



# OECD HEALTH CARE QUALITY REVIEW: KOREA

ASSESSMENT AND RECOMMENDATIONS

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## *Foreword*

This report is the first of a new series of publications reviewing the Quality of Health Care across selected OECD countries. As health costs continue to climb, policy makers increasingly face the challenge of ensuring that substantial spending on health is delivering value for money. At the same time, concerns about patients occasionally receiving poor quality health care has led to demands for greater transparency and accountability. Despite this, there is still considerable uncertainty over which policies work best in delivering health care that is safe, effective and provides a good patient experience, and which quality-improvement strategies can help deliver the best care at the least cost. OECD Health Care Quality Reviews seek to highlight and support the development of better policies to improve quality in health care, to help ensure that the substantial resources devoted to health are being used effectively in supporting people to live healthier lives.

Korea is an ideal place to start this new series. Few countries have had as remarkable an expansion in health coverage over the past three decades. That Korea has achieved this at modest costs relative to other OECD countries is all the more remarkable. However, it is for the magnitude of its looming challenges – an ageing population, rapidly rising costs and growing chronic disease burden – that Korea is now pursuing further reforms. The challenges that Korea faces are common to many OECD countries, and will demand that policy makers re-orient health care to prioritise quality while containing costs. This report seeks to provide constructive advice to further these efforts, informed by the experience of OECD countries at large.

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## Executive summary

This report reviews the quality of health care in the Korean health system. It begins by providing an overview of the range of policies and practices and the role they play in supporting quality of care in Korea today (Chapter 1). It then focuses on three key areas: using health financing to drive improvements in the quality of health care (Chapter 2), strengthening primary care in Korea (Chapter 3), and improving care for cardio-vascular diseases (Chapter 4). In examining these areas, this report seeks to highlight best practices and provide recommendations to improve the quality of health care in Korea.

Within less than 30 years, Korea has gone from having a limited medical infrastructure and a fragmented health financing system with several insurance schemes covering a relatively small share of the population to establishing a health care system characterised by universal coverage and substantial acute medical facilities. Even after achieving universal coverage in 1989, the pace of reform in the Korean health system has not slowed. At the turn of the century, the functions of prescribing and dispensing of pharmaceuticals were separated (the former to doctors and the latter to pharmacists), and the large number of autonomous insurance societies were consolidated into a single national insurer. A legacy of this continuous period of ongoing change is that efforts to improve the quality of care are not embedded in the Korean health system. At the provider level, quality of care is often driven by motivated individuals that choose to prioritise this. At the national level, policy makers have an institutional architecture that allows them to improve the quality of care, but often struggle to prioritise this over other objectives.

The Korean health system needs to shift its focus from an ever-continuing expansion of acute services to be prepared to deal with the rapid population ageing that Korea has begun experiencing and the rising incidence of chronic diseases. The financial starting point for dealing with these challenges makes health care reform in Korea all the more necessary: Korea is already experiencing growth in health care expenditure per capita that is amongst the fastest in the OECD, and double the average of OECD countries over the past decade. More spending does not necessarily lead to

higher quality. Indeed the opposite is possible - where the likely over-provision of health services to patients by Korea's hospitals today is a significant concern for the quality of care. Policy makers should seek to introduce payment systems that encourage an appropriate amount of care being delivered to individual patients when they visit a hospital. These reforms ought to be combined with greater control of the overall budget for hospitals. In this way, policy makers can influence where money is spent, and channel spending growth to more cost-effective services beyond hospital doors. This will help patients avoid hospital admissions (or re-admissions) in the first place. The single insurer is Korea's foremost institutional strength in achieving these reforms to improve quality, but doing so will require Korea's single insurer to become a proactive purchaser and not simply a passive payor.

The key policy priority for improving the quality of care in Korea should be the development of a strong primary care sector. This will be critical to ensuring that the Korean health care system can support patients in coordinating their ongoing health needs across multiple health services and to help them undertake actions to moderate the risk of their condition. This will require investments to scale up the primary care sector – for example, by supporting the expansion of successful models of care, and higher remuneration for cost-effective patient services such as patient counselling and lifestyle modification. A stronger primary care sector will also require a larger, dedicated workforce of primary care professionals. These investments will need to be consistent with developing strong primary care institutions in the long term. At the most immediate level, best practice from OECD countries suggest that group practice can help improve the quality and coordination of care. These practices ought to be supported by regional institutions – which can provide the means for the insurer to channel specific resources to those communities most at need. To inform this, Korea will need better measures of quality of care along regional boundaries.

There is also considerable scope for targeted and high-impact initiatives to deliver improvements in the quality of care today. The most pressing is to develop better systems to monitor individual clinician performance, which can identify breaches in patient safety and provide a means for patients to provide feedback on the quality of care they experienced. This ought to be complemented with greater efforts to encourage clinicians to keep their skills up-to-date through continuing education. Korea already has a best practice system for hospital accreditation, but too few hospitals are being accredited. Efforts to extend the scope of accreditation beyond hospitals are commendable, and would be further enhanced by extending accreditation to primary care. Similarly, Korea has world class information technology, as

demonstrated in its Drug Utilisation Review. However, the application of this information infrastructure ought to be extended beyond pharmaceuticals. Patient histories should be made available (within a privacy framework) to help providers improve the appropriateness of the care they provide.

The various strengths and areas for improving the quality of care across the Korean health system at large are mirrored in the quality of care for cardiovascular conditions. While variations exist across the country, Korea's hospital sector delivers high quality cardiovascular care. This is likely to be the consequence of policies for cardiovascular care that reflect the same hospital-focused approach to health policy that Korea has for the system as a whole. The focus for the future ought to be outside hospitals: by preventing cardiovascular conditions through modifying risky behaviours, helping patients manage their condition before they are admitted to hospital, improving ambulance services and providing comprehensive rehabilitation to support recovery.

By pursuing a combination of policy reforms at a system-wide level and targeted reforms to address particular shortfalls, there is considerable scope to improve the quality of care in the Korean health system. This report contains the OECD's recommendations to help Korea do so.



## Assessment and recommendations

### Introduction

Korea has undergone a remarkable increase in economic and human development over the past three decades. Rising standards of living have been accompanied by major improvements in the availability of health care services, underpinned by the rapid expansion of health insurance coverage. Remarkably, Korea today combines one of the highest life expectancies in the world with one of the lowest levels of health care expenditure amongst OECD countries (6.9% of GDP in 2009). Hospitals are more likely to be available, and equipped with cutting-edge medical technologies, than in most other OECD countries. Two decades of pursuing reform has not only expanded coverage but also delivered administrative savings through the consolidation of insurers under the publically-owned National Health Insurance Corporation. The development of the Korean health system over the past two decades serves as a model for countries seeking to deliver universal coverage for health care through social insurance at a reasonable cost.

Having now consolidated its achievements, Korea's health care system needs to shift its focus from simply supporting an ever-continuing expansion of acute care services. A health system operated along these lines will not be well prepared for the challenge of chronic diseases and disabilities that will come with Korea's wealthier and older population. Recent lifestyle changes, such as a shift towards more western diets, have resulted in a steady increase in the fat intake and increases in obesity levels (albeit from a low level). While low compared with other OECD countries, alcohol consumption is increasing. Smoking rates remain persistently high, with more Korean men smoking on a daily basis than in all OECD countries other than Turkey and Greece. These indicators of risky behaviours foreshadow the twin challenges of chronic disease and ageing that will continue to compound pressure on the health system. Health spending per capita in Korea has already been growing at nearly 8% a year since 2002 – the fastest amongst OECD countries and more than double the OECD average of 3.6% a year over the same period. Korean policy makers face a considerable challenge: continued increases in spending at these rates of growth are clearly unsustainable. Yet

maintaining a system that is focused on acute care will only perpetuate high growth in health care spending.

Despite the rapid increase in investment and physical resources that Korea has experienced over the past years, it is not evident that the system is delivering proportionately higher quality care. Korea has some of the highest rates of potentially avoidable hospital admissions for the common respiratory conditions of asthma and chronic obstructive pulmonary disease (COPD). Similarly, admissions to hospitals of people suffering from high blood pressure (a potentially manageable condition) have increased steadily in recent years to now be the fourth highest amongst OECD countries. Within hospitals, the proportion of people who die within 30 days of being admitted into hospital for acute myocardial infarction in Korea is the highest amongst OECD countries. More generally, once admitted to hospital for inpatient care, a Korean patient is likely to remain there for more than twice as long as the average of nine days across OECD countries. These relatively poor outcomes are likely to reflect that Korea has had considerable policy challenges, and focused its efforts over past years on expanding coverage and reducing out-of-pocket costs. Looking ahead, the major challenge for Korea's health care system over the next decade should be to make quality of care and value for money the operating principles for health policy.

Quality of care policies in Korea are patchy. This is reflected in three core challenges for improving the quality of care that consistently recur throughout this report:

- Korea does not have a strong community-based primary-care system. As a result, consumer preferences to seek out hospital care are reinforced by a fiercely competitive market of health care providers who, too often, deliver what is possible for them and not what is most appropriate for patients' long-term health.
- Governance of the health system does not sufficiently reinforce quality of care as a key priority. Policies to monitor and improve the performance of the system are often taken up unevenly across health care providers, and pockets of excellence are often driven by the initiatives of select providers and institutions.
- The health system does not make the most of the data available to it. Korea has the information technology infrastructure and data to help map shortfalls in performance and assess what works well and what does not. This information should be judiciously deployed to direct funding to areas that deliver high value for money and respond to health needs.

Notwithstanding these concerns, Korea's substantial health reforms to date have equipped it with an ideal institutional architecture from which to pursue further reforms. The single insurer provides Korea with the ability to use its monopoly purchasing power to drive improvements in quality of health care. Equipped with better financing instruments, the single insurer could be harnessed to gradually improve the structure of health services in Korea to better meet the changing health care needs of its population. Doing so will be necessary to support Koreans more effectively as they live longer and more often, with multiple chronic diseases.

More immediately, Korea's National Health Insurance is facing the prospect of further deficits. This creates a unique window of opportunity for further reform. As with many other OECD countries, reform will need to be undertaken while government grapples with tight fiscal circumstances. This situation will be compounded by an ageing population and shrinking workforce. This report argues that prudent reforms are desirable, and that leveraging improvements in the quality of care ought to be a key objective. It seeks to highlight good practices and make recommendations on how further improvements can be made in the quality of care.

### **Effort is needed to strengthen the focus of governance on quality of care**

Korea's quality of care policies have too often relied on motivated individuals and institutions to build pockets of excellence within the Korean health system. Too often, these individuals and institutions do not seem to work within a system whose governance demanded best practice or sought to disseminate it across the system. The Korean approach towards health care system governance is often grounded in the policy mindset of industry development: it encourages the growth of providers and competition amongst them, but often lacks the same focus on delivering broader social objectives which characterise insurance-based health systems across OECD countries. The focus of the health system is on product quality and less on system quality – each individual task may be done well, but they may not be the best choice of tasks, given the problems being addressed.

Encouraging a system-wide focus on improving the quality of care should begin with changing the focus of governance from reimbursing medical services to improving peoples' health. Korea could achieve this by broadening the current legal framework and creating an institutional 'champion for quality'. The current legal framework for health care in Korea centres around assuring the delivery of *insured* services. This is a narrower scope than the significant majority of OECD countries who locate governmental responsibility for the broader objective of protecting (and often improving) their citizens' health within their constitutions or key

health legislation. The most immediate implication of this is that responsibility for quality assurance of the significant amount of health care delivered outside of the basic insurance basket is not clear. A further consequence of this approach is reflected in the operations of Korea's Health Insurance Review Agency (HIRA), whose role today centres around quality assurance and auditing of claims for publicly reimbursed medical services.

There is scope for HIRA to play an expanded role and drive quality improvement for *all* services, not just those covered under insurance. This will require a sustained effort to change the culture of providers in the Korean health system to prioritise quality of care in their work. HIRA ought to take the lead on this: by providing feedback to individual providers and judiciously publishing information on the quality of care, HIRA should seek to establish itself as a champion for quality improvement across the system at large. This would build on HIRA's current responsibilities for evidence-based medicine (in collaboration with the National Evidence-based Medicine Collaboration Agency) and its loose links with organisations for health technology assessment and evaluating pharmaceuticals. Legislation to enforce such a framework for governing health care quality in Korea would be worthwhile.

***Good policies for quality of care exist – especially in the hospital sector– but without monitoring of the quality of individual clinician performance, have less impact than they should***

While both medical and hospitals associations have developed processes for hospital accreditation and clinical education, self-regulation of individual clinician practice is weak. Medical education and in-hospital training programmes for new doctors provide the bedrock of assuring quality of care in Korea. This is supported by a programme of continuing education provided by the respective medical and nursing professional bodies. Recent policy efforts by the Ministry of Health to seek the re-certification of medical professionals to improve continuing education completion rates and strengthen licensing are a welcome step to further improve the quality of care provided in Korea.

Perhaps the most alarming feature of the Korean health system is the lack of clear mechanisms to assure patient safety. Over the past two decades, health systems across OECD countries have sought to monitor individual clinician performance in order to identify undesirable trends in clinical practice and mitigate the situation. Such systems monitor breaches in patient safety (such as sentinel events) and provide a means for patients to deliver feedback on their experience of health care services (including on matters

relating to quality). Efforts ought to be undertaken to build a comparable system in Korea as part of a national programme on patient safety. This could build on some existing quality assurance mechanisms where individual hospitals have instituted their own procedures.

Such systems for patient safety typically have feedback mechanisms to assist medical associations in maintaining professional standards. Across OECD countries, medical associations often play an important self-regulatory role in investigating serious quality breaches and cases of potential professional misconduct, and if necessary, move to de-register a medical professional. It would be worthwhile for medical professional bodies in Korea to learn from the processes and systems that the Korean Nursing Association has put in place. There is a strong case for government to establish a mechanism to investigate such matters if medical professional bodies do not do so. A lack of action in this area will likely lead to strong growth in medical malpractice-related legal disputes. Already, these are estimated to cost 1% of health expenditure, growing at a rate of 15% a year.

As with most OECD countries, Korea has had a longstanding hospital accreditation programme that has seen some reforms in recent years. While Korea's new accreditation process is rigorous, it is not applied broadly enough within the hospitals sector and is only beginning to extend beyond it. Modelled after programmes in the United States, Chinese Taipei, and Australia, Korea's hospital accreditation process covers a large number of areas. It also pursues the worthwhile approach of using accreditation to enable it to act as a quality improvement partner with hospitals. However, at the end of 2011, accreditations undertaken to date have covered the forty-four tertiary hospitals but only 12% of general hospitals (33 hospitals) and 0.6% of small hospitals (8 hospitals). While this may in part reflect the infancy of the new arrangements, the change from mandatory to voluntary accreditation has weakened its role as a strategy for quality assurance, particularly in the small and medium hospitals where accreditation is most needed. Accreditation ought to be linked to financing to provide the necessary pressure on more small and general hospitals to seek accreditation. Recent efforts to expand the scope of accreditation to include long-term care hospitals and psychiatric hospitals from 2013 are commendable. Beyond this, accreditation should also be extended to primary care facilities in order to institute a focus on quality throughout Korea's health care facilities.

A range of other policies can also be strengthened to improve quality of care. In recent years, Korea has sought to boost its capacity to develop clinical practice guidelines. One programme is run through the Korean Academy of Sciences. The other is government-sponsored and operates through clinical research streams. These programmes have usually been led

by specialist research groups on different topics. While there is significant work being undertaken with research institutes and the National Evidence-based Health Care Collaborating Agency (NECA), the extent to which this is influencing clinical practice or decisions on financing care is limited. Establishing a process by which such agencies could feed into financing decisions and inform clinical standards would be a desirable development.

***Korea has world-class information technology infrastructure and health care data – these should be harnessed to improve quality and drive policy***

Korea has overcome many of the challenges other OECD countries have faced in recent years to build a world-leading health information technology infrastructure. In particular, Korea's Drug Utilisation Review is one of the most extensive systems for monitoring prescribing to be found amongst OECD countries. This system uses an individual identifier to check for when a patient has been provided with a drug that is likely to conflict or overlap with medications they are currently using. The system undertakes these tests both when drugs are prescribed at clinics and when sold at pharmacies. However, despite the substantial investment in advanced technological infrastructure to put this system in place, the system seeks to identify incompatibilities in the chemical composition of drugs rather than incompatibilities in the therapeutic function of drugs prescribed (the latter provides more scope to identify situations of unnecessary prescribing and pre-empt medication mis-management). Narrowing the scope of such a system unnecessarily constrains its potential impact, and efforts ought to be undertaken to make the most of this technology which exceeds in breadth and depth any other system in the world. Similarly, the eventual extension of this system to include major hospitals would be worthwhile in helping manage medication management issues and reduce costs.

More value can be extracted from data already available to HIRA. By linking claims information, quality indicators for clinical care and information available in registries, Korea could better analyse the performance of the health care system and tailor care to specific needs. For example, Korea currently has the capability to "follow" patients with multi-morbidities or those suffering from chronic health conditions to better understand which health care services they are using, how often, and their readmission and mortality prospects. The knowledge garnered from such monitoring could inform what services are best delivered to patients as a follow up to one of Korea's health-care screening programmes. Similarly, better information would be indispensable for improving the quality of cancer care, where registries could follow various cohorts of patients, their treatment outcomes and their mortality. The carefully orchestrated use of

data on patient outcomes and services could also be used to provide regional-level information – and help policy makers and consumers determine if the right (and enough) resources are being directed to those areas most at need.

Korea already has the technological capability to build a simple electronic patient history, and should do so. Individual patient identifiers form the basis of the Drug Utilisation Review and are recorded in claims services reimbursed under health insurance. This system for electronic recording of patient identifiers could form the backbone of a simple electronic patient history that records information on a person's medications and previous use of health services. In time, this could be extended to include electronic storing of diagnostic and other test results, potentially helping reduce the cost of duplicate services in the system today. There is a reluctance to undertake further efforts in this direction in Korea due to privacy concerns. Korea should look to efforts being undertaken in other OECD countries to accommodate privacy concerns, as this technology can deliver a considerable payoff in helping doctors improve the quality and appropriateness of the care they provide.

Improving the quality of information about what is being delivered in Korea's hospitals sector and how much hospitals are earning will help ensure that financing decisions are better informed. Systems already exist within hospitals today which separate services into those that are reimbursed by insurance and those that are paid directly by consumers. Government is not currently informed about the extent of the latter, and receiving this information could help national health insurance agencies understand the extent of utilisation of new technologies in the health system. As a longer term ambition, it would provide a means to determine the extent to which licensing of certain high-technology medical equipment – as is undertaken in France, the United Kingdom, Canada and Australia – ought to be considered to encourage appropriate utilisation and reduce costs. At the same time, improved financial reporting by hospitals would provide an indication of their operational challenges and what their cost pressures are. When combined with information available within government on public subsidies provided to these hospitals for the delivery of insured services, this could provide much-needed transparency on the extent to which hospitals raise revenues from sources outside of funds from public insurance. Given the substantial public investment in the hospitals sector, seeking further financial transparency is not an unreasonable expectation and should be made obligatory as a condition of insurance payments.

## **Strengthening primary health care in Korea**

### ***Tackling chronic diseases demands better primary-care services to help patients get appropriate care***

Korea's rapid economic development, emerging lifestyle risk factors and ageing population will increase the prevalence of chronic diseases in the future. Korea has one of the fastest growing elderly populations and the lowest birth rates amongst OECD countries. At the same time, too many Koreans are presenting at hospitals for conditions that could have potentially been avoided. In 2009, there were around 326 000 admissions for hypertension, angina, diabetes, heart failure, COPD and asthma. Compared with other OECD countries, Korea ranks amongst the highest for potentially preventable admissions relating to COPD, asthma and uncontrolled diabetes. These unnecessary episodes, and the health care costs they incur, underline the need for targeted actions to ensure that chronic disease is properly managed within the community setting.

As is the case in many other OECD countries, older and poorer patients seeking Korea's health services are more likely to be living with more than one health condition and are likely to require care that straddles multiple health services and specialists. Dealing with such cases effectively demands better co-ordination of their care and support to help them undertake actions to help moderate the risk of their condition. The Korean health care system will need to adapt to support patients in co-ordinating their health needs across the multiple specialist services they may rely on, and ensure good continuity of care. Critically, it will need to help patients avoid acute care except where necessary. Currently, the system does the opposite – it encourages further diagnosis and the utilisation of the large hospital sector. This is medically undesirable, unnecessary, and expensive. A reliance on hospitals is exacerbated by a long-standing tradition of health-seeking behaviour which places a greater value on hospital-based care. Over-provision of treatment is a major quality of care issue in Korea.

### ***Developing primary care must be the major investment priority for Korea's health system***

Korea's community-based family medicine sector is woefully underdeveloped today. There is a need to shift away from the current version of "primary care" as a gateway to more complex surgical or medical procedures and towards the provision of evidence-based health promotion and prevention along with partnering with patients to help them select the appropriate services for their needs. Current remuneration levels make it hard to do this, making the practice of family medicine unattractive while



supporting the oversupply of other services with greater complexity. As a result, primary care providers feel a financial pull towards becoming mini-hospitals that provide surgical procedures, often when not appropriate or safe. Correcting this situation will require ongoing investment, specifically for primary care and preventative health services.

The bulk of this investment should be directed towards supporting the scaling up of effective models of primary care. A number of small-scale initiatives and demonstration projects that accord with best-practice models of primary care currently exist in Korea today, but they lack the financial support and the institutional backing to expand across the country at large. The critical characteristics which successful projects have in common include: a community focus, patient registration backed by financial support, outreach preventive services, continuity of care, patient follow up and information exchange with HIRA and the NHI. Many of these features figure prominently in OECD countries with strong primary care systems. A good example of a community programme is the Gwang Myeong registration project which focuses on diabetes and hypertension management (profiled in Chapter 3).

The broader development of such services could be supported by domestic policy makers specifying “best-practice characteristics” and financially supporting regional providers who can deliver services that accord with these characteristics in meeting local health needs. Such a policy should also be used to encourage the development of group practice amongst Korea’s 26 000 solo practitioners, making it easier for them to undertake care coordination and peer review. Where useful and appropriate, such an approach should build on existing infrastructure supporting mandatory coverage of screening services in communities across Korea – in essence, becoming “follow-up” services for patients with identified health needs. Over the long term, this will help establish a regional architecture for primary care that National Health Insurance agencies can use to identify and direct funding to areas most in need.

***Strengthening primary care requires better information and increased efforts to build a primary care workforce***

Encouraging controlled and appropriate referrals by primary care professionals could help reduce the over-utilisation of hospital services. Many OECD countries rely upon family doctors to help direct patients towards appropriate services – whether it be specialist care in a hospital or allied health services. While there is notionally a requirement to have a referral from a family medicine specialist or a general medical practitioner prior to visiting a medical specialist, gate-keeping in Korea is not enforced

strictly and patients can access acute services with relative ease. Many hospitals have also adopted practices such as establishing family medicine centres (or departments) on hospitals premises that could sometimes also serve as a “gateway” for patients into the hospital at large. Engendering a culture of controlled and appropriate referrals is a complex and long-term challenge for the Korean health system that will require a combination of better information, a better understanding of the value of primary care amongst health professionals, greater financial investment and a shift in remuneration practices.

The use of existing data to develop better measures of quality of care in primary care could be a useful tool to guide policy development and funding. The development of primary care quality measures will facilitate analysis of quality trends and will provide the information base for remedial action. Within its expansive data infrastructure, HIRA currently has the ability to monitor the number and type of patients presenting at hospitals with potentially preventable admissions. Such information could be invaluable in identifying areas where primary care services are not encouraging controlled and appropriate referrals. Similarly, HIRA is able to monitor the utilisation of ambulatory care in emergency departments. In pharmaceuticals, HIRA is able to monitor the prescribing of antibiotics, drugs of limited clinical value and the ratio of generic to branded drugs – information that could help map where quality shortfalls are occurring (and where unnecessary costs to the system are being incurred). Critically, HIRA has the ability to map the geographical differences in performance across Korea. Doing so along the lines of regional boundaries that align with the scaling up of primary care services (as recommended above) will provide National Health Insurance agencies with the tools to make regional assessments of needs or identify where shortfalls may be occurring. Such information could bring into focus the often higher needs and fewer resources in rural communities. More broadly, these indicators can bring the benefits of primary care into sharper relief and foster a culture of delivering higher quality care.

Efforts to develop a workforce of primary health care professionals will be essential to developing a stronger primary care system. The majority of new medical graduates in Korea currently prefer to gain a specialisation and often undertake most of their training in hospital-based settings. At the same time, independent medical professionals working in primary care often feel the need to deliver basic surgical and inpatient services to maintain their viability. While investment and a more pronounced role in the health system would help enhance the professional status of family physicians, Korea also needs to engender an awareness of the importance of primary care amongst its medical profession. Providing more medical students with the experience

of working in primary care could help impart an understanding of the role and importance of primary care. Policy makers should work with medical associations and universities to introduce a mandatory training rotation in a primary care facility. Such a programme (of limited duration) could build on existing training opportunities available in select schools. Critically, it would also help bolster the size of the primary care workforce, especially in rural areas where the number of community-based health professionals has been steadily reducing. Providing a modest training subsidy would support the development of a training culture in primary care practices across the country. At the same time, more immediate changes could be driven by further promoting advanced practice nurses, who could play a valuable role in supporting physicians' delivery of preventive health care, reviewing people at risk of developing chronic disease and planning coordinating care for patients with complex health care needs.

## **Using financing to drive improvements in quality of care**

### ***The significant hospitals sector is driving growth in health spending***

Hospitals accounted for nearly half of all additional expenditure in Korea over the past decade. This is significantly more than in other OECD countries where hospitals accounted for around one third of additional health expenditure. Whether measured by the number of hospitals, beds or high-technology medical equipment, for the size of its population, Korea has one of the most substantial hospital sectors amongst OECD countries today.

In part, this reflects the fact that payments for health services that are not efficient and do not reward quality of care. Korea's fee-for-service payments reward doctors for delivering ever more complex care, but often at lower unit fees per service compared with many OECD countries. This is compounded by a fiercely competitive private market for delivering health care services. As providers have sought to compete by increasing volumes, complexity or delivering services outside the health insurance benefit basket (where prices are unregulated), the boundaries between services delivered in small doctors' clinics and in hospital outpatient departments have become increasingly blurred. This has come at the expense of properly funding community-based primary health care services. Within this market structure, doctors in Korea have to balance the desire to provide appropriate care with the need to generate revenue. The result is often higher costs. For example, this is reflected in Korea's exceptionally high lengths of stay for hospital inpatient services, which along with Japan are more than double the OECD average and significantly higher than the next highest country. A major challenge for financing is to build better incentives for appropriate care.

***In a difficult budgetary environment, tackling burgeoning acute care services will improve quality and reduce costs***

Quality can be improved and costs can be contained by reversing the incentives for over-provision and over-supply of hospital services. Hospital financing reforms have had a difficult history in recent years as Korea has sought to shift to paying a benchmark price per “case” delivered in a hospital (diagnosis-related groups, DRGs). DRGs reward service providers who are more efficient than the benchmark price and provide all with an incentive to moderate costs. After substantial negotiations, the current Korean DRG scheme was established and covers a handful of clinical categories. However, the non-participation of tertiary hospitals in this scheme has weakened its potential to drive quality and efficiency. DRGs ought to be introduced across the *entire* Korean hospitals sector to introduce price signals that encourage an appropriate amount of care per case – a focus that Korea’s hospitals’ lack today.

These reforms to hospital financing should be complemented with better safety and quality monitoring. Other OECD health systems such as Australia, Canada, France and the United States with these forms of payments have sought to establish appropriate admissions and discharge criteria and close surveillance of the intensity and volume of services delivered. Some of these countries also use financing systems to improve data collection on the quality of care, such as through recording secondary conditions and flagging conditions that are present on a patient’s admission to hospital. These measures would be worthwhile to collect even before a shift to DRG-based payment can be feasibly implemented in Korea. Indeed, while they have cited concerns over a deterioration in quality in resisting the introduction of DRGs, Korea’s tertiary hospitals are more likely than general and smaller hospitals to have already instituted the kind of quality management programmes and checklists needed to monitor and correct perverse outcomes. The challenge for policy makers is to encourage the use of such systems in the large number of small and medium-sized hospitals, who are likely to have already opted into DRG-based payments. Such quality monitoring will provide the information architecture needed to incorporate quality into purchasing, which ought to be institutionalised by giving National Health Insurance agencies a greater mandate to vary payments to hospitals (or groups of hospitals) on the basis of achieving a certain level of quality performance or delivering services more efficiently. Shifting from the current system based on retrospective reimbursement based on fees set annually to a dynamic and ongoing process of negotiation offers Korea an opportunity to make the most of the purchasing power of its single insurer.

DRG-based financing could also be used to develop better macro budgetary controls and influence the balance of funding between acute and primary care over time. DRGs not only specify a set of relative prices between different types of health care services, but also provide the ability to adjust the overall level of prices, which can be an important lever in influencing overall spending for hospital services. Health systems that use DRGs in OECD countries often specify (or target) an overall budget for acute care services in the year ahead – based on forecasts of the mix and volume of services within a given year. This helps signal the government’s overall appetite for outlays and helps manage the risk of providers increasing volumes. Within the institutional architecture of a single insurer, Korea is well placed to consider specifying an overall budget for acute hospitals. If budget overruns incur a credible penalty (such as no payment or discounted payment for services), such an approach could provide a system-wide impetus for additional efficiency. As a longer term ambition, this could also be used to influence the allocation of funds between acute and primary care sectors in Korea.

***More appropriate care should begin with making primary care the core financing priority***

Driving more appropriate care will require National Health Insurance to shift the centre of financial gravity in the Korean health system from hospitals to primary care. With a single insurer, Korea is well positioned to use its purchasing power to drive improvements in the quality of care. However, health financing in Korea is currently embedded in the psychology and operational model of fee-for-service payments. For National Health Insurance to become more of a proactive purchaser – rather than a passive payor – this will need to change. National Health Insurance will need to develop the tools needed to direct funding for services to patients or areas most at need. This should be directed at effective primary care services, which hold the potential to provide care that is better suited to the rising population health challenge of people living with multiple chronic diseases, and potentially at a lower cost.

To establish primary care as an institutional priority, investments to scale up primary care in Korea should become a distinct component of National Health Insurance expenditure. Policy makers ought to have the financial freedom to assess and invest in proposals that represent best value for money in delivering high-quality primary care. Locating funding within National Health Insurance would align new investments with the institutional imperative of reducing longer term payouts by the single insurer. This would build on current efforts to make the National Health Insurance more responsible for programmes to support the management of

patients with chronic disease. On a broader level, it would help foster an operating culture where the insurer is seen as a financial agent capable of delivering system change to improve quality of care, and not simply as a payment clearinghouse. In the same manner in which the gradual expansion of insurance helped underwrite the development of Korea's hospitals sector, the National Health Insurance should now be harnessed as a major source of financing for the development of a stronger primary care sector in Korea. Korean policy makers may wish to consider hypothecating a gradually increasing proportion of NHI revenues towards this purpose. On-going financial commitment will be critical to change the structure of health care service providers in Korea over time.

Institutional reform of this nature is a long-term objective. In the immediate future, Korean policy makers should increase financial support for prevention and patient self-management of chronic disease. This will require developing an effective means of incentivising primary care professionals to derive a greater proportion of their income from the delivery of physician education and counselling, and reducing their reliance on minor surgical procedures, referrals for diagnostic tests and prescribing drugs as a source of income. A modest starting point for broader financing reform could be to address the structure of fee-for-service payments in Korea, which currently pay hospitals a premium per service delivered on the basis of their size (*i.e.* larger hospitals get paid more for the same service than smaller hospitals). This is a substantial outlay that rewards providers to pursue capacity expansion. Redirecting some of this investment towards rewarding hospitals – irrespective of their size – that deliver high-quality and appropriate services would deliver better value for money. At the same time, there exists scope for policy makers to pilot the use of “bundled payments” that prospectively combine payment for a hospital admission as well as a reasonable number of pre- and post-admission services. This could provide a financial incentive for hospitals to invest downstream, into less clinically intensive rehabilitation services and to substitute complex and acute care services with cheaper (and more appropriate) family-based medical care.

***Pay for performance in Korean hospitals has had moderately encouraging results, and may be usefully extended to targeted areas***

The introduction of a pay-for-performance scheme in Korea's 43 tertiary hospitals is one of the more innovative policies to use financing to drive improvements in quality of care across OECD countries. Korea's Value Incentive Programme targets improvements in two areas of comparatively poorer performance compared with other OECD countries: acute myocardial infarction and the proportion of caesarean deliveries. Hospitals participating

in the programme have improved acute myocardial infarction treatment performance and outcomes over the three years since the programme was established. Similarly, data indicate an observable reduction in caesarean sections. Most notably, data suggest that there has been a decrease in the variance in performance amongst hospitals and significant improvements amongst the lowest performing group.

Absent a formal evaluation at this early stage, this targeted pay-for-performance programme appears to be a useful way of collecting data and incentivising targeted improvements in the quality of care. The Value Incentive Programme benchmarks the relative improvements in performance of each of Korea's tertiary hospitals through collecting indicators associated with good clinical processes, the impact of hospital interventions on mortality and reductions in caesarean deliveries relative to anticipated levels. The collection and publication of data involved in this programme provides an innovative example of the kind of information that policy makers and consumers ought to have available to assess the quality of care. The reputational effects of this data alone may be a strong impetus for hospital managers to improve performance, particularly in Korea's highly competitive hospital market. However, in the absence of a formal evaluation, it is difficult to judge the extent to which the pay-for-performance programme has driven improved performance, or on the contrary merely mimicked a trajectory of gradually improving performance that existed prior to the introduction of the scheme. The study of the US programme on which Korea modelled this scheme suggests that the introduction of pay-for-performance led to an improvement in quality outcomes amongst participating hospitals relative to their peers, but that differences dissipated after five years. This is consistent with other international evidence suggesting that *targeted* pay-for-performance schemes can help drive improvements over a specified period. Furthermore, it is unclear whether the pay-for-performance scheme incentivises activity without the adverse effects of leading providers to modify behaviour to maximise payments. For this reason, the Korean balance of modest financial incentives and a strong focus on data collection may be the virtue of this programme.

## **Improving care for cardiovascular diseases**

### ***There is a paradox in quality of care outcomes for cardiovascular conditions in Korea***

Quality indicators for cardiovascular care paint an interesting paradox in Korea when compared with other OECD countries. In general, Koreans are less likely to die from acute myocardial infarction (AMI), but those Korean

patients who are admitted to hospital for AMI are likely to face amongst the highest case-fatality rates amongst OECD countries. At the same time, Koreans are more likely to die of stroke than those in many other OECD countries, but fatalities from stroke once in hospital, are much lower in Korea compared with other OECD countries – in hospital 30-day case fatality rates are 1.2 per 100 patients compared with an OECD average of 5.2 per 100 patients.

In most OECD countries, in-hospital fatality rates across the two acute manifestations of underlying vascular conditions – AMI and stroke – are both either relatively good, or relatively bad. For example, Denmark, Norway and the United States report amongst the lowest rates of OECD countries for both conditions. Population-based mortality *trends* also tend to be similar – they are either good or bad across the two conditions. Furthermore, countries with high population-based mortality rates will also often have high case-fatality rates, though care is needed in inferring that high case-fatality rates in hospitals are a principle *cause* of high population-based mortality rates.<sup>1</sup>

However, this Korean paradox suggests there are two issues around the quality of cardiovascular care in Korea. The first is whether the high case-fatality rates reflect poor quality hospital care. Trends in OECD countries have shown an overall decline in case-fatality rates over the past ten years, suggesting quality improvements in acute care delivery can make a difference. The second is whether policies to reduce cardiovascular disease outside the hospital sector are being delivered appropriately.

***Acute care is usually delivering high-quality cardiovascular care, but there are variations in quality across the country***

It is unlikely that the divergence in in-hospital case-fatality rates for cardiovascular care (notably AMI mortality rates) reflects bad performance in Korean hospitals. The Korean Government's review of care quality for cardio- and cerebro-vascular diseases (CVD), as well as performance data collected by both HIRA and the Korean Centre for Disease Control (KCDC), suggests that quality of care for AMI and stroke in hospitals is amongst the best in OECD countries. After arrival to the appropriate hospital unit, care delivered in Korea is likely to be consistent with clinical guidelines and best practices in other OECD countries. This is demonstrated by good performance in process indicators such as the administration of aspirin upon arrival to the hospital and appropriate prescriptions at the time of discharge in the case of AMI. While the volume and capacity of acute and elective cardio-vascular interventions such as PCI's and CABGs has been increasing significantly over the past few years in Korea, a clear relation



between volumes and patient outcomes is difficult to establish. These indicators of performance and recent capacity expansions suggest that neither low capacity, nor poor processes are likely explanations of high in-hospital case-fatality rates for AMI relative to other countries.

Instead, the most plausible explanation of the apparently poor performance of acute care for AMI is actually a failure in the non-acute care sectors. The case mix of patients presenting to Korean hospitals is likely to be characterised by advanced stages of AMI and more complex conditions. Consistent with this review's major conclusion of an underdeveloped primary care system, it is likely that insufficient care and support provided *outside* hospitals (in primary care for prevention and in post-acute rehabilitation) is the cause of poorer hospital outcomes. This is likely to be reinforced by the absence of cardiac rehabilitation services leading to a higher numbers of readmitted patients.

The contrast between high-quality hospital care and weaker out-of-hospital care for CVD reflects policy. While the government has had a proactive strategy to improve quality of care for CVD through strengthening prevention and in-hospital care, more effort has been directed at assisting certain hospitals in adopting best-practice care delivery models for CVD. The Korean government's Comprehensive Plan for CVD is the major national policy that seeks to drive improvements in the quality of care for cardiovascular conditions, most notably though advocating for the creation of regional cardiovascular centres. Ideally, these centres ought to serve as vertical institutions offering services ranging from health promotion (with tailored consultations with a specialised physicians) to care in the acute phase and rehabilitation. However, in implementation most of the financial assistance to designated regional centres has been directed at new services (such as 24-hour emergency stroke units) or operation and maintenance costs associated with acute CVD care. Investments in the prevention and health promotion work streams are more marginal.

Only a selected number of institutions have received financial and technical assistance to develop stroke units and enhanced facilities under Korea's Comprehensive Plan for CVD. Efforts have been made to support hospitals located outside of Seoul: nine institutions (including three university hospitals) have been designated as regional centres since 2008. While this has helped to create pockets of excellence, it has not made significant progress in improving the quality of cardiovascular care across the acute care sector at large. While they have often invested in high-technology medical equipment, many Korean hospitals have not established stroke units, which are a comparatively simple innovation that can make a substantial difference in improving the quality of CVD care. Today, half of tertiary hospitals and 90% of general hospitals do not have stroke units.

Furthermore, given the broad dispersion of those living in rural areas across the country, the small number of centres that have benefited from the comprehensive plan for CVD is unlikely to have made major progress in helping reduce significant disparities that exist between rural and urban areas. For most people living in rural areas, whether their closest hospital happens to be equipped with a stroke facility (and/or other acute cardiovascular intervention facilities) is likely to be a major determinant in the quality of their acute cardiovascular care. Efforts should be undertaken to rebalance the focus of financial investments away from equipping a small number of hospitals with very sophisticated technologies towards establishing care pathways for acute cardio-vascular conditions and stroke units across the system at large. This would help address inequalities between regions and between tertiary and general hospitals.

***Pre- and post- acute care should be the focus of improving quality of care for cardiovascular diseases***

Improving cardiovascular care outside of hospitals ought to be the policy priority to help improve cardiovascular care outcomes for Koreans. The Korean population is currently experiencing substantial changes in lifestyles, such as an increased consumption of trans-fats and salts, which presage likely future rises in the prevalence of particular chronic conditions relevant to CVD. Korea also has one of the most rapidly ageing populations, with the proportion of those aged 65 among the total population projected to reach 37% by 2050 (today, the share of those aged 65 and older is 11% of the total population). With the principal risk factor for CVD being older age – even in the absence of symptoms or very high levels of hypertension, diabetes and smoking – this is likely to drive an increase in the prevalence of CVD across Korea.

Focusing on prevention and proactive primary care services to modify these risky lifestyle behaviours and support patients in managing their health would help reduce the burden of cardiovascular conditions (and the burden of diabetes) in the future. Current prevention policies in Korea mainly revolve around two screening programmes organised by the National Health Insurance Corporation and the Ministry of Health and Welfare. While this forms a solid basis for identifying patients, there is a need to build on these programmes by establishing formal mechanisms to help coordinate care and deliver case management to those patients at risk in the long run. Korea ought to consider establishing registration for patients at risk as part of broader efforts to strengthen primary care (as noted above). A select few initiatives, such as those in Daegu city and Gwang Meong-si, have demonstrated the capability to help organise health care in a patient-centered way and secure high levels of satisfaction amongst both patients and

medical professionals. The success of these programmes lies in regular monitoring of risk factors to help patients avoid a general deterioration of health prior to hospital admission.

Supplementing this, efforts ought to be made to minimise intervention time and the lag between the onset of a stroke or AMI and the arrival of a patient to hospitals. An evaluation of ambulance services details high reported times – of up to six hours – between the onset of AMI and stroke and arrival in hospital and pointed to the need to act on two key challenges. Firstly, to raise public and patient awareness in identifying the onset of a stroke and AMI and seeking care rapidly. Secondly, to enhance the quality and responsiveness of ambulance services (especially in rural areas) that could help ensure that therapeutic interventions such as thrombolysis (when indicated) is performed more quickly, thereby offering patients a higher chance of survival.

Establishing formal rehabilitation processes for AMI and stroke would also be a high value-for-money investment in Korea. Providing comprehensive rehabilitation care is fundamental to the recovery of patients who have suffered a heart attack, a coronary artery bypass graft operation or a stroke. By assisting patients in exercise, education and psycho-social health, rehabilitation can help prevent secondary complications, reduce mortality and improve patients' health outcomes. Rehabilitation care in Korea is supported by two avenues: National Health Insurance provides funding for stays in long-term care hospitals (which mainly provide sub-acute care) and long-term care insurance supports extended stays in long-term care facilities for patients assessed to have ongoing care needs. In general, rehabilitation care in Korea is at an early stage of development and there are few institutional facilities that provide rehabilitation services exclusively for patients who have survived an AMI or stroke. The recent growth of long-term care hospitals is a welcome development in helping expand these critical services. Policy makers should consider building on this by seeking to support community-based rehabilitation (especially home care services for patients who have to live with the consequences of a stroke) as part of National Health Insurance and not simply for the smaller group of people that have long-term care insurance. Community-based rehabilitation services are often able to be delivered more cheaply than in a hospital setting, which may also help make them more financially accessible to patients discouraged by high out-of-pocket costs. This represents a value-for-money investment in improving cardiovascular care in Korea. It will help reduce readmission rates and holds the potential to reduce unnecessary expenditure on expensive cardiac interventions

## Concluding remarks

The strengths and weaknesses in the quality of cardiovascular care in Korea mirror those of the Korean health care system at large. In Korea's substantial achievement of expanding health coverage over the past two decades, value for money has often been secondary to health care industry development. This has delivered world-class hospitals to the bulk of the population (those in major cities), but has also entrenched the primacy of acute care in the Korean health care system.

The Korean experience provides some important lessons to other countries, both those of the OECD and other middle income countries seeking to deliver universal health coverage. Foremost, strong budgetary controls are important. Without budget constraints or regulation on supply, the well-organised hospital sector can quickly come to dominate health services delivery at the expense of quality. Secondly, Governments ought take early action to develop primary care infrastructure and entrench gate-keeping by primary care professionals as a norm in the health system. Lastly, Governments and insurers should demand accountability for – and improvements in – the quality of care for the substantial payments they make to health care providers.

Korea's challenges are not unique – most OECD countries are grappling with reorienting their health care systems towards enhancing cost-effective primary care and preventive health services that support people in making good lifestyle decisions, living healthier lives and avoiding visits to hospitals. However, the tendency for over-delivery of hospitals services is now so entrenched in the Korean health care system that Korea faces increases in health care costs that outpace its OECD counterparts.

Korea is fortunate to be able to face this challenge from a position of lower overall levels of spending, but must act to ensure that additional health care spending goes to the right places. This report argues that transitioning to a health care system that is better placed to deliver high-quality care into the future will require a continued focus in three areas: building a stronger community-based primary care system; using information to target services more effectively and assess whether taxpayers are receiving value for money; and re-orienting the focus of policy making to deliver continued improvements in health, not just health insurance.

### **Policy recommendations for improving the quality of care in the Korean health system**

The challenge for the Korean health system over coming years will be to shift its focus towards supporting the rising number of people living with chronic disease and multiple morbidities. To achieve this, quality of care should be embedded as a key objective of further reforms. This will require changes to:

1. Improve governance and quality of care strategies by:
  - Establishing systems to monitor individual clinician performance to identify undesirable events such as breaches in patient safety. This should be complemented with a means for patients to provide feedback of their experience of health care services and report medical errors.
  - Seeking that medical professional associations investigate quality breaches and professional misconduct, including recommending de-registration to the Minister for Health and Welfare in instances of serious misconduct.
  - Requiring that general and small hospitals undertake accreditation and continuing to expand accreditation into long-term care hospitals, as well as establish a programme for the accreditation of primary care facilities.
  - Bolstering the development of clinical practice guidelines and establishing a process by which guidelines can influence financing decisions.
  - Making the most of the Drug Utilisation Review by checking for compatibility amongst therapeutic groups, and over time, expanding it to include drugs delivered in major hospitals.
  - Better utilising available data to analyse the performance of the health system and tailor care to the needs of patients. For example, HIRA should provide information on patient outcomes and services on a regional level, to assess if resources are being directed appropriately.
  - Building a simple electronic patient history, using information and technology already available to HIRA and by working to accommodate privacy concerns.
  - Establishing HIRA as an institutional champion for quality of care in the Korean health system that is responsible for assuring the quality of all health care services (including those not covered by insurance), provides feedback to individual providers and publishes information for consumers.
2. Strengthen primary care's capacity to prevent disease and support those suffering from chronic conditions by:
  - Making the development of a community-based, family-medicine sector the foremost investment priority in the Korean health care system.

- Directing the bulk of new investment towards scaling-up effective models of primary care by specifying “best-practice characteristics” and supporting regional providers who can accord with these characteristics in meeting local health needs. Where appropriate, this should build on existing infrastructure for screening services across Korea and encourage the adoption of group practice.
  - Using financial investments in primary care to support the long-term establishment of a regional architecture for primary care that can help National Health Insurance agencies identify and direct funding to areas most at need.
  - Developing better measures of quality of care in primary care to guide policy development and funding, including regional assessments of needs and shortfalls.
  - Establishing a mandatory training rotation in a primary-care facility as part of medical education in Korea, and considering a modest training subsidy to support such a programme.
  - Expanding the number of advanced practice nurses and better utilising their skills in working with physicians to deliver primary care services.
  - Investigating methods to further encourage controlled and appropriate referrals by primary care professionals.
3. More effectively use financing to drive improvements in quality of care by:
- Expanding DRG-based financing across the entire Korean hospitals sector and across as many services categories as clinically feasible.
  - Complementing DRG-based financing with appropriate admissions and discharge criteria, quality measures such as present-on-admission flags and close surveillance of the volume and mix of services being delivered.
  - Better embedding quality into purchasing over time by giving National Health Insurance agencies a greater mandate to design payment structures and to customise payments to hospitals on the basis of improving quality or efficiency outcomes.
  - Using DRG payments to consider specifying an overall budget for hospital services. This should be supported by credible penalties for overruns and in the long term, be used to influence the allocation of funds between acute and primary care.
  - Making investments to scale up primary care a distinct component of National Health Insurance expenditure, and consider the hypothecation of a gradually increasing proportion of revenues towards this purpose over time.
  - Increasing financial support for primary care services to support prevention and patient self management of chronic disease (such as physician education and counselling), and reduce the reliance on minor surgical procedures, diagnostic tests and prescribing as a source of income.

- Redirecting current incentives, which increase fee-for-service payment by the size of hospital, towards rewarding hospitals on the basis of the quality of care they deliver.
- Piloting the use of “bundled payments” that prospectively combine payment for a hospital admission as well as a reasonable number of pre and post-admission services, to encourage hospitals to invest in less clinically intensive rehabilitation services.
- Formally evaluate the Value Incentive Programme to inform the further use of pay-for-performance to improve the quality of care in targeted areas on an intermittent basis.
- Improving transparency in the Korean hospital sector by reporting services not reimbursed by insurance to government and strengthening financial disclosure obligations on major hospitals.

4. Improving the quality of care for cardiovascular diseases by:

- Undertaking greater investment in promoting good health and preventing cardiovascular diseases.
- Rebalancing the focus of investment away from equipping a small number of hospitals with sophisticated technologies and towards establishing cardiovascular critical-care pathways and stroke units across the system at large.
- Establishing registration for patients at risk in order to deliver regular monitoring services and follow-up services.
- Raising public and patient awareness in identifying the onset of a stroke and AMI in order to seek care rapidly.
- Enhancing the quality and responsiveness of ambulance services (especially in rural areas).
- Expanding rehabilitation capacity in the Korean health system, including through community-based rehabilitation by a broad range of health professionals.

## **Note**

1. Population-based mortality is an indication of overall population health, dependent on social and economic health determinants, preventive care and access to secondary care. While case-fatality rates are intended to indicate the quality of hospital care – hospitals admitting a higher proportion of complex and more advanced disease cases will, possibly, have worse outcomes. In the absence of a proper international method for adjusting for differences in case mix, it is difficult to make robust international comparisons.



