first time that the government has taken such a step. Regional governments in turn evaluate the plans established by municipal government. While regional and municipal governments are frequently interested in maintaining autonomy, but concerns were raised that some local governments may be lacking capacity; the step towards a more formal evaluation committee seems a very positive development. A local-level contest is also run every year, with the central government awarding a prize to the most successful plan or programme, the 'Integrated Health Promotion Programme Award'. This mix of formal evaluation of plans and positive incentives for good performance appears to seek to balance local and central public health governance.

Korea is also active in using local benchmarking to track how well local governments are performing on public health and public health emergency preparations. For example, a set of indicators has been developed for local governments to assess capacity to respond to public health emergencies, which gives an overall score, which is used as a grant giving mechanism.

Box 1.2. Balancing local autonomy and central oversight in Korean public health policy

Korea has been taking some steps to encourage local government actors to design their own programmes, in order to address local challenges. The Integrated Health Promotion Program moves away from the previous top-down model, and helps communities design and operate their own programmes to address issues specific to them. City and provincial governments (regional local governments) take the lead in implementing these health promotion programmes in line with the central government's evaluation guidelines. The Program should better reflect the needs of local communities and residents.

Academics from major local universities form Integrated Health Program Support Teams and conduct evaluations, both of the process and outcome of the local programmes. Based on the evaluation results, awards are given annually, and best practice programmes are promoted and disseminated. This programme is also oriented towards linkage and integration between programmes.

1.3.2. Korea Centre for Disease Control

While the Ministry of Health and Welfare leads on policy development and legislation, the Korean Centre for Disease Control (KCDC) is involved with some implementation and monitoring roles, research, and surveillance. For example, the KCDC has a key role in strengthening public health emergency response capacity (see Chapter 4), as well as disease surveillance, and biomedical response. The KCDC role includes focuses on infectious disease, chronic disease, and genomics (see Chapter 3). For example, the KCDC works to develop vaccines and develop the response to emerging infectious diseases, for instance MERS. The KCDC also undertakes some work on antimicrobial resistance (AMR, including patient surveillance related to AMR, on a ONE Health response (coordinating the human, animal and environmental use of antimicrobials), and on developing and screening new antibiotics.

1.3.3. Korea Health Promotion Institute

The Korea Health Promotion Institute (KHPI) plays a key role in designing national policy and programmes around smoking reduction, nutrition, alcohol consumption and active lifestyles (see Section 1.3.3). The KHPI, which reports to the MOHW, also collects statistics on health risks and behaviour, undertakes a number of key surveys, designs programmes and supports public health policy in local governments.

In order to inform policy design, KHPI establishes ad hoc expert committees, which include civil society and academic experts. KHPI also has a permanent committee to advise on routine operations, the Deliberative Committee on National Health Promotion Policy (Kwon, Lee and Kim, 2015^[16]).

1.3.4. Seoul City Government

Roughly 50% of the Korean population lives in the Seoul metropolitan area, rendering the Seoul City Government a particularly important actor in public health policies in Korea. Seoul City has relatively well-developed public health policy, implements its own programmes, and in some areas, the city government has taken bolder public health policies than the central government. For example, Seoul has 22 metropolitan parks, in which drinking alcohol is banned, although this ban cannot be enforced as the national law does not support its implementation. Seoul also has campaigns, for example on promoting alcohol-free university campuses, promoting moderate drinking, and responsible after-work drinking by Seoul government employees.

With regards to tobacco policy, Seoul has also taken a bolder approach than national policy. Public smoking is banned in outside public spaces near schools, metro exits, and busy streets (national regulation only affects indoor spaces), and no-smoking parks have been introduced with some success. Seoul was able to expand national legislation as the design allowed for application of the ban in public spaces ‘as necessary’, which is not the case for alcohol regulation.

Seoul also has smoking cessation programmes which particularly target male smokers. Programmes also seek to target men in full time employment, who might be less able to or likely to visit Community Health Centres, for example through visiting workplaces to promote smoking cessation an environmental changes, such as removing outdoor smoking areas or making it more complicated or time consuming to reach a smoking area. All companies with more than 300 employees can request the intervention. The city is also targeting young people to try and reduce smoking, and prevent uptake of smoking, for example making streets around schools non-smoking areas.

Seoul’s smoking policy was introduced following a number of public debate forums with the public, including through civil society groups and Community Health Centres. This form of civic engagement that was understood to be critical, and is expected to be used in designing alcohol policy also.

1.4. Partnerships and collaboration

1.4.1. Engagement with civil society, patient and consumer groups

There are some positive signs of engagement with civil society actors, patient and consumer groups in Korea, although it is not clear how systematic this approach is. For example, Seoul Government engaged with civil society panels in designing smoking regulation for the city. The Deliberative Committee on National Health Promotion Policy should be a mechanism through which civil society groups can be effectively engaged in public health promotion policy development; the MOHW should be sure to engage civil society in this process, and not restrict engagement to government departments and academic experts.

In general, as Kwon, Lee and Kim (2015^[16]) point out, Korea is a health system where private providers play a particularly important role, which means that protecting the voice of patients and consumer is particularly critical. Since 2010 the Korea Alliance of Patient Organizations (KAPO) has existed as an umbrella patient group, and since 2003 the Health Right Network (HRN) has sought to ensure the right to health of citizens and patients as health consumers. In general though these groups appear engaged with efforts around health system entitlements, for example insurance coverage, rather than engagement with public health policy shaping.

1.4.2. Collaboration and cross-Ministry working

In many respects, it appears that cross-government working in Korea is quite well developed. Communication seems particularly strong in some areas, for example emergency preparedness (see Chapter 4). Co-ordination across horizontal levels of government – local to central – also appears quite strong, and a good balance between autonomy and oversight seems to be struck.

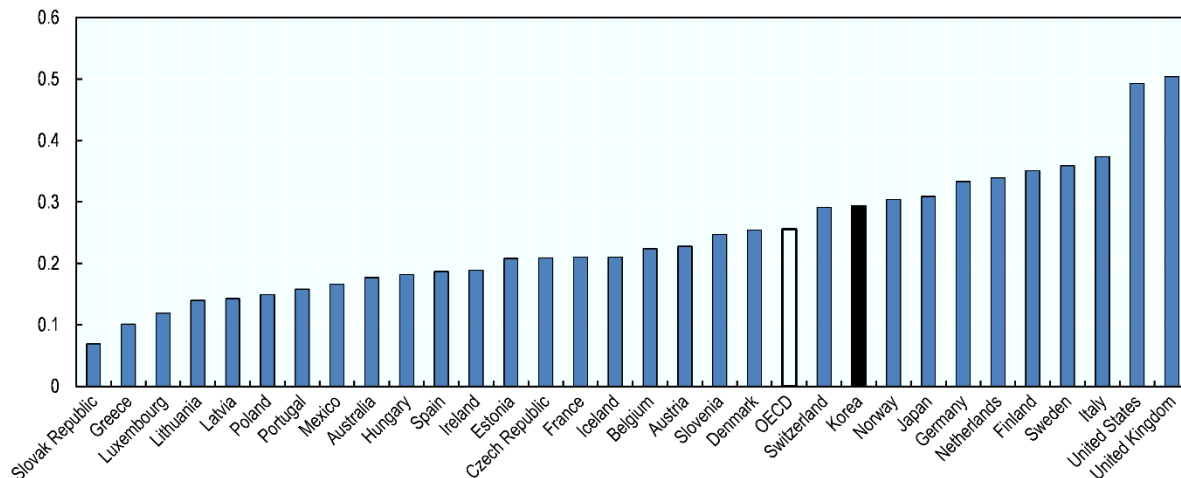
Specifically, the Deliberative Committee on National Health Promotion Policy could be seen as a strong positive approach to cross-government working for the development of public health promotion. The Committee, led by the Vice Minister of Health and Welfare, has participation at Director-General level from the Ministry of Strategy and Finance, Ministry of Education, Ministry of National Defence, Ministry of Culture, Sports and Tourism, Ministry of Employment and Labour, and Ministry of Environment, as well as professors in preventive health and experts from relevant research institutions.

1.5. Financial resources

1.5.1. Spending on health and public health

In 2018, Korea spent 8.1% of GDP on health care – just under the OECD average of 8.8% (OECD, 2019^[2]). Of this spend, 2.9% went to preventive care, just above the OECD average 2.6% spend (see Figure 1.18).

Figure 1.18. Spending on preventive care as a percentage of total health spend, 2017 (or nearest year)



Source: OECD (2019^[11]), *OECD Health Statistics 2019*, <https://stats.oecd.org/>.

Spending on preventive care has increased considerably in recent years, and a large part of this increase is due to additional spending on screening (Gmeinder, Morgan and Mueller, 2017^[53]). Since Korea launched the National Cancer Screening Programme (NCSP) in 1999, its scope and target population have been increased while co-payments were reduced. Moreover, in 2007 the government introduced a health check programmes, which were also expanded in subsequent years.

1.5.2. Payment mechanisms to incentivise public health functions

The National Health Promotion Fund was established in 1995 to fund health promotion and prevention programmes. In 2015, this fund was worth KRW 3.3 trillion, primarily financed by a dedicated tax on tobacco.

A number of health promotion programmes are financed through the National Health Promotion Fund. The National Health Promotion Fund is under operation to support and facilitate the implementation of national health promotion programmes. The main programmes focus on the promotion of healthy lifestyles, including smoking cessation, moderate alcohol use, obesity control, and better nutrition, as well as prevention and control of communicable and non-communicable diseases such as cancer. The National Health Promotion Fund also finances programmes aimed at strengthening public health programme implementation systems and expanding public health care infrastructure. The primary expenditure of the fund in 2017 was to support health insurance, with small percentages financing vaccination, research and development, and smoking cessation (Kim, Lee and Park, 2017^[54]).

However, some programmes such as health care outreach programmes are financed through the general government budget. Funding for health check-up programmes is provided through different sources depending on the eligibility of the target recipients. Those eligible under the National Health Insurance Act are financed through the National Health Insurance System, whereas those eligible under the Medical Care Assistance Act are financed through the central and local governments' budgets. The Medical Care Assistance Act provides targeted health care to people living under national poverty line – around 3.2% of the total population (International Labour Organization, 2012^[55]).

In most cases, there are no co-payment charges for health promotion programmes provided by public health care facilities such as Public Health Centres. However, it is common that clinics and other health care institutions charge 20-30% co-payment fees.

1.6. Knowledge development

1.6.1. Key data sources for understanding public health

Data sources for public health include the Public Health Information System, the information system of the National Health Insurance Service, and various surveys.

The Public Health Information System (PHIS) was developed and launched between 2005 and 2009. It spread sequentially and the introduction had been completed to all centres by 2012 (Park, 2017^[56]), and is currently being used by all 3 552 public health centres, public health sub-centres, and primary health care posts in Korea. The system integrates information from the different local public health facilities into a standardised national platform, with the aim to enhance the health management of citizens, reinforce the integration between organisations, advance new national health policies, and improve the efficiency of public health organisation (Ryu et al., 2013^[57]).

The PHIS provides a standardised electronic medical record (EMR) for each patient and other services, including fee claims and test results. It also provides a standardised approach to 47 public health tasks, such as nutrition education, tuberculosis management, and vaccinations. For inter-organisational tasks that require the involvement of other organisation, the PHIS provides integration with external stakeholders such as the Korean Centers for Disease Control and Prevention (KCDC), the National Health Insurance Corporation, or the National Cancer Center – among others (Ryu et al., 2013^[57]).

In addition to managing care delivery, the data from the PHIS is used by the Ministry of Health and Welfare and by local governments to monitor performance and formulate new policies.

The national health check-up programmes in Korea are linked to the National Health Insurance Service (NHIS). Target populations and the results of health check-ups are managed through the NHIS Information System.

To understand trends and behaviours related to public health, a number of surveys are run in Korea. The Korea National Health and Nutrition Examination Survey (KNHANES) is part of the National Health Promotion Act and samples 25 households in 192 regions, investigating about 10 000 individuals annually (KNHANES, 2019^[7]) (Kweon et al., 2014^[58]). The Youth Risk Behavior Survey is web-based, and questions around 70 000 middle- and high-school students about their health risk behaviours (KCDC, 2017^[59]) (Kim et al., 2016^[60]). Both surveys are managed by the KCDC.

However, despite the rich data sources that Korea has – from EMR and hospital data, to cancer data from the National Cancer Centre, KCDC data, data from HIRA, and National Institute of Health Data – data linkage still appears to be a challenge. For example, use of data for secondary purposes – such as linking of Korean Biobank data and HIRA data (see Chapter 3) – is not allowed. A national data platform already exists, but the incentives for joining the network are weak. This network, which for example would show patient history to providers, is currently used by less than 10% of institutions (although a greater percentage of the population is covered).

1.6.2. Promoting health literacy around public health

The Korea Health Promotion Institute runs a number of public health campaigns to promote healthy behaviours. These include campaigns on smoking cessation, nutrition, alcohol use and oral health. In

addition to running advertisements on mass and print media, the Institute provides materials for other stakeholders, including posters, leaflets and information on running educational events.

The Korea Health Promotion Institute also manages the examination and licensing of Health Educators. The content of the national examination for Health Educators is defined in the Enforcement Degree of the Health Promotion Act, and includes topics such as smoking, alcohol use, disease prevention, diet, physical activity and other public health matters. To qualify for the one of the three examination levels, candidates need to have completed a certain number of relevant courses and/or be able to prove that they have experience working in public health. National and local governments are encouraged by the National Health Promotion Act to employ trained health education specialists in projects related to health promotion.

In addition to the Health Educator examinations, the Institute also runs topic-specific courses, such as a two-day course to become a certified “Specialist in Alcohol Prevention and Prevention”.

1.6.3. Generating Health-Related Data

Besides the Public Health Information System (PHIS), other public data sources include the National Health Insurance Service (NHIS) fee claims and eligibility data, the National Cancer Center’s cancer registry, and KCDC’s Korea National Health and Nutrition Examination Survey and genomic epidemiology data. In addition, each health care institution holds electronic medical records (EMR) and patient data. The volume of data is rapidly increasing as the development of wearable devices enables the collection of personal health data from individuals.

1.7. Workforce

1.7.1. Human resources in public health care

In terms of overall health workforce, Korea has one of the lower rates of practicing doctors in the OECD, with 2.3 doctors per 1 000 in 2017 (OECD, 2019^[1]). Although this represents a considerable increase since 2000 (when there were just 1.3 doctors per 1 000 population), amongst OECD countries only Turkey has a lower rate of practicing doctors. Numbers of practicing nurses are not as low, but were still below the OECD average at 6.9 nurses per 1 000 in 2017 compared to the OECD average of 8.8, after a significant increase from 3.0 per 1 000 population in 2000 (ibid). The share of different categories of doctors in Korea is also unusual as compared to other OECD countries; 73% of Korean doctors were specialists in 2017, compared to 65% OECD-wide, and just 6% of doctors were ‘General Practitioners’, compared to the OECD average of 23% (ibid).

Indeed, public health services in Korea are primarily delivered in Public Health Centers, managed by the municipalities, and Sub-Health Centers. Nurses and nurse assistants account for over half of the medical staff in both types of centers. In addition, there are physicians (9% of medical personal in Public Health Centers, 21% in Sub-Health Centers) and medical technicians (32% and 10% respectively). The remainder is made up of dentists, pharmacists and doctors of traditional Korean medicine.

As of 2019, these local public health institutions had a total of 30 476 personnel, which includes doctors (7.4%), dentists (1.6%), traditional Korean medicine doctors (3.4%), pharmacists (5.1%), nurses (36.6%), nurse assistants (7%). The rest of the personnel included administrative staff, dental hygienists and other medical technicians (Table 1.1).

Table 1.1. Public health workforce in Korea

Number of workforce in Public Health Centres and Sub-Health Centres, by category

		Total	Physicians	Dentists	Doctors of traditional Korean medicine	Pharmacists	Nurses
Public Health Centres		15 220	735	292	304	148	4 965
Sub-Health Centres		6 988	1 357	199	709	2	2 809
		Nutritionist	Medical technicians	Nurse assistants	Administrative workers	Health service post	Technical post
Public Health Centres		405	3 081	663	1 159	1 438	1 776
Sub-Health Centres		50	704	801	58	110	108

Source: Ministry of Health and Welfare (2018^[61]), *Current Status of Health Care Center and Rural Sub-Health Care Centers*, http://kosis.kr/statHtml/statHtml.do?orgId=117&tblId=DT_11719N_001&conn_path=13.

Korea's MOHW also wishes to develop a programme to encourage public health specialists, and specialists-in-training, towards particular areas. For example, students could be given incentives to serve in particular areas, for instance scholarship offers or fee waivers. Encouraging the right health care professionals to practice in particular areas, for example rural or remote areas, is a challenge many OECD countries have grappled with (OECD, 2016^[62]). Countries such as Australia, Norway, Japan and Canada have used policies such as financial support for student medics in exchange for a commitment to practice in a rural area after their training, or targeted recruitment of students from rural backgrounds, who are more likely to return to practice in rural areas after their training (ibid).

Conclusion

Korea's health system is in very large part focused on curative, rather than preventive care. In many ways this is understandable – mortality from chronic diseases, such as circulatory diseases, is still far lower than in many OECD-peers, while overall rates of risk factors – obesity, smoking, even overall alcohol consumption – appear comparatively low, though risky behaviour by males is higher and even above the OECD average for example for smoking. However, Korea's population is aging rapidly, and by 2050 the share of the population over 80 is projected to be nearly the same as in Japan. The average rates of risk factors, too, hide a more nuanced story, with some 40% of the male population smoking, rates of overweight amongst children are close to the OECD average, and binge drinking is common. These behavioural risks, combined with the demographic transformation that has already in Korea, are a clear sign that prevention policies and public health should become a top priority sooner, rather than later.

In some respects Korea is building a solid public health policy package. For instance, tobacco laws have been strengthened recently, and tobacco cessation programmes are available. There are signs that collaboration is good between local and central governments, and across Ministries, which is relatively rare, and central oversight over local public health policy making has recently been strengthened, which is surely a positive step. However, there is still scope to strengthen Korea's approach, notably around tobacco policy; regulations around tobacco point-of-sale, packaging, and public smoking could be tightened. In addition, there are likely missed opportunities to make the most of Korea's rich data infrastructure to inform public health policies and surveillance, with data bases not linked up or fully exploited. Finally, and critically, Korea should look to strengthen secondary and tertiary disease management programmes; in the absence of a developed primary care system, effective management of chronic diseases will be essential to ensure good population health and keep health costs down in the years and decades to come.

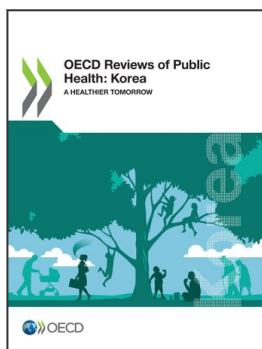
References

- Bannai, A. and A. Tamakoshi (2014), “The association between long working hours and health: A systematic review of epidemiological evidence”, *Scandinavian Journal of Work, Environment & Health*, Vol. 40/1, pp. 5-18, https://www.jstor.org/stable/43187983?seq=12#metadata_info_tab_contents (accessed on 23 October 2018). [10]
- Choa, H. et al. (2010), *Immunization decision-making in the Republic of Korea*. [35]
- Gmeinder, M., D. Morgan and M. Mueller (2017), “How much do OECD countries spend on prevention?”, *OECD Health Working Papers*, No. 101, OECD Publishing, Paris, <https://doi.org/10.1787/f19e803c-en> (accessed on 23 October 2018). [53]
- Go, U. et al. (2018), “Tuberculosis prevention and care in Korea: Evolution of policy and practice”, *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, Vol. 11, pp. 28-36, <http://dx.doi.org/10.1016/J.JCTUBE.2018.04.006>. [4]
- Government of Korea (2018), *National Action Plan for Suicide Prevention*, <https://www.mindbank.info/item/6785> (accessed on 29 January 2020). [15]
- Health Insurance Review & Assessment Service (2018), *Major Activities of HIRA*, <https://www.hira.or.kr/eng/about/08/01/index.html> (accessed on 13 August 2018). [21]
- IHME (2017), *South Korea*, <http://www.healthdata.org/south-korea> (accessed on 22 October 2018). [3]
- International Labour Organization (2012), *Medical Aid Program - Korea*, http://www.ilo.org/dyn/ilossi/ssimain.viewScheme?p_lang=en&p_scheme_id=320&p_geoaid=410 (accessed on 23 October 2018). [55]
- Je Cho, M. et al. (2015), “Prevalence and Correlates of DSM-IV Mental Disorders in South Korean Adults: The Korean Epidemiologic Catchment Area Study 2011”, *Psychiatry Investigation*, Vol. 12/2, pp. 164-170, <http://dx.doi.org/10.4306/pi.2015.12.2.164>. [9]
- KCDC (2017), *National Immunization Program*, <http://www.cdc.go.kr/CDC/eng/contents/CdcEngContentView.jsp?cid=74258&menuIds=HOME002-MNU0576-MNU0586> (accessed on 16 August 2018). [39]
- KCDC (2017), *Youth Health Behavior Survey*, <http://www.cdc.go.kr/CDC/contents/CdcKrContentView.jsp?cid=77749&menuIds=HOME001-MNU1130-MNU2393-MNU2749> (accessed on 18 July 2018). [59]
- Kim, H., B. Yoo and E. Lee (2018), “Evaluation of the national chronic diseases management policy: performance and future directions”, *Public Health Affairs*, Vol. 2, pp. 105-120, <http://dx.doi.org/10.29339/pha.2.1.105>. [52]
- Kim, J. et al. (2016), *Recommended immunization schedule for children and adolescents: Immunization guideline (8th edition) released by the Korean pediatric society in 2015*, <http://dx.doi.org/10.3345/kjp.2016.59.12.461>. [36]
- Kim, J., J. Lee and E. Park (2017), “Current Status of National Health Promotion Fund in Korea”, *Health Policy and Management*, Vol. 27/4, pp. 366-371. [54]

- Kim, W. et al. (2016), "Effect of working hours and precarious employment on depressive symptoms in South Korean employees: a longitudinal study.", *Occupational and environmental medicine*, Vol. 73/12, pp. 816-822, <http://dx.doi.org/10.1136/oemed-2016-103553>. [11]
- Kim, Y. et al. (2016), "Data Resource Profile: The Korea Youth Risk Behavior Web-based Survey (KYRBS)", *International Journal of Epidemiology*, Vol. 45/4, p. dyw070, <http://dx.doi.org/10.1093/ije/dyw070>. [60]
- KNHANES (2019), *Korea National Health and Nutrition Examination Survey*, https://knhanes.cdc.go.kr/knhanes/sub01/sub01_02.do. [7]
- Kwak, J. et al. (2017), "Effectiveness of government anti-smoking policy on non-smoking youth in Korea: A 4-year trend analysis of national survey data", *BMJ Open*, <http://dx.doi.org/10.1136/bmjopen-2016-013984>. [45]
- Kweon, S. et al. (2014), "Data Resource Profile: The Korea National Health and Nutrition Examination Survey (KNHANES)", *International Journal of Epidemiology*, Vol. 43/1, pp. 69-77, <http://dx.doi.org/10.1093/ije/dyt228>. [58]
- Kwon, S. (2015), *Korea Health System Review*. [40]
- Kwon, S., O. Kim and Y. Lee (2018), "Effects of students' satisfaction with school meal programs on school happiness in South Korea", *Nutrition Research and Practice*, Vol. 12/4, pp. 342-347, <http://dx.doi.org/10.4162/nrp.2018.12.4.342>. [47]
- Kwon, S., T. Lee and C. Kim (2015), "Republic of Korea Health System Review", *Health Systems in Transition*, Vol. 5/4, http://apps.who.int/iris/bitstream/handle/10665/208215/9789290617105_eng.pdf;jsessionid=202657338B0BE096D2E7FC62E0117DC3?sequence=1 (accessed on 7 December 2018). [16]
- Lee, J. et al. (2016), "Finding the primary care providers in the specialist-dominant primary care setting of Korea: A cluster analysis", *PLoS ONE*, <http://dx.doi.org/10.1371/journal.pone.0161937>. [32]
- Lee, J. et al. (2016), *Letter to the Editor Are the Public Health Centers Real Threats to Private Clinics in Korea? Dear Editor-in-Chief*, <http://ijph.tums.ac.ir> (accessed on 16 August 2018). [34]
- Lee, K. et al. (2011), "Gastric Cancer Screening in Korea: Report on the National Cancer Screening Program in 2008", *Cancer Res Treat*, Vol. 43/2, pp. 83-88, <http://dx.doi.org/10.4143/crt.2011.43.2.83>. [50]
- Lee, K. et al. (2018), "The economic burden of rotavirus infection in South Korea from 2009 to 2012", *PLOS ONE*, <http://dx.doi.org/10.1371/journal.pone.0194120>. [37]
- Lee, S. and E. Lee (2018), "Cancer screening in Koreans: a focus group approach", *BMC Public Health*, Vol. 18/1, p. 254, <http://dx.doi.org/10.1186/s12889-018-5147-9>. [51]
- Logyoung Kim, J. (2014), *A guide for the utilization of Health Insurance Review and Assessment Service National Patient Samples*. [22]
- MFDS (2014), *Promoting Healthy Diets and Safe Food Consumption | Ministry of Food and Drug Safety*, http://www.mfds.go.kr/eng/wpge/m_13/de011004I001.do (accessed on 16 August 2018). [42]

- Ministry of Health and Welfare (2018), *Current status of health care center and rural sub-health care centers*, http://kosis.kr/statHtml/statHtml.do?orgId=117&tblId=DT_11719N_001&conn_path=I3. [61]
- Ministry of Health and Welfare (2017), *White Paper 2017 (in Korean)*. [26]
- Ministry of Health and Welfare & National Health Insurance Service (2018), *The History of Long Term Care Insurance: 2008-2018*. [25]
- National Health Insurance Service (2018), *2017 Long Term Care Statistical Yearbook*, Wonju. [24]
- National Health Insurance Service (2018), *Monthly Report of Long Term Care: 2017 December (in Korean)*, Unpublished. [23]
- NHIS (2018), *NHI program*, <http://www.nhis.or.kr/static/html/wbd/g/a/wbdga0401.html> (accessed on 10 August 2018). [18]
- NHIS (2018), *Population Coverage*, <https://www.nhis.or.kr/static/html/wbd/g/a/wbdga0403.html> (accessed on 14 August 2018). [17]
- Ock, M. et al. (2014), "Perceptions of primary care in Korea: a comparison of patient and physician focus group discussions", *BMC Family Practice*, <http://dx.doi.org/10.1186/s12875-014-0178-5>. [28]
- OECD (2019), *OECD Health Statistics 2018*, https://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT. [2]
- OECD (2019), *OECD Health Statistics 2019*, OECD Publishing, Paris, <http://stats.oecd.org/>. [1]
- OECD (2019), *OECD Reviews of Public Health: Chile: A Healthier Tomorrow*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264309593-en>. [48]
- OECD (2019), *The Heavy Burden of Obesity: The Economics of Prevention*, OECD Health Policy Studies, OECD Publishing, Paris, <https://dx.doi.org/10.1787/67450d67-en>. [5]
- OECD (2018), *Average annual hours actually worked per worker*, <https://stats.oecd.org/index.aspx?DataSetCode=ANHRS> (accessed on 23 October 2018). [12]
- OECD (2018), *Health Care Quality Indicators - Primary Care - OECD*, <http://www.oecd.org/els/health-systems/hcqi-primary-care.htm> (accessed on 7 August 2018). [27]
- OECD (2017), *Health at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, https://dx.doi.org/10.1787/health_glance-2017-en. [31]
- OECD (2016), *Health Workforce Policies in OECD Countries: Right Jobs, Right Skills, Right Places*, OECD Health Policy Studies, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264239517-en>. [62]
- OECD (2014), *Making Mental Health Count: The Social and Economic Costs of Neglecting Mental Health Care*, OECD Health Policy Studies, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264208445-en>. [13]
- OECD (2013), *Making Mental Health Count - Korea Country Note*, OECD Publishing, Paris, <http://www.oecd.org/health/mental-health-> (accessed on 23 October 2018). [8]

- OECD (2012), *OECD Reviews of Health Care Quality: Korea 2012: Raising Standards*, OECD Reviews of Health Care Quality, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264173446-en>. [29]
- Paek, Y. et al. (2018), "Smoking cessation services provided by the National Health Insurance Service", *Journal of the Korean Medical Association*, Vol. 61/3, p. 157, <http://dx.doi.org/10.5124/jkma.2018.61.3.157>. [46]
- Park Ki-yong (2017), *Study finds that 87% of South Korean households have private health insurance : National : News : The Hankyoreh*, http://english.hani.co.kr/arti/english_edition/e_national/825097.html (accessed on 14 August 2018). [20]
- Park, S. (2017), *The Public Health Information System and Current status of Health Service performance*, Social security information No.2. [56]
- Park, Y. et al. (2013), "Reemergence of measles in South Korea: Implications for immunization and surveillance programs", *Japanese Journal of Infectious Diseases*, <http://dx.doi.org/10.7883/yoken.66.6>. [41]
- Ryu, S. et al. (2013), "Web-based integrated public healthcare information system of Korea: development and performance.", *Healthcare informatics research*, Vol. 19/4, pp. 314-23, <http://dx.doi.org/10.4258/hir.2013.19.4.314>. [57]
- Seoul Metropolitan Government (2014), *Contact Information of Community Health Centers in Seoul*, <http://english.seoul.go.kr/policy-information/welfare-health-security/efforts-curb-mers/7-contact-information-community-health-centers-seoul/> (accessed on 15 August 2018). [33]
- Shin, J. (2012), "Private health insurance in South Korea: An international comparison", *Health policy*, Vol. 108, pp. 76-85, <http://dx.doi.org/10.1016/j.healthpol.2012.08.011>. [19]
- Sung, N. et al. (2010), "Patient's assessment of primary care of medical institutions in South Korea by structural type", *International Journal for Quality in Health Care*, <http://dx.doi.org/10.1093/intqhc/mzq053>. [30]
- WHO (2018), "WHO Recommendations for Routine Immunization - summary tables", *WHO*, http://www.who.int/immunization/policy/immunization_tables/en/ (accessed on 22 May 2018). [38]
- WHO (2017), *WHO report on the global tobacco epidemic, 2017 Republic of Korea WHO Framework Convention on Tobacco Control (WHO FCTC) status Socioeconomic context*. [43]
- WHO (2003), *Guidelines on Protection from Exposure to Tobacco Smoke*. [44]
- WHO Expert Consultation (2004), "Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies", *Lancet*, Vol. 363, pp. 157-63, [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(03\)15268-3.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(03)15268-3.pdf) (accessed on 1 September 2017). [6]
- Woo, T. (2015), *Nutrition policy in South Korea*, <http://www.moe.go.kr/web/100066/ko/board>. (accessed on 20 August 2018). [49]
- Yonhap (2018), *Govt., ruling party work to reduce suicide, traffic, industrial accident deaths*, <http://www.koreaherald.com/view.php?ud=20180122000358> (accessed on 21 August 2018). [14]



From:
OECD Reviews of Public Health: Korea
A Healthier Tomorrow

Access the complete publication at:
<https://doi.org/10.1787/be2b7063-en>

Please cite this chapter as:

OECD (2020), “The public health system in Korea”, in *OECD Reviews of Public Health: Korea: A Healthier Tomorrow*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/6e005d47-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.