Course Book

HEALTHCARE FINANCING

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HEALTHCARE FINANCING

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Ms. Brenner completed her studies in business administration at FAU Erlangen-Nuremberg (Germany), majoring in healthcare management. She went on to receive her PhD in diabetes research from the Institute of Public Health, Medical Decision Making and Health Technology Assessment at UMIT Tyrol (Austria).

Before her academic career, Ms. Brenner was a healthcare management consultant at Deloitte and PwC Strategy&. She advised over 40 clients, including rehabilitation clinics, hospitals, health insurers, investors, manufacturers, and professional societies on various strategic and operational topics. As a project manager at Roche Diagnostics, she managed large development projects for new diagnostic tests.

Ms. Brenner has lived and worked in Asia, Europe, the Middle East, Russia, and the U.S. She has a great passion for healthcare and how it can achieve better outcomes for patients.

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INTRODUCTION

WELCOME

SIGNPOSTS THROUGHOUT THE COURSE BOOK

This course book contains the core content for this course. Additional learning materials can be found on the learning platform, but this course book should form the basis for your learning.

The content of this course book is divided into units, which are divided further into sections. Each section contains only one new key concept to allow you to quickly and efficiently add new learning material to your existing knowledge.

At the end of each section of the digital course book, you will find self-check questions. These questions are designed to help you check whether you have understood the concepts in each section.

For all modules with a final exam, you must complete the knowledge tests on the learning platform. You will pass the knowledge test for each unit when you answer at least 80% of the questions correctly.

When you have passed the knowledge tests for all the units, the course is considered finished and you will be able to register for the final assessment. Please ensure that you complete the evaluation prior to registering for the assessment.

Good luck!

BASIC READING

Cashin, C., Chi, Y.-L., Smith, P., Borowitz, M., & Thompson, S. (Eds.). (2014). *Paying for performance in health care: Implications for health system performance and accountability*. Open University Press. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=cat05114a&AN=ihb.50027&site=eds-live&scope=site

Chang, A. Y., Cowling, K., Micah, A. E., Chapin, A., Chen, C. S., Ikilezi, G., Sadat, N., Tsakalos, G., Wu, J., Younker, T., Zhao, Y., Zlavog, B. S., Abbafati, C., Ahmed, A. E., Alam, K., Alipour, V., Aljunid, S. M., Almalki, M. J., Alvis-Guzman, N., . . . Dieleman, J. L. (2019). Past, present, and future of global health financing: Areview of development assistance, government, out-of-pocket, and other private spending on health for 195 countries, 1995–2050. *The Lancet, 393*(10187), 2233–2260. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edsswe&AN=edsswe.oai.DiVA.org.his.17231&site=eds-live&scope=site

Feldhaus, I., & Mathauer, I. (2018). Effects of mixed provider payment systems and aligned cost sharing practices on expenditure growth management, efficiency, and equity: A structured review of the literature. *BMC Health Services Research, 18*(996), 1–14. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edssjs&AN=edssjs.292BDF54&site=eds-live&scope=site

Gottret, P., & Schieber, G. (2006). *Health financing revisited: A practioner's guide*. The World Bank.

Kutzin, J., Witter, S., Jowett, M., & Bayarsaikhan, D. (2017). *Developing a national health financing strategy: A reference guide.* World Health Organization.

REQUIRED READING

UNIT 1

Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abolhassani, H., Aboyans, V., Abrams, E. M., Abreu, L. G., Abrigo, M. R. M., Abu-Raddad, L. J., Abushouk, A. I., . . . Murray, C. J. L. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, *396*(10258), 1204–1222. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edsnar&AN=edsnar.oai.repub.eur.nl.133595&site=eds-live&scope=site

UNIT 2

Murray, C. J., & Frenk, J. (2000). A framework for assessing the performance of health systems. *Bulletin of the World Health Organization*, *78*(6), 717–731. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edsair&AN=edsair.pmid.....1e1af7bcdf6d3fe4927f638aa5f71472&site=eds-live&scope=site

UNIT 3

Mueller, M., & Hewlett, E. (2016). *Better ways to pay for health care*. Organization for Economic Co-Operation and Development. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=cat05114a&AN=ihb.51216&site=eds-live&scope=site

UNIT 4

Regan, L., Wilson, D., Chalkidou, K., & Chi, Y.-L. (2021). The journey to UHC: How well are vertical programmes integrated in the health benefits package? A scoping review. *BMJ Global Health*, *6*(8), 1–11. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=cmedm&AN=34344664&site=eds-live&scope=site

UNIT 5

Kovacs, R. J., Powell-Jackson, T., Kristensen, S. R., Singh, N., & Borghi, J. (2020). How are pay-for-performance schemes in healthcare designed in low- and middle-income countries? Typology and systematic literature review. *BMC Health Services Research, 20*(291). http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edssjs&AN=edssjs.1D863E1C&site=eds-live&scope=site

UNIT 6

Scheller-Kreinsen, D., Quentin, W., & Busse, R. (2011). DRG-based hospital payment systems and technological innovation in 12 European countries. *Value in Health, 14*(8), 1166–1172. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edselp&AN=S1098301511015348&site=eds-live&scope=site

FURTHER READING

UNIT 1

Murray, C. J. L., & Lopez, A. D. (Eds.). (1996). *The global burden of disease: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020*. Harvard School of Public Health.

Available online

UNIT 2

Adams, O., Shengelia, B., Stilwell, B., Larizgoitia, I., Issakov, A., Kwankam, S. Y., & Jam, F. S. T. (2003). *Provision of personal and non-personal health services: Proposal for monitoring.* World Health Organization. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=asn&AN=26367357&site=eds-live&scope=site

UNIT 3

Feldhaus, I., & Mathauer, I. (2018). Effects of mixed provider payment systems and aligned cost sharing practices on expenditure growth management, efficiency, and equity: A structured review of the literature. *BMC Health Services Research, 18*(996). http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edssjs&AN=edssjs.292BDF54&site=eds-live&scope=site

UNIT 4

Dieleman, J. L., Sadat, N., Chang, A. Y., Fullman, N., Abbafati, C., Acharya, P., Adou, A. K., Ahmad Kiadaliri, A., Alam, K., Alizadeh-Navaei, R., Alkerwi, A., Ammar, W., Antonio, C. A. T., Aremu, O., Asgedom, S. W., Atey, T. M., Avila-Burgos, L., Ayer, R., Badali, H., . . . Murray, C. J. L. (2018). Trends in future health financing and coverage: Future health spending and universal health coverage in 188 countries, 2016–40. *The Lancet*, *391*(10132), 1783–1798. http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edsswe&AN=edsswe.oai.lup.lub.lu.se.b5647391.3700.4fda.996c.93d1678a7d7f&site=eds-live&scope=site

UNIT 5

Zaresani, A., & Scott, A. (2021). Is the evidence on the effectiveness of pay for performance schemes in healthcare changing? Evidence from a meta-regression analysis. *BMC Health Services Research, 21*(175). http://search.ebscohost.com.pxz.iubh.de:8080/login.aspx?direct=true&db=edssjs&AN=edssjs.9D61CCC8&site=eds-live&scope=site

UNIT 6

Jiang, G., & Peng, Q. (2019). *Medical payment series: The rise of the DRG payment model* [White Paper]. Milliman.

Available online

LEARNING OBJECTIVES

This course provides students with an overview of the principles of **Healthcare Financing**. On completion of this course, students will understand what drives health spending, how health systems generate funding, how payment for health services can be designed, and how these principles differ across the globe.

The course provides an overview of global health spending, shaped by the burden of disease. It conveys the importance of government spending as an indicator for health system maturity. Students will be introduced to the key components of health financing and given an explanation why, in healthcare, more supply of services often induces more demand. Students will be able to analyze and dissect important provider payment systems, with emphasis on the buzz terms pay-for-performance and DRGs. The course also casts a light on scenarios for future health spending and access to health services, highlighting the important role of development assistance for health to assist low- and middle-income countries to grow resilience and equity in their health systems.

On successful completion of the course, students will have a solid knowledge base in health financing. They will be able to recognize and dissect health financing systems and propose mechanisms for improvement. They can make valuable contributions to health system design efforts, critically evaluate provider payment schemes, and engage with confidence in discussions about health financing.

UNIT 1

HEALTH EXPENDITURE ANALYSIS

STUDY GOALS

On completion of this unit, you will be able to ...

- differentiate between health spending patterns in World Bank income groups.
- analyze the correlation between health spending and universal health coverage.
- explain the burden of disease concept and interpret the disability-adjusted life year (DALY), years of life lost (YLL), and years of life lived with disability (YLD).
- describe the concept of epidemiological transition.
- compare the role of government spending to other funding sources in health systems.
- understand the role of development assistance in relation to health in low-income countries.

1. HEALTH EXPENDITURE ANALYSIS

Introduction

In 2018, global health spending reached USD 8.5 trillion, which is 9.9 percent of the global economy (Institute for Health Metrics and Evaluation, 2021), but how much is that in real terms? If we write 8.5 trillion on a piece of paper, it is an 85 with 11 zeros: 8,500,000,000,000.

One-dollar bills
The US dollar is an accepted currency in the United States and several other countries. The one-dollar bill is 6.6 cm wide, 15.6 cm long, and 0.01 cm thick (Brucker, 2022).

If we stacked 8.5 trillion **one-dollar bills** on top of each other, the stack would be 850,000 kilometers high. This stack could circle the earth 21 times, or we could build two towers that are taller than the distance from earth to the moon. The bills would weigh about 8.5 million tons. If you had this amount of money and continued to live for another 50 years, you could spend over USD 450 million every day and still have a few million left. Alternatively, based on their market value in January 2021, you could buy six of the world's most valuable companies: Alibaba Group, Alphabet (Google), Apple, Amazon.com, Facebook, and Microsoft Corporation (Value.Today, n.d.). After that, you would still have a few million dollars left in the bank for ice cream and sports cars. USD 8.5 trillion is the amount of health spending for one year; it is a massive amount of money (Fullman et al., 2017).

1.1 Global Trends in Health Spending

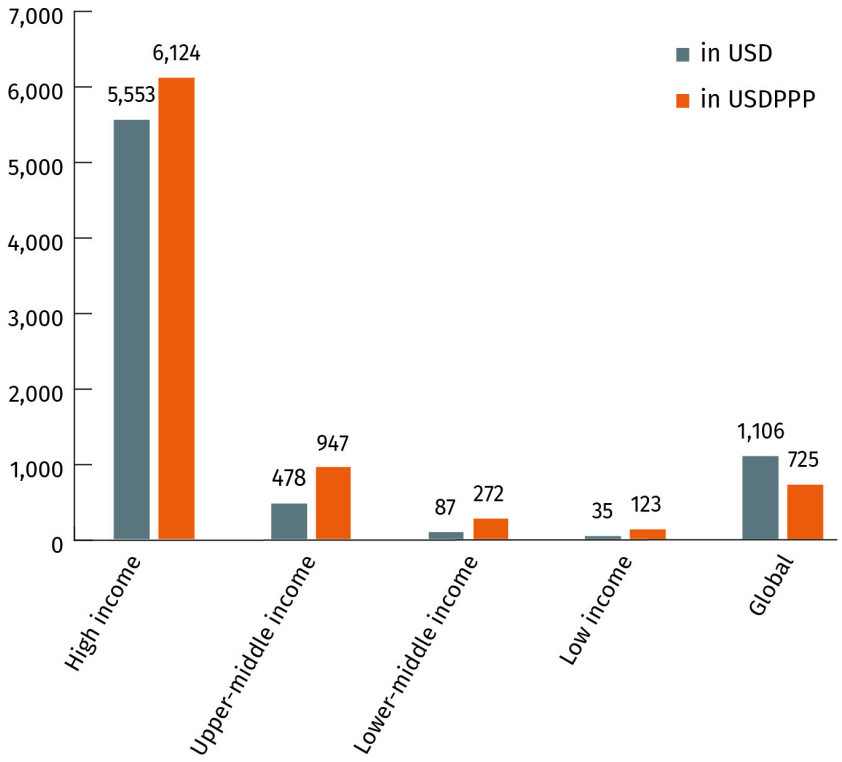
In movies about organized crime, the culprits are often tracked and found by following a money flow. Similarly, in health systems, looking at where funds are spent and how spending is projected to change can yield interesting insights about countries' priorities regarding health, inefficiencies, allocation problems, and risks.

Global Health Spending

If the global funds for healthcare were distributed evenly across the entire population, spending would have been USD 1,106 per person (per capita) in 2018 (Institute for Health Metrics and Evaluation, 2021). However, the reality is not so balanced. If we look at the average per capita health spending in countries with different income levels (World Bank Income Groups), we see a large discrepancy, as shown in the figure below.

World Bank Income Groups classify 218 countries into four income groups based on their Gross National Income (GNI) per capita in USD. For the 2018 data presented here, the thresholds were less than or equal to USD 1,025 for low income, USD 1,026–3,995 for lower middle income, USD 3,996–12,375 for upper-middle income, and more than USD 12,375 for high income. The thresholds for classification and assignment of countries to classes are updated annually (The World Bank, n.d.-a).

Figure 1: Average Health Spending per Capita by World Bank Income Group (2018)



Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation (2022b). Used with permission. All rights reserved.

Per-capita spending in high-income countries is at least five times higher than the global average, and at least 150 times higher than in low-income countries. The figure above shows the average health spending per capita in USD and USD **Purchasing Power Parity** (USDPPP) in 2018 (Institute for Health Metrics and Evaluation, 2022b).

Purchasing Power Parity
This is a special currency conversion rate that tries to balance the purchasing powers of different currencies. If a standard bucket of goods and services can be purchased for less money in one country than another, the purchasing power in this country is higher.

Funding Sources for Health Spending

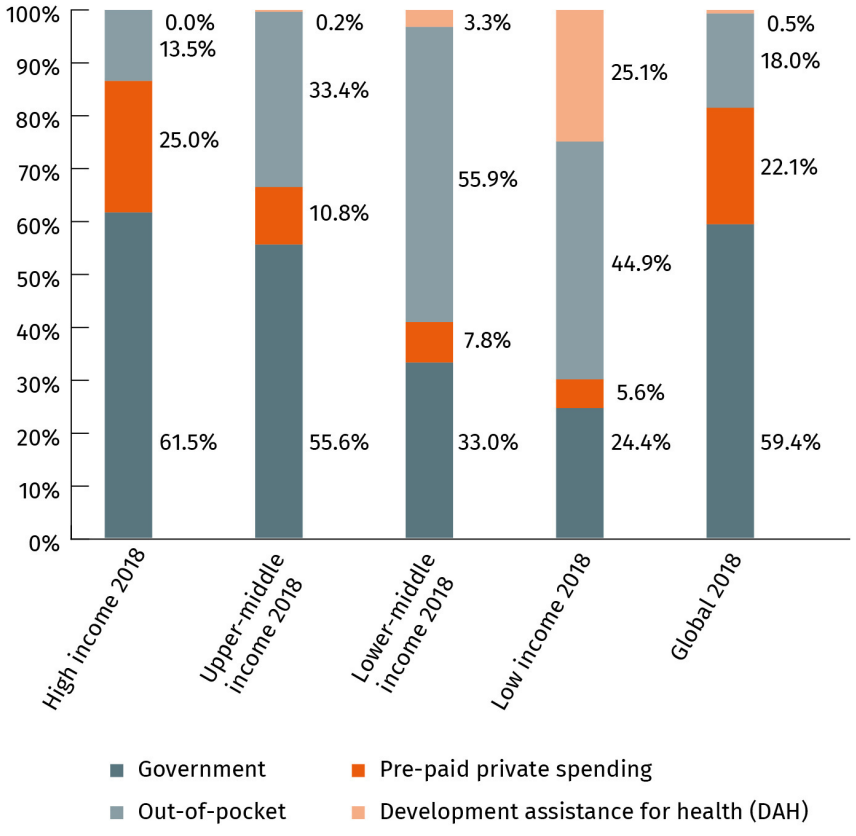
What makes up global health spending? When measuring health expenditure, analysts often look at current health expenditure, which does not include investment. They also assign health spending to four distinct categories based on the source of funding (Dieleman et al., 2018):

1. Government health spending from domestic sources. This includes tax money assigned to healthcare and social health insurance (SHI) provisions.
2. Out-of-pocket health spending. This includes all payments made at the point of health service, including co-payments.

3. Development assistance for health (DAH) spending. This includes all financial and in-kind transfer of resources from supranational organizations to low- and middle-income countries with the primary intent of improving health.
4. Pre-paid private health spending. This includes private health insurance and non-governmental organizations (NGOs) spending.

Government health spending is the largest funding source for health services globally. In 2018, it was 60 percent of total health spending, as shown in the figure below. Pre-paid private spending is the second largest source of funding at 22.1 percent of total health spending, and out-of-pocket spending makes up 18 percent of global spending. Development assistance for health is small on a global scale, but contributes to 25 percent of health funding in low-income countries (Institute for Health Metrics and Evaluation, 2021, 2022b).

Figure 2: Share of Health Service Financing by Funding Source and World Bank Income Group (2018)



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Access to Health Services

Another important perspective for the assessment of global health funding is how accessible it makes healthcare for the population. If we only look at average health spending, we cannot determine whether the funds are used appropriately and to what extent they facilitate better health services and outcomes.

In 2015, all members of the United Nations (UN) committed to the 2030 agenda for sustainable development. This blueprint aims to foster human and planetary peace and prosperity. At the heart of this agenda are 17 sustainable development goals (SDGs). Goal three, "health and well-being," is to ensure healthy lives and promote well-being for everyone (United Nations Department of Economic and Social Affairs, n.d.). This joint commitment puts pressure on nations to improve population health.

One target that the UN sets for themselves in the frame of SDGs is Universal Health Coverage (UHC), which means that health services are accessible to everyone without leading to the risk of poverty (World Health Organization, 2021b). Countries that move closer to UHC will also improve on other health-related goals. Good population health facilitates learning for kids and earning for adults, ultimately leading to long-term economic improvements (United Nations Department of Economic and Social Affairs, n.d.).

UHC is measured with the UHC index, which is based on 41 inputs: nine health interventions plus the risk-standardized death rates for 32 causes changeable by healthcare (Fullman et al., 2017). The UHC index aims to capture a wide range of essential health services. It looks at

- vaccination coverage for diphtheria.
- pertussis.
- tetanus and polio.
- access to modern contraceptives.
- prenatal care.
- birth assistance by skilled personnel and in-facility delivery.
- coverage of medicines to treat HIV.

The causes of death are components of the Healthcare Access and Quality (HAQ) index. They include

- tuberculosis,
- diarrhea,
- respiratory infections,
- diphtheria,
- tetanus,
- measles,
- different types of cancer,
- heart and cardiovascular disease,
- diabetes,
- epilepsy,

- chronic kidney disease, and
- adverse effects of medical treatment.

The 41 inputs are scaled from 0 to 100, with 0 representing the lowest and 100 the highest observed levels between 1990 and 2016 (Fullman et al., 2017). In 2016, the highest UHC index performances were achieved by Finland, Iceland, and Switzerland, followed by Japan, Norway, and Sweden (all ≥98). The lowest UHC index performances occurred in Afghanistan, the Central African Republic, and Somalia (all ≤5). Chad, Guinea-Bissau, and South Sudan had slightly higher, but still poor, performances (all <20; Fullman et al., 2017).

1.2 Burden of Disease and Domestic Health Spending

Health spending is different from commercial investment. Commercial investments usually have the primary objective of providing financial gains to the investor, be it short- or long-term, whereas the intention of health spending is to improve health. Therefore, it is important to assess domestic health spending in the context of how well a country can solve the health problems it faces. The health problems in a country can be operationalized by calculating the burden of disease.

The Concept of "Burden of Disease"

Burden of disease is a conceptual framework developed in the 1990s by a collaboration of the Harvard School of Public Health, the World Bank, and the World Health Organization (Murray & Lopez, 1996). Burden of disease describes death and loss of health due to disease, injury, and risk factors. The burden of a specific illness is computed by combining the following:

- years of life lost (YLL). This is the number of years a person loses by dying prematurely due to an illness.
- years of life lived with disability (YLD). This is the number of years a person lives with impaired health (disability) because of an illness.

The YLD calculation uses disability weights (DW). DW values range between >0 and <1. Higher DW values indicate a higher level of disability caused by a specific condition. The DW of Alzheimer's disease is higher than the DW for a fractured femur, for example. To calculate YLD for a condition, the DW is multiplied by the number of incident cases in the population and the average duration of the case until remission or death.

Adding YLL and YLD leads to a single figure approximation of the burden of disease, called disability-adjusted life year (DALY). One DALY equals the loss of one year of life lived in full health. DALYs allow an evaluation of the toll certain diseases take on a population, i.e., the burden of disease. DALYs creates a currency for the burden of disease, and they can be added or subtracted for different illnesses, populations, and regions.

The Global Burden of Diseases, Injuries, and Risk Factors study (GBD) 2019 conducted a systematic scientific evaluation of the global burden of disease. It evaluates **incidence, prevalence**, **mortality**, YLLs, YLDs, and DALYs for a comprehensive list of 369 illnesses and injuries and 204 geographies. GBD 2019 uses different types of input data, including the following (Vos et al., 2020):

- censuses
- household surveys
- civil and vital statistics
- disease registries
- statistics on health service utilization
- environmental statistics
- satellite images

Incidence, prevalence
These are epidemiological parameters to measure frequency of illness. Incidence measures new cases of illness or injury in a population over a specified period, and prevalence reports all existing cases in a population at a specific point in time or during a specific period.

Mortality
This is an epidemiological parameter used to capture death rates. Mortality rates measure the share of deaths in a population during a specific period.

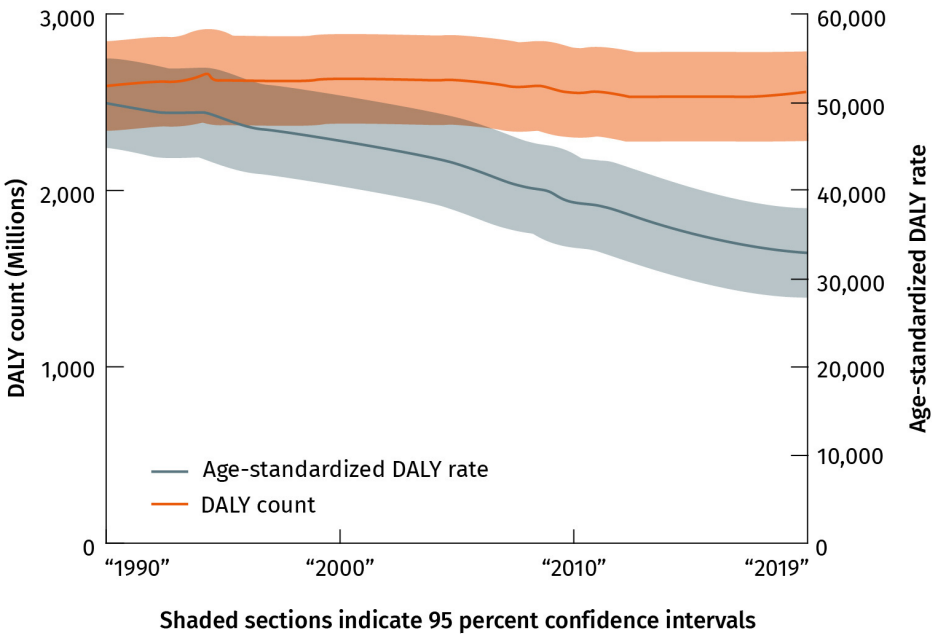
Disease Burden over Time

Between 1990 and 2019, the total number of crude DALYs remained almost unchanged (Vos et al., 2020). However, during these almost 30 years, the global population and average life expectancy increased. When researchers adjusted for these factors, the resulting age adjusted DALYs showed a steady decline of approximately 1.3 percent per annum (p. a.) between 1990 and 2020, i.e., a reduction of the burden of disease (Vos et al., 2020).

GBD allows a closer look at individual causes contributing to the global burden of disease. The declining rate in age-standardized DALYs in the past decades is driven by a complex set of different trends. The strongest decline in DALYs was observed in young children aged 0–9 years (1990–2010: -2.5 percent p. a., 2010–2019: -4.0 percent p. a.). This is very good news. It means that fewer children are sick or dying young. For older adults aged 50–74 years, however, the decline in burden of disease remained constant and even slowed down slightly between 2010–2019 (Vos et al., 2020). This means that health improvements made with technological innovation and public health programs, for example, are countered by an increase in **non-communicable diseases** (NCDs).

Non-communicable diseases
NCDs, also known as chronic diseases, tend to have longer durations and are caused by a combination of genetic, physiological, environmental, and behavioral factors. Major types of NCDs are cardiovascular illnesses, such as strokes and heart attacks; cancers; chronic respiratory illnesses, like chronic obstructive pulmonary disease (COPD) and asthma; and diabetes mellitus.

Figure 3: Global Crude DALYs and Age-Adjusted DALY Rates (per 100,000 Individuals)

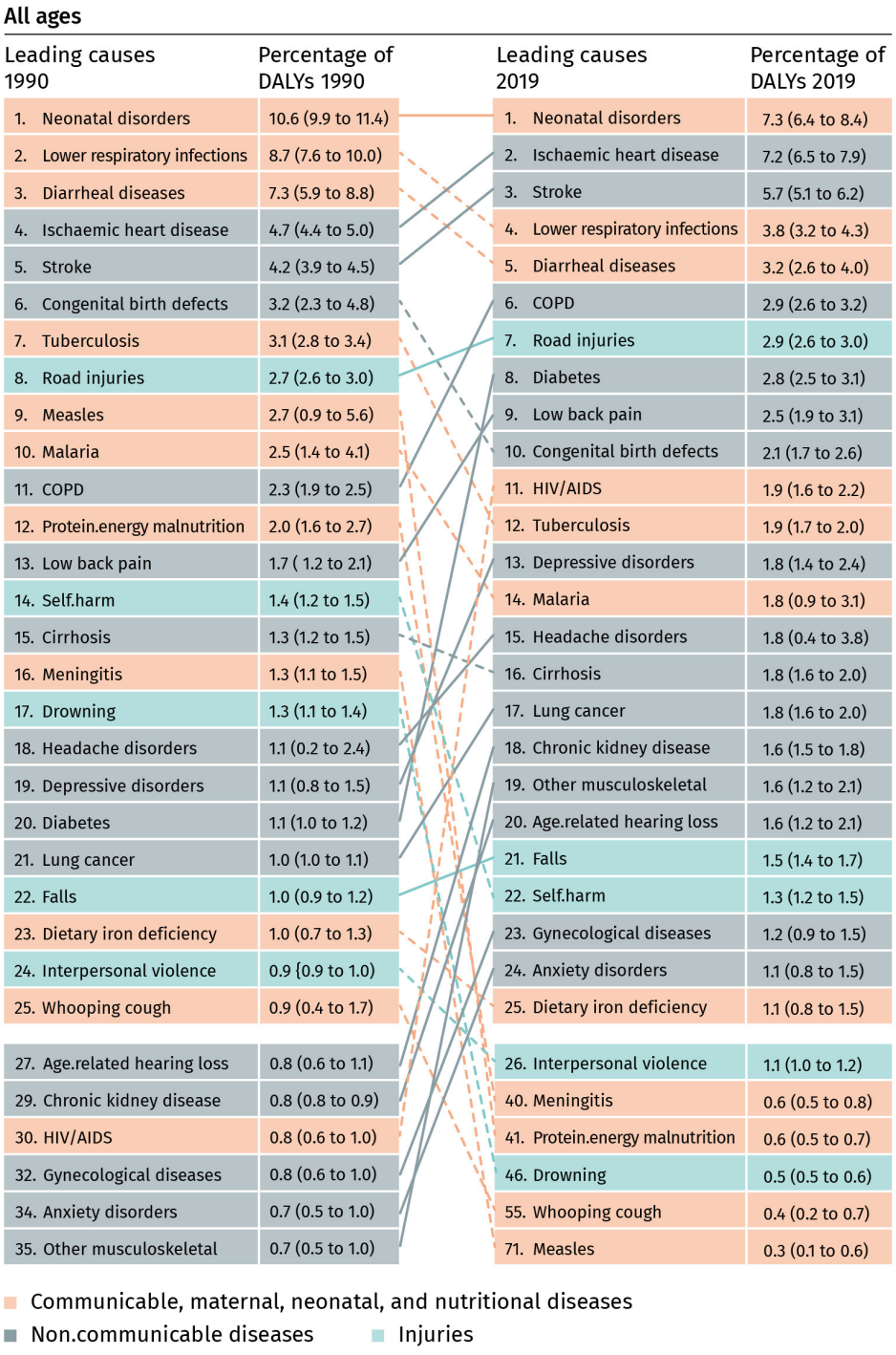


Source: Vos et al. (2020). CC BY 4.0.

The Epidemiological Transition

When we look at the leading contributors of DALY globally (for all ages and sexes, based on the percentage of total DALYs) we can observe an interesting shift: The burden of disease from communicable diseases, e.g., lower respiratory infections, tuberculosis, measles, and malaria, is declining. However, the burden of disease from non-communicable diseases, such as ischemic heart disease, stroke, and chronic obstructive pulmonary disease (COPD), is rising (Vos et al., 2020). The long-term shift in major causes of morbidity and mortality from infectious diseases to degenerative, non-communicable, and human-made diseases is called epidemiological transition (Omran, 2005). The figure below shows how the leading causes of global DALYs changed between 1990 and 2019.

Figure 4: Leading Causes of Global DALYs and Percentage of Total DALYs 1990—2019 (Two Sexes, All Ages)



Source: Vos et al. (2020). CC BY 4.0.

The ten strongest contributors to an increasing burden of disease (largest increase of DALYs between 1990 and 2019) were as follows (Vos et al., 2020):

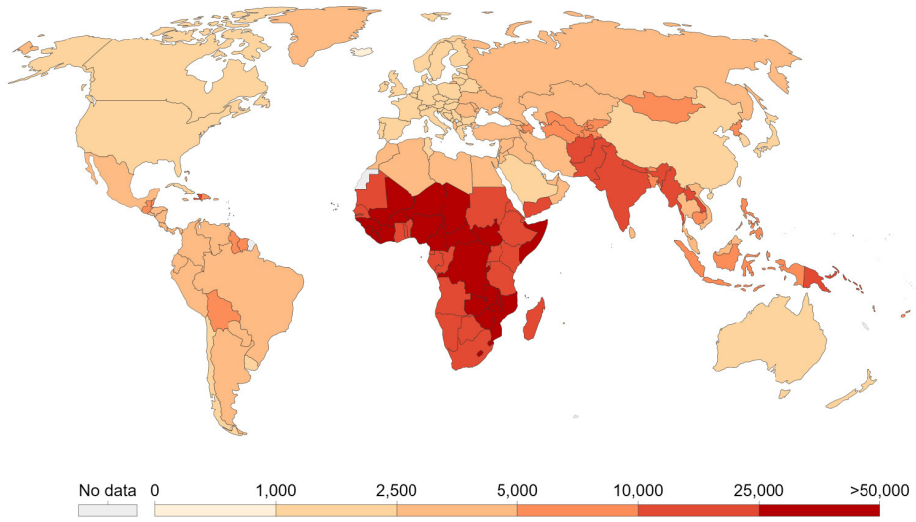
- six causes primarily affecting older adults (ischemic heart disease, diabetes mellitus, stroke, chronic kidney disease, lung carcinoma, and age-related loss of hearing)
- four causes common from adolescence to older age (HIV/AIDS, lower back pain, other musculoskeletal disorders, and depressive disorders)

Three of these indications have seen very strong DALY growth over the past decades: HIV/AIDS (+59 percent), other musculoskeletal disorders (+31 percent), and diabetes mellitus (+24 percent). However, there is some good news about HIV/AIDS: Its burden of disease peaked in 2004 and decreased substantially since then after provision of antiretroviral medication was scaled up globally (Vos et al., 2020).

Disease Burden by Geography

The burden of disease varies between countries. The figure below illustrates the burden of disease from communicable, neonatal, maternal, and nutritional illnesses. A darker color indicates a higher burden of disease.

Figure 5: DALY Rates per 100,000 Individuals for Communicable, Neonatal, Maternal, and Nutritional Diseases (2017)



Source: Rosner & Ritchie (2016). CC BY 4.0.

The figure shows that the burden of disease from these illnesses is >10 fold in Sub-Saharan Africa compared to most other countries in the world.

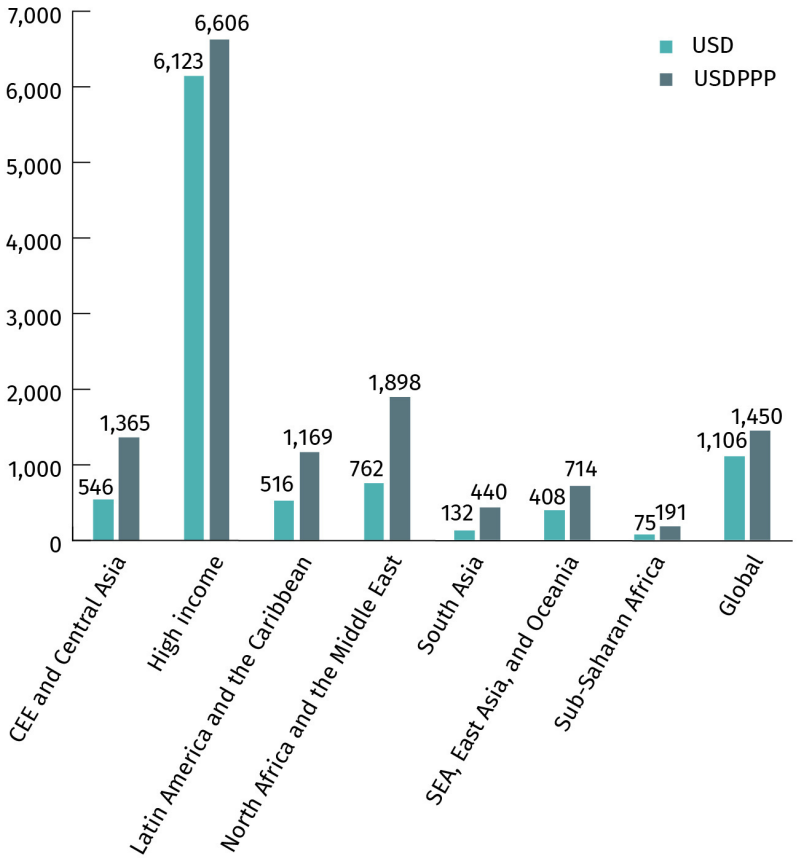
For NCDs, the global picture looks very different, as they are a global problem with high burdens of disease in South and North America, Africa, Europe, and Asia (Rosner & Ritchie, 2016).

Domestic Health Spending

Health spending varies greatly between countries. The following figure shows domestic health spending, split by the **GBD super regions**. High-income regions, such as Australia, Western Europe, and North America, spend more than five times as much on health services than the global average, and the lowest spending is observed in South Asia and Sub-Saharan Africa. Higher purchasing power in some areas like South Asia slightly improves the funding situation.

GBD super regions
The seven GBD regions are part of the GBD regional classification system and were created based on two criteria: epidemiological similarity and geographic proximity. The seven super regions are further divided into 21 GBD regions.

Figure 6: Health Spending per Capita by GBD Super Region (2018)



Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation (2021).

1.3 Government Health Spending

Government health spending refers to expenditures that are pulled primarily from domestic sources. Government spending funds the infrastructure of the public health system and the expenditures of social health insurance provided by the government (Institute for Health Metrics and Evaluation, 2021).

Government spending is the largest source of funding for health systems. In 2018, 59.4 percent of the global health funding came from government spending (Institute for Health Metrics and Evaluation, 2022b). In lower-income countries, the share of government funding for total health spending is much lower than in higher-income countries. Low government contribution requires people to find the money to pay for their healthcare out of pocket or forego care altogether. Development assistance for health (DAH) organizations aim to counter these risks for undertreatment and poverty with their funding and health programs. In 2018, 25 percent of total health spending in low-income countries came from DAH funding (Institute for Health Metrics and Evaluation, 2022b).

Types of Government Funding

Government health spending comes from two main sources (Chang et al., 2019):

1. Taxes (national health service)
2. Employer-employee contributions (social health insurance)

A prominent example of a tax-based, centralized, single-payer health system is the national health service. These systems are primarily funded with tax payments. Funds are usually allocated to providers via budgets, sometimes based on how many people a healthcare provider needs to take care of or how many health providers are available to the population (Mills et al., 2018). National health service models are also called Beveridge models. They were first established in 1948 in the United Kingdom (UK) and named after Sir William Beveridge (Chung, 2017). Examples of national health service models today are those in New Zealand, Spain, and the United Kingdom.

Employer-employee contributions are the major source of funding in social health insurance systems. These systems are financed by compulsory contributions from both parties to sickness funds. This type of health system originally emerged from small, voluntary groups, like workers' councils, that were trying to shoulder the financial risks of illness collectively (Mills et al., 2018). Social health insurance systems are also called Bismarck models. They were first created in Germany in 1883 and named after German chancellor Otto von Bismarck (Chung, 2017). Examples of Bismarck models today are the health systems in Belgium, Germany, Japan, and Switzerland.

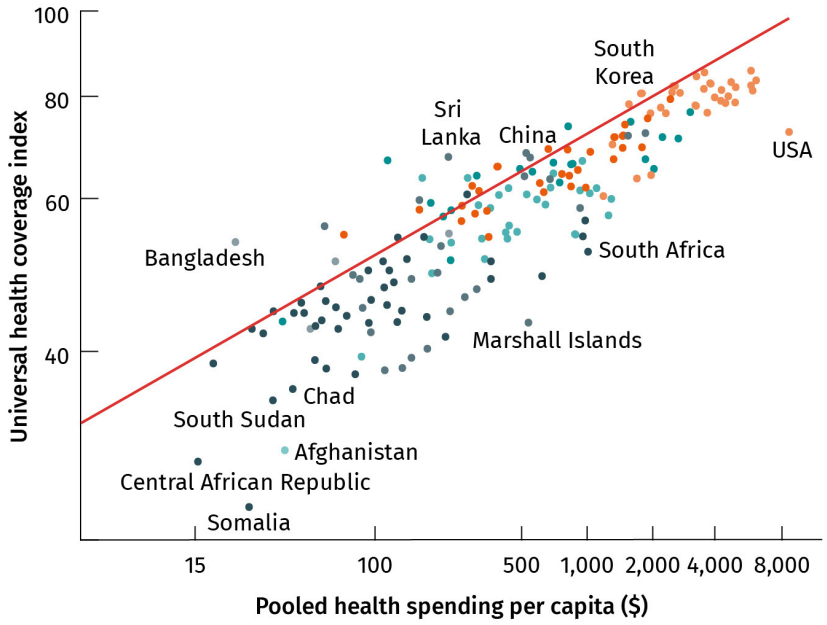
National and social health insurance models are most common in higher-income countries where governments have sufficient funds and infrastructure to set up comprehensive healthcare. Lower-income countries might derive some health service funding from taxes or employer-employee contributions, but are unable to create a functioning health system

with this income. In those countries, people purchase private insurance if they can afford it. Otherwise, they must rely on DAH contributions or try to pay for healthcare out of pocket.

Government funding from tax revenues or mandatory health insurance is a part of the pooled health resources. **Pooled resources** or pooled funding includes all funds that are not paid out-of-pocket (Savedoff et al., 2012).

Pooled resources
These are resources that are aggregated for a group of people or an entire population, which can originate from public or private sources. Pooled resources include all funds that are not out-of-pocket payments by individuals to healthcare providers.

Figure 7: Correlation between Pooled Health Spending and UHC Index



Pooled health spending per capita for 2015 is measured in 2017 purchasing-power-parity-adjusted dollars adjusted for inflation. The red line represents the fitted frontier value of the universal health coverage index fitted using data from 1995 through 2015. Each dot represents a country color-coded by Global Burden of Disease (GBD) super region.

- Central Europe, Eastern Europe, and Central Asia
- GBD high income
- Latin America and Caribbean
- North Africa and Middle East
- South Asia
- Southeast Asia, East Asia, and Oceania
- Sub-Saharan Africa

Source: Dieleman et al. (2018). CC BY 4.0.

Inversely, higher out-of-pocket contributions correspond with lower UHC index values. This highlights the importance of health financing composition, as well as funding amounts or growth rates.

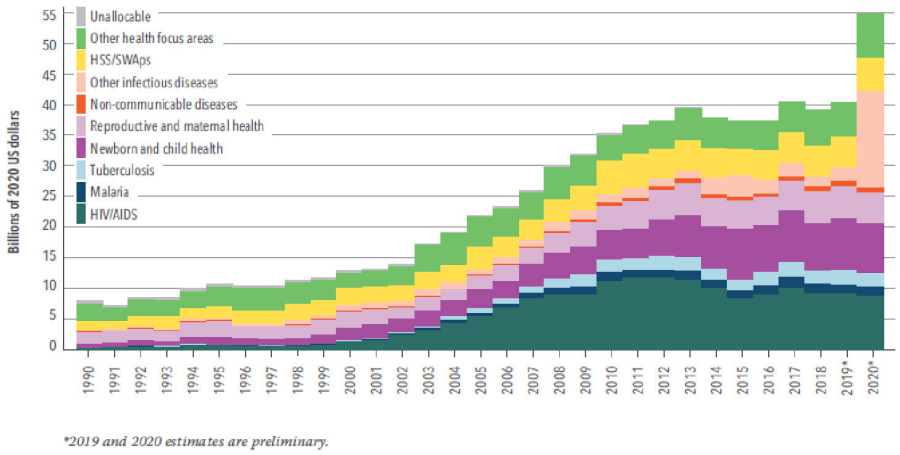
In this context, the health financing transition has emerged as a theory. It describes the gradual turn in the amount and source of health funding observed in different countries over time. At the beginning of this transition, countries usually have low per capita spending for health services, primarily out-of-pocket or provided by DAH organizations. Over time, countries transition to higher per capita health spending and government contribution to health service funding (Chang et al., 2019).

Government Spending Projection

It takes time to collect and consolidate global health financing information. Therefore, the Institute for Health Metrics and Evaluation's (IHME) latest actual data are from 2018, two years before the COVID-19 pandemic hit the world in 2020. Health systems needed to respond quickly to emerging knowledge about the virus; implement safety protocols; and roll out new testing, tracing, prevention, and treatment schemes. As a result of this increase in demand for COVID-19 related health services, the demand for other health services changed. People delayed elective appointments and stopped treatment out of fear of infection or lack of funding. Other conditions, like mental illness, spiked due to the pandemic; gross domestic products (GDPs) contracted; and governments needed to support the struggling economy with borrowed, donated, or redirected funds (Institute for Health Metrics and Evaluation, 2021).

The IHME's latest health spending forecast includes considerations for the impact of COVID-19 on health financing in the future. Global government health spending, for example, increased by 18 percent (USD 912 billion) between 2019 and 2020. The share of government spending of total health spending jumped from approximately 60 percent in 2018 to 64 percent in 2020 and 2021. Total health expenditure increased by USD 757 billion, i.e., less than government health expenditure. This indicates that the COVID-19 induced spending increase pulled funding from other areas that likely remained underserved as a result. Another COVID-19 induced spike occurred in thedevelopment assistance for health: Between 2019 and 2020, DAH funding increased by 35.7 percent. Approximately USD 13.7 billion in DAH funding was mobilized for COVID-19 (Institute for Health Metrics and Evaluation, 2021).

Figure 8: Development Assistance for Health by Health Focus Area (1990–2020)



Source: Institute for Health Metrics and Evaluation (2021). CC BY 4.0.

A longer-term outlook of IHME's baseline projection shows that health spending will return to the same level, or below, pre-COVID-19 trajectories. Global government spending per total health spending, for example, will return to approximately 60 percent after 2023, and gradually decrease to 56 percent in 2050. Total health spending is forecasted to reach USD 9.9 trillion in 2030 (pre-COVID-19 predictions were USD 10.6 trillion) and USD 14.4 trillion in 2050 (pre-COVID-19 predictions were USD 14.3 trillion; Institute for Health Metrics and Evaluation, 2021, 2022a).

The experts at the IHME wanted to evaluate the financial implications of country policy and programs to improve population health, triggered by sustainable development goal (SDG) compliance or other programs. They conducted a scenario analysis with upsides for global health spending in addition to the conservative base model presented above. Two scenarios were included (Chang et al., 2019):

1. Increased priority and spending for the health sector
2. Increased priority and spending for the health sector, and increased overall government spending

These scenarios estimate the additional funding countries could activate if governments increased their overall spending and put more emphasis on the health sector. Compared to the base case, scenario one could increase health spending per capita by USD 229 in 2050. In scenario two, the increase is USD 617, relative to the base case. In some countries, this spending increase more than doubles the projected health expenditure per capita. These potential upsides are proportionally larger in low- (scenario one: +USD 35, scenario two: +USD 79) and lower-middle-income countries (scenario one: +USD 172, scenario two: +USD 354) with low baseline spending. These results suggest that increased prioritization

of the health sector and higher government health spending could lead to more than double the health spending per capita, with greater positive effects on outcomes and access for countries with the lowest levels of government health spending (Chang et al., 2019).

SUMMARY

Global health spending was USD 8.5 trillion in 2018, or 9.9 percent of the global economy, and an average per capita spending of USD 1,106. In reality, per capita funding is much less homogenous, but it is more than 150 times higher in high-income countries than in low-income countries. This disparity is forecast to increase even more by 2050 (Institute for Health Metrics and Evaluation, 2021, 2022a).

There are four sources of health funding: government health spending, out-of-pocket health spending, DAH, and pre-paid private health spending. DAH is most important for low-income countries where it contributes 25 percent of total health spending.

Health spending is forecast to increase at an average rate of 1.67 percent p.a. by 2050, with higher growth rates in lower-income countries. Absolute spending grows stronger in high-income countries with higher baseline funding. Globally, health spending is projected to grow slightly above the economy.

The burden of disease concept creates a currency for death and loss of health. It is measured with disability-adjusted life years (DALYs). Age-standardized DALYs have declined in the past three decades, especially for young children. Today, DALY growth is no longer mainly driven by infectious diseases, but rather by non-communicable, chronic illnesses (epidemiological transition).

Government spending is the largest contributor to global health spending (60 percent). It is mainly funded by taxes and employer-employee contributions to sickness funds. Health spending is correlated with access to healthcare. The universal health coverage (UHC) index is higher for countries with higher (pooled) health spending.

During the COVID-19 pandemic, health spending spiked to fund the additional need for health services. Between 2019 and 2020, government health spending and DAH funding increased by 18 and 36 percent, respectively. After 2023, health spending is projected to return to pre-COVID-19 patterns.

UNIT 2

FINANCING HEALTHCARE

STUDY GOALS

On completion of this unit, you will be able to ...

- explain and differentiate revenue raising, risk pooling, and resource allocation.
- list funding sources, contribution mechanisms, and collecting agencies for health funds.
- describe the four most common risk pooling systems in healthcare.
- compare and explain active and passive procurement.
- explain the rationale for risk pooling in health financing.
- understand the process and incentive structures for health service provision.

2. FINANCING HEALTHCARE

Introduction

How does the healthcare money reach the point of service? Some health services are paid for out of pocket, meaning the patient pays their doctor directly. Out-of-pocket payment is expensive but easy. However, most health services are paid for with pooled resources. These funds are often moved and allocated based on specific principles, laws, or priorities.

To better understand the flow of pooled funds, we can use an analogy of the water cycle and its four major steps: evaporation, condensation, precipitation, and collection. Health funds follow a similar flow, but whether or not this constitutes a full cycle is up for debate.

In the first step of the water cycle, moisture evaporates from seas and moist land areas into the sky. Similarly, health revenue raising occurs from different sources, e.g., taxes or employer-employee contributions. In the second step of the water cycle, the evaporated water condensates in clouds that get increasingly heavier. In health service financing, this resembles the step of risk pooling where money from different sources is combined into big funds, e.g., sickness funds in social health insurance. The third step of the water cycle is precipitation. Rain, snow, and hail bring the water back to the earth. However, the water is not poured out evenly across the earth; it hits different pockets of land at different times with different intensities. The health funding equivalent to precipitation is resource allocation or purchasing. In this step, funding gets assigned to different health services, sectors, or providers. Collection is the last step of the water cycle, in which water is taken and used for drinking, watering crops, etc. In healthcare, this step is the equivalent of providing services. Health services are provided to the population using the available funds, based on the applicable policies for health benefit design, rationing, and entitlement.

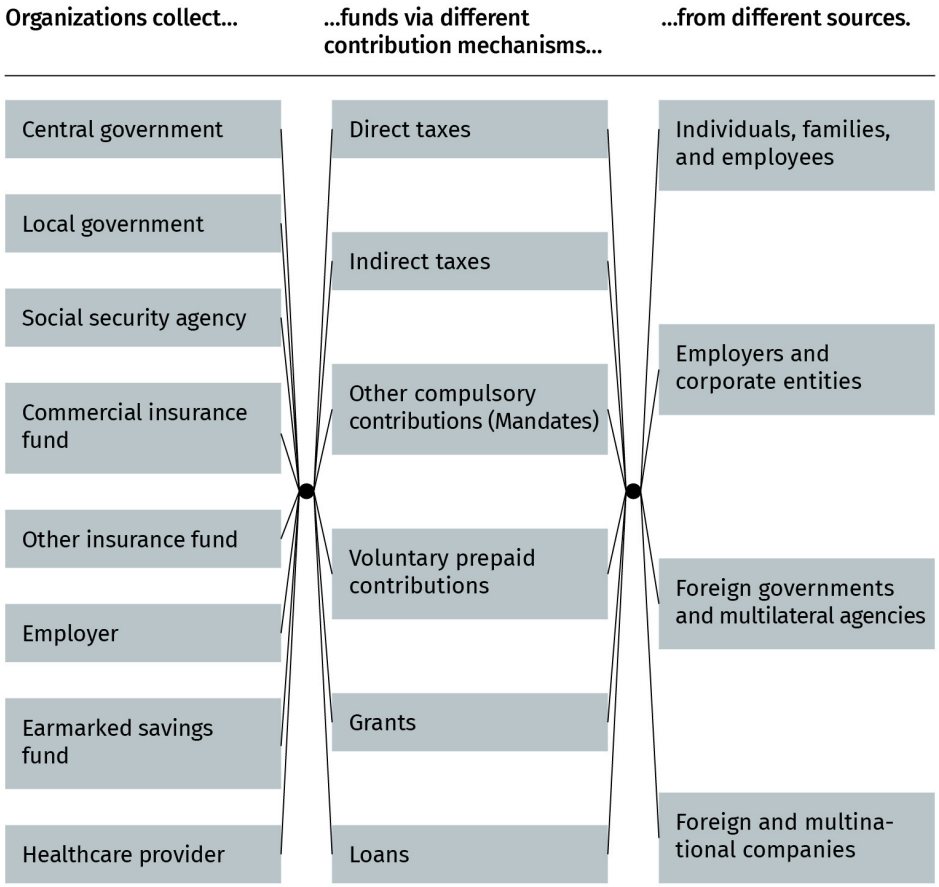
2.1 Revenue Raising

Revenue raising is the process of collecting funding for health services from different sources.

Source of Funds

The following figure shows the different funding sources, contribution mechanisms, and collecting agencies for raising pre-paid revenues for healthcare. This section focuses on pooled funds for healthcare and includes all funding for health services that is not out-of-pocket payments.

Figure 9: Pre-Paid Funding Sources, Contribution Mechanisms, and Collecting Organizations



Source: Sophie Brenner (2022), based on Kutzin (2001).

Apart from foreign donors, the domestic population and local enterprises are the initial source of all funds for health services. They pay direct or indirect taxes, contributions to social health insurance, and premiums to private health insurance (Kutzin, 2001).

What is often referred to a "source of funds" for health services is a combination of a source, a contribution mechanism, and a collecting organization. The following are three examples of sources of funds based on the previous figure:

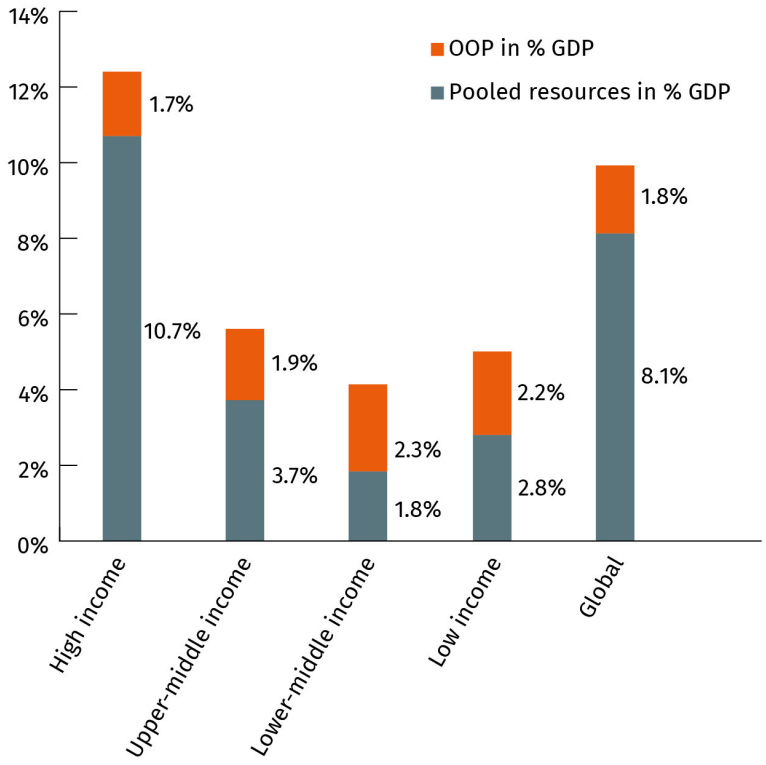
1. In national health insurance systems, the central government collects **direct taxes** from individuals and corporate entities.
2. In social health insurance systems, the social security agency collects compulsory contributions to sickness funds from employers and employees.
3. In private health insurance, a commercial insurance fund collects voluntary prepaid contributions (premiums) from individuals.

Direct taxes
These are mandatory payments by individuals or organizations directly to the government entity that levied the tax. They include income taxes, property taxes, and taxes on assets.

Comparison of Funding Levels

The amount of pooled revenues differs greatly between countries, both in absolute values and percentage of gross domestic product (GDP). The figure below shows the share of pooled resources versus out-of-pocket spending for different groups of countries. We can see that out-of-pocket spending is roughly two percent of GDP in all groups. However, those two percent are more than 50 percent of the total health spending in low-income countries, and only 13 percent in high-income countries. Therefore, low-income countries are not only able to collect fewer total funds from pooled resources, but they also collect fewer pooled funds relative to their GDP (Institute for Health Metrics and Evaluation, 2022b).

Figure 10: Share of Pooled Funding 2018 per GDP



Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation(2022b). Used with permission. All rights reserved.

Levers to Increase Funding

The most immediate way to increase the share and amount of pooled resources is to assign more public revenues to healthcare, either by reallocating funds from other public budgets or increasing overall public spending. However, even if there is political will to redirect funds to prioritize the health sector, the monetary impact is likely minimal, as the amount of health funding is closely linked to overall public funding. Big health funding

thus requires big public funds. Therefore, increasing health funding is especially difficult for low-income countries. The following are examples of specific challenges for these countries related to raising tax revenues (Gottret & Schieber, 2006):

- small size and growth rate of the economy
- large informal sector with difficult-to-trace revenues
- large number of small-scale entrepreneurs receiving in-kind revenues
- unstable, unpredictable pricing of commodities (e.g., crops and minerals)
- domestic **dualism** leading to income inequality, high tax burden, and tax avoidance
- largest enterprises often being government- or foreign-owned
- illiteracy and poor accounting practices limiting taxation of income and profits
- limited capacity for tax administration

Dualism
Internationally, dualism refers to the long-term economic and developmental gap between wealthier and poorer nations. Domestically, dualism refers to different living standards within a country, e.g., modern urban and traditional rural sectors.

Instead of or in addition to direct taxes, countries can raise **indirect taxes** to increase funding for the health system. Indirect taxation is mostly based on consumption; people with lower income tend to spend a higher share of their income on consumption. Therefore, raising indirect taxes can disproportionally burden people with lower income, which constitutes a regressive tax burden (Kutzin, 2001).

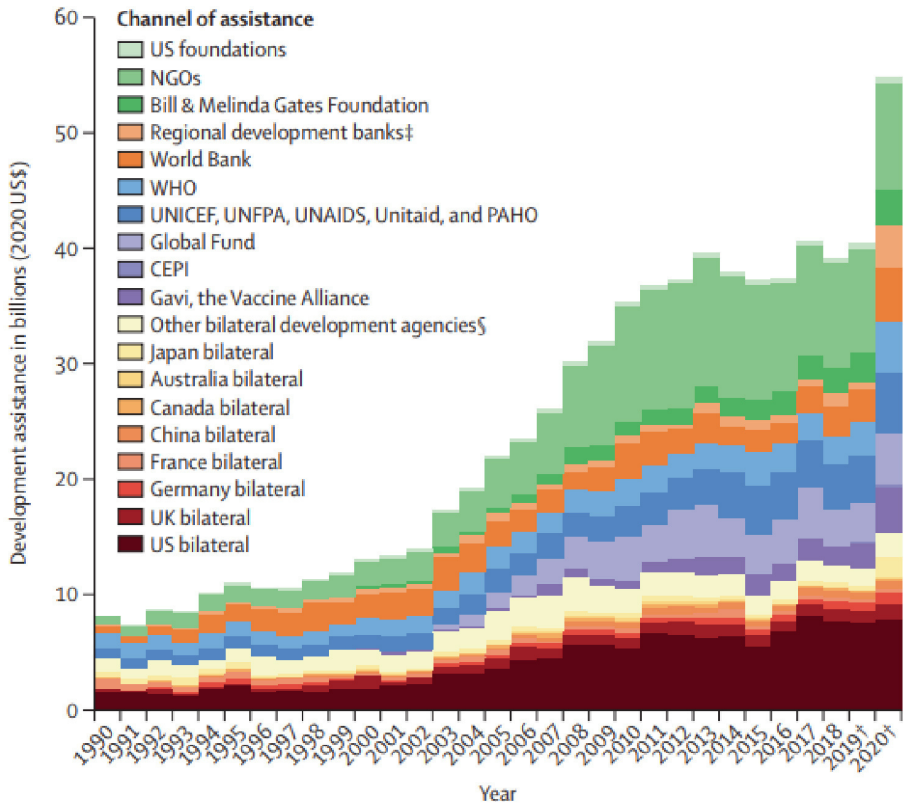
Indirect taxes
These are taxes that are levied based on consumption of the seller, but they are paid by the buyer. Indirect taxes include sales, value-added (VAT), excise, and import.

Another way to increase pooled revenues is to create or expand mandatory insurance contributions, such as social or mandatory private health insurance. Mandatory insurance schemes depend on the economy and labor market. During recession and rising unemployment, introducing or increasing mandatory contributions is difficult. When employers bear the costs for these contributions, raising them increases labor costs and might discourage employment and economic growth. Governments and health policy makers must choose adjustments to mandatory insurance carefully if they want to avoid these changes backfiring on the economy (Kutzin, 2001).

Overall, countries' ability to increase pooled funding expands as the economy grows. Larger economies tend to be more formalized, have more solvent individuals and businesses, and be more capable of collecting taxes (Gottret & Schieber, 2006). However, increased government spending is not always translated into increased health funding. A recent analysis compared the change of government spending between 2000 and 2017, and the change in health priority for several countries. Many countries, like Vietnam, increased the share of health spending as their economy grew. Others, like Mongolia, increased government spending but reduced the share for health in the public budget (World Health Organization, 2020).

In lieu of or in addition to raising mandatory funding, health systems can try to increase voluntary funding through grants and loans, the difference being that loans must be paid back with interest, whereas grants are essentially gifts. These funds are part of development assistance for health (DAH). DAH funding specifically targets lower-income countries and is usually tied to a specific program (e.g., pandemic preparedness or health system strengthening) or disease area (e.g., HIV/AIDS, newborn and child health, or COVID-19; Micah et al., 2021). The main funding sources for DAH for health in 2020 came from the US and the UK, as well as the Bill & Melinda Gates Foundation (Micah et al., 2021). Major disbursing organizations for DAH funds were US bilateral organizations, non-governmental organizations (NGOs), and the World Bank.

Figure 11: DAH Funding for Health by Channel of Assistance (1990–2020)



Source: Micah et al. (2021). CC BY 4.0.

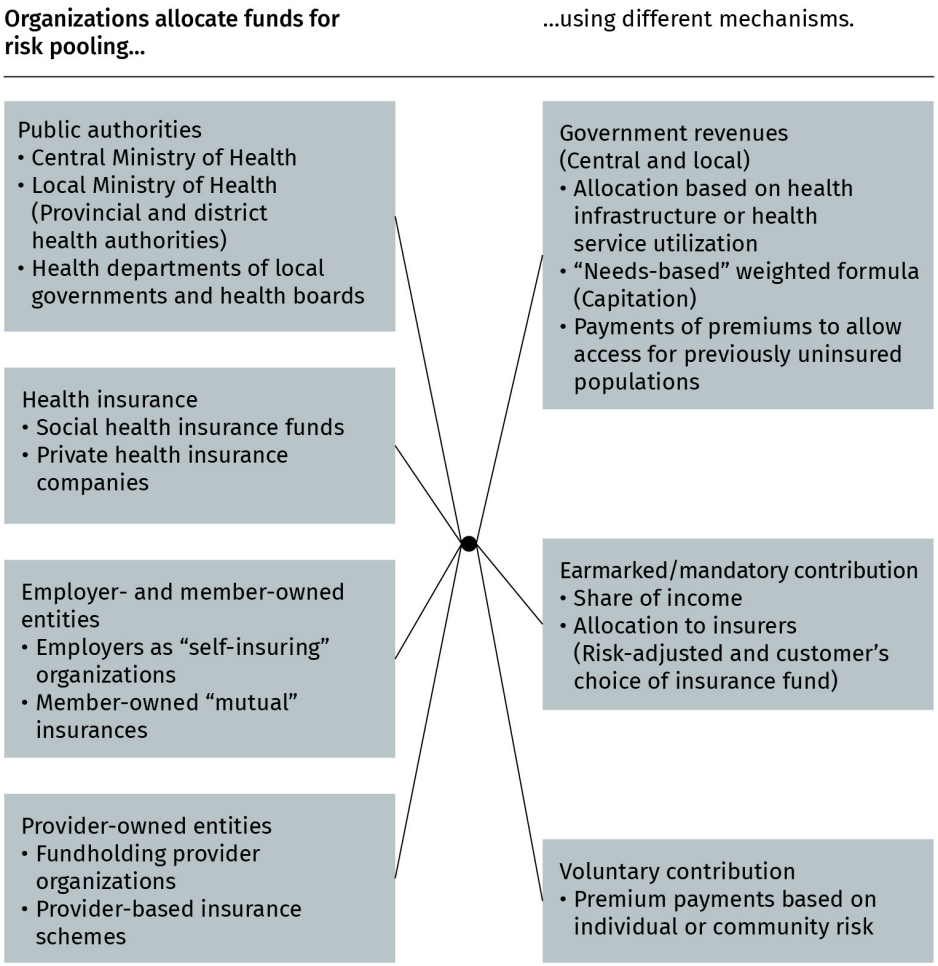
2.2 Risk Pooling

Risk pooling is the aggregation of pre-paid health funds for a specific population. Sometimes, funds are pooled for the entire population of a region or country, and sometimes only for different groups of individuals (Kutzin, 2001). Pooled funds are no longer tied to an individual, but rather accumulated for the joint benefit of all participants who share the financial risks of health, hence the term “risk pooling.” This collective perspective differentiates between risk pooling and revenue raising; however, raised revenues may still be assigned to an individual and not shared across a population, e.g., in the case of a medical savings account (Murray & Frenk, 2000).

Risk Pooling Mechanisms

The following figure shows examples of risk pooling organizations and mechanisms.

Figure 12: Risk Pooling Organizations and Mechanisms



Source: Sophie Brenner (2022), based on Kutzin (2001).

Pooling organizations can be public or private, and pooling mechanisms can be mandatory or voluntary. Funds can be pooled in three different ways (Kutzin, 2001):

1. From the initial source of funds to the pooling organization, e.g., when tax revenue gets transferred to the Ministry of Health (MoH)
2. From the collecting organization to the pooling organization, e.g., when funds are transferred from local governments to the central MoH or a social health insurance agency to a sickness fund
3. Between two pools, e.g., when funds from the central MoH are transferred to local health authorities based on population size, or when funds are transferred between health insurances for morbidity- and risk-based adjustments

Rationale for Risk Pooling

Pooling financial risks is the core competency of traditional insurance. Pooling risks makes spending more predictable, as it distributes it between different health risks and illnesses. There are several reasons why risk pooling is useful in health financing (Gottret & Schieber, 2006):

- Risk pooling consolidates large amounts of funds for large populations. A high number of participants reduces the weight of outliers, normalizes health needs forecasts, and creates predictability for health spending.
- Risk pooling over time balances individuals' life cycle risks. Health service needs change over time, and there is little correlation between a person's health service needs and capacity to pay at a certain point in time.
- Risk pooling combines the health risks of a large populations, and this volume can create economies of scale. Risk pooling can reduce the average costs of a health package.
- Risk pooling allows for the redistribution of funds across health risk categories (risk subsidy) and between wealthier and poorer individuals (equity subsidy).
- Risk pooling can improve affordability and access to essential health services. In this context, risk pooling can affect health outcomes because it influences who can access lifesaving health services.

If a risk pooling mechanism is meant to benefit the poor, it must be designed to raise the number and share of people whose health services are covered under the pooled scheme. They must also make sure that the risk of excessive payments for poor people is decreased or eliminated, and pooling mechanisms must improve the access to prevention and basic treatment services for poor people.

The Four Key Risk Pooling Systems

There are four key types of risk pooling systems used in conjunction with health insurance provision: state-funded systems, social health insurance, community-based insurance, and voluntary health insurance. Each of these distinct systems can perform very differently depending on the health system context in which they are embedded. Different income levels determine the amount of funding available for health service coverage, different employment structures determine the availability of skilled staff to provide health services, different health burdens determine different health needs and adequate scope of services, and different administrative capabilities determine the ability to track and steer funding allocation and redistribution according to national priorities (Gottret & Schieber, 2006).

State-funded health insurance

State-funded health insurance systems are managed by the government and provide universal coverage for health services for the population. The government pools a share of the public budget to fund the health system and health services. Central governance makes these systems comparably easy to manage, but possibly also inefficient.

Social health insurance

Social health insurance is a system in which revenues from mandatory employer-employee contributions are pooled. These funds can be redistributed to social health insurances or provider groups and health service programs. Social health insurance systems require a sufficiently large formal employment sector and robust administrative processes, which makes it challenging to implement these systems in lower-income regions.

Community-based health insurance

Community-based health insurance pools resources for health in communities where formalized health insurance is unavailable. Contributions include payments from the informal sector and can be enriched with government technical support, subsidies, and initiatives to connect this system with formal health financing. Community-based risk pooling is often underfunded, but it can be a helpful starting point or complement to robust government health funding.

Voluntary health insurance

Voluntary health insurance pools insurance premiums from individuals for health coverage. Premiums are usually calculated based on members' health risks and desired scope of services. Voluntary insurance is less dependent on labor markets than mandatory health insurance, but a certain economic strength is required for citizens to be able to afford private health insurance. The performance of risk pooling systems depends on the following factors (Murray & Frenk, 2000):

- Are funds pooled centrally or separately for different populations?
- Are subsidiaries in place between high- and low-risk contributors?
- How many pools of which size are in place?
- Can funds be transferred between pools?
- Are pools competing over funds and can people choose between pools?
- Who can enter and exit a pool under which conditions?
- How are contributors protected against insolvency and bankruptcy of the pool?
- Can the funds in the pool be invested, and what investment risk is allowed?

2.3 Resource Allocation

Resource allocation is also called purchasing. It refers to the transfer of pooled funds to health service providers for the population for whom the funds were pooled. Resource allocation pays health service providers, such as hospitals, clinics, and pharmacies (Kutzin, 2001). Resource allocation has a broad scope. It can be a budgeting task where pooled tax funds in state-funded systems are assigned to different programs or entities to cover the costs for health service provision. Alternatively, it can be a more complicated task when specific inputs (e.g., personnel or material); **health outputs**; and **health outcomes** are procured (Murray & Frenk, 2000).

Health outputs
Outputs are the immediate results of a health service. They often indicate the completion of an activity, and areusually easy to measure in numbers (e.g., number of tests or number of people reached).

Health outcomes
Outcomes are often not achieved immediately, but rather in the longer term, which is also called second level results. They measure the result and achievement of an activity or program (e.g., mortality rate and quality of life).

Purchasing Organizations

The following figure gives examples of health service purchasing and resource allocation organizations. They are also named payers, health insurance, or health service procurement organizations.

Table 1: Purchasing Organizations

Organizations that allocate funds and purchase of health services	
Public authorities • Central Ministry of Health • Local Ministry of Health (provincial and district health authorities) • Local government health authority • Area health boards	Employer-/member-owned entities • Employers • Member-owned “mutual” insurances
Health insurance • Social health insurance funds • Private health insurance companies • Health plans	Provider-owned entities • Fundholding provider organizations • Health maintenance organizations

Source: Sophie Brenner (2022), based on Kutzin (2001).

When designing or evaluating the purchasing scheme of a health system, two of the most important policy considerations (Kutzin, 2001) are

1. Active or passive procurement. Are resource allocation and purchasing organizations passive financiers or active users of their purchasing power to foster quality and efficiency improvement in the health service market?
2. Payer market structure. Is there a single payer organization to cover the population, or are multiple payers sharing coverage? If there are multiple insurers, are they competing over market shares or dividing the market in a non-competitive way?

Active and Passive Procurement

Passive procurement means that purchasers are mere financial intermediaries. They see their main responsibility as paying for the services delivered by health service providers. Passive procurement does not incentivize providers to improve the efficiency or quality of their services. As a result, passive procurement often leads to provider-induced cost increases, often in combination with unnecessary and possibly harmful service expansion (Kutzin, 2001).

Active procurement allows purchasing organizations to link resource allocation decisions with provider performance. Examples of active procurement (Kutzin, 2001) include

- financial incentives. These shift some financial risk for service provision to providers and reward the achievement of cost or quality targets, e.g., case-based payment for type-2 diabetes patients who participate in a disease management program and maintain HbA1c levels within the range of therapeutic targets.
- gatekeeping. This is the designation of a first contact point for all patients seeking treatment. The gatekeeper can refer patients to other specialist providers, e.g., a general practitioner as the first point of contact for all insured persons.
- managing choice. This is the pre-qualification and selection of provider organizations from which members can choose **elective procedures**, e.g., members can choose from a network of preferred providers to receive services without co-payment. The use of out-of-network providers is not covered or requires high co-payments.
- selective contracting. This is a contractual agreement between payer and provider for a certain type, and possibly volume, of health service, with discounts for the payer and a chance of high volume for the provider, e.g., a selective contract for an exclusive partnership for knee replacement surgery between a payer and a chain of hospitals.
- pre-authorization. This is the requirement for providers to obtain approval from the payer before conducting procedures. Payers may refuse (full) payment for non-approved procedures, e.g., pre-authorization of a pacemaker surgery for all patients insured with a specific payer before the surgery is performed.
- standard treatment protocols. Payers require providers to follow certain protocols when treating their members. If evidence-based, this standardization can improve outcomes. It makes process and outcome quality comparable between partner providers, e.g., a payer requires providers to strictly adhere to treatment guidelines of the national association of oncologists when treating patients with cancer, and providers risk not being reimbursed when deviating from treatment protocols.

Elective procedures
This is a non-emergency procedure that can be scheduled in advance. Elective procedures can also refer to procedures that achieve advantages for the patient but are not essential to their life or health.

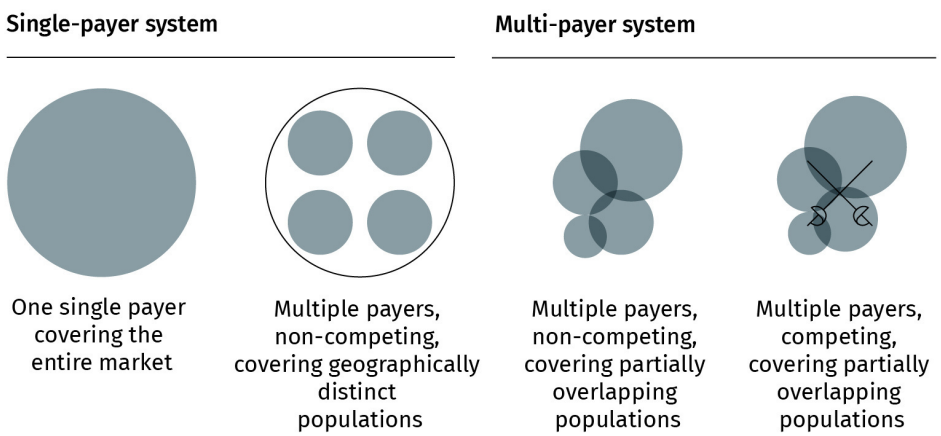
Active procurement includes different methods of steering and regulating the quantity and quality of health services. Many of these methods are key elements of value-based health service management, also called **"managed care."**

Managed care
In this concept, payers structure health provision in a way that reduces costs and improves quality. Managed care can restrict the choice of provider or treatment and demand adherence to planned, contracted care processes.

Payer Market Structures

Health payers are purchasing or allocation entities. The organization of payers in a health system can be categorized based on their number and the degree of competition between them. The following figure shows four different types of health payer market structures.

Figure 13: Health Payer Market Structures



Source: Sophie Brenner (2022), based on Kutzin (2001).

Single-payer systems can have one or more health payers when they do not compete over patients and each cover distinct geographic areas. The National Health Service (NHS) in the UK and the Social Security Fund (CCSS) in Costa Rica are examples of single-payer systems with one payer. In Canada, every province has its own payer, and in Sweden, there is a payer for every county; both are examples of single-payer systems with several payers (Kutzin, 2001).

Many countries have several health payers that cover different, partially overlapping populations. Sometimes, these payers compete for patients, as is the case in the private health insurance market in the US and Switzerland. In other multi-payer systems, multiple payers exist, but they don't compete for the same population. This is the case in Mexico where the Social Security Institute (IMSS) and the Civil Service Security and Services Institute (ISSSTE) cover different populations within the same regions. Thailand has five different compulsory insurance funds that don't compete for enrollment (Kutzin, 2001).

2.4 Service Provision

Service provision is the customer-facing element of the health system: the health services provided to patients. Health services range from lifestyle education and awareness campaigns to general practitioner (GP) consultations, differential diagnostic testing, the prescription of medications, and complex surgeries (Murray & Frenk, 2000). Service provision combines inputs into a production process that takes place in a particular organizational or domestic setting and delivers a series of interventions.

Health services can be personal or non-personal. Personal health services are directed at an individual, and they include prevention, diagnostics, therapy, and rehabilitation. Non-personal health services are actions directed at populations (e.g., population health education and HIV prevention campaigns) or non-human components of the environment (e.g., mandates for clean air and clean drinking water; Adams et al., 2002).

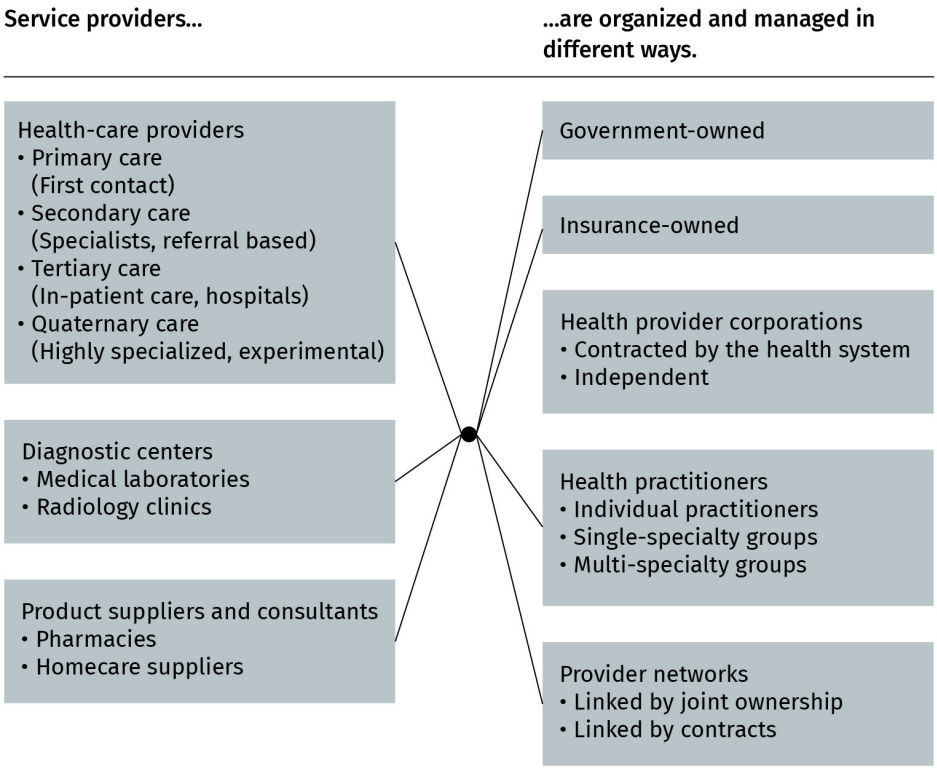
Externalities describe the indirect or unintended consequences of a process which impacts a third party, rather than the producer or consumer. In healthcare, vaccinations are an example of positive externalities; if enough people are vaccinated, herd immunity also protects non-vaccinated people. Obesity is an example of a negative externality; obese people are at higher risk of suffering from metabolic disorders, such as type-2 diabetes mellitus and coronary heart disease. These illnesses are expensive and are not paid for by the individual, but by the population.

Personal health services may or may not create externalities. Non-personal health services normally either create substantial positive externalities or reduce potential negative externalities (Adams et al., 2002).

Service Provider Organizations

The figure below shows examples of health service providers and how they can be organized and managed.

Figure 14: Health Provider Organizations



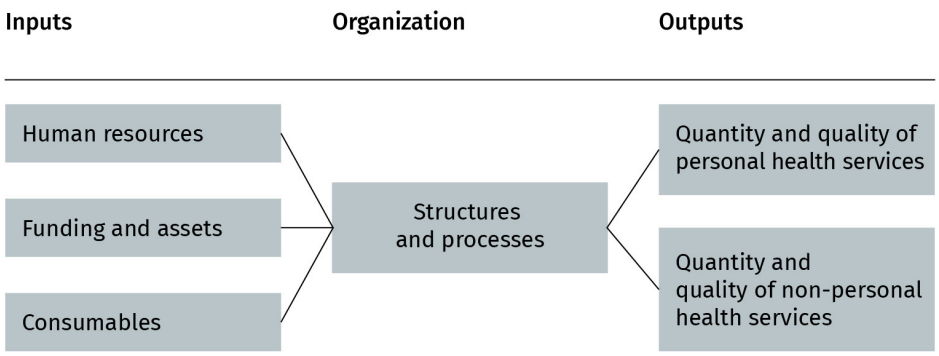
Source: Sophie Brenner (2022), based on Kutzin (2001).

The Service Provision Landscape

The objectives of health service provision are to improve the health of the population and reduce inequalities in health services. The population's health-related needs should be addressed with the best available quantity and quality of services possible within the given budget.

The following figure shows the health service provision process. It includes health service inputs, such as human and financial resources, the health service "production" process and structure, and the health services "produced." The output of this process is the health service (Adams et al., 2002).

Figure 15: The Health Service Production Process



Source: Sophie Brenner (2022), based on Adams et al. (2002).

Health service provision is responsible for procuring and selecting inputs for the health production process. The choice of these inputs influences the production costs. Variable inputs, such as medication and supplies, are easier to adapt than fixed inputs, such as facilities or large equipment. However, from a longer-term perspective, all inputs become variable.

The structures and processes of service provision depend on their inputs, and they impact health service quality and quantity. Structures and processes can be evaluated by looking at autonomy, integration, and incentives for health providers.

The degree and type of autonomy influences providers' decisions about how to deploy inputs and how to respond to market changes, regulatory changes, or expectations of the population (Adams et al., 2002). A small, independent provider with more autonomy may be more flexible in adapting its scope of services or may be more able to provide a more individualized approach of care than large provider networks or state-owned healthcare organizations. However, smaller providers may be challenged or overwhelmed with shouldering the costs and effort of implementing new regulation.

Integration or **integrated care** provides services in close collaboration with providers from different sectors. More integrated providers are likely to have more efficient links between different levels and disciplines of health service provision. Siloed organizations may be able to increase patient access, efficiency, and outputs within their own care sector; however, inefficiencies or quality problems can occur when providers are not well aligned or connected, and when patients transition between sectors, e.g., from hospital care to rehabilitation. Integrated organizations are more likely to optimize service provision and outputs along the patient pathway and across care sectors.

Integrated care
This is a cross-sectoral form of healthcare that promotes greater collaboration between various disciplines and sectors to improve the quality of patient care while reducing healthcare costs.

Incentive structures influence how healthcare providers behave. Sometimes, these incentives are purposefully set by policy makers, but they are often also an unintended byproduct of health policy.

"Laws" of Service Provision

In an ideal world, health service provision is not guided or skewed by incentives of the health systems, but only by the health needs of the population. In reality, health service delivery occurs under several layers of bias and distortion:

- when patients demand services they don't need
- when providers recommend procedures they are most experienced with, rather than those with the best chances of good outcomes
- when health systems ration the access to health services because they don't have the budget to make them universally accessible

Incentives have created interesting "laws" of service provision in some health markets (Tulchinsky & Varavikova, 2014).

Sutton's law

Sutton's law is named after bank robber Willy Sutton. When a reporter asked him why he robbed banks, he answered, "banks are where the money is." Transferred to health services, Sutton's law is used to characterize the observation that health systems tend to emphasize. A typical example is the neglect of preventive services, which are often underfunded, and the emphasis on curative services (Tulchinsky & Varavikova, 2014).

Capone's law

Capone's law is named after famous gangster Al Capone. He is said to have divided the Chicago market by assigning the north side to a colleague and the south side to himself. This division suited all participants' interests. Transferred to healthcare, Capone's law means that health planning is done according to the preferences of providers rather than the population. An example could be a hospital planning process where each hospital organization gets a share of the regional budget for a complex, lucrative surgery rather than assigning the entire budget to the provider with most experience and best patient outcomes (Tulchinsky & Varavikova, 2014).

Roemer's law

Roemer's law is not based on a criminal, but on an American health service researcher, Milton Roemer. He allegedly said that every hospital bed will be filled once it is built and insured. The amount of hospital beds available determines their utilization level, especially when public health insurance covers hospital care for the population. As an example, we can look at the effects of replacing daily rates with case-based hospital reimbursement (diagnosis-related groups) in Germany: a substantial decrease of the average length of stay and occupancy rates (Tulchinsky & Varavikova, 2014).

Bunker's law

Bunker's law states that more surgeons create more surgeries, meaning that a greater supply of surgeons increases the number of surgeries. This may be partially due to case-based reimbursement where more surgeries increase hospital revenues (the phenomenon that to those who are holding a hammer, most problems look like a nail). Surgeons might suggest a promising surgical approach rather than refer a patient to a colleague for a less invasive, cheaper alternative. Measures to limit referrals and self-referrals or the introduction of differentiated treatment guidelines can curb this type of supply-induced increase (Tulchinsky & Varavikova, 2014).

In this unit, we looked at revenue raising, risk pooling, resource allocation, and service provision. When we evaluate or attempt to change health systems, we should view these four items more as concepts than institutions. They are functions of health financing, aiming to raise and distribute health funding and follow principles like fairness, financial risk sharing, effectiveness, and efficiency. They might be applied very differently by different health systems: A centralized national health insurance system might raise, risk-pool, and allocate funds, as well as organize service provision all within one organization. Health systems with more competitive elements or localized structures might have a different entity responsible for each of these functions. However, every time we talk about pooled funds, i.e., everything that is not out-of-pocket health spending, these four functions are present in some shape or form. They may not be very sophisticated or effective, but they need to be in place to collect funding and pay providers for their health service (Tulchinsky & Varavikova, 2014).

SUMMARY

Most healthcare is paid for with pooled resources, not out-of-pocket spending. Raising revenues is the process of collecting resources from different sources. Revenues are raised by different organizations, such as governments, social security agencies, and commercial insurances, and collected as taxes, voluntary or compulsory contributions, grants, and loans. Major sources of revenues are the domestic population and local enterprises.

Both the share and amount of pooled funding is higher in high-income than low-income countries. Funding can be increased by assigning more public revenues to healthcare. This can be challenging for lower-income countries with smaller economies, a larger informal sector, and limited tax administration capabilities.

Risk pooling is the aggregation of pre-paid health funds for a specific population and the core competency of health insurances. Risk-pooled funds are then no longer tied to an individual, but rather accumulated for the benefit of all participants who share the financial risks of health.

Risk pooling makes health spending more predictable, creates economies of scale, and allows distribution of funds across risk and wealth in a population. Well-known risk pooling systems are state-funded insurance systems, social insurance systems, community-based health insurance, and voluntary health insurance.

Resource allocation or purchasing uses pooled funds to pay health service providers. Health purchasing schemes distinguish between active and passive procurement mechanisms and single- versus multi-payer markets, as well as the level of competition between payers.

Service provision is the customer-facing element of health systems; it combines different inputs into a production process to create health services. Service provision aims to improve the health of the population and reduce inequalities in the best possible quantity and quality within the given budget.

Incentives embedded in the health system influence health providers' behavior. Supply-induced demand and focus on high-value pockets are examples of incentive-driven provider behavior.

UNIT 3

PROVIDER PAYMENT SYSTEMS AND ASSOCIATED QUALITY INCENTIVES

STUDY GOALS

On completion of this unit, you will be able to ...

- recognize different provider payment models, such as fee for service and diagnosis-related groups (DRGs).
- calculate the payment for providers for different payment models.
- explain and calculate deductibles, coinsurance, and co-payments.
- discuss the incentives and areas for useful application of different payment models.
- design provider payment models based on health policy priorities.
- recall variants and the rationale for mixed payment models.

3. PROVIDER PAYMENT SYSTEMS AND ASSOCIATED QUALITY INCENTIVES

Introduction

What is the best way to pay health providers for their services? The answer is: It depends on whether you ask the payer or the provider, what the payment model wants to achieve, how much money is available, and many other factors.

What makes payment for health services more complex than payment for other services? First, decision-makers, payers, and recipients are decoupled: When we buy a new pair of shoes or select a shop to repair our bike, we—the customer—are able to select the item or service. We pay for it and use it. Healthcare is different; the patient receives the service, but their health professional has expert knowledge and will be the one to influence or make the treatment decision. Patients receive the service that doctors choose, but payment is often covered by a third party, such as insurance. Payers are focused on containing costs, so they might ration services or steer patients towards certain services based on costs rather than outcomes. Payers might want to reduce services, but providers might want to increase them (if they get paid extra). For patients, it's often difficult to judge which is better.

Second, health services deal with our health and, therefore, our lives. When someone receives the wrong type of heart surgery, medication, or chemotherapy, they often cannot just go back and return it or start over; a wrong treatment choice might kill or debilitate a patient. It is important that the right health services are available and provided safely and effectively.

In health systems, service provision tends to follow the money. Services that are covered by insurance are usually offered more. There are often different solutions to a health problem with different risk profiles, health outcomes, and price tags. A very expensive treatment might financially overburden the health system or patient. Too much healthcare (overtreatment) might threaten a patient's health just as much as too little (undertreatment). Health service financing therefore needs to strike a smart balance regarding which services to cover.

Health systems' decisions about the services they recommend impact the provider landscape. Payment systems can be used to direct spending to align with health priorities, and there are different ways to do this. In this unit, we will discuss some key concepts for provider payment, including fee-for-service, capitation, global budgets, case-based payments, and private co-financing. These different payment systems are calculated using a value (price) and volume (number) parameter, and they create different incentives for providers.

3.1 Fee-for-Service

Fee-for-service is a payment system that works like commercial shopping. Each service has a price tag that is paid every time the service is performed.

Characteristics of Fee-for-Service

Fee-for-service models are usually based on tariffs or a fee schedule. The **unit of payment** is each defined service unit or bundle of services in the tariff or fee schedule (e.g., an examination, surgery, prescription, or consultation). Tariffs and fees are defined in advance (prospectively) for each service or bundle of services, and fee-for-service payments compensate health service providers for each service. Services are billed and paid retrospectively, i.e., after the service is provided (Cashin, 2015; Kutzin, 2001). Tariffs and fee schedules can be the same for the entire health system or separate for each region, payer, or provider.

Unit of payment
This is the defining characteristic of each provider payment system (e.g., bed, case, service, and visit). Providers are incentivized to increase the unit of payment volumes.

Fee-for-service models with fee schedules defined by the payers are the most common form of compensation for health services (Ellis & Miller, 2008). They are predominantly used to pay for general practitioners and outpatient specialist services (Mueller & Hewlett, 2016).

Germany, for example, has two different national fee-for-service catalogs: *Einheitlicher Bewertungsmaßstab* (EBM) and *Gebührenordnung für Ärzte* (GOÄ). The EBM is for outpatient services billed to the social health insurance system (Kassenärztliche Bundesvereinigung, n.d.). The GOÄ includes fees for services billed to private health insurance or out-of-pocket payments. The last major GOÄ reform dates back to 1996. Attempts to update the GOÄ have been ongoing for many years, but they face opposition from provider groups that are afraid to lose funding as priorities shift (Bundesamts für Justiz, 2019).

Fee-for-Service Calculation

The parameters for calculating fee-for-service payments are fixed service fee (value parameter) and number of services provided (volume parameter; Cashin, 2015).

The total payment to the provider in a fee-for-service model is the sum of all different types of services multiplied by their respective fixed fees.

The formula for calculating payments to providers in a fee-for-service model is

$$Total\ payment\ to\ the\ provider_{fee-for-service} = \sum_{k=1}^{n} (fee_k \cdot number\ of\ services_k)$$

Example

If *n = 3*, *fee 1; 2; 3 = USD 10; 100; 1,000*, and *number of services; 1; 2; 3 = 200; 20; 2*, then

$$
\begin{aligned}
&Total\ payment\ to\ the\ provider_{fee-for-service} \\
&= \big(USD\ 10 \cdot 200\big) + \big(USD\ 100 \cdot 20\big) + \big(USD\ 1000 \cdot 2\big) \\
&= USD\ 6,000
\end{aligned}
$$

Incentives and Application of Fee-for-Service

Fee-for-service payment motivates providers to increase the number of services they provide, either by attracting more patients or supplying more billable services per patient. If there are no upper volume caps, service volumes may increase beyond necessary or useful levels. This can lead to overprovision of services by healthcare providers. This proactive provision of services creates **supplier-induced demand** (SID).

Supplier-induced demand
Suppliers motivate or incentivize customers to demand more services. This occurs when suppliers benefit financially from increased demand.

Fee-for-service also creates incentives to reduce inputs, i.e., the amount or resources to produce a service, because efficiency gains increase the provider's profit. This can possibly have a detrimental effect on the quality of the service (Cashin, 2015).

Fee-for-service models may be useful when cost containment is not a high priority and expansion or access to services is desired. Fee-for-service models help expand productivity, supply, and patient access to services. This payment system is usually attractive for providers and can sustain or grow the provider base. In fee-for-service models, providers must be capable of recording and billing itemized services, and payers must be capable of reviewing and monitoring itemized billing. This requires at least moderate management capabilities on both sides (Cashin, 2015).

3.2 Capitation

Capitation is a payment system that resembles a TV subscription. Payment is per individual or household for a defined period, and an entitlement to a certain benefit package does not change with fluctuating usage volume.

Characteristics of Capitation

Capitation comes from the Latin word *caput*—the head. Capitation systems pay a fixed "per head" in advance based on enrollment with a general practitioner (GP), primary healthcare (PHC) clinic, etc. Capitation includes a defined bundle of health services, such as primary prevention and care services. The unit of payment is the enrolled person for all included services for a fixed period (Cashin, 2015). The amount paid per person is defined and paid out prospectively (Kutzin, 2001).

Capitation payments are used to pay for GP services in several countries. Sometimes, countries adapt the payouts for risk factors, such as age, gender, or morbidity to discourage the cherry-picking of healthier patients and off-loading of sicker patients to other health sectors (Mueller & Hewlett, 2016).

An example of capitation-based reimbursement of GPs was implemented in the UK's National Health Service in 2004. The minimum practice income guarantee (MPIG) was introduced to achieve equitable pay for provision of basic services (Rhys et al., 2010). However, MPIG resulted in less funding for many practices. Therefore, correction factor payments were made between 2014 and 2021 to gradually adjust payments and reach equal weighted funding per patient (British Medical Association, 2020).

Capitation Calculation

The parameters for calculating capitation payments (Cashin, 2015) are

- base rate (value parameter),
- number of enrolled individuals (volume parameter), and
- **adjustment coefficient**.

Adjustment coefficient
This is a factor applied to the final payment amount to consider systematic cost differences caused by the provider or patient characteristics (e.g., location, age, gender, morbidity, or provider type).

In a capitation system, the total payment to the provider is the sum of all enrolled individuals multiplied by the base rate and adjustment coefficient, if applicable.

The formula for calculating payments to providers in a capitation model is

$$\begin{aligned} &Total\ payment\ to\ the\ provider\ _{Capitation} \\ &= base\ rate \cdot number\ of\ enrolled\ individuals \\ &\cdot adjustment\ coefficient \end{aligned}$$

Example

If the base rate is USD 1,000, there are 1,000 enrolled individuals, and adjustment coefficient is 1.1, then

$$\begin{aligned} &Total\ payment\ to\ the\ provider_{Capitation} = USD\ 1{,}000 \cdot 1{,}000 \cdot 1.1 = \\ &USD\ 1{,}100{,}000 \end{aligned}$$

Incentives and Application of Capitation

Capitation systems motivate providers to increase the number of enrollees, as each new enrollee increases their revenue. However, each health service provided reduces the profit of the health provider due to the resources consumed by service provision.

Therefore, providers are incentivized to select healthier participants or make and keep participants healthy. Capitation provides incentives for providers to optimize their mix of inputs and outputs. An ideal input mix is less costly or has favorable cost-benefit ratios. An ideal output mix focuses on less expensive procedures to achieve the desired outcomes. Overall, capitation makes it attractive to provide fewer services, possibly underserving the community, especially in models with ashort-term focus (Cashin, 2015).

Capitation models may be useful when cost control is a key priority for the health system. Capitation is most appropriate for primary care settings where longer-term and lower-intensity services are provided. Service quality in capitation settings tends to increase

when there are competing providers from which patients can choose. Capitation requires payers to define and monitor whether minimum levels of care are met, and it requires providers to be deliberate about the services they provide, balancing costs and outcomes. For effective capitation, moderate to advance management capabilities are needed from both the payer and the provider (Cashin, 2015).

3.3 Global Budget

Global budgets function similar to a household fund or allowance. One (large) batch of money needs to fund a variety of products and services.

Characteristics of Global Budgets

Global budgets allocate a fixed amount of funds to providers for a specific period. Providers must use these funds to provide an agreed set of services. The budget is not allocated to any of these services specifically, and providers can spend it flexibly (Cashin, 2015).

Depending on how the global budget is structured, its unit of payment is either an agreed service volume or a specific combination of inputs in a defined time period. Global budgets are agreed and paid out prospectively (Kutzin, 2001).

Global budgets are used to pay for hospital services in several countries. These provider payment systems have evolved and are no longer just based on resources (inputs) or historic performance (services). They may be adjusted for risk factors, such as age and gender, or may consider the patient population's severity of illness (Mueller & Hewlett, 2016). Global budgets can be designed to be "soft" or "hard." In soft budget models, the payer pays for any cost overruns, so these models are considered ineffective for cost containment. Hard budget models require the provider to absorb these costs (Berenson et al., 2016).

Hospitals in Spain are one example of the use of global budgets. The budgets are calculated based on a mix of service- and input-related factors. Budgets consider the historic number and severity of cases, but also structural elements of the hospital. In the real world, global budget calculation is based on historic performance, possibly increased by a negotiated rate without consideration of future costs and strategic priorities. This approach thus regularly fails to cover present costs, and payers then need to cover funding gaps with operating grants (Bernal-Delgado et al., 2018).

Global Budget Calculation

The parameters for calculating global budgets are different for input- and volume-based budget payment models (Cashin, 2015). For input-based budgets, the parameters are input unit cost (value parameter) and number of input units (volume parameter). For volume-based budgets, the parameters are payment rate per service (value parameter) and projected number of services (volume parameter; Cashin, 2015).

For input-based global budgets, the total payment to the provider is the sum of all *n* units of inputs, multiplied by their respective projected unit costs.

The formula for calculating input-based global budgets is

$$Total\ payment\ to\ the\ provider_{global\ budget\ (input-based)} = \sum_{k=1}^{n}\left(input\ unit\ cost_k \cdot number\ of\ input\ units_k\right)$$

Example

If *n = 3*, the *input unit cost 1; 2; 3 = USD 5; 50; 500*, and the *number of input units 1; 2; 3 = 100; 10; 1*, then

$$Total\ payment\ to\ the\ provider_{global\ budget\ (input-based)} = \left(USD\ 5 \cdot 100\right) + \left(USD\ 50 \cdot 10\right) + \left(USD\ 500 \cdot 1\right) = USD\ 1,500$$

For volume-based global budgets, the total payment to the provider is the projected sum of all *n* types of services, multiplied by their respective payment rates.

The formula for calculating volume-based global budgets is

$$Total\ payment\ to\ the\ \ \ provider_{global\ budget\ (input-based)} = \sum_{k=1}^{n}\left(payment\ rate_k \cdot number\ of\ services_k\right)$$

Example

If *n = 4*, the *payment rate 1; 2; 3; 4 = USD 20; 40; 60; 80*, and the *number of services 1; 2; 3; 4 =100; 80; 60; 40*, then

$$Total\ payment\ to\ the\ provider_{global\ budget\ (input-based)} = \left(USD\ 20 \cdot 100\right) + \left(USD\ 40 \cdot 80\right) + \left(USD\ 60 \cdot 60\right) + \left(USD\ 80 \cdot 40\right) = USD\ 12,000$$

Incentives and Application of Global Budgets

When global budgets are paid based on inputs, providers have incentives to increase the number of these inputs, provide fewer services, and refer patients to other providers. In this scenario, less service provision will not change a provider's revenue, but rather improve its profit.

When global budgets are paid based on service volume, providers have incentives to increase their number of services, either by attracting more patients or providing more services per patient. Service-volume based budgets create incentives for providers to reduce the number of inputs they use for their services to improve their profitability (Cashin, 2015).

Global budgets can be useful when competition between providers is neither desirable nor possible, and when cost containment is a top priority for payers. Global budgets may be the approach of choice when payers and providers have limited capability or capacity to manage billing and service provision in detail. Combined with other incentives, global budgets can foster efficiency improvements (Cashin, 2015).

3.4 Diagnosis-Related Groups (DRGs)

Diagnosis-related groups (DRGs) and other case-based payments work similarly to the tiered pricing models we see in amusement parks or movie theaters. Every guest books and pays for a different package of services, e.g., fast lane or front seat package, hotel nights, snacks, beverages, or merchandise.

Characteristics of DRGs

DRGs were originally designed as patient classification systems. They allow patient cases to be sorted into homogenous groups based on medical characteristics and resource use. **Case weights** allow the comparison of resources between DRGs. A higher case weight indicates a more severe and costly clinical episode. Multiplication of case weights and base rates enables the patient classification system to become a prospective output-oriented payment tool. A well-designed DRG system creates transparency for payers and providers about the payment for a certain case.

Case weights
These are indicators of the economic severity of a hospital case in the DRG system, i.e., the costs of treating the case. Multiplied by the base rate, the case weight determines the case revenues.

In DRG systems, providers receive a lump-sum payment for each case. The unit of payment is a case, i.e., the bundle of services that constitutes a treatment. Payment is calculated using a base rate that is weighted by the patient's characteristics and procedures performed during their stay (Cashin, 2015).

Usually, one case is equal to one admitted or discharged person. Case-based payment units are defined prospectively and paid out retrospectively (Kutzin, 2001). There is some discussion and a few applications of DRGs in outpatient settings; however, the majority of DRG systems can be found in the hospital sector.

The US Medicare system started using DRGs in 1983 to harmonize hospital payment and contain hospital costs (Ellis & Miller, 2008). Today, DRGs are used to pay for inpatient hospital cases in many countries (Mueller & Hewlett, 2016).

DRG systems require methods to code diagnoses (usually **ICD**-19) and procedures (usually proprietary tools), as well as a grouper software to convert diagnoses and procedures into DRGs

ICD
The International Classification of Diseases is an internationally used and accepted tool for classifying illnesses for analytical, epidemiological, health management, and clinical uses. The ICD is governed by the World Health Organization.

DRG Calculation

The parameters for calculating DRGs (Cashin, 2015) are

- base rate (value parameter),
- number of cases (volume parameter), and
- relative case weights.

In DRG systems, the total payment to the provider is the base rate multiplied by the case mix. The case mix is equal to the number of cases multiplied by the **case mix index** (CMI), or each of the *n* cases multiplied by their relative case weight. The base rate is a universal rate ("price") that is set or negotiated for, e.g., all hospitals in a region, provider organization, or country.

Case mix index
This is an index for the average severity of patient cases in the DRG system. The CMI measures the relative number of resources required to treat all hospital cases over a specific period (usually one year).

The formula for calculating payments to providers in a DRG model is

$$Case\ payment\ to\ the\ provider_{DRG} = Base\ rate \cdot relative\ case\ weight$$
$$Total\ payment\ to\ the\ provider_{DRG} = Base\ rate \cdot case\ mix$$
$$case\ mix = \sum_{i=1}^{n} case\ weight_i$$
$$case\ mix\ index = \frac{case\ mix}{number\ of\ cases}$$

Example

If *n = 3*, the *base rate = USD 2,000*, and *case weights 1; 2; 3 = 0.9; 1.5; 4.0*, then

$$Case\ \ payment\ to\ the\ provider_1 = USD\ 2,000 \cdot 0.9 = USD\ 1,800$$
$$Case\ \ mix = 0.9 + 1.5 + 4.0 = 6.4$$
$$Total\ payment\ to\ the\ provider_{DRG} = USD\ 2,000 \cdot 6.4 = 12,800$$

Incentives and Application of DRGs

Case-based payments motivate providers to increase the number of cases, but without volume caps, volumes can increase beyond necessary levels. Also, case-based payments can set incentives to reduce certain inputs to increase efficiency, possibly accepting a reduction in output quality. Providers in DRG systems are incentivized to discharge patients early or refer them early into, e.g., continued treatment, such as rehabilitation or long-term care (Cashin, 2015).

DRG systems can be the payment system of choice when there is intention to reduce excess hospital capacity. DRGs set incentives to reduce the average length of stay (ALOS) per hospital case. Even if case numbers tend to increase in DRG systems, the short ALOS frees up bed capacity. DRGs aid health systems where cost containment is moderately important, but improving efficiency is a top priority. Continuous monitoring and updating of the DRG calculation tools is necessary and requires a large amount of effort. Therefore, payers and providers in DRG systems need to have at least moderate (preferably advanced) management capabilities (Cashin, 2015).

3.5 Deductibles, Coinsurance, and Co-Payments

Deductibles, coinsurance, and co-payments (DeCos) are similar to a private tax. Every time we earn or spend money, we may need to pay tax, such as value-added tax (VAT) for purchases in the supermarket, or federal income tax. The tax amount is not the same for everyone and every transaction. It depends on the tax system, types of transactions, and amounts involved.

Characteristics of DeCos

DeCos are out-of-pocket payments that supplement insurance coverage. DeCos are most common in private health insurance, but they can also occur in national or social health insurance systems.

Deductibles are specified amounts that need to be paid out-of-pocket, usually every year, for medical bills before health insurance begins to cover them.

Coinsurance is the share of medical bills that the insured person needs to pay out-of-pocket. Normally, coinsurance is a percentage of the bill. Coinsurance payment normally commences after paying the deductible.

Copayments (or copays) are fixed amounts paid out-of-pocket for a health service. Copay amounts vary and are usually due at the point of service (Blue Cross Blue Shield of Michigan, & Blue Care Network, n.d.). Copays can occur before or after completing the payments towards a deductible, and they can be due instead of, or in combination with, coinsurance (Blue Cross Blue Shield of Michigan, & Blue Care Network, n.d.; Langenbrunner et al., 2009).

The unit of payment for DeCos is the volume or value of the services provided, depending on the insurance contract.

DeCo Calculation

In DeCo systems, the total payment to the provider is the total billed amount, usually based on a fee-for-service model. The total billed amount is split between the insured person and the insurance provider. Technically, the insurance usually pays the entire billed amount (minus discounts as applicable) and collects DeCos from the insured.

The formula for calculating the payment to providers is

$$Payment\ to\ the\ provider\ (Insurance)_{DeCo} = billed\ amount - DeCo$$
$$Payment\ to\ the\ provider\ (Insured)_{DeCo} = DeCo$$

Example 1: Deductible

If the billed amount is USD 2,000 and the deductible is USD 1,500, then

$$Payment\ to\ the\ provider\ (Insured)_{Deductible} = USD\ 1{,}500$$
$$Payment\ to\ the\ provider\ (Insurance)_{Deductible}$$
$$= \ USD\ 2{,}000 - USD\ 1{,}500 = USD\ 500$$

Example 2: Coinsurance

If the billed amount is USD 2,000, the deductible is USD 0, and the coinsurance is 20 percent, then

$$Payment\ to\ the\ provider\ (Insured)_{Coinsurance} = USD\ 2{,}000 \cdot 0.2$$
$$= USD\ 400$$
$$Payment\ to\ the\ provider\ (Insurance)_{Coinsurance} = USD\ 2{,}000 \cdot 0.2$$
$$- USD\ 2,000 \cdot 0\,.\,2 = USD\ 1,600$$

Example 3: Co-payment

If the billed amount is USD 2,000, the deductible is USD 0, the co-payment is USD 10 per prescription, and the number of prescriptions is five, then

$$Payment\ to\ the\ provider\ (Insuree)_{Co-payment} = \ USD\ 10 \cdot 5 = USD\ 50$$
$$Payment\ to\ the\ provider\ (Insurance)_{Co-payment} = USD\ 2{,}000$$
$$- USD\ 10 \cdot 5 = USD\ 1{,}$$
$$950$$

Incentives and Application of DeCos

DeCos are out-of-pocket payments based on the value or volume of health services. They are an instrument of cost containment, motivating the insured to reduce the number of services or choose less costly services. This can lead to undertreatment, especially in areas without immediate medical need, like primary prevention, and in areas with high DeCos, like high-frequency or high-value treatment.

DeCos require providers to issue itemized bills and payers to split bills, applying the relevant DeCos of different health plans. Providers might have to collect payment from different payers, and payers might have to collect payment from patients and providers. This requires advanced management capabilities of both payers and providers.

DeCos may be useful when cost containment is a priority or provider capacities are tight. They require patients to make trade-offs between the out-of-pocket cost and the health benefits of a service. Through DeCos, payers want to encourage patients to reduce non-essential medical services, such as cosmetic or wellness services. To make DeCos effective, payers should design them carefully to ensure they do not steer patients away from important services that may cause high medical costs later. One way to do this is creating DeCos exemptions for essential services and services where demand is not **price elastic**.

Price elastic
The price elasticity of demand measures how

the quantity demanded reacts to its price. Low price elasticity is observed when the demand does not decline when prices are increased (e.g., for organ transplant).

This section describes different provider payment models in isolation, which is useful to gain a conceptual understanding of these models. However, most health systems have mixed provider payment systems. These mixed systems may be historically grown, specifically designed, or tweaked to achieve certain health policy objectives (Feldhaus & Mathauer, 2018).

Blended payment models

These models combine different provider payment models, such as capitation, fee-for-service, global budgets, and DRGs. Bundled payments may include incentives for individuals or a group of providers. An example of a blended payment is a disease management program for chronically ill patients where fee-for-service payments and partial capitation are combined, and an add-on payment for coordination activities is paid.

Bundled payment models

These models combine different health services in one payment. Capitation and case payments are traditional bundled payments, usually within one provider or provider type. However, bundling also occurs across care levels, sectors, and specializations:

- Disease-based bundled payments pay out one amount per patient per month or year to a group of providers for a set of services included in a defined patient pathway, e.g., for ischemic heart disease.
- Episode-based bundled payments pay out one amount per patient per episode of care. The amount is based on the average costs for a set of services from different providers or facilities that constitute an episode of care. These payments are usually found in non-acute care settings, such as rehabilitation, palliative care, and hospice care.

Cost containment rewards

These are additions to blended or bundled payment models. Their objective is to foster the integration of different steps of care for a certain diagnosis or different health needs. Cost containment rewards are agreements between provider and purchaser and can occur in two basic forms:

1. Shared savings payments promise providers a portion of the cost savings achieved with their health spending for a defined group of patients (compared to forecasted costs). They motivate providers to use fewer or lower-cost health services. Shared savings can be implemented to discourage the use of high-cost services.
2. Gainsharing payments reward providers for cost reduction efforts and performance improvements for certain health services. Such direct payments can be agreed between a payer and a provider, but also between a provider and its employees. Gainsharing is most common in areas with large numbers of high-value services, such as heart surgery, neurology, and oncology.

SUMMARY

Payment for health services is complex because decision-makers, payers, and recipients are decoupled, and because health services ultimately deal with our life.

In healthcare, service provision tends to follow the money. Services covered by health insurance tend to be provided more often. Provider payment systems shape service provision; common payment systems are fee-for-service, capitation, global budget, and case-based payments.

Fee-for-service models pay a fixed fee for each service. They incentivize providers to increase the number of services and are useful when the expansion of (certain) services is desired.

Capitation models pay a base rate for each enrolled person, possibly adjusted for the type of patient population or scope of services. They incentivize providers to increase the number of enrollees and are useful when cost control is a top priority.

Global budgets pay a fixed amount to providers for a specific period, either based on inputs or the service volume. “Hard” global budgets are where the provider absorbs excess costs to motivate providers to reduce the number of services (input-based) or inputs (service based). They are useful when inter-provider competition is not relevant and cost control is key.

DRGs are common in the hospital sector. They pay a case-based lump sum depending on the economic severity of a case. DRG systems motivate providers to increase the number of cases and may be useful when a reduction of hospital capacity is desired.

Deductibles, coinsurance, and co-payments are out-of-pocket payments that are intended to supplement insurance coverage. DeCos motivate the insured to seek fewer health services and may be useful as a cost containment instrument or when health systems are operating at capacity.

Most health systems have mixed provider payment systems, e.g., in the form of blended or bundled payment models. These combinations of payment elements can support health systems in achieving their strategic goals.

UNIT 4

HEALTH FINANCING GLOBALLY

STUDY GOALS

On completion of this unit, you will be able to ...

- explain the correlation between health spending and burden of disease.
- describe the main influencing factors for national health funding.
- sketch the flow of funds for development assistance for health (DAH).
- list different sources, intermediaries, and recipients for DAH funding.
- differentiate between approaches for aligning vertical and horizontal health programs.

4. HEALTH FINANCING GLOBALLY

Introduction

Let's imagine for a moment that you are the newly elected—or better, appointed—Earth Tsar, and that you have made improving your earthlings' health a priority of your imperial policy work. You want to build a health system that creates universal health coverage for everyone. With your background in finance and economics, you know that the financing system has great influence on outcomes and good policy work is based on a solid analysis of the problem.

You take your crystal ball virtual reality glasses and look at the status quo of health financing for your earthlings. Soon, you see lots of concerning evidence that makes you doubt the leadership skills of some of your country's heads (but that's a different topic).

In health financing, you see lots of differences between countries. In richer countries, healthcare is often ubiquitous, accessible to many people, and free of charge at the point of service. However, that's a bit deceptive since earthlings in those countries usually pay hefty taxes or contributions to social security funds, but they have been doing this for so long that they seem to have forgotten about it—at least, it doesn't seem to bother them too much.

In other countries, resources are scarcer and funding for health services is minimal. Basic health services can be spotted if you zoom in, but they are often of bad quality with long waiting lists. Every time you see a shiny clinic and take a closer look at the beauty, you realize it's a private hospital with fees that are inaccessible to most, but sometimes, these oases of health excellence within "health deserts" are open to the public. With a closer look you can see that these oases are created by supranational funding structures: global development programs, jumping in to attack certain health system problems and illnesses like HIV/AIDS, malaria, and COVID-19.

After this virtual tour, you realize you need to tackle the following issues if you really want health to be the legacy work that makes you eternally famous:

- There seems to be a sweet spot of how much money should be spent on health services per earthling—less is bad for health, more is bad for private and public pockets. Maybe all countries should work towards this sweet spot.
- Health funding depends on the economic power of a country and how much of a priority healthcare is for them. Maybe economic growth is like a probiotic for health spending—both seem to grow hand in hand.
- International development assistance for health (DAH) programs are wonderful funding injections, boosting the health status and creating islands of knowledge and resources. Maybe their benefits would be even larger if integrated with the regular health system.

Now, you are ready to get to work to impress your earthlings. You know that handling this task on your own is a bit overwhelming, so you are working the magic of diplomacy with the leaders in each country. Your objective is to appeal to their honor and nudge them to get their financing in order. Since you know how competitive they are, you set up a transparent global benchmarking and make each country head's annual bonus dependent on their progress toward universal health coverage.

Before implementing your global health strategy, you and your leadership team must better understand different health spending scenarios, global financing systems, and how international financing programs can best benefit national health systems.

4.1 Health Spending Scenarios

Health systems are often categorized by their financing mechanisms. Typically, a categorization includes three financing archetypes (Böhm et al., 2013):

1. Tax-financed national health insurance
2. Employer-employee-financed social health insurance systems
3. Private-type health systems with high out-of-pocket spending

This group of three, however, is skewed in favor of high-income countries where healthcare is more organized and the share of government spending is high. Most people live in a country that falls in the "private-type health system" category, which fails to describe the differences between health systems in this category. The disease burden and health spending per capita are inversely related (Rosner & Ritchie, 2016). Health spending per capita can thus be considered a possible **key performance indicator** (KPI) for health systems performance. The health status tends to increase when countries spend more money on health per person, at least up to a certain spending level. Of course, funding alone does not improve health, and many other factors contribute to the burden of disease or its reduction. These factors include nutrition quality and lifestyle, density of healthcare personnel, and the degree of political conflict.

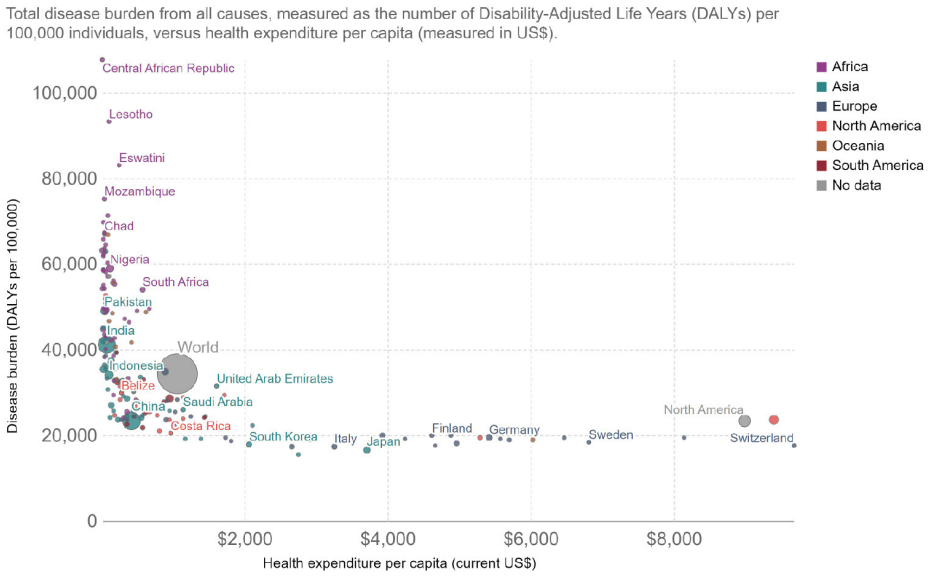
Key performance indicator
These are quantifiable measures of performance that track objectives over times. KPIs allow goal setting and facilitate decision-making.

So, good health is not so much associated with national or social health insurance design. It is, however, correlated with how much funding is allocated to each person (particularly pooled or government funding).

The Correlation of Health Spending and Burden of Disease

The figure below shows the relationship between health spending per capita and health status. Health status is measured with the number of all-cause disability-adjusted life years (DALYs) per 100,000 individuals. Higher DALYs signify poorer health (Rosner & Ritchie, 2016).

Figure 16: Disease Burden and Health Expenditure Per Capita (2014)



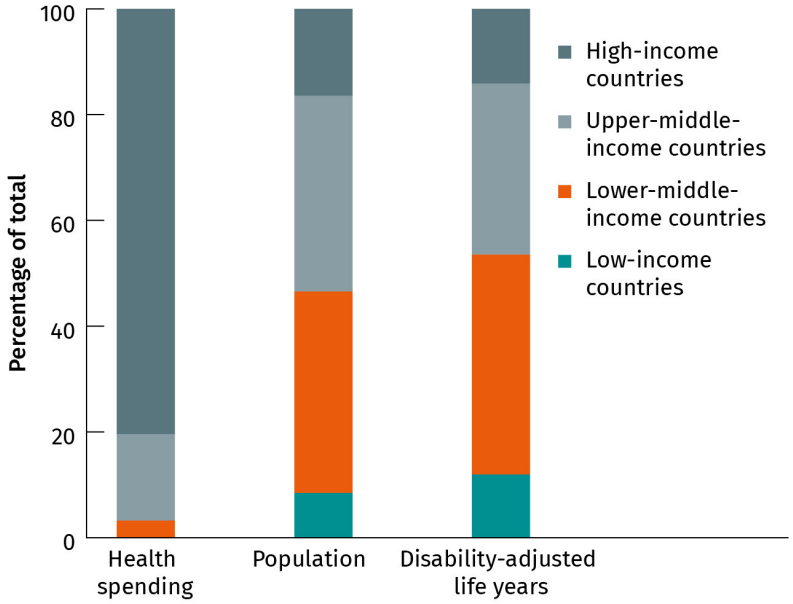
Source: Rosner & Ritchie (2016). CC BY 4.0.

Health spending and disease burden are somewhat inversely related. Less spending tends to be correlated with a higher disease burden. However, with increasing health expenditure, the disease burden plateaus at around 20,000 DALYs per 100,000 people. 20,000 DALYs seems to be a threshold for disease and mortality that cannot be overcome by further increasing health spending per capita. The figure also illustrates that the sweet spot for health financing and burden of disease seems to be around USD 2,000 annual health expenditure. Even doubling or quadrupling this amount does not reduce the burden of disease.

Below USD 2,000 annual health spending, more spending is correlated with improved health. The figure above shows that lower-income countries in Africa and Asia, for example, tend to have high or very high DALYs and low or very low health spending per capita. The figure supports the hypothesis that increasing health spending per capita will improve population health.

On a global scale, there is a mismatch between health spending and disease burden. The figure below illustrates the distribution of global health spending, global population, and global burden of disease. High-income countries spend an enormous amount of financial resources to keep their share of DALYs slightly below their global share of population. Lower-income groups are unable to manage their burden of disease with the little health funding available to them.

Figure 17: Share of Health Spending, Population, and DALYs for World Bank Income Groups (2018)



Source: Institute for Health Metrics and Evaluation (2021). CC BY 4.0.

Scenarios for Future Health Spending

The Global Burden of Disease Health Financing Collaborator Network, a group of more than 200 international experts associated with the **Institute for Health Metrics and Evaluation** (IHME), published a paper in 2019 where they forecasted health spending per capita by 2050 (Chang et al., 2019).

Institute for Health Metrics and Evaluation
This is an independent population research organization at the University of Washington that aims to develop evidence for the global state of health.

The experts forecasted country-level health expenditure based on estimates for the gross domestic product (GDP); population estimates, including fertility rates; size of working population and retirees; extrapolation of DAH; and prepaid private spending, plus country specific assumptions (Institute for Health Metrics and Evaluation, 2022a). They calculated a reference health spending scenario based on estimates for five key contributors:

1. Wealth. Wealthier governments can provide more funding for health systems. Wealth was measured as GDP per capita $\left(\frac{GDP}{Population}\right)$.
2. Fiscal capacity. Higher government spending requires a strong formal sector and tax system. Markets with a larger informal sector often have low fiscal capacity. Fiscal capacity was measured as total government spending per GDP $\left(\frac{GovSpend}{GDP}\right)$.
3. Health sector prioritization. Absolute health spending depends on wealth and fiscal capacity. Health sector priority measures the relative health spending, considering a country's financial capability. Health sector priority was measured as government spending on health per total government spending $\left(\frac{GHES}{GovSpend}\right)$.

4. Role of private funding. A high share of private funding, especially out-of-pocket (OOP) funding, increases the poverty risk for people and might deter them from seeking essential health services. The role of private funding was measured as prepaid private (PPP) health spending per GDP and out-of-pocket spending per GDP $\left(\frac{PPP}{GDP}\right)$; $\left(\frac{OOP}{GDP}\right)$.
5. Role of development assistance for health. DAH funding is often project-based, short- to medium-term, paid by donors voluntarily, and not guaranteed with legislation, which makes this important source of funding for lower-income countries more volatile. The role of DAH was measured based on forecasted spending of large DAH payer organizations.

In addition to this reference scenario, the experts calculated two scenarios for health spending. These scenarios measure how much national governments would spend if they would allocate more resources to health, collect and spend more government resources, and assign more of those funds to the health sector. Both scenarios forecast higher spending than the reference scenario, even if the first scenario is dubbed a "lower" scenario.

In a lower scenario, governments make health a higher priority. The share of government spending on health per total government spending is at least as high as the target value. In an upper scenario, governments make health a higher priority and, overall, government spending increases. Government spending on health per total government spending and government spending per GDP is at least as high as the target value.

The target values are the ninetith percentile of the observed fraction's distributions. This means that the calculation sorts the shares of all countries by size from low to high and selects the value that includes 90 percent of all values below it. This threshold is the target value. The experts consider this value ambitious, yet achievable (Chang et al., 2019).

Health Spending Forecast

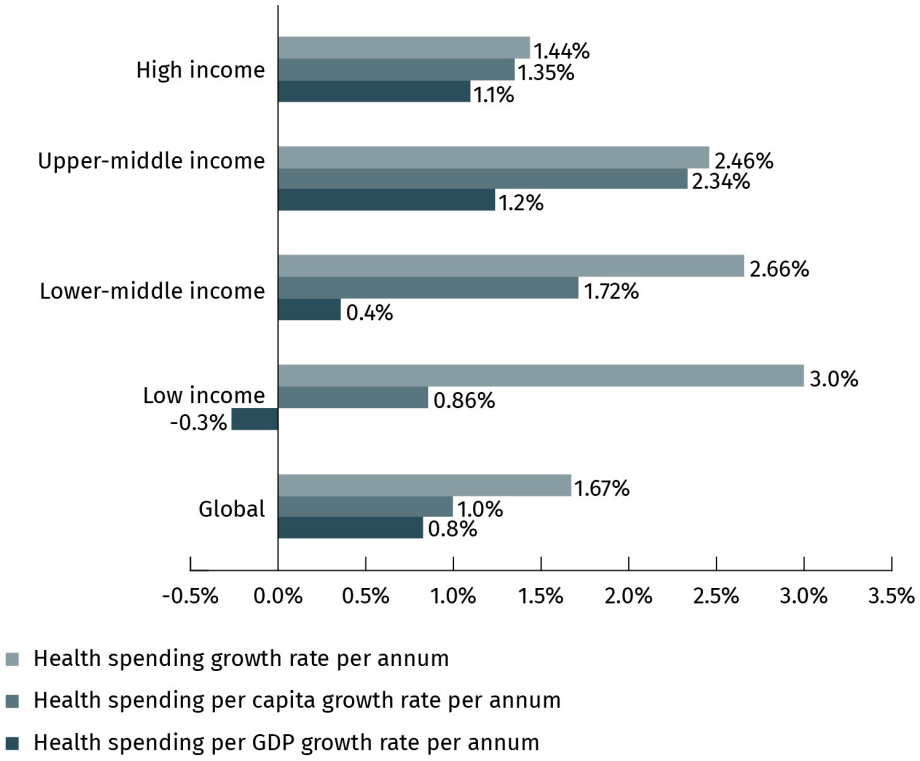
Health spending will continue to rise. According to the IHME reference scenario, global health spending will reach USD 9.9 trillion by 2030 and USD 14.4 trillion by 2050. Converted to purchasing power parity (PPP) in USD, spending would reach USD 13.2 trillion in 2030 and 19.5 trillion in 2050 (Institute for Health Metrics and Evaluation, 2022a).

IHME forecasts an average annualized increase of health spending by 1.67 percent between 2018 and 2050. Total health spending grows faster in low- and middle-income areas than in high-income areas (Institute for Health Metrics and Evaluation, 2022a, 2022b).

In higher-income countries with higher spending for healthcare, a smaller growth rate naturally yields much higher absolute gains than a slightly higher growth rate applied to the much lower baseline health expenditure of low-income countries. As low-income countries tend to have higher population growth rates than high-income countries, their average forecasted per capita growth of health expenditures is much lower than the total

growth (1.0 percent). This indicates that part of the health spending increase goes to financing the health needs of the growing population rather than improved health services for the individual.

Figure 18: Forecast Annualized Change Rate in Health Spending (2018–2050) by World Bank Income Group: Reference Scenario



Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation (2022a, 2022b). Used with permission. All rights reserved.

These numbers show how deceiving an isolated look at growth rates can be. Attractive or acceptable growth rates of health spending can get diluted by low baseline spending and high population growth in low-income countries, leading to only little additional funding for each person. Considering inflation, real health spending per capita might even be negative.

Health spending per GDP is an interesting indicator because it shows whether countries' funding for health services aligns with their economic abilities. Growth rates for health spending per GDP illustrate whether health spending grows faster or slower than the economy.

In 2018, the global average for total health spending per GDP was 9.9 percent, but with staggering differences between income groups: Low-income countries spent an average of 5.0 percent of their economy on health services, and high-income countries spent 12.4

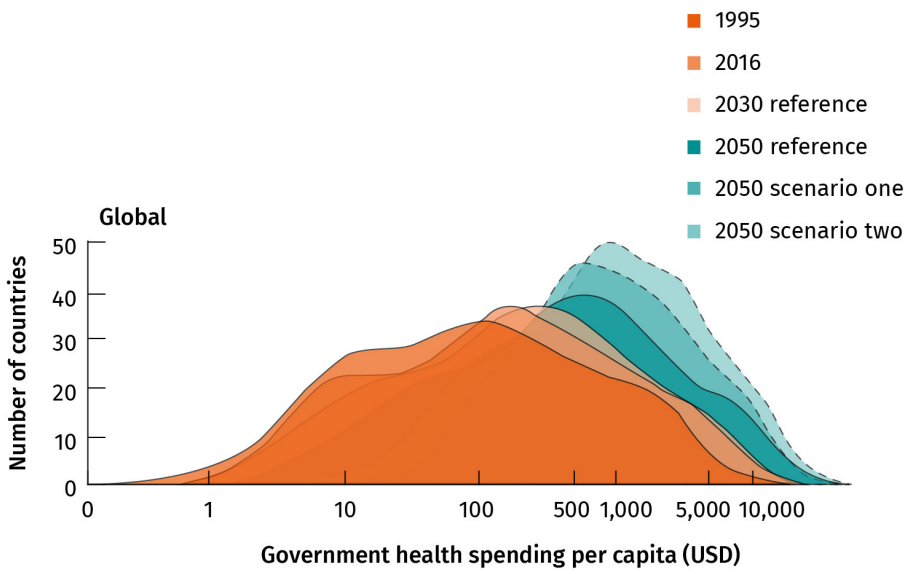
percent. Low-income countries therefore spend little on health in absolute terms, as well as relative to their economic capabilities (Institute for Health Metrics and Evaluation, 2022b).

Global health spending per GDP is forecasted to grow at an annual rate of 0.8 percent (Institute for Health Metrics and Evaluation, 2022a, 2022b). This shows that health expenditure grows slightly faster than the economy. Spending more on healthcare does not necessarily improve health outcomes, at least in countries where spending levels are already sufficient. However, in low-income countries where both per capita spending and spending per GDP are low, increased health expenditure does tend to improve accessibility and health in health services.

By 2050, the highest share of health spending per GDP is forecast for high-income countries (17.6 percent). These countries already have the highest total spending, per capita spending, and spending per GDP (Institute for Health Metrics and Evaluation, 2022a). High-income countries struggle with increasing financial pressure caused by ageing populations with growing demands for health services. At the same time, medical advancements, like innovative drugs and medical devices, make healthcare more expensive.

Health spending per capita is forecasted to increase from an average USD 1,106 in 2018 to USD 1,519 in 2050. Again, there are large discrepancies between high- (2018: USD 5,553, 2050: USD 8,536) and low-income countries (2018: USD 35, 2050: USD 46; Institute for Health Metrics and Evaluation, 2022a, 2022b).

Figure 19: Distribution of Government Health Spending Per Capita, Globally (Inflation-Adjusted USD, 2018)



Source: Chang et al. (2019). CC BY 4.0.

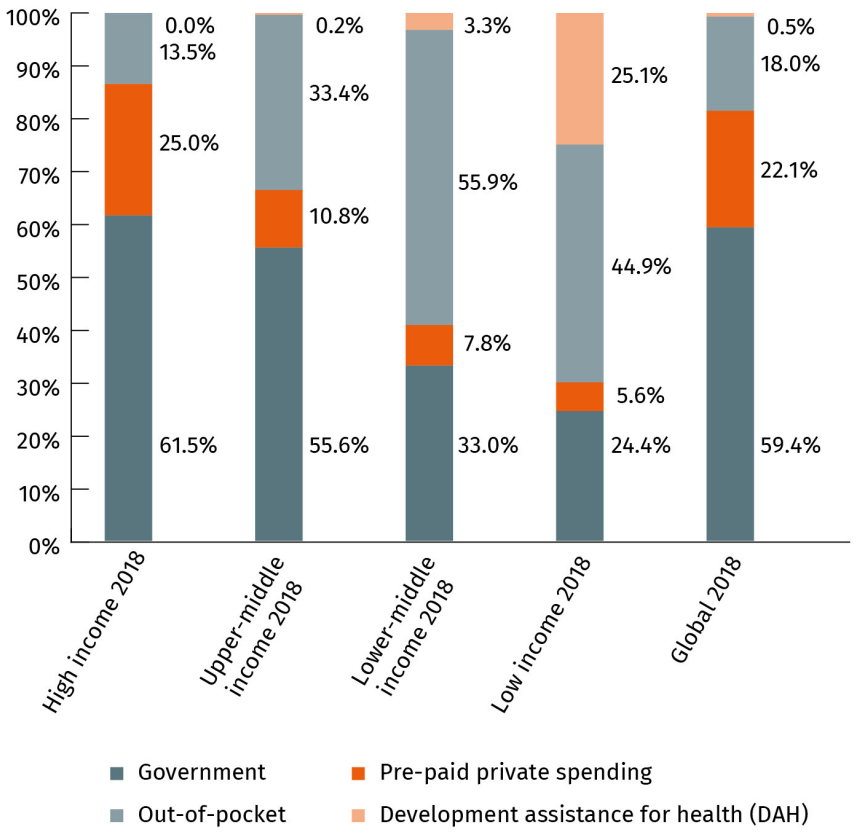
The figure above shows the distribution of countries based on their historic, current, and forecast health spending per capita. It indicates a gradual increase of per capita health funding. The scenarios show the additional effect on health funding made possible when governments increase the priority of healthcare in their agenda (scenarios one and two) and their share of GDP spending (scenario two).

Source of Funding Forecast

In high-income countries, the share of government funding is expected to decrease by 2050, with a compensatory rise of pre-paid private spending and out-of-pocket payment (Institute for Health Metrics and Evaluation, 2022a). In upper- and lower-middle-income countries, the share of pre-paid government funding is forecast to increase, reducing the share of out-of-pocket payments (Institute for Health Metrics and Evaluation, 2022a). Increased pre-paid funding generally improves access and reduces poverty risks for the population.

Especially in low-income countries, funding remains inadequate. Not only will health spending per capita remain low, but also the share of government funding continues to cover less than one third of health expenditures. DAH spending, an important contributor to financing health services in low-income countries, increases overall, but not as fast as total health expenditures. Its contribution to total health expenditure is expected to decline from 25 percent in 2018 to 15 percent in 2050 (Institute for Health Metrics and Evaluation, 2022a, 2022b).

Figure 20: Share of Health Service Financing by Funding Source (2050)



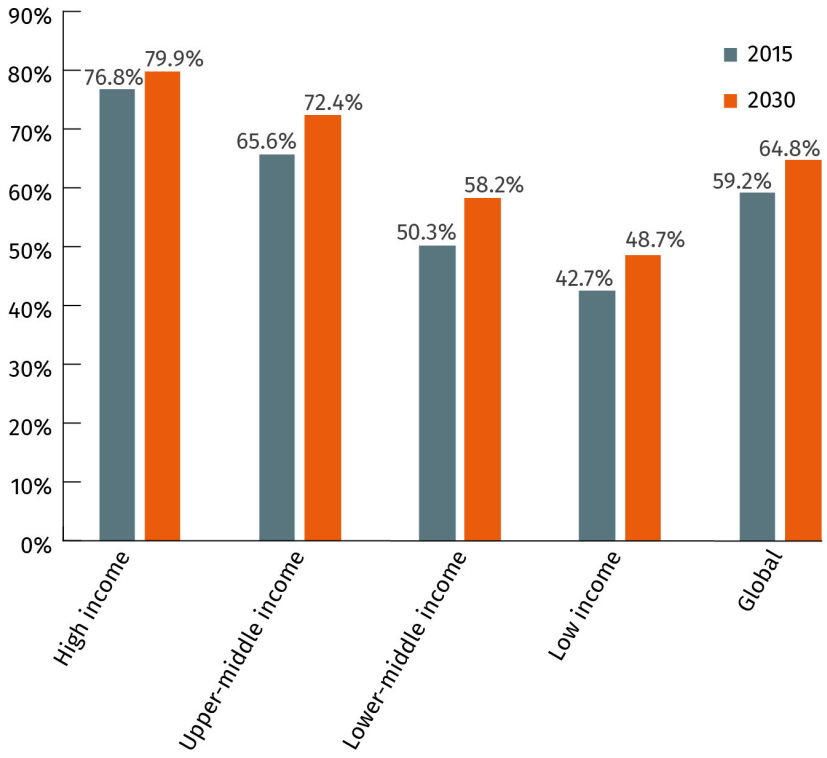
Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation (2022a). Used with permission. All rights reserved.

Forecast for Access to Health Services

The increase in global health spending cannot correct the spending disparities between economies with higher and lower incomes. By 2050, 74.6 percent of global health spending is expected to occur in the 80 high-income countries. 20.7 percent and 4.1 percent of spending is forecast for the 107 upper- and lower-middle income countries respectively. Only 0.4 percent of global spending is forecast for the 31 low-income countries, even though these countries will be home to 15.7 percent of the global population in 2050 (Chang et al., 2019; Institute for Health Metrics and Evaluation, 2022a; The World Bank, n.d.-a).

The universal health coverage (UHC) index is forecast to climb from 59.2 percent to 64.8 percent in 2030. Between 2015 and 2030, an additional 1.1 billion lives are expected to access essential health services. However, in low-income countries, the average UHC index remains below 50 percent, which means that less than half of the population will have access to these essential services (Dieleman et al., 2018).

Figure 21: Universal Health Coverage Index (2015–2030)



Source: Sophie Brenner (2022), based on Dieleman et al. (2018).

In summary, we observe three global trends in health spending (Chang et al., 2019):

1. Continued increase in health spending. Health spending is growing in all income brackets. Relative growth is higher in lower-income countries, and absolute growth is higher in higher-income countries with higher baseline spending.
2. Declining population growth rates. Globally, population growth rates are declining. High growth rates in Sub-Saharan Africa are slowing down compared to the previous two decades. However, the total population is still growing. Against this backdrop, increased health spending only leads to small per capita spending growth.
3. Growing disparities between income groups. Differences in health funding are growing between countries. The difference between the largest and smallest health spender was USD 10,787 in 2016 and is expected to reach USD 15,806 by 2050. By 2050, high-income countries are forecast to spend 126 times more on health services than low-income countries.

In this section, we looked at determinants for health spending. We also looked at forecasted health spending based on different scenarios and for different types of health systems. This analysis shows that countries across the globe are in very different places when it

comes to the funding and capabilities of their health systems. Countries with low per capita health spending should focus on increasing their spending, i.e., access to health services, if they want to improve population health.

4.2 Global Financing Mechanisms

There are four major categories of health spending based on the source of funding (Dieleman et al., 2018):

1. Government health spending from domestic sources
2. Out-of-pocket health spending
3. Pre-paid private health spending
4. Development assistance for health (DAH) spending

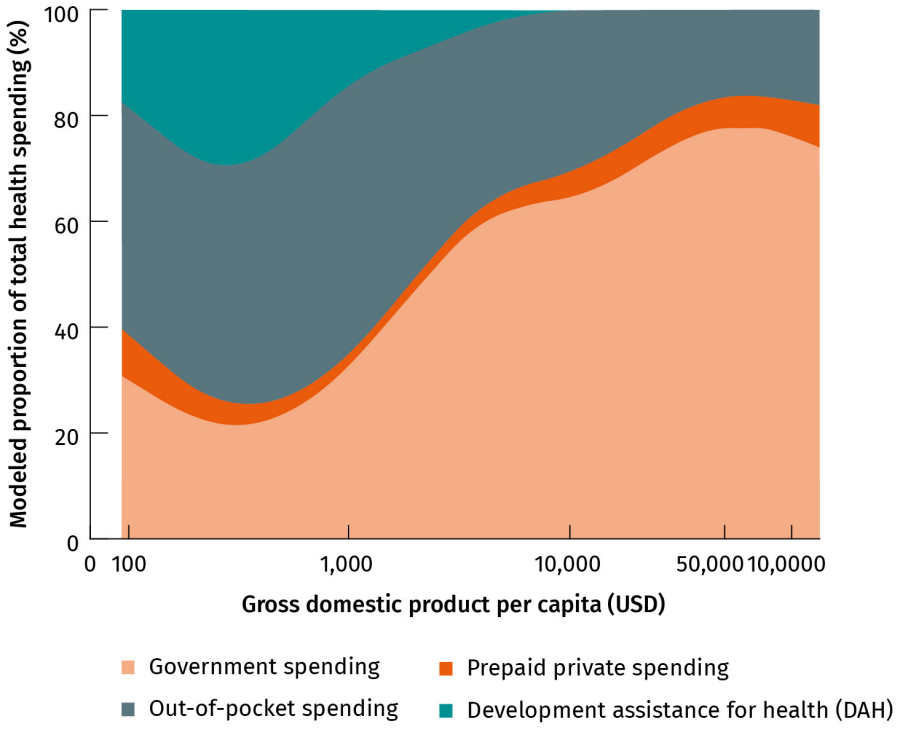
Government spending, out-of-pocket spending, and pre-paid private health spending are national sources of health financing. DAH funding is usually **transnational** funding, sometimes coming from global funding sources.

Transnational
A transnational activity transgresses national political borders. Transnational actors can be stationed in one or multiple countries.

Composition of Global Health Spending

The figure below shows the composition of health spending by funding source and is modeled as a function of economic development (GDP per capita).

Figure 22: Composition of Health Spending by Source



Source: Chang et al. (2019). CC BY 4.0.

While wealthier countries fund their health systems with national funding, DAH is a major source of funding for low-income and lower-middle-income countries. As countries become wealthier, less of their health service funding comes from DAH. Interestingly, the share of government spending goes down as DAH increases. Low-income countries often rely on DAH funding. DAH funding, however, does not increase government priority for health, as intended, but rather decreases government health spending. It thus makes DAH not purely additional. Sustainable DAH, however, must also leverage and stimulate government spending (World Health Organization, 2021a).

For a closer look into global health financing mechanisms, we can evaluate DAH funding by its **source of funding**, distribution mechanism, and target (Institute for Health Metrics and Evaluation, 2021).

Source of funding
This is the origin of funds, like national government treasuries, private philanthropies, and contributions by private organizations.

Sources of Global Health Financing

In 2020, an estimated USD 55 billion in funding was provided as development assistance for health (Institute for Health Metrics and Evaluation, 2021). This is an unprecedented increase of 36 percent compared to 2019, mainly caused by additional spending needs for the fight against COVID-19. Without COVID-19 in 2020, DAH would only have increased by 1.8 percent from 2019 (Institute for Health Metrics and Evaluation, 2021).

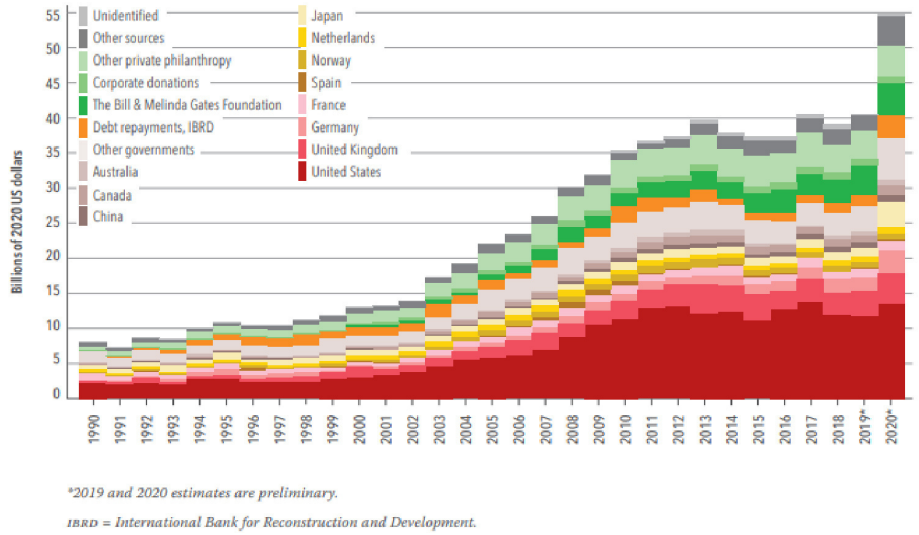
USD 55 billion is only 0.6 percent of global health funding, but an essential pillar of funding for many lower-income countries. In 2018, DAH amounted to 25 percent of health spending in low-income countries and three percent in lower-middle-income countries (Institute for Health Metrics and Evaluation, 2021).

The figure below shows a breakdown of global DAH funding by source. There are three main sources of DAH funding (Institute for Health Metrics and Evaluation, 2021):

1. National treasuries. The largest sources of DAH funding are national governments, notably the US, UK, Japan, Germany, and Canada. Contributions from national governments amounted to 68 percent of total DAH funding in 2020.
2. Private philanthropy. The second largest source of DAH funding is private donations, which contributed 18 percent of total DAH funding in 2020. The Bill and Melinda Gates Foundation is the largest private philanthropy with USD 4.6 billion.
3. Debt repayments to international financial institutions. Another six percent of DAH funding in 2020 came from spending of development banks, most notably the **International Bank for Reconstruction and Development** (IBRD).

International Bank for Reconstruction and Development
This is the largest development bank, owned by 189 member countries. It provides loans, guarantees, risk management products, and advice to lower-income countries as a response to global or regional challenges (The World Bank, n.d.).

Figure 23: DAH Financing by Source of Funding



**2019 and 2020 estimates are preliminary.*

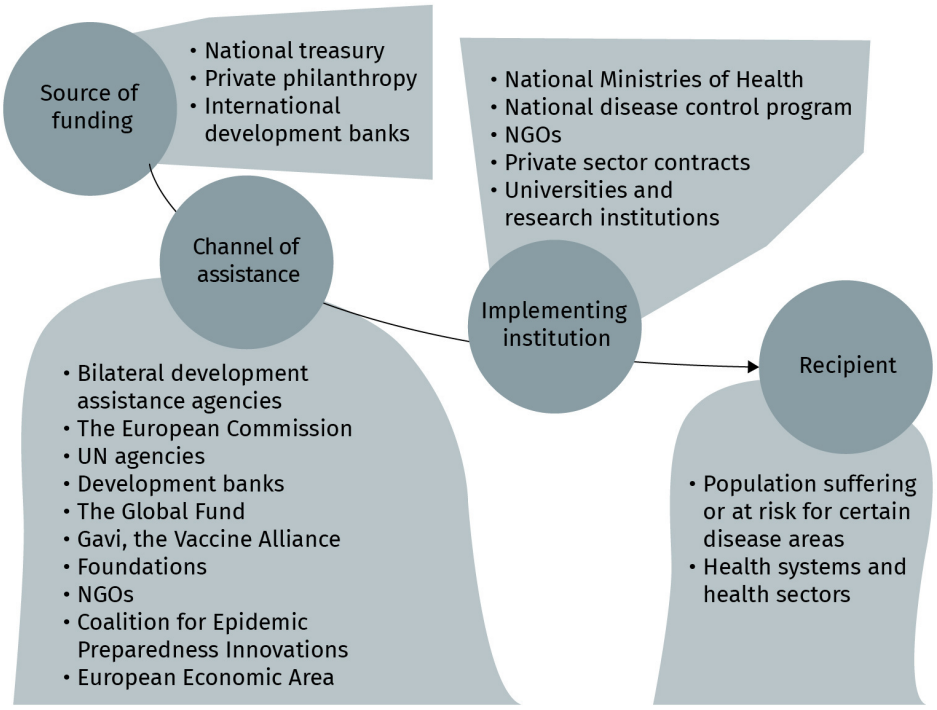
IBRD = International Bank for Reconstruction and Development.

Source: Institute for Health Metrics and Evaluation (2021). CC BY-NC-ND 4.0.

Mechanisms of Global Health Financing

Development assistance for health flows from sources to recipients through intermediaries. These intermediaries are **channels of assistance** and **implementing institutions**. The figure below illustrates the flow of DAH funding from the source to the recipient.

Figure 24: Flow of DAH Funding from Source to Recipient



Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation (2021).

Channel of assistance
These are intermediaries in the flow of funds from sources to recipients. Channels include bilateral aid agencies, non-governmental organizations (NGOs), United Nations (UN) agencies, and private foundations.

Implementing institutions
These are providers of health services as part of DAH programs in low-and middle-income areas. Implementing institutions include governmental bodies, NGOs, and international organizations.

Funding flows through channels of assistance, which include bilateral development aid organizations, the European Commission, United Nations (UN) agencies, foundations, and non-governmental organizations (NGOs). The funds are used by implementing organizations that use funding to achieve the DAH objectives. These organizations include governmental and non-governmental institutions (Institute for Health Metrics and Evaluation, 2021).

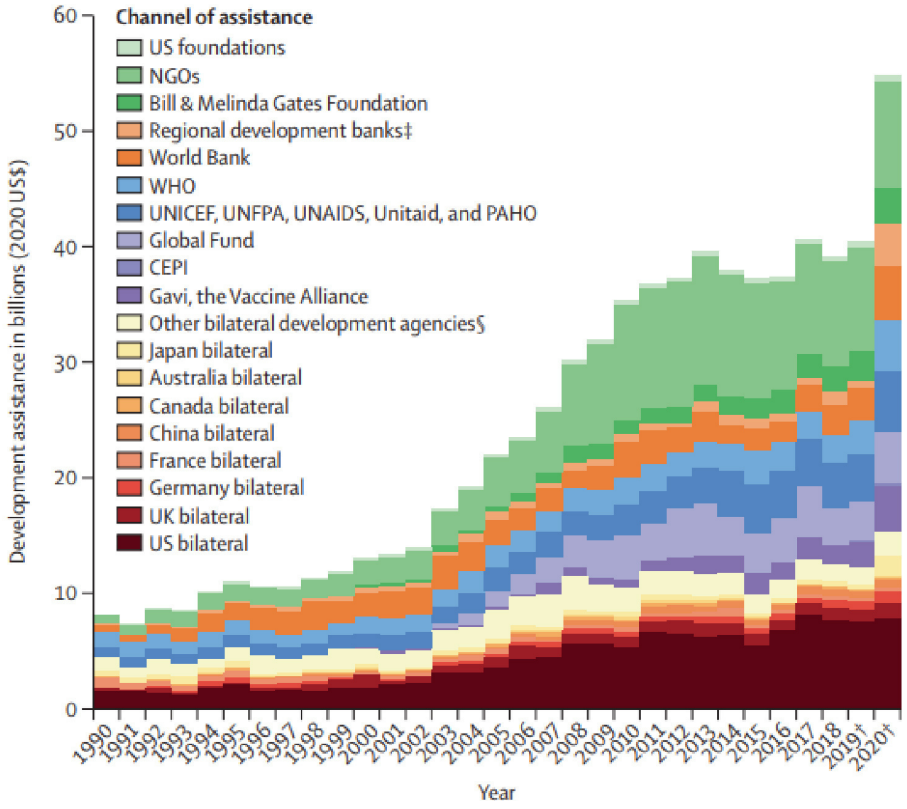
Sources of funding and channels of assistance are identical for bilateral payments that do not pass through an intermediary. The figure below breaks down DAH funding by channel. Some of the most important DAH channels of assistance are

- The Bill and Melinda Gates Foundation. This is the largest private philanthropy organization globally, based in Seattle, WA, US, and founded by Melinda Gates and Microsoft co-founder Bill Gates. The foundation issues grants for improving the health and wealth of people in developing countries (The Bill & Melinda Gates Foundation, n.d.).
- The Coalition of Epidemic Preparedness Innovations (CEPI). This is a global partnership between public, private, and civil society organizations, as well as philanthropy. CEPI's mission is to speed up the development of vaccines and achieve equitable access to these vaccines during epidemics (Coalition for Epidemic Preparedness Innovations, n.d.).

- Gavi, The Vaccine Alliance. This is a global alliance of public and private sector players aiming to save lives and improve health through sustainable and equitable access to vaccines. Gavi vaccinates half of all children globally. By using this negotiation power, Gavi is able to procure all 11 World Health Organization (WHO)-recommended vaccines for children for USD 28 per child compared to approximately USD 1,200 in the US (Gavi, The Vaccine Alliance, 2022).
- The Global Fund. The Global Fund raises money from donors (mostly governments) and invests in programs that aim to end the AIDS, tuberculosis, and malaria epidemics. The Global Fund has an annual volume of USD four billion and invests in 100 different countries. All programs are implemented by local experts with the Global Fund providing oversight (The Global Fund, n.d.).
- The World Bank. This is a global partnership of 189 member countries and one of the larges sources of funding for developing countries. It includes five institutions: The International Bank for Reconstruction and Development (IBRD), The International Development Association (IDA), The International Finance Corporation (IFC), The Multilateral Investment Guarantee Agency (MIGA), and The International Centre for Settlement of Investment Disputes (ICSD). The World Bank's mission is to reduce the share of people living in extreme poverty to three percent and increase the incomes of the poorest 40 percent of people globally (The World Bank, n.d.-b).
- The World Health Organization (WHO). This is an agency of the United Nations that promotes health and safety in the world and supports vulnerable populations. The WHO leads the global effort toward united healthcare (UHC), leads the global response to health emergencies, and promotes healthy living. The WHO's decision-making body is the World Health Assembly, attended by representatives of all member states (The World Health Organization, n.d.).
- UN agencies, such as
    - The United Nations Children's Fund (UNICEF). This organization collaborates with other UN agencies to represent the interests of children through research and practical solutions, such as vaccinations, nutrition, sanitation, and education, as well as prevention and protection from HIV and violence (United Nations Children's Fund, n.d.).
    - The United Nations Population Fund (UNFPA). This is the UN's sexual and reproductive health agency. The fund develops strategies to increase access to birth control and safe childbirth, and fight child marriage and gender-based violence (United Nations Population Fund, 2022).
    - The Joint United Nations Programme on HIV/AIDS (UNAIDS). This organization leads the work towards the sustainable development goal (SDG) of ending AIDS as a public health threat by 2030. It does so by crafting global strategies and supporting accelerated, inclusive, and synchronized action against HIV/AIDS (UNAIDS, n.d.).
    - Unitaid. This is a global health agency to identify and implement innovative solutions for prevention; diagnosis; and faster, cheaper, and more effective treatment for lower-income countries. Unitaid focuses its work on HIV/AIDS, malaria, and tuberculosis, as well as their coinfections and comorbidities (Unitaid, n.d.).
    - The Pan American Health Organization (PAHO). This is an international health agency. It is the regional WHO office for the Americas, specializing in improving the health of the people living in the area (Pan American Health Organization, n.d.).

Between 2019 and 2020, the COVID-19 pandemic led to an increase in World Bank disbursements of 70 percent. Gavi, with its mission to make vaccines available globally, raised its funding by 73 percent, partially through its international partnership with COVID-19 Vaccines Global Access (COVAX). Regional development banks even multiplied their DAH funding (+522 percent) in 2020 compared to 2019 (Institute for Health Metrics and Evaluation, 2021).

Figure 25: DAH Financing by Channel of Assistance



Source: Institute for Health Metrics and Evaluation(2021). CC BY-NC-ND 4.0.

Recipients of Global Health Financing

DAH funding is usually tied to focus areas and assigned to specific regions. These focus areas and regions can be considered recipients of DAH funding.

Health focus areas

The main areas of focus for development assistance for health are as follows (Institute for Health Metrics and Evaluation, 2021):

- infectious diseases (HIV/AIDS, malaria, tuberculosis, etc.)
- newborn and child health
- reproductive and maternal health
- **non-communicable diseases** (NCDs)
- health systems strengthening and sector-wide approaches

Non-communicable diseases
These are diseases that are not transmissible directly from one person to another. Examples of NCDs are autoimmune diseases, cataracts, most cancers, diabetes, and strokes.

Within these focus areas, DAH funds a wide array of activities and resources. In HIV/AIDS, for example, funding goes to prevention (including prevention of mother-to-child transmission), counseling and testing, treatment, orphans and vulnerable children, care and support, and health personnel and health system strengthening. In newborn and child health, nutrition and vaccinations are important areas of funding. The funding of tuberculosis includes topics like community outreach, testing vector control with indoor residual spraying, and bed nets (Institute for Health Metrics and Evaluation, 2021).

DAH funding for specific health focus areas like HIV/AIDS or tuberculosis is usually delivered through vertical health programs. Vertical health programs (verticals) are components of the health systems with the following characteristics (Cairncross et al., 1997):

- clearly defined objectives, usually measurable and tied to a specific health problem or small group of health problems
- outcomes measured in short- or medium-term
- centrally managed, with dedicated resources (personnel, equipment, and funding)

We can imagine verticals as resource-filled cylinders with a specific purpose, cutting through the weeds of the health system, often creating a chamber of abundance for the targeted disease area in otherwise underserved areas.

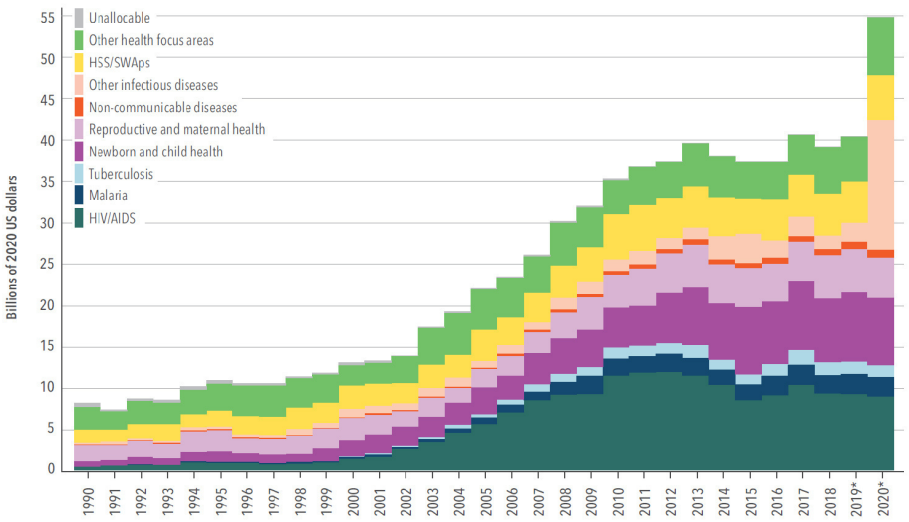
Verticals emerged in the 1980s when health donors realized how little success community-based health programs sometimes had in meeting basic health needs. Even the minimum **health benefits package** (HBP) proposed by the World Bank was too expensive for some of the poorest countries. Verticals were considered the best way to create measurable successes and make investments in healthcare attractive again for donors and governments (Cairncross et al., 1997).

Health benefits package
This is a list of essential services to be provided by the health system, ideally chosen based on rational and evidence-based criteria, reflecting the policy goals of universal health coverage (UHC).

While indication-specific health programs are considered verticals, health systems strengthening and sector-wide approaches (HSS/SWAps) are also called **horizontal programs**. This is due to their broader approach and objective to improve the capabilities of certain sectors of the health systems, usually cutting across multiple disease areas.

Horizontal programs
These are financing programs that address health problems on a broader front and with longer-term perspective by creating a system of permanent organizations, also called general health services.

Figure 26: DAH Funding by Health Focus Area



Source: Institute for Health Metrics and Evaluation(2021). CC BY-NC-ND 4.0.

The amount of funding shifts as epidemiological landscapes and policy priorities change. The figure above shows how funding for different health focus areas have changed over time. Since 2002, funding for HIV/AIDS increased every year until 2013, and has gone down slightly since then (Institute for Health Metrics and Evaluation, 2021).

A decline in funding does not necessarily mean a reduction of activity. It could also be due to lower prices, e.g., when patents for medications expire. We also see a relative decline of HSS/SWAps over time. These generalist schemes have been overtaken by more targeted vertical initiatives over the past three decades. The large jump between 2019 and 2020 is, again, driven by COVID-19 as part of other infectious diseases. NCDs remain a small, but very fast growing segment of DAH funding (two percent in 2020; Institute for Health Metrics and Evaluation, 2021).

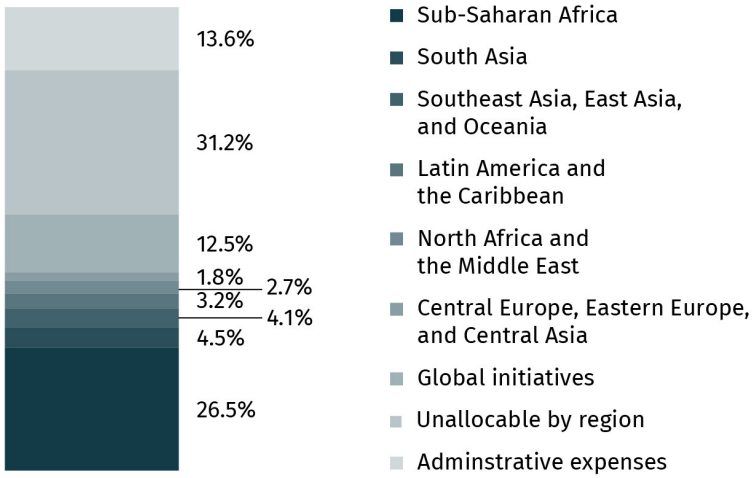
Remarkably, COVID-19 has led to a steep increase in overall DAH, but spending on other health focus areas remained the same or declined marginally. This is an indicator that the spotlight on COVID-19 has not spiked an increase in DAH overall (Institute for Health Metrics and Evaluation, 2021).

Regional DAH allocation

Most DAH funding is distributed to lower-income geographies. Among all global burden of disease super-regions, Sub-Saharan Africa has received the most DAH funding between 1990 and 2018. In Sub-Saharan Africa, 48 percent of countries are low-income, and 41 percent are lower-middle-income according to the World Bank income groups (Institute for Health Metrics and Evaluation, 2021).

In 2018, a total of USD 39.1 billion in DAH was distributed to regions, as indicated in the figure below.

Figure 27: DAH by Global Burden of Disease Super Region (2018)



Source: Sophie Brenner (2022), based on Institute for Health Metrics and Evaluation(2021).

Large shares of DAH funding were allocated to global initiatives, i.e., initiatives not limited to a certain country or region, or covered administrative expenses. The researchers at the Institute for Health Metrics and Evaluation (IHME) who conducted this analysis were unable to allocate about one third of DAH funding to regional or global projects (Institute for Health Metrics and Evaluation, 2021).

4.3 Alignment

Vertical health programs have many advantages. These include strong centralized control of technical execution and financing, the capability to react quickly to changes, and the chance to achieve fast results in otherwise weak health systems. These characteristics make verticals attractive to donors, especially for programs aimed at eradicating illnesses like poliomyelitis, dengue fever, and micronutrient deficiencies (Cairncross et al., 1997).

Controversy About Vertical Health Programs

The alleged strengths of verticals, however, are also perceived as challenges in controversial discussions, especially when verticals operate in silo mode and fail to leave a mark on the national health system (Regan et al., 2021).

DAH funding has had great success in reducing—or, in some countries, even eliminating—severe health problems. For example, new HIV infections were reduced by one third between 2000 and 2015, and better access to diagnostic and care services for tuberculosis

likely prevented more than 50 million deaths between 2000 and 2017. The successful elimination of smallpox is a frequently cited case study for a vertical program that achieved its objectives and did not negatively affect the health system performance (Gounder, 1998).

Other vertical programs are considered less successful. One example is malaria eradication; this lack of success is considered to be partially due to the separation of active surveillance of malaria cases from general health service provisions. Experts believe that integrating case surveillance with the primary care sector could have improved the program's success (Bradley, 1998; Gish, 1992).

In other cases, vertical programs deliver mixed results. DAH funding for HIV/AIDS has increased over the past years in almost all countries. An analysis of 135 countries shows that HIV/AIDS incidence rates decreased in 73 countries between 2000 and 2017, most notably in Sub-Saharan Africa. However, in the remaining 62 countries, incidence increased (Micah et al., 2020).

The following are common areas of criticism about vertical health programs (Atun et al., 2008; Cairncross et al., 1997):

- creation of parallel funding and governance systems. Vertical programs are usually financed and managed by actors who are not employed by the national health systems. This creates a silo next to the national health system, often without collaboration or exchange of information.
- disturbing national health priorities. Verticals are often set up by international organizations and designed to deliver results for a specific health need. Having them sweep in, promoting their cause may be misaligned with the cultural context or distort other national health initiatives.
- resource-intensive delivery. Verticals often allocate large resources, at least compared to the local resources, to their specific cause to achieve measurable results in the short- or medium-term. This funding might not be cost-effective and cannot be sustained beyond program runtime.
- little contribution to strengthening the overall health system. By creating temporary parallel health infrastructure for selected health problems, no sustainable improvement in local health systems is created. Verticals may even create negative spillover effects to the population not participating in the program, e.g., through access barriers or crowding out established services.
- focus on diseases, not users of service. Verticals target certain illnesses and health problems. Patients may suffer from multiple illnesses. They may need to go to different places to interact with people for various health problems. Diseases with multiple causes or comorbidities, such as cardiovascular diseases, cancer, or disability, are more difficult for verticals to tackle.

Alignment of Global Funding and National Health Systems

There are several reasons for a better connection of global and national health funding. One of these reasons is eligibility and transition frameworks for countries receiving international aid. Many global health initiatives, including Gavi, the Global Fund, and the Global Polio Eradication Initiative (GPEI), have adopted policies that define when a coun-

try is no longer eligible for DAH. These transition decisions are based on, e.g., exceeding a certain GDP per capita threshold or falling below a certain disease burden. Transitioning can thus be structurally and fiscally risky for countries (Silverman, 2018).

Overcoming the siloed health service provision of verticals can improve countries' chances to deliver long-term effects, even as DAH funding subsides. There are many ways to work toward the alignment of verticals and national health systems.

Many countries, including low- and middle-income countries, are progressing towards Universal Health Coverage (UHC). There is an opportunity for these countries to include externally-funded vertical programs in this transition by integrating them in the national health benefits package (HBP), which is part of the UHC policy. An analysis of 26 low- and middle-income countries showed that countries follow different patterns in integrating verticals in their HBP: Most commonly integrated are maternal and child health programs, and family planning programs are least commonly integrated (Regan et al., 2021).

Another alignment approach is to combine the advantages of the vertical and horizontal models to a "diagonal" approach. The diagonal approach aims for indication-specific results through an improvement of the health system. It uses health priority areas to create necessary improvements in the health system through, e.g., staff development, funding, infrastructure planning, medicine supply, and quality management. The main funding vehicle of the diagonal approach could be a DAH-financed global health fund acting as a national health insurance and health system development vehicle to achieve more than or equal to USD 40 health funding per capita (Ooms et al., 2008). Examples of diagonal models are the measles elimination programs in China and the US, where disease-specific measures, such as routine immunization and surveillance, were embedded in national legislation and health systems (Orenstein & Seib, 2016).

Another approach is to design disease-specific programs to be already integrated with the health system whose population they intend to serve. This can be done by including an explicit policy for strengthening the health systems in the program and embedding the program in the structure of the health system. This integration creates benefits for the health systems through sharing and supplementing resources, giving better access, and higher demand for services, as well as greater trust in the public health service. India is a country with many years of experience with externally-funded health programs. The country has found that more integrated programs, like the national programs for tuberculosis control (RNTCP) and vector borne disease control (NVBDCP), strengthened the health system and were effective in their disease area (Rao et al., 2014).

SUMMARY

Health spending per capita and health status are positively correlated. Disability-adjusted life years (DALYs) are higher in countries with low spending. They tend to increase as spending increases.

In 2018, global health spending was 9.9 percent per GDP, and it is expected to increase by an average 1.67 percent per annum between 2018 and 2050. Forecasting global health spending is based on wealth, fiscal capacity, and health sector prioritization, as well as the role of private funding and DAH.

Spending grows faster in lower-income countries, but from a smaller base. There, higher population growth increases demand. Health spending per capita is forecast to increase from USD 1,106 to 1,519 between 2018 and 2050.

The increase in global health spending cannot correct the spending disparities between higher- and lower-income countries. By 2050, 75 percent of health spending will occur in high-income countries.

The universal health coverage (UHC) index is forecasted to climb from 60 to 65 percent between 2015 and 2030, covering an additional 1.1 billion lives.

DAH represents only 0.6 percent of global health funding but makes up 25 percent of total health spending in low-income countries.

DAH funding comes from national treasuries, private philanthropy, and international development banks. It flows through intermediary channels like UN agencies, The Global Funds, NGOs, and foundations.

DAH funding often comes as vertical programs. Verticals have measurable objectives, have a short- to medium-term focus, and operate with its own management and resources. Verticals are sometimes criticized for their siloed operation and inability to improve the overall health system. Therefore, it can be beneficial to align verticals with horizontal programs that are oriented towards health system strengthening. One way to do this is utilizing the convergence towards UHC for the integration of verticals into the national health benefits package. Other experts suggest a diagonal approach between both program types or to design disease-specific programs already integrated into the health system.

UNIT 5

PAY-FOR-PERFORMANCE

STUDY GOALS

On completion of this unit, you will be able to ...

- explain the concept and objectives of pay-for-performance (P4P) in healthcare.
- recognize and evaluate the design elements of a P4P scheme.
- differentiate between the scope of P4P in primary and hospital care.
- describe successful elements and areas for improvement in selected primary and hospital care P4P schemes.

5. PAY-FOR-PERFORMANCE

Introduction

Imagine you want to build your dream home. You have a clear vision of how it should look and start talking to various contractors: experts in concrete laying, drywall installation, plumbing, electrical wiring, roofing, painting, and carpentry, and maybe even a landscaper. They applaud your great taste and explain confidently how their work will achieve —or even exceed—the vision for your home. You explain how they will get paid: They bill every task they perform, including materials used, directly to you, indicating why each task is necessary for the project. They love your payment model.

Your construction site is buzzing. Everyone is working on their piece of the house. Frequently, someone walks up to you, presenting a new suggestion about how to make your house even more functional and beautiful. The suggestions sound great and you agree. They are the experts and will know best.

A few weeks later, you notice several of the same machines on your construction site, partially blocking the road. Your contractors are upset with each other for delayed pre-work or incompatible parts. Also, the house emerging in front of you does not look like your vision. The invoices are piling up. Soon, two thirds of the budget is blown. As you are not an architect or engineer, it is hard for you to decide what to change to get your project back on track.

This is what fee-for-service models do in the world of health services. Incentives to increase services are paid on an itemized level and authorized by the party that executes the work; the patient is usually not qualified to judge which service leads to the desired outcome. The result is quality problems and budget overruns.

You may not be an architect or engineer, but you are a health economist who can analyze situations and recommend routes for performance improvement. You decide that you need to get to a place where your contractors want what you want: your dream house.

You decide to do four things: First, you develop best practice pathways and activity bundles for each task. Second, you pay your contractors a lump-sum for successful completion of the task, following the best practice. Third, you carve out some of the budget for a project manager to coordinate all the tasks. Finally, you set out a bonus that will be paid to everyone when your house is ready on time, per its specifications.

One year later, you move into your house. It looks and feels great, like you imagined, and the budget overrun mainly comes from that motorcycle garage you realized you absolutely needed halfway into the project. Only the fence, whichwas not part of your new incentive scheme, did not get done.

This, minus the motorcycle, is the idea of pay-for-performance (P4P); services are performed according to pre-defined standards, and payment is linked to the results.

5.1 Pay-for-Performance and Quality of Care

In the 1990s, US health payers were looking for ways to combat rising health spending caused by excess health service provision. They introduced reimbursement caps, such as capitation, or other lump-sum payments. This focus on financing led to serious quality problems, as quality was not the priority (James, 2012).

P4P Definition and Background

Policy makers have tried to address quality problems with clinical guidelines, fostering competition between providers, increasing patient choice, issuing warnings, publicly reporting quality indicators, and implementing accreditation requirements. As these measures had limited effect on performance, policy makers turned to another instrument: linking payment with performance (Cashin et al., 2014b). James (2012) states that P4P "is an umbrella term for initiatives aimed at improving the quality, efficiency, and overall value of healthcare. These arrangements provide financial incentives to […] healthcare providers to carry out such improvements and achieve optimal outcomes for patients" (p. 1).

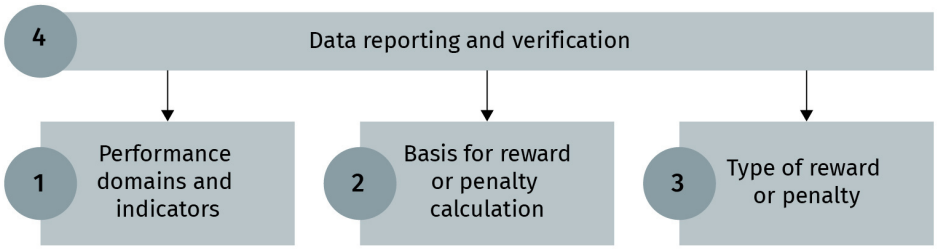
In 2022, P4P schemes are implemented all over the world (Renmans et al., 2016). This includes high-income countries with large, organized health systems, such as Australia, Germany, the UK, and the US (Cashin et al., 2014a). In low- and middle-income countries (LMIC) in Africa, Southeast Asia, and South America, P4P is also prevalent (Kovacs et al., 2020; Singh et al., 2021).

P4P Design Principles

P4P schemes typically pay a bonus to health service providers when they achieve or exceed predefined quality or performance standards, e.g., a reduction of HbA1c levels in diabetic patients. P4P programs can also reward performance improvement over time, e.g., a yearly decline in the rate of preventable **hospital readmissions** (James, 2012). The following figure shows four key design elements of P4P schemes.

Hospital readmissions This involves patients returning to the hospital immediately following discharge. Reducing preventable hospital readmissions is a priority when trying to improve healthcare and reduce costs.

Figure 28: P4P Design Elements



Source: Sophie Brenner (2022), based on Cashin (2014a).

Performance domains and indicators are the areas measured to assess performance in P4P schemes. Performance domains (Cashin, 2014a) include

- clinical quality. This is the most common performance domain, and it rewards structure, process, and outcome quality. Outcome quality is most difficult to measure.
- coverage of priority services. This rewards broad uptake of politically desired services, such as vaccination and screening for cancer or chronic illnesses.
- efficiency. This rewards a low number of services performed or minimal resources used, such as the prescription of generic pharmaceuticals and the avoidance of hospital readmissions.
- patient experience. This rewards patient satisfaction, quality of life, and service.
- equity. This rewards equal access to health services or reduced health disparity, e.g., targeting certain "in-need populations."

This list shows the variability of P4P design. High-income countries often struggle with the constant increase in health service demand, especially for services that are complex, innovative, and expensive. There, P4P schemes often focus on efficiency. Lower-income countries with public health systems and salaried employees often struggle with productivity and coverage of essential services. There, P4P schemes often aim to increase uptake of priority services in good quality (Cashin, 2014a).

The type and number of P4P indicators vary. Some programs choose few indicators, covering the areas with the highest disease burden or prevalence. Other programs work with composite parameters that capture multiple aspects of clinical quality or indicators along the patient pathway to encourage process adherence.

The second P4P design element is the basis for reward or penalty calculation. It defines how achievement against performance targets is used to calculate a reward or penalty. There are three common ways to structure the basis for (dis)incentives (Cashin, 2014a):

1. Absolute level. This is the most common basis for reward and penalty calculation. Absolute levels measure performance based on a target, e.g., achieving a clinical parameter or reaching a patient population.
2. Difference. This measures a change of performance, e.g., improvement of a clinical parameter or increased patient access.
3. Relative ranking. This measures performance against other providers, e.g., best and worst, and the average performer in a group of providers.

The third P4P design principle is the type of reward or penalty. There are three main characteristics of a reward or penalty (Cashin, 2014a):

1. Size. How large is the reward or penalty? The reward size is a subject of much debate. Many P4P schemes set them at less than five percent of the baseline value, but some schemes go up to 20 or 25 percent. The baseline value itself can vary from, e.g., the value of certain services to the entire public budget.
2. Addressee. Is the recipient of the reward or penalty a person or an organization? Health services are team efforts and reward payouts are often directed at institutions. Rewards for individual professionals have a greater impact than institutional payouts.
3. Nature. Is the reward or penalty purely financial, or does it have a non-financial component? A non-financial reward could be publishing the top-ranked providers, or a ranking with all providers.

The fourth P4P design element is data reporting and verification as enabling functions for the P4P process. P4P programs need accurate performance data that are available in a timely manner, and rely on capable data and information systems (Cashin, 2014a).

Data reporting sometimes relies on "off the shelf"-type data, such as **claims data** or structured information from medical records. If those do not suffice for performance measurement, additional data may need to be collected.

Claims data
These are routine data collected for billing purposes, including information related to diagnoses, procedures, and utilization. Claims data can be used for analyses to compile information and support decision-making.

Data verification is a critical review step of the performance data. Rewards or penalties are issued by the payer based on this. This step is a chance for dialog and alignment between payer and provider about current performance and the path for improvement.

5.2 Pay-for-Performance at the Primary Care Level

P4P schemes look different for primary, specialist, and hospital care. The programs are conceptually similar, but often have different objectives and scopes. This relates to the performance areas they target, the care delivery setting, and the available data (Cashin, 2014a).

In primary care, P4P tend to be broad in scope. They cover large populations with health services that are proven to be effective and are included in clinical guidelines (Cashin, 2014a). Primary care is the most common sector of P4P. Most P4P schemes in primary care award bonuses for achieving specific objectives. Common objectives of P4P schemes (Cashin et al., 2014b) include

- preventive services,
- management of chronic diseases,
- productivity,
- patient satisfaction, and
- application of information technology (IT) services.

In primary care, priority areas for P4P are usually easily identified based on high health economic burden and evidence-based care standards. Primary prevention, such as vaccination programs, is a common area for primary care P4P. Another common area is chronic illnesses with high prevalence, such as type-2 diabetes mellitus (T2DM) and cardiovascular diseases. Large primary care P4P schemes, such as the Australian Practice Incentives Program (PIP), the Integrated Healthcare Association (IHA) in California, *La rémunération sur objectifs de santé publique* (ROSP) in France, and the Quality and Outcomes Framework (QOF) in the UK include, among others, performance indicators derived from evidence-based T2DM guidelines (Cashin & Borowitz, 2014).

Primary Care P4P Example One: Quality and Outcomes Framework, UK

The National Health Service (NHS) in the UK launched its Quality and Outcomes Framework (QOF) in 2004. The QOF is the world's largest health-related P4P scheme in primary care (Roland & Olesen, 2016). Prior to its introduction, primary care physicians were paid a relatively low flat fee by the NHS per enrolled patient. With increasing complexity and incidence of chronic diseases, this model caused low morale and little interest from doctors to join the NHS (Cashin, 2014b).

The QOF aimed to raise productivity, increase the scope of services offered, implement patient-centricity, raise general practitioner (GP) skills, create a setting conducive for high-quality care, and more successfully hire and retain physicians (Cashin, 2014b). At the beginning, the QOF covered clinical care, organizational aspects, and patient satisfaction. Over time, more clinical indicators were added. The organizational indicators were dropped in 2012 because almost all participants scored 100 percent. The patient satisfaction indicators were adjusted several times but never successfully implemented (Roland & Olesen, 2016).

In terms of results, the QOF's scores were mixed. A meta analysis of 24 studies on the QOF showed some improvements in theprocess of care, such as a reduction in emergency department admissions and improved prescription behavior for oral contraceptives and diabetes medication. Some surrogate outcome parameters, such as blood pressure, HbA1c, and blood cholesterol improved, but not in studies that had a control group. The QOF seemed to encourage process adherence as a vehicle for improving patient-relevant outcomes. However, overall mortality did not improve (Mendelson et al., 2017).

Two important factors for getting GPs on board for the QOF were involving them in the design and selection of performance indicators, and allowing them to exclude patients from the P4P under certain conditions (Roland & Olesen, 2016).

The financial reward for performance was exceptionally large in the QOF (Zaresani & Scott, 2021). Upon the P4P launch, GPs could earn up to 25 percent more for good performance. This emphasis on selected performance targets was later corrected, and the QOF remuneration was cut back to 15 percent. Other lessons from QOF included the following (Roland & Olesen, 2016):

- Use P4P as one component of a broader quality initiative, blended with other tools.
- Think beyond indicators for individual diseases, reflecting the strong prevalence of **multimorbidity**.
- Combine technical and clinical expertise in developing the indicators and involve clinicians in indicator development.
- The financial incentive should be large enough to initiate change but not so large that non-incentivized areas get neglected.
- P4P programs should be continuously monitored, and effects should be evaluated to course-correct if needed.

Multimorbidity
This is the occurrence of two or more chronic conditions at the same time in one patient. Multimorbid patients are some of the most costly and difficult to treat.

Primary Care P4P Example Two: National P4P, Rwanda

After the 1994 genocide, Rwanda was impoverished and a large part of its health system was destroyed (Soeters et al., 2006). Almost all health facilities had become unusable, and three quarters of health professionals had either died or fled the country. Health outcomes, like child mortality rates, were worse in 2000 than in 1990 (Center for Global Development, n.d.).

To improve health system performance and morale, the Rwandan Ministry of Health implemented a P4P scheme. The program aimed to reward health professionals, not based on position or experience, but for the work delivered and the outcomes achieved. It was rolled out between 2002 and 2008 and focused on child, maternal, and general health (Center for Global Development, n.d.; Kalk et al., 2010).

Table 2: Selected Rewarded Quality Indicators of the National P4P, Rwanda

Area	Indicator	Payment (USD per unit)
Primary care	Curative care visits	1.83
Family planning	One-month supply of contraceptives	0.18
Maternal health	Delivery in the facility	4.59
Child health	Child with completed and on-time vaccination	1.83
HIV/AIDS	New adult clients put on antiretroviral (ARV) drugs	4.58

Source: Sophie Brenner (2022), based on Sherry et al. (2016).

The P4P program supplemented hospital budgets with quarterly performance payments based on the volume of 24 services provided. Payment ranged from USD 0.1 for a first-time prenatal care visit to USD 9.0 for HIV testing of an exposed child. Highest rewards were paid for emergencies, inpatient care, and treatment of patient afflicted with or at risk for HIV/AIDS (Kalk et al., 2010; Sherry et al., 2016).

These performance payments could be used by clinics to cover regular operating costs and reward staff members. Approximately two thirds of the funds went to the staff, and the P4P scheme created a large personal benefit for health professionals who earned very low base salaries. Funding for the Rwandan P4P program was heavily subsidized by international aid organizations, including the World Bank and the Global Fund Against AIDS, Tuberculosis, and Malaria (GFATM; Kalk et al., 2010).

A controlled study measured the effectiveness of 166 P4P clinics versus traditionally-financed clinics. It showed that P4P had the highest impact on services with high financial rewards and were easiest to perform. In the Rwandan P4P, financial incentives increased inpatient deliveries and the number of pediatric consultations. Tasks that required multiple visits, such as vaccinations and prenatal care, increased less frequently (Basinga et al., 2011).

Child mortality dropped after launching the P4P program. However, as Rwanda needed to rebuild its health system, the P4P was not the only systemic improvement at that time. The country introduced a new community-based health insurance system and raised its health spending from USD 73 million to USD 302 million between 2000 and 2006, heavily backed by international donors (Kalk et al., 2010).

Some observers of Rwanda's P4P scheme were concerned that its high pay rates to individual professionals incentivized gaming. Gaming in this context means tailoring one's behavior and neglecting non-rewarded tasks, exhibiting erratic behavior, or even forging records. Another observation states that, prior to P4P and other health reforms, the Rwandan primary care segment was simply understaffed and underfunded. Once these shortages were corrected, performance improved—and not because of P4P (Kalk et al., 2010; Sherry et al., 2016; Soeters et al., 2006).

5.3 Pay-for-Performance at the Hospital Level

Compared to P4P programs, hospital P4P often has a narrower scope and aims to address specific performance problems, such as reducing preventable complications or adhering to clinical guidelines in selected areas (Cashin, 2014a).

Incentives of hospital P4P include rewards and penalties for process adherence, clinical results, and patient satisfaction. Common objectives of P4P (Cashin et al., 2014b) are

- clinical outcomes of care,
- adherence to guidelines and standards, and
- patient satisfaction and experience.

In hospital care, it is often more difficult to identify priority areas for P4P than in primary care. Hospital services are highly differentiated and complex. There are few services that, on their own, have a high impact on population health and the budget. Of those high impact services, few have widely-accepted clinical guidelines that can be translated into effective performance indicators for P4P (Cashin & Borowitz, 2014).

Hospital P4P Example One: Medicare Premier Hospital Quality Inventive Demonstration, US

The Premier Hospital Quality Inventive Demonstration (Premier HQID) was implemented by the US Centers for Medicare and Medicaid Services. The P4P program ran from 2003 to 2009 and aimed for performance improvements for three critical diagnoses (acute myocardial infarction, congestive heart failure, and pneumonia) and two surgical interventions (coronary artery bypass grafting and total hip or knee replacement; Mathes et al., 2019).

The program defined performance indicators for each of these conditions and interventions, some of which were dropped or revised after the first three years of program runtime (Centers for Medicare & Medicaid Services, 2021). Hospitals could earn a relative performance reward of one to two percent on top of Medicare reimbursement if they performed within the top twentieth **percentile** of hospitals. In year three, penalties for low performance were introduced and bonuses were paid out to hospitals that were able to substantially improve their performance (Chee et al., 2016; Mathes et al., 2019).

Percentile
The percentile rank of a score is the percentage of scores in its distribution that are less than it.

Premier HQID is one of the most well-known P4P initiatives; however, evaluations of the program show mixed results. Some studies showed improved quality of care, but others were not able to show improvements on outcome, or improvements that were only temporary (Chee et al., 2016).

Assuming that making quality indicators public can improve performance, one study measured the effect of P4P in addition to public reporting. It found performance improvements of three to four percent attributable to P4P, which was lower than the impact of public reporting on performance (Lindenauer et al., 2007). Another study compared quality of care and hospital mortality for myocardial infarction in Premier HQID hospitals with non-P4P hospitals and found no significant difference (Glickman et al., 2007).

To assess the relationship of P4P performance and clinical outcomes, another study looked at 30-day mortality rates and cost development for the three Premier HQID conditions. Researchers evaluated the effect over five years, testing different incentives schemes, but did not find P4P to cause performance improvements. They did find that the group of hospitals that started off with performance levels close to the median showed the highest performance gains (Ryan, 2009; Ryan et al., 2012).

Other outcome studies found performance improvements at the beginning of the program, but those were not sustained over time. The results suggested that increasing financial incentives or providing ramp-up funding to hospitals with poor financial status can improve P4P performance (Jha et al., 2012; Werner et al., 2011).

Hospital P4P Example Two: Value Incentive Program, Republic of Korea

The Republic of Korea (Korea) has achieved a remarkable transformation of its health system over the past three decades. Life expectancy in the country increased from 53 years in 1960 to among the highest worldwide. This was possible because of a massive expansion of health services and health insurance coverage, a favorable demographic situation, and a healthy lifestyle in the population. These improvements caused health expenditure to rise at a rate of nine percent per annum between 2000 and 2009 (Bisiaux & Chi, 2014).

In 2007, the Ministry of Health and Welfare (MOHW) launched the Value Incentive Programme (VIP) as part of a broader initiative to manage service quality and costs in hospitals. It initially included 44 **tertiary hospitals** and covered two areas: acute myocardial infarction (AMI) and caesarean sections (c-sections; Bisiaux & Chi, 2014).

Tertiary hospital
These are highly specialized hospitals, which are often university hospitals or specialist centers. They can also be referral hospitals for lower-tiered providers.

AMI was selected because Korea, by international comparison, had high AMI mortality rates (6.3 percent in 2009). The 35.1 percent share of c-sections per all live deliveries was approximately ten percentage points above the Organisation for Economic Co-operation and Development (OECD) average. In 2010, the scope of the VIP was broadened to include general hospitals and 16 clinical areas, including stroke, hemodialysis, and breast cancer (Kim et al., 2012).

The VIP is a P4P scheme that was developed based on Premier HQID in the US (Bisiaux & Chi, 2014). The initial program used composite quality indicators for both focus areas. For c-sections, the observed share was compared to the expected share per all live deliveries in the hospitals. For AMI, performance was measured with a composite quality score, built with five process parameters and one outcome parameter (30-day mortality rate; Kim et al., 2012).

Table 3: Components of the Composite Performance Indicator for Acute Myocardial Infarction (AMI) in the Korean VIP P4P

Process parameters	Outcome parameter
Fibrinolytic therapy received within 60 minutes of arrival	Adjusted 30-day mortality rate (survival index)
Primary percutaneous coronary intervention (PCI) received within 120 minutes of hospital arrival	
Aspirin at arrival	
Aspirin prescribed at discharge	
Beta-blocker prescribed at discharge	

Source: Sophie Brenner (2022), based on Kim et al. (2012).

The VIP used bonus payments and penalties to incentivize hospitals for good performance. In the first phase of the program, hospitals were grouped into five performance tiers for each indicator. In the first year, performance was only reported, but no payouts occurred. From year two, a bonus payment of one percent of the total public health insurance payment was awarded to tier one hospitals. A one percent penalty for performance at or lower than baseline tier five was set. However, no penalties were charged because, by year two, all participants' performances were above baseline tier five. In years two and three of the P4P scheme, 21 and 26 hospitals, respectively, received bonus payments. The expanded program introduced nine tiers and staggered bonus and penalty amounts to one and two percent for the top and bottom two tiers (Bisiaux & Chi, 2014; Kim et al., 2012)

Between 2007 and 2010, the composite quality indicator for AMI increased by 5.6 points. This most notably reflects improvements in timely therapy initiation and drug administration. The quality indicator for c-sections improved only slightly by 1.1 points between 2009 and 2010. After general hospitals joined the P4P, the score improved by 2.5 points between 2010 and 2011. The VIP seemed to reduce variation in performance quality, likely by lifting the lower tiers up enough to avoid the penalty (Bisiaux & Chi, 2014; Kim et al., 2012).

Given these small performance improvements, observers recommend expanding the VIP P4P to take a broader perspective on quality of care. A more in-depth view of differences between individual hospitals and best-practice sharing could be useful for general hospitals with lower baseline performance. Linking financial incentives with adherence to clinical guidelines can improve quality by describing the ideal care pathway (Bisiaux & Chi, 2014).

SUMMARY

P4P is an umbrella term for initiatives used to increase the value and effectiveness of health services. They combine performance targets and indicators with financial or non-financial incentives.

P4P has four design elements. Performance domains and indicators are measured for performance assessment. The basis for reward or penalty calculation defines how performance against targets is used to calculate a reward or penalty. The type of reward or penalty is defined by its size, addressee, and nature. Data reporting and verification is an enabling function of P4P.

Primary care P4Ps tend to be broad in scope, covering large populations with health services that are proven to be effective and are included in clinical guidelines. Hospital P4Ps usually focus on specific conditions or interventions.

The QOF in the UK is the world's largest primary care P4P scheme. It aims to raise productivity, services offerings, qualification, and physician retention by offering large financial rewards to GPs for good performance.

The Rwandan National P4P was established to rebuild the country's health system and improve clinical outcomes. It focused on child and maternal health in primary care by supplementing hospital budgets with performance payments.

Medicare Premier HQID was a hospital P4P, aiming to improve performance in five select areas. Hospitals in the top tier could earn bonuses on top of Medicare reimbursement, but hospitals in low tiers were charged penalties.

The VIP hospital P4P in Korea was implemented to contain the costs for the country's health system overhaul. It started with tertiary hospitals and focused on two clinical areas. Bonus and penalty payments were set for top-tier versus low-tier performance.

P4P schemes show mixed results on performance. Some improve process quality and guideline adherence, but clinical outcome improvements are rare. Still, P4Ps remain popular among payers and policy makers.

UNIT 6

THE EVOLUTION OF DRGS

STUDY GOALS

On completion of this unit, you will be able to ...

- describe the origins and principles of diagnosis-related group (DRG) systems.
- compare the incentives created by DRGs to other payment systems.
- calculate simple DRG payments from case weights and base rates.
- describe possible objectives, design choices, and implementation paths for DRG systems.
- convey the key features of DRG systems in Australia, Estonia, Germany, Thailand, and US Medicare.

6. THE EVOLUTION OF DRGS

Introduction

Imagine you are a young chef, bursting with creative energy and proudly taking over the kitchen in your city's newest gourmet temple. You have cooked thousands of meals with ingredients from all over the world. You know everything about fresh ingredients, processing techniques, cooking times, kitchen operations, and how to make a plate look amazing.

One day, your restaurant manager sits you down to plan out next weeks' menu. They explain to you that the restaurant aims for a small range of dishes that must be altered every day. Each dish must be prepared with regional fresh ingredients and offer dining options for people on a paleo diet, with preference for vegan or vegetarian food, and with common intolerances like gluten and lactose. The restaurant manager hands you the conceptual grid for each menu. Every day, ten fresh dishes need to be prepared: four appetizers, four main courses, and two desserts. For each of these ten dishes, the price on the menu is set, ranging from basic to premium. Your kitchen needs to prepare them for 25 percent of the customer price.

You get to work; define groups of dishes; write down lists of ideas for each group; calculate and adjust ingredient volumes and costs; optimize staffing in the kitchen; and restructure the *mis en place*, preparation, and plating of dishes. You manage to serve ten fresh dishes every day. You are not sleeping much, but you are proud of your young team's achievement.

The critics are raving and, after three years, a renowned publisher approaches you about a book collaboration. For the book, you are compiling 20 of your favorite dishes in each of your restaurant's ten categories. Within each group of 20, you have been careful to meet the restaurant manager's categories, like a basic cold appetizer or a premium main course. So, naturally, each group of 20 yields a comparable group of dishes with comparable input costs of ingredients.

This analogy using groups of dishes illustrates the concept of diagnosis-related groups (DRGs). Complex processes and products are grouped into themes and resource-homogenous categories. These groups are the foundation for planning, budgeting, process redesign, and payment for actual outputs and performance—the restaurant and the health space.

6.1 Principles of DRG Payment

DRG systems are originally patient classification systems (PCS). The objective of a PCS is to structure large numbers of patients into groups with roughly comparable attributes (Kobel et al., 2011).

DRG systems exist in many countries. Most countries have adapted them to their specific needs and context. However, similarities remain, mainly due to a joint origin: Most DRGs date back to the Yale DRG, a tool for measuring hospital resource utilization, created in the 1970s by Yale university. In the early 1980s, US Medicare realized the potential of the classification system for output tracking and reimbursement. The original United States HCFA DRG system was born from this and has influenced many of today's DRG systems, including *Groupes Homogènes de Malades* (GHM) in France; NordDRG in Sweden, Finland, and Norway; and German Diagnosis Related Groups (G-DRG) in Germany. Some countries, like the UK, Austria, and the Netherlands, have chosen a different route and developed their own DRG systems (Kobel et al., 2011).

Patient Classification

DRG systems create clinically and economically homogenous bundles of **patient cases**—usually in hospital settings. Therefore, grouping needs to consider both the clinical and the resource perspective. The most common Healthcare Finance Administration (HCFA)-derived DRG systems approach this requirement through Major Diagnostic Groups (MDCs), groups, and partitions (Kobel et al., 2011).

Patient cases
These are treatment episodes for a patient, starting with admission, and ending with discharge or death. They include all surgical and conservative procedures during the treatment episode.

The structure of MDCs usually reflect the human organ system and an array of medical specialties. Therefore, most DRG systems have around 25 MDCs, sometimes called chapters (Kobel et al., 2011).

Within each MDC, cases are assigned to groups, usually based on their diagnosis and procedures, as well as additional factors, such as length of stay, demographics, and **comorbidities**. To assign a diagnosis to a case, most DRG systems use the World Health Organization's (WHO) International Classification of Diseases (ICD-10), sometimes with national modifications. For procedures, the range of classification system is less standardized. Most countries have developed their own coding systems, like the Australian Classification of Health Interventions (ACHI) or the French *classification commune des actes médicaux* (CCAM). These catalogs differ in range; the German *Operationen- und Prozedurenschluessel* (OPS) has about 20 times more items than the Austrian *Leistungskatalog* (LKF; Kobel et al., 2011).

Comorbidities
Comorbidity is the presence of one or more diseases or medical conditions, often co-occurring with a primary condition.

In some DRG systems, partitions divide the groups of cases into sub-groups. This aims to achieve even more resource-homogeneity within groups. Most DRG systems divide groups by the type of their major procedure, e.g., surgical or conservative (Kobel et al., 2011).

The classification of cases into DRGs is computed by grouping software, following the DRG system's classification rules. DRG groupers use structured information about patient characteristics, diagnoses, and procedures, alongside other relevant information to determine the DRG. Therefore, successful application of DRG systems requires hospitals to accurately code each case with the appropriate digital infrastructure to collect, store, and transfer this information (Quentin et al., 2011).

DRG Weight and Monetary Conversion

To use DRGs in a payment system or budget planning instrument, the resource use of each DRGs must be made comparable by converting them to a weight. A weight is based on an economic algorithm to express the relative resource intensity of the DRG compared to the average case. A DRG weight may also be called cost weight or case mix index.

There are different ways to use DRG weights for monetary conversion. Most systems use the relative weight approach. Another option is the score approach. For both, a hypothetical example is depicted below.

Table 4: DRG Weight and Monetary Conversion Example

Method	DRG weight	Monetary conversion	Payment rate
Relative weight	2.0	USD 2,000	USD 4,000
Score	150 points	USD 30	USD 4,500

Source: Sophie Brenner (2022), based on Quentin et al. (2011).

In the relative weight method, a DRG weight of 1.0 represents the average treatment costs of all patients in a region or country. The sample DRG weight of 2.0 tells us that this specific case consumed twice the resources of an average case (Quentin et al., 2011). In the score method, the resource need is expressed with a score of points, higher or lower than the average case.

Multiplying the DRG weight with the monetary conversion unit (e.g., a base rate or standard value) gives us the payment rate (e.g., reimbursement price or hospital payment rate). The weights of all hospital cases (case mix) multiplied by the monetary conversion equal the hospital budget (before adjustments).

The case value is a result of analytics and negotiation. The DRGs and weights are based on analytics and aim to create objectivity and homogeneity for the hospital case load. The monetary conversion is usually negotiated. It may be a standard price for a hospital or each hospital in a region, or a score value a hospital chain agrees with a payer. The monetary conversion is related to actual costs, but may also include a profit margin or an incentive to reduce inefficiencies.

Payment System

When stakeholders aim to reform the hospital payment system, DRGs are always on the agenda. A system that creates transparency about the patient structure and the services provided, applies objective criteria, and can be used for resource planning sounds too good to bypass.

The precision of the DRG system comes from a large amount of data and algorithms that require substantial effort to build and maintain. The clinical reality, health system profile, resources, and objectives are different in every country. Countries interested in DRG implementation must therefore strike a careful balance between leveraging pre-work from mature DRG systems and adjustments or self-developed components.

Today, DRG systems are mainly known as payment systems. Beyond that, DRG systems are used for measuring outputs, planning, allocating budgets, **benchmarking**, and billing. All these activities benefit from the homogenous groups produced by DRGs (Geissler et al., 2011).

Benchmarking
This is the comparison of performance metrics to best practices from other organizations or departments. Dimensions that are typically measured are quality, time, and cost.

DRGs usually create the following incentives for providers (Geissler et al., 2011):

- spend less resources on each case
- earn more revenues per case
- treat more cases

Hospitals or health systems that convert to DRG payments usually transition from either fee-for-service models (US) or global budgets (many European countries). These systems have different incentives. Fee-for-service models, for example, incentivize hospitals to provide many services for each patient, and DRGs do the opposite. DRG introduction might cause a decrease in service volume and quality, or an increase in service volume and spending. Global budgets incentivize providers to treat fewer patients—DRGs do the opposite (Quentin et al., 2011).

Spending and service quality must therefore be closely monitored while transitioning to a DRG system. This is often achieved by introducing the DRGs as patient classification tools first and gradually increasing their relevance for hospital funding.

DRGs can be considered a type of pay-for-performance (P4P) scheme: DRGs pay for outputs, i.e., conducted procedures associated with certain diagnoses. Payment is based on the cases treated and services provided, unlike in systems operating with global budgets or daily rates.

Due to their high budgetary impact and potential for distortions, DRGs and weights must be calculated accurately. Classifications and formulas must be reviewed regularly. Updates are necessary for controlled introduction of innovations, changes in treatment patterns, efficiency gains, and other scope changes (Scheller-Kreinsen et al., 2011).

6.2 DRG-Based Payment for Hospital Services: Country Case Studies

Although they are all grouped under the same umbrella term, no two DRG systems look alike. Their breakdown of MDCs, resource allocation, accounting method, implementation path, and way of addressing innovation or unwanted consequences may differ. It is therefore informative to look at different DRG systems in more detail (Busse et al., 2011).

The following presents a selection of DRG case studies with different scope, maturity level, and health system framework. We will review the DRG systems of Australia, Estonia, German, Thailand, and the US (Medicare) as examples. This list includes DRG pioneers and more recent adapters, mature and emerging geographies, and smaller and larger health markets.

Australia

Australia was one of the first countries to develop a DRG system in the late 1980s in a five-year collaboration with Yale university (Bales et al., 2019). Yale played a large role in the Healthcare Financing Association (HCFA) version of DRGs for US Medicare. Australia decided to alter the US system to increase the acceptance of health professionals who required the system to accommodate all age groups rather than focusing on the elderly Medicare population. The first DRG classification (AN-DRG) was issued in 1992 and replaced in 1998 by AR-DRG. In 2005, AR-DRG was introduced as a funding system for all public hospitals in Australia. With the implementation of a DRG payment system, Australia wanted to improve access to hospital services and increase their efficiency (Bales et al., 2019).

ICD-10
This is the tenth revision of the International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO).

AR-DRG uses the tenth edition of the International Statistical Classification of Diseases and Related Health Problems, Australian Modification (**ICD-10**-AM) for coding diagnoses, and the proprietary Australian Classification of Health Interventions (ACHI) for coding procedures. DRGs are based on the national classification manual, calculated by special grouper software for AR-DRGs issued by private companies that are regulated by the Independent Hospital Pricing Authority (IHPA). AR-DRG is used for payment of in- and outpatient hospital services based on a national efficient price, which the IHPA has published annually since 2012 (Bales et al., 2019).

Australia's federal system gives states authority in hospital financing (Bales et al., 2019). Hence, they adopted the DRG system at different paces. Victoria was the first state to implement a HCFA-DRG classification system in 1993, initially as a shadow reporting system for more transparency and to measure hospital activity. Other states started to use DRGs as a benchmarking tool and to nudge hospitals into more efficient use of resources. By 2008, all public hospitals in Australia were DRG-funded. By 2011, this funding was based on a nationally-unified case mix system. Though AR-DRG was developed for public hospitals, today, almost all contracts between private payers and private hospitals are DRG-based. The DRG transition included strong involvement of stakeholders, collaboration, and debate, which created a broad community of DRG experts involved in its promotion and improvement (Bales et al., 2019).

Further development of AR-DRG focuses on two areas: expanding DRG use beyond hospital care to include areas like rehabilitation, palliative, and outpatient care, and differentiating provider payment to encourage cross-sectoral collaboration (Bales et al., 2019).

Estonia

In 2001, Estonia decided to implement a DRG system (Bales et al., 2019; Kobel et al., 2011). The hospital sector was large and wait times were long. The previous fee-for-service system and the 1999 economic crisis caused a clash between service volume expansion and tight budgets. With a DRG system, the country wanted to better control costs, dampen volume expansion of services, and create more efficiency and transparency in its hospital sector. After reviewing Australia's AR-DRG system and Scandinavia's NordDRG system, while also considering developing its own DRG system, Estonia decided to use NordDRG with an option to adjust it for Estonian needs. Familiarity with the Scandinavian Nordic Medical Statistical Committee Classification of Surgical Procedures (NCSP), geographic proximity, preexisting clinical collaborations, lack of commercial interest, and good access to technical support led to the decision. The Estonian Health Insurance Fund (EHIF) implemented NordDRG Est in 2003 as a case grouper and in 2004 as a hospital payment system (Bales et al., 2019; Kobel et al., 2011).

NordDRG Est uses ICD-10 for coding diagnoses, Scandinavia's NCSP for coding procedures, and the NordDRG grouper. NordDRG is based on HCFA-DRG and is thus familiar with most other DRG systems. Estonia decided to use its own DRG weights for areas where it had resource data for >30 cases and substitute with HCFA-DRG weights for the remaining DRGs. For payment, a nationally-unified base rate was used. Estonia decided that identical cases should be paid the same in each hospital. Specific needs, such as teaching and research, are funded from separate budgets (Bales et al., 2019).

Estonia opted for a stepwise DRG implementation in all EHIF hospitals that provided acute care or outpatient surgery. As a digitally advanced country, Estonia had already rolled out the EHIF information technology (IT) system with central invoicing nationwide in 2000. This infrastructure facilitated the installation and integration of the DRG grouper. Since 2003, the share of cases billed by DRGs continuously rose to approximately 70 percent of the costs by 2019. Remaining areas, like psychiatry, rehabilitation, long-term care, and specialties with a high share of low- and high-cost outliers, are still covered by fee-for-service payments (Bales et al., 2019).

Estonia does not plan to increase the share of DRG payments beyond the current 70 percent. However, it does consider new reimbursement methods, like episode-based payment, in some areas. Estonia continues to update its patient classification system (PCS) by adopting a new version of the NordDRG grouper every two years, and refines its case weights, base rates, and reimbursement method annually (Bales et al., 2019).

Germany

Germany embarked on the path towards DRGs coming from a hospital payment system of daily rates, episode payments, and fee-for-service elements. The government wanted to see more output-based payment in hospitals and tasked the self-governing bodies in 2000

to implement a DRG system. Germany chose the Australian AR-DRG system as a reference because of its accuracy in resource differentiation. Germany's G-DRG system was rolled out as a payment system in 2005 (Bales et al., 2019).

G-DRG uses ICD-10-GM, an adjusted version of the WHO's ICD-10 for coding diagnoses. For coding procedures, G-DRG uses its proprietary *Operationen- und Prozedurenschluessel* (OPS), which is based on the WHO's International Classification of Procedures in Medicine (Kobel et al., 2011). The initial G-DRG grouper was developed by the newly founded Institute for the Hospital Remuneration System (InEK). Subsequent versions have been developed by private companies and must be certified by the InEK before they can be used for billing. The InEK continues to refine the G-DRG. The number of DRGs increased from 664 in 2002 to roughly 1,300 in 2018. Currently, most hospital care is paid for by G-DRG. For psychiatric inpatient care and 20 percent of other costs (e.g., services with small volume, high resource variability, expensive drugs, and innovative procedures), hospitals can negotiate payments. Prospective budget ceilings control the case volume. When billing above budget, hospitals get reimbursement for only a fraction of the DRG, i.e., their costs, and when below budget, hospitals still get paid a share of the budgeted services (Bales et al., 2019).

During the 2001 pilot phase, AR-DRG was implemented unchanged and tested in 20 hospitals. Based on this experience, the InEK recalculated the DRGs and created the first version of G-DRG, which was tested by volunteering hospitals. Until 2004, G-DRG was used for learning and recalculation but did not impact hospital reimbursement. Starting in 2005, G-DRG was rolled out in German hospitals as a payment system. The InEK adjusts case weights based on actual costs submitted every second year by a group of calculation hospitals. Base rates were converted in two steps: Between 2005 and 2009, hospital-specific base rates were converted to unified state base rates, and between 2010 and 2014, state base rates were converted to a unified national base rate (Bales et al., 2019).

Germany continues to improve and refine its hospital financing system, sometimes by reducing the scope of the DRG system. Since 2016, hospitals receive financial provisions for nursing and must comply with staff-to-patient ratios for nursing. These provisions were introduced to counter the reduction of nursing staff as an unintended consequence of DRG's incentive for cost reduction. Another measure is contributions for rural hospitals, meant to sustain these hospitals in otherwise underserved areas (Bales et al., 2019).

Thailand

The introduction of DRGs in Thailand was part of a broader restructuring program of the health system around the year 2000, from which three social health insurance systems emerged: the Civil Servant Medical Benefit Scheme (CSMBS), the Social Security Scheme (SSS), and the Universal Coverage Scheme (UCS). Together they offered universal health coverage to the Thai population, including the large majority in the informal labor sector. Before DRGs, capitation-based hospital financing restricted the access to health services and underserved the population. DRGs were considered an option to improve access and transparency. Thailand initially developed its own DRG system but later adopted the Australian AR-DRG system, which the three insurance systems rolled out as a payment scheme between 2003 and 2007 (Bales et al., 2019).

The Thai DRG system uses ICD-10 for coding diagnoses and a proprietary scheme for coding procedures. Thailand developed its own DRG grouper software that is provided to hospitals free of charge and is a major vehicle for achieving classification standards and collecting information about hospital activity and output. Cost weights (relative weights [RW]) were developed based on actual cost data prior to the DRG rollout. Thai RW were benchmarked against the Welsh and International Refined DRG groupers with good results of high within-group homogeneity and between-group heterogeneity. However, upon introduction of these uniform RWs, hospitals complained that they did not reflect the realities of different hospital types (e.g., different size, location, ownership, and specialization). Recalibration improved the accuracy and uniform RWs were adopted by all three insurance schemes (Bales et al., 2019).

The three insurance systems addressed different hospital setups with different base rates. The UCS, for example, developed four base rates for different levels of hospitals but later aimed to converge to a national base rate. When hospitals continued to negotiate base rates and requested extra contributions, the UCS introduced 13 regional base rates and gave regions more accountability. The CSMBS, conversely, developed 27 different base rates for different hospital groups. The SSS introduced a unified base rate and provided extra provisions for cases with RW less than or equal to two (Bales et al., 2019).

The UCS was the first to adopt DRGs in 2003, the CSMBS followed in 2004, and the SSS adopted the system in 2005. Over time, Thailand issued several versions of its DRG system, each aiming to correct shortfalls of the previous version. Thai DRG version two included more combinations of diseases and procedures than Thai DRG version one. Thai DRG version three adopted AR-DRG with almost 1,300 groups. By version five, the number of groups had increased to almost 2,500 based on clinician input but was scaled back to 1,500 in version six to reduce complexity. As mentioned, the Thai DRG system also saw several base rate adjustments in its three insurance systems (Bales et al., 2019).

Thailand's Casemix Centre of the Health Systems Research Institute is tasked with refining and updating case weights and DRGs, aiming for more standardization in the payment scheme. The institute also works on developing a case-mix-based payment system for psychiatric inpatient care, non-acute care, and Thai traditional medicine (Bales et al., 2019).

US Medicare

The US Medicare system is a federal health insurance program for the elderly. In the 1970s, Medicare hired a team around Prof. Robert Fetter at Yale University to develop a classification system for hospital cases, with the objective of helping build better patient pathways. Later, the team realized that the case mix classification could be matched with resource use and employed as a hospital payment system. US Congress approved the nationwide application of the DRG system in 1983, hoping to reign in the yearly Medicare cost of 18 percent in the early 1980s (Bales et al., 2019; Geissler et al., 2011).

The beginnings of developing the system were humble. Data quality was low and based on too few cases to assess resource use accurately. The length of stay was used as a proxy when more detailed information was lacking. Over the years, the Medicare DRG system

(also called Inpatient Prospective Payment System [IPPS]) was constantly refined and is currently known as the main reference DRG system globally (Bales et al., 2019; Geissler et al., 2011).

The IPPS uses ICD-10 Clinical Modification (ICD-10-CM) for coding diagnoses and ICD-10 Procedure Coding System (ICD-10-PCS) for coding procedures. The IPPS has its own MS-DRG grouper (Centers for Medicare & Medicaid Services, 2022). By 2019, the number of MS-DRGs increased to approximately 1,000, differentiated by four severity levels. At the beginning, the system allowed coding of five diagnoses. By 2019, up to 25 could be coded for one case, which creates substantial differentiation of the case mix for both billing and quality monitoring (Bales et al., 2019).

Upon the introduction of the IPPS, hospitals initially received guaranteed payments within five percent of their previous budgets to address concerns about the possible distortions caused by this new system of hospital financing. In the first three years after implementation, hospitals received 25 percent, 50 percent, and 75 percent of their payment for Medicare services from DRGs. The DRG payments used a unified base rate. The initial DRG system included 476 DRGs and covered only operating costs; capital costs and subsidies for teaching hospitals or rural hospitals came later. Considering the novelty of the system, Medicare emphasized transparency and stakeholder involvement. DRG regulation was developed with stakeholder input, calculation methods and formula were made public, and annual revisions of the system were conducted (Bales et al., 2019).

The IPPS system is continuously evaluated and refined. Adapting to the new payment system, hospitals have reduced their patients' length of stay, conducted internal restructuring programs, changed the skill mix and staffing structure, and adjusted their clinical profile. Medicare hospital spending increase was slowed, and a center of experts was established, composed of economists, physicians, and statisticians, and tasked to continuously review the IPPS system and update it annually (Bales et al., 2019).

While DRG systems were "invented" and are still prevalent in high-income countries for more transparency and cost control, they are also useful when applied in low- and middle-income countries (LMIC). China is rolling out a DRG system to reduce the average length of hospital stays and excess prescription and service delivery in its previous fee-for-service model (Jiang & Peng, 2019). Other countries like Indonesia, Kyrgyzstan, Mexico, and Romania have implemented either self-developed or adapted DRG systems. Lessons learned from these countries include the following (Mathauer & Wittenbecher, 2013):

- Most health funding should come from public rather than private sources.
- Pilot the DRG system before rollout.
- Encourage provider collaboration for data collection and claims management.

- Implement spending caps to limit excessive growth of case volumes.
- Define the areas for modification when adapting an existing DRG system.

SUMMARY

DRGs were originally invented as a patient classification system by Yale University, and first adapted by US Medicare in the 1980s. Today, DRG systems exist in many high-, low-, and middle-income countries.

DRGs aim to create clinically and economically homogenous bundles of patient cases, usually for the hospital sector. Grouper software creates DRGs based on coded diagnoses, procedures, and patient characteristics and converts them to weights. The weight indicates how a DRG's resource use relates to a (fictional) standard case. Multiplying these weights with the applicable—and usually negotiated—base rate delivers the payment rate.

DRGs create incentives to spend fewer resources per case, earn more revenue per case, and treat more cases. These incentives are powerful and can shift volume, cost, and quality when a health system transitions to DRGs, which should be closely monitored.

Australia was one of the first countries to develop a DRG system in the 1980s. Today, its AR-DRG is attempting to expand the scope covered of services and encourage cross-sectoral collaboration.

Estonia is a highly digitized country that was able to implement its Scandinavia-based NordDRG Est only two years after deciding to implement a DRG system.

Germany's G-DRG system is one of several systems based on AR-DRG. It was rolled out as a payment system in 2005. Recent adjustments include compensatory payments to counter some of G-DRG's cost saving incentives.

Thailand's three social health insurance systems rolled out Thai DRG between 2003 and 2007. The system is partially self-developed and inspired by AR-DRG. It balances the objectives of standardization and consideration for heterogeneity among hospitals.

US Medicare's IPPS is considered the first DRG system. During its humble beginnings, hospital process and resource data quality was low. Today, the IPPS is well established, but still evolving, with annual updates from its own committee of experts.

BACKMATTER

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